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Charmler, Richard; Musah, Alhassan; Akomeah, Evans et al.

Article

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Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/econis-archiv/>

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The Impact of Liquidity on Performance of Commercial Banks in Ghana

Richard Charmler¹, Alhassan Musah², Evans Akomeah³, Erasmus Dodzi Gakpetor⁴

^{1,3}University of Ghana Business School, Box LG78, Accra, Ghana,

¹E-mail: chamlerrichard@yahoo.com, ³E-mail: akomeahevans@gmail.com

^{2,4}Dominion University College, School of Business, PMB CT 69, Accra, Ghana

²E-mail: a.musah@duc.edu.gh, (Corresponding author), ⁴E-mail: erasburg@gmail.com

Abstract The concept of liquidity and profitability are two critical concepts in finance literature especially in banking sector. Finance assumes an inverse relation between liquidity and profitability even though several empirical studies indicate otherwise. The study examined the level of bank liquidity, the trend of banks liquidity and the impact of bank liquidity on profitability of commercial banks in Ghana. The study was based on a sample of 21 banks over a 10 year period from 2007 to 2016 with data arranged in the form of a panel. Data was analysed using descriptive statistics, correlation analysis and regression analysis. The results show that the average liquid assets to total assets for commercial banks is 20% whiles liquid assets cover over total interest bearing liabilities was 1.19. The results show that liquidity is positively associated with return on assets using both measures of bank liquidity. Regarding return on equity, there is a weak positive relationship between the ratios of liquid assets to total assets (LIDQ1). An insignificant negative relationship was observed between return on equity (ROE) and liquid assets to total interest bearing liabilities (LIQD2). On the control variables, the study reported a positive association between net interest margin, bank size, capital adequacy ratio, foreign ownership and bank profitability. The study implies that a pre-determined optimal level of liquid assets is needed by banks to enhance profitability. Thus, banks should determine the level of liquidity beyond which profitability will be reduced.

Key words Liquidity, commercial banks, profitability, Ghana

JEL Codes: E44, G21 G32

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1. Introduction

According to Khan and Ali (2016), liquidity and profitability are among the two most important concepts in the corporate world. The fundamental role of commercial banks with respect to financial intermediation is rooted in the two main functions, which are deposit mobilization and credit extension (Sumaila, 2015). The performance of these functions by commercial banks exposes them to several risk, prominent among them is liquidity risk (Lartey *et al.*, 2013). Liquidity creation is the primary function of banks but also a major source of vulnerability. This vulnerability from their primary function requires deliberate policies and actions by the bank to mitigate against such risks (Dybvig, 1983; Bryant, 1980). Banks usually experience liquidity challenges when significant portions of short-term liabilities are invested in illiquid assets. This situation compounds when such short-term liabilities are claimed at short notice. Liquidity is simply the ability of a bank to finance increases in assets and also to pay its liabilities as and when they fall due without incurring proportionally higher losses (BIS, 2008). From accounting perspective, liquidity risk is the uncertainty that an organization will have difficulty in meeting its liabilities as and when they fall due (IFRS, 2005). Khan and Ali (2016) define liquidity as the ability of a firm to pay its current liabilities using its current assets. A bank is liquid when it is capable of meeting its own obligations when they become due, repay deposits and to make such payment based on customers order (Lartey *et al.*, 2013; BIS, 2009).

Sumaila (2015) and Bordeleu and Graham (2010) argues that the aftermath of the 2008 financial crises caused liquidity challenges in virtually all developed economies and corporate entities including banks. Acharya *et al.* (2009) supported this view and stated that the crises caused significant balance sheet challenges and affected banks' ability to honour previous commitments and to provide new credit commitments. This increased the concerns about liquidity risk of banks the world over which Ghana is not an exception (Ivashina and Scharfstein 2010; Brunnermeier 2009; Huang *et al.*, 2009). Sumaila (2015) and Lartey *et al.* (2013) the intense competition among commercial banks in Ghana and the increasing number of microfinance and savings and loans companies competing for deposits and lending have slowed liquidity creation by commercial banks. This means that commercial banks in Ghana are supposed to pay more attention to their liquidity management. Research has established increasing interest in liquidity of companies globally and banks in particular, with emphasis on liquidity management and its impact on profitability (Khan and Ali, 2016; Ibe, 2013; Abdullah and Jahan, 2014). This is because a strong and resilient banking industry is critical for economic growth and development in every economy. Banks play critical roles on both sides of their balance sheet.

On the assets side of the balance sheet, banks make loans available to illiquid borrowers thereby enhancing credit flow in the economy (Sumaila, 2015). On the liability side of the balance sheet, they provide liquidity on demand to depositors. These two roles make banks susceptible to liquidity risk because they are expected to convert short term deposits to medium and long term loans (BIS, 2008). Some studies have argued that in reality, commercial banks experience certain levels of imbalances between their assets and liabilities that need to be managed (Khan and Ali, 2016; Warrad *et al.*, 2015; Sumaila, 2015). If banks are unable to manage these imbalances, liquidity challenges will arise which could result in dire consequences such as reputation risk, government bailout or even insolvency. These consequences will materialize if most depositors engage in panic withdrawals. Banks in their quest to create liquidity do not keep all of depositors' funds in their vault. Doing so will reduce the function of a bank to just a safe deposit box institution. The profitability of a bank is its ability to generate revenue above its costs (Lartey *et al.* 2013). Research has established that the management of liquidity by banks have positive implications on the profitability of banks. After all, a profitable bank will be able to withstand shocks and help to stabilise the banking sector (Athanasoglou *et al.*, 2008). Other studies have argued along the line of liquidity contra profitability: profitability increase leads to liquidity decreases (Warrad *et al.* 2015; Lartey *et al.*, 2013, Shabbir *et al.*, 2012). There are different measures of liquidity but the appropriate measure that ensures that banks do not have liquidity challenge is still a subject of academic and policy debate (Sumaila, 2015). In the light of the above, there are calls for more elaborate measure of bank's liquidity and how that measure affects the profitability of banks.

Earlier studies have stressed the importance of banks liquidity on several dimensions including the banks own operations, the banking industry and regulatory bodies like the Central Bank (Khan and Ali, 2016; Bhunia, 2012; Athanasoglou *et al.*, 2008). The importance of liquidity in the banking sector has prompted some legislation of banks liquidity in section 31 of the Banking Act, 2004, Act 673 where banks are required to keep 9% of their deposits as primary reserves with the central bank which is used to make interbank settlement and also serve as insurance for depositors (Lartey *et al.*, 2013). However, Sumaila (2015) argues that if liquidity holding becomes a matter of regulations, it might come with some cost to banks which can affect their profitability. Studies have established that excess liquidity affect the development of the interbank market and affect a country's monetary policy (Gary, 2010). Sumaila (2015) revealed that liquidity ratios of commercial banks in Ghana according to the World Development indicator which is measured by the ratio of liquid reserves to bank assets have continuously being higher than the world average. Liquidity ratios are usually used by organizations to measure and manage liquidity. These ratios include current ratio, quick ratio and acid test ratios (Sumaila, 2015; Saleem and Rehman, 2011). With respect to banks, ratios such as liquid assets to total assets, liquid assets to total deposits, advances and loans to total deposits (Khan and Ali, 2016; Abdullah and Johan, 2014; Ibe, 2013; Lartey *et al.*, 2013; Bordeleau and Graham, 2011) are often used in measuring and managing liquidity. The official indicator in banks liquidity by the Bank of Ghana is liquid assets to total deposits and liquid assets to total assets (Sumaila, 2015; Lartey *et al.*, (20113).

Several literatures on determinants of banks' profitability have mostly included one measure of bank liquidity as key determinants of banks' profitability (Athanasoglou *et al.*, 2008; Demircuc-Kunt and Huizinga, 1999; Molyneux and Thornton, 1992). Other strand of literature have examined the impact of bank liquidity on its performance and have reported conflicting results (Khan and Ali, 2016; Warrad *et al.*, 2015; Abdullah and Johan, 2014; Ibe, 2013; Bordeleau and Graham, 2010). For instance, Abdullah and Johan (2014) sampled five banks in Bangladesh over five year to estimate the relationship between liquidity and bank profitability but found no significant relationship. Ibe (2014) observed that banks in Nigeria reported a negative but statistically insignificant relationship between liquidity and profitability. Khan and Ali (2016) study on Pakistan banks reported a positive and significant relationship between liquidity and profitability of commercial banks. The conflicting results could be attributed to the sample size of most studies and the measurement of liquidity. Also, the literature discussed above related to studies conducted in different jurisdiction with different bank regulations that might affect their liquidity. The only study that have examined the impact of liquidity on profitability of commercial banks in Ghana is the study by Lartey *et al.* (2013) where they found a positive but statistically insignificant relationship between liquidity and profitability of listed banks in Ghana. The major limitation of their study is the fact that the study only focused on listed banks which includes 7 banks resulting in smaller sample size. The study also relied on only one measure of liquidity and its impact on return on assets as the only measure of bank profitability. This study attempts to comprehensively assess the impact of liquidity on performance using three different measures of both liquidity and profitability. Again the study uses all commercial banks in Ghana; listed or otherwise. The results of the study will make significant contribution to literature in the area of liquidity risk among banks in Ghana as there is limited study in the area. The central bank could benefit from the results of the study in crafting guideline that will enhance the profitability of the banks through effective liquidity management in the banking sector while protecting the Ghanaian public. The liquidity of commercial banks in any jurisdiction is one of the main predictor of bank insolvency and bankruptcy. The results will allow policy makers and management of banks influence the profitability of commercial banks through liquidity.

2. Literature review

2.1. The concept bank liquidity

According to Ibe (2013) liquidity as a financial term simply means the amount of capital that is available for investment. The study further argues, today's capital as used in this context is usually credit and not cash. As Marozva (2015) emphasized, even though the subject area of bank liquidity is not a new phenomenon, however, there has not been a universally accepted definition. Adler (2012) argues that the lack of universally agreed definition for bank liquidity is because of its derivation from different economic standpoints. Bank liquidity according to Adebayo *et al.* (2011) is a financial term and can be said to mean the amount of capital that is readily available to banks for investment. They argue that most of this capital are in the form of credit and not capital. On the other hand, Koranteng (2015) posits that liquidity of a bank is the readily funds available to banks and their ability to readily fulfil their growing requirements as Ibe (2013) puts it as the ability of banks to constantly meet cash, cheque, withdrawal commitments and loan demands of the their customers while meeting their basic requirement for bank reserves. In the view of this, Amengor (2010) in relation to Commercial banks puts liquidity as the ability of banks to finance its contractual obligations such as lending, investment and customers' withdrawal of deposits and maturity of liabilities at the course of banks' activities. Marozva (2015) explains the term bank liquidity by categorizing it into two; market liquidity and funding liquidity. He defines market liquidity in the context of how easy a bank's security can be traded and on the other hand, the funding liquidity as how easy a bank can obtain funding to trade its security. He adds that both market and funding liquidity are complementary since bank performance (funding liquidity) is dependent on the ease of trading security. In view of Amengor's (2010), Alshatti (2015) argues that liquidity is the ability of banks to meet the financial needs of their increased assets and meeting liabilities as and when they fall due without the occurrence of unforeseen losses. From the definitions outlined above, it can be noted that the scopes of liquidity is based on the timing required in converting assets of banks into monetary asset or cash; the certainty with regards to the conversion and the value realized from the asset and the banks' ability to meet obligations without incurring losses. According to Koranteng (2015) banks' liquidity is dependent on its liquid assets, the bank's ability to acquire cash through deposits and finally, its ability to reinvest as and when needed.

2.2. Relationship between bank liquidity and bank profitability

As Marozva (2015) clearly points out, there have been several studies conducted and still on-going debates to investigate the relationship between bank liquidity and bank profitability. He posited that the findings of these studies resulted in varying conclusions; whereas some researchers conclude that there is a negative relationship between these variables, other writers conclude otherwise. Surprisingly, Marozva (2015) points to other studies that observed parallel relationship between these variables. Below are some findings by a number of researchers that are support a positive relationship between bank liquidity and performance (profitability). A study by Bordeleau and Graham (2010) of Canadian and USA banks for the period 1997 to 2009, as cited in Tamunosiki (2017) sought to determine the bearing of banks holding liquid assets using econometric analysis. Their result concluded that even though banks holding liquid assets have positive impact on profitability, however, increased profitability was dependent on the quantum of liquid asset and over a certain period of time. The result suggests that, banks' profitability could be increased by holding a certain amount of liquid assets over a specified time. However, the research also suggested that holding such assets pass the optimal time diminishes the banks' profitability. Further empirical evidence also suggests that the link between the duos is dependent on the bank's framework and the economy in general. In a work by Andrew and Osuji (2013) to examine the efficiency of liquidity management and bank profitability using a survey design, their findings also indicated a positive relationship between effective liquidity management and bank profitability. Again, their findings also revealed efficient liquidity management is very critical to ensuring the security of banks.

Also, a study by Abubakar (2015), whose work examined the traditional measures of bank liquidity like cash reserve requirement and liquidity ratios, nature of liquidity management and financial ratio analysis. His findings concluded that the quantum of a bank's liquid assets coupled with proper management measures had a positive relationship to the bank's performance. However, this finding to some extent is refuted by Anthony *et al.*, (2016). The basis of their argument was the fact that his study only focused on the banking sector hence was not a good yardstick for generalization. A study conducted by Bourke (1989) in view of arriving at the factors responsible for banks performance and profitability in Australia, North America and Europe curiously concluded that liquid assets of banks in his study area was responsible for banks' performance and profitability. Also, an attempt was made to ascertain the determinants of Greek's banks performance at the time of financial integration by the European Union in the periods of (1990-2002) by Kosmidou (2008). It was found that banks' liquid assets have a positive relationship with ROA. Another work by Kosmidou *et al.*, (2005) also found out that there is a positive relationship between banks' ROA and the ratio of liquid assets to customer and short funding obligations.

Kosmidou (2008) findings are in agreement with Bourke's findings of positive relationship between liquidity risk and bank profitability. Olangunji *et al.* (2012) in their study found that there is a significant positive relationship between bank liquidity and its performance. In their study, they argued that there is a two-way relationship, especially for commercial banks, where banks' accelerating performance and profitability is significantly influenced by high levels of liquidity and vice-versa. On the other hand, there are other research findings that point to a negative relationship between bank liquidity and performance. Their argument is based on the premise that banks hold liquid assets only as a mandatory requirement as opposed to the belief that it yields positive consequences to the banks' fortune: Molyneux and Thornton (1992). Tobin (1958) made a simplified deduction of Keynes' liquidity preference theory (1936) by arguing that liquidity by banks is for the purposes of operational transactions and reinvestments. Tobin's assertion is in support of Keynes' theory that presupposes that liquid assets held by banks constitute cost rather than profit. This assertion stems from the fact that, liquid assets are held as reserves and used to cater for contingencies. According to Molyneux and Thornton (1992), legal imposition is the sole reason for banks holding certain levels of liquid assets.

Marozva (2015) argues that the authors may have missed the argument as to why banks hold liquid assets. He acknowledged that, the reason for banks maintaining substantial liquidity cut across much functionality of the banks' operations. A study by Raheman and Nasr (2007) revealed an inverse relationship between bank liquidity and bank profitability. Again, their adopted net operating profit as the dependent variable and inventory turnovers, average collection and payment periods, cash conversion cycle, fiscal asset, size of firm, current ratio and financial asset to total asset ratio as the independent variables, they came out with a highly negative relationship between debts used by the firms and its profitability. As stated earlier, other researchers conclude both positive and negative relationship for bank liquidity and performance. On the contrary to this, some findings also conclude parallel relationship. For instance Shen *et al.*, (2010) posit that liquidity risk is positively related to interest margins in market based financial system. This implies that banks with lower level of illiquid asset are faced with lower interest income and vice-versa. Contrary to the above, their earlier findings in relation to interest margin concluded that unlike the earlier position, liquidity risk is negatively related to ROA and inversely related to ROE. In this context, they posited that banks with higher illiquid asset incur higher funding cost as extra funds to bridge the funding gap must be recouped from the market.

Again, a work by Shen *et al.* (2010) came to the conclusion that there is no relationship between bank liquidity and its performance. Their argument is based on the premise that because banks play a constant and key role in financing in the bank-based financial system they are therefore not affected by liquidity risk. Also, Naceur and Kandil (2009) concluded that banks' asset or equity are not determined by the banks' liquid assets based on their analysis of cost of intermediation in the post capital regulation regimes. Abdullah and Johan (2014) examined the impact of liquidity on commercial bank in Bangladesh. The study sampled five commercial bank using panel data over a five year period where return on assets and return on equity were used to measure bank profitability and loan deposit ratio, deposit asset ratio and cash deposit ratio. The results of the study showed that there is no significant relationship between liquidity and profitability of listed commercial banks in Bangladesh. Ibe (2013) examined the impact of liquidity management on profitability of commercial banks in Nigeria. The study randomly selected three commercial banks to represent the Nigerian banking industry using proxies such as cash and short term fund, bank balances and treasury bills and certificates, while profit after tax was the proxy for profitability. The result of this study has shown that liquidity management is indeed a crucial problem in the Nigerian banking industry. The study therefore recommends that banks should engage competent and qualified personnel in order to ensure that right decisions are adopted especially with the optimal level of liquidity and still maximize profit.

Khan and Ali (2016) examined the impact of liquidity of profitability of commercial banks in Pakistan. The study used secondary data extracted from the financial statement of some selected banks over a five year period from 2008 to 2014. Using correlation and regression analysis, the results of the study revealed that a positive and significant relationship between liquidity and profitability of commercial banks. The study however cautioned that the small sample size meant that the results cannot be generalized for the entire banking sector in Pakistan. In the Ghanaian context, Lartey *et al.* (2013) examined the effect of liquidity on the profitability of listed banks in Ghana. The study sampled the entire seven listed bank on the Ghana Stock Exchange at the time over a 6 year period from 2005 to 2010. The study revealed that the liquidity and profitability position of listed banks in Ghana declined over the study period. The regression and correlation analysis revealed that there was a weak positive and statistically insignificant relationship between liquidity and profitability of listed banks in Ghana. Warrad *et al.* (2016) examined the impact of liquidity on profitability of commercial banks in Jordan. The study sampled 15 commercial banks in Jordan over a 7 year period from 2005 to 2011. The results of the study showed that a significant impact of liquidity on profitability of listed commercial banks in Jordan. The study however used quick ratio as a means of bank liquidity contrary to the bank liquidity measures used in literature.

The review shows that there is little study that examines the impact of liquidity on profitability of commercial banks. The few studies used liquidity as one of the factors that influence profitability of commercial banks. The only study that appears to have examined liquidity and profitability of commercial banks in Ghana is the work by Lartey *et al.* (2013). The study apart from using a small sample size of 7 also focused on only listed commercial banks in Ghana. This means that the results of the study cannot be generalized on all commercial banks in Ghana hence the need for this study. The review of theories explaining bank liquidity and how it impacts on the profitability of banks as well as the empirical review shows some conflicting results. On the empirical results, some studies reported a positive significant relationship between liquidity and profitability of commercial banks (Khan and Ali, 2016; Anthony *et al.*, 2016; Abubakar, 2015; Warrad *et al.*, 2015; Osuji, 2013; Olangunji *et al.*, 2011; Kosmidou, 2008; Kosmidou *et al.*, 2005; Bourke, 1989), other studies have reported a negative significant relationship between liquidity and profitability of commercial banks (Marozva, 2015; Islam, 2008; Raheman and Nasr, 2007) while other studies reported no significant impact of liquidity on profitability of commercial banks (Abdullah and Johan, 2014; Lartey *et al.*, 2013, Shen *et al.*, 2010). It can therefore be deduced that previous studies on bank's liquidity and performance still leave huge gaps since these studies have not reached a compromised conclusion on the subject matter, thereby needing extra work to exploit the gap. Given the fact that more studies have reported a positive relationship between liquidity and profitability in other jurisdiction, the study hypothesizes that:

H1. There is a positive significant relationship between liquidity and profitability of commercial banks in Ghana.

3. Methodology of research

The study is a quantitative study relying mainly on panel regression analysis. In a panel data analysis, one of the challenges associated with examination of the entire population is the availability of data for all subjects, objects, or institutions in the population. In our current study for instance, the availability of data on all the variables under consideration and for all the banks spanning the years under consideration is one major challenge. The banks in Ghana started operations at different years, and for this obvious reason, some banks will not have data spanning the entire period of the study. This criterion is one of the many employed in sample selection for this current study. The sample for this study consists of 23 Universal banks in Ghana for the period 2010 to 2016. The sample size consists of 23 purposively sampled universal banks in Ghana that are operating under the universal banking license which constitutes approximately 66% of the total population. The sampling criteria are as follows:

- i. The bank must be a universal bank, and operating under the global banking license;
- ii. The bank must have been in operation since 2010.
- iii. The bank must have published annual financial reports for the years under study (2010 to 2016).

3.1. Empirical Model Estimation

Dependent variable

Profitability employed as the dependent variable of the model. There are various measures of bank performance and profitability is one aspect of firm performance. Performance could also be measured using various indicators that include a return on asset, return on equity, firm margin, etc. For the purpose of this study, the profitability of banks is measured by return on assets and return on equity.

Independent variables

The study used two measures of liquidity for banks sampled for this study. The first one is the ratio of liquid assets to total assets. This is a measure of liquidity calculated as Total liquid assets divided by total assets. It indicates the proportions of bank assets that are liquid: easily converted to cash. The second measure of liquidity is LIQD. It measures the ratio of liquid funds to total assets. This ratio measures the average number of times that liquid assets cover total interest bearing liabilities. This study used the net interest margin, capital adequacy ratio, foreign ownership, and the bank size as the firm specific variables.

Control variables

Capital ratio (CAR)

Capital adequacy ratio is one of the key determinants of bank profitability. Studies such as Athanasoglou *et al.* (2008) and Iannotta *et al.* (2007) argue that the capital adequacy ratio is a measure of capital strength. A high capital adequacy ratio makes a bank safer in terms of managing customer's deposits safe. From this point of view an inverse relationship between risk and return, is expected. That is capital adequacy ratio will have a negative relationship with profitability. On the other

hand, a lower risk as a result of high capital adequacy ratio implies a bank credit worthiness which can reduce its cost of financing.

Size

The size of a bank is one of the major determinants of bank profitability (Musah, 2017; Musah *et al.*, 2018). Larger banks are expected to be more profitable than smaller banks because of economics of scale and their ability to undertake larger project financing with bigger margins. Bigger banks are expected to be relatively big enough to manage different investment portfolios, and also attract more customers, with the possible effect of increased profitability, all things being equal. Smaller banks are also expected to be more innovative to push profitability as possible. However, the bigger and larger the bank, the better it gets, and the higher the expected profitability. Bank size will be measured using the natural logarithm of total assets.

Net Interest Margin (NIM)

Net interest margin as a measure of bank’s financial intermediation which is technically called the interest spread. Ghana is believed to have one of the biggest interest spread which could affect the profitability of banks in Ghana.

Ownership (OWN):

Previous studies have shown that foreign owned banks in Ghana are more profitability compared to local banks which makes ownership major determinants of bank profitability in Ghana.

3.2. Regression Method

The model adopted for the study is that of Kuznetsov and Muravyev (2001) method for panel regression. The general form for panel data regression given as:

$$Y_{it} = \alpha + \beta X_{it} + e_{it} \tag{1}$$

Where:

i = the individual cross-sectional dimension (i.e. Banks), and t = the time dimension (i.e. 2007-2016);

α = constant/intercept; β = the coefficients;

Y_{it} = dependent variables/Profitability measure (which is measured return on assets and return on equity);

X_{it} = the independent variables of the model (bank liquidity and otehr control variables);

e_{it} = the residual error of bank i at time, t .

$$ROA_{it} = \beta_0 + \beta_1 LIQD1_{it} + \beta_2 LIQD2_{it} + \beta_3 NIM_{it} + \beta_4 CAR_{it} + \beta_5 SIZE_{it} + \beta_6 OWN_{it} + \epsilon_{it} \tag{2}$$

$$ROE_{it} = \beta_0 + \beta_1 LIQD1_{it} + \beta_2 LIQD2_{it} + \beta_3 NIM_{it} + \beta_4 CAR_{it} + \beta_5 SIZE_{it} + \beta_6 OWN_{it} + \epsilon_{it} \tag{3}$$

3.3. Variable definition and their measurement

Variable	Acronym	Measurement
Return on Assets	ROA	Profit before tax divided by total Assets
Return on Equity	ROE	Profit after tax divided by total equity
Liquid asset to total assets	LIQD1	Total liquid assets divided by total assets
Liquid assets to interest bearing liabilities	LIQD2	Total liquid assets divided by total interest bearing liabilities
Net interest margin	NIM	banks' interest income – banks interest expenses) divided by total assets
Capital adequacy ratio	CAR	Equity divided by total assets
Bank size	SIZE	Natural logarithm of total assets
Foreign ownership	OWN	Dummy, 1 if a bank of foreign owned, 0 otherwise

4. Analysis and discussions

4.1. Descriptive Statistics

The results from table 1 shows that the average return on assets for commercial banks over the study period is 5% with a minimum profitability of negative 11% and a maximum profit of 18.24%. The return on equity of banks in Ghana ranges from negative 10% to 54% with an average return on equity of 8% over the study period. The first measure of liquidity examines the ratio of liquid assets to total assets. The result shows that about 50% of banks assets are liquid assets. The

higher liquid assets to total assets ratio attributed to banks appetite for holding investment in government securities. The second liquidity measures the ratio of liquid funds to total interest bearing liabilities. On average banks can pay their interest bearing liabilities with their liquid assets. The minimum point of the ratio which is 0.06 suggests that some banks are willing to take higher risk by holding less liquid assets. On net interest margin (NIM), the average ratio for banks over the period is 5%. This variable simply measures the cost of financial intermediation in Ghana. The next variable is the capital adequacy ratio (CAR) from table 1 above has a mean of 13%, a minimum of negative 4% and a maximum of 22%. The average capital adequacy ratio reported for the study is however higher than the Bank of Ghana regulatory requirement of 10% but the minimum ratio suggest that some banks have a far less capital adequacy ratio compared to the regulatory requirement. Finally, on the ownership, the results suggest that majority of the banks commercial banks in Ghana are foreign owned. Foreign ownership accounts for 55% of the banks sampled.

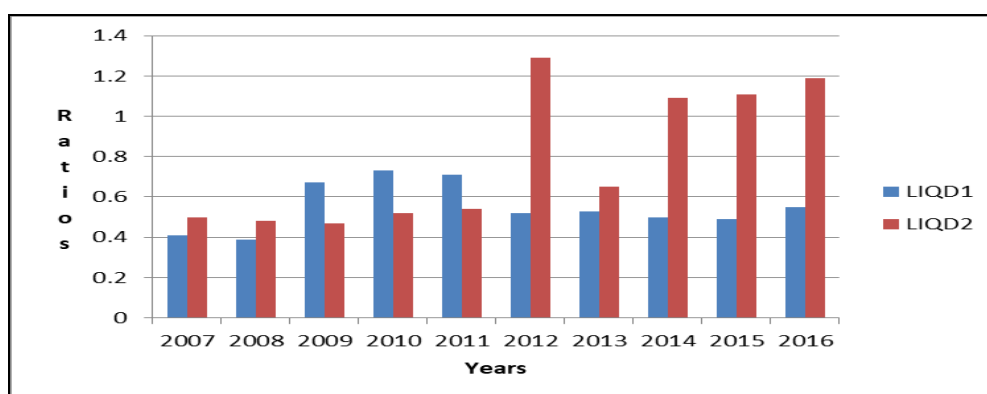
Table 1. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
ROA	0.052	0.0241	-0.1073	0.1824
ROE	0.0824	0.0321	-0.1073	0.5463
LIQD1	0.505	0.402	0.08255	0.895
LIQD2	1.1924	0.0254	0.0645	2.578
NIM	0.0586	0.043	0.0076	0.1456
CAR	0.1349	0.0325	-0.045	0.3425
SIZE	0.852	0.1425	7.679	9.5325
OWN	0.5519	0.4123	0	1

4.2. Trend of Banks Liquidity Ratios in Ghana

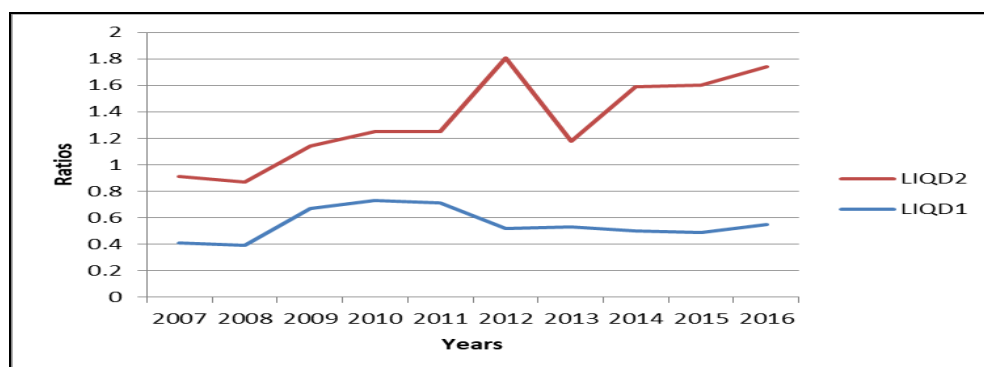
The next objective of the study seeks to establish the trend of the two liquidity ratios used for the study. The figure below shows the trend of liquidity ratios for liquid assets to total assets (LIQD1) and liquid assets to interest bearing liabilities (LIQD2). The chart shows that the ratio of liquid assets to interest bearing liabilities have been improving over the last few years but its peak was in 2012. The ratio of liquid assets to total assets on the other hand started increasing during 2010-2011 and peaked, then afterwards, reduced in 2015 and has started seeing marginal improvement in 2016.

Figure 1. Graphical presentation of liquidity trend of commercial banks in Ghana



Source: Researcher own constructs, 2018

Figure 2. Graphical presentation of liquidity trend for commercial banks in Ghana



The figure 2 above shows that the ratio of liquid assets to interest bearing liabilities has been consistently higher compared to the ratio of liquid assets to total assets.

4.3. Correlation Analysis

Table 2. Correlation analysis between ROA and independent variables

	ROA	LIQD1	LIQD2	NIM	CAR	SIZE	OWN
ROA	1.000						
LIQD1	0.4567	1.000					
LIQD2	0.3568	0.3567	1.000				
NIM	0.3528	0.1245	0.1045	1.000			
CAR	0.3748	0.1025	0.2563	-0.2604	1.000		
SIZE	0.6027	0.4527	0.3125	0.3452	-0.004	1.000	
OWN	0.2237	0.2451	0.4567	0.0125	0.0074	0.3021	1.000

Table 3. Correlation analysis between ROE and independent variables

	ROE	LIQD1	LIQD2	NIM	CAR	SIZE	OWN
ROE	1.000						
LIQD1	0.5436	1.000					
LIQD2	0.4567	0.3567	1.000				
NIM	0.5237	0.1245	0.1045	1.000			
CAR	0.4537	0.1025	0.2563	-0.2604	1.000		
SIZE	0.7683	0.4527	0.3125	0.3452	-0.004	1.000	
OWN	0.6738	0.2451	0.4567	0.0125	0.0074	0.3021	1.000

The results from the correlation analysis from table 2 and table 3 above shows a positive association between both measures of liquidity and bank performance. The results suggest that banks with higher levels of liquidity perform better in terms of profitability compared to less liquid banks. The results seems to be at variance with finance theory which suggest a negative association between liquidity and profitability as higher levels of liquidity suggest less risk and hence less profitability. The results however, can be interpreted within the context of high non-performing loans. The less risky banks are expected to experience low non-performing loans by holding more liquid assets which pays relatively higher in Ghana as a result of higher interest rates and inflation. The result is contrary to the finding of Abdullah and Jahan (2014) study on Bangladesh listed banks where they reported a negative correlation between bank liquidity and profitability. The results are however, consistent with the findings of Khan and Ali (2016) study on Pakistan banks where they reported a positive correlation between three different measures of liquidity and profitability. The result is also consistent with the findings of Lartey *et al.* (2013) a study on listed banks in Ghana where they reported a weak positive correlation between bank liquidity and profitability in Ghana.

The correlation results show that there is a positive relation between profitability and interest margin. This suggests that an increase in the interest margin will result in an increase in profitability of the listed bank measured by the return on assets. However, the relationship appears to be weak as the correlation coefficient is 0.35. This positive relation is similar to findings from previous studies on correlation results. For instance, Raharjo *et al.* (2014) had a positive and strong relationship between profitability and net interest margin using Indonesia banks. Malik *et al.* (2014) also had a positive relation between NIM and profitability using Pakistan banks. On the control variables, the correlation results also show a positive relation between capital adequacy ratio and profitability. This result is however contrary to the findings of Raharjo *et al.* (2014) where they found a negative relationship between capital adequacy ratio and profitability of Indonesia banks. The next control variable which is firm size measured using market capitalization is strongly correlated with profitability with a correlation coefficient of 0.6027 and 0.7863 for the first and second model respectively. This mean that the bigger the firm, the bigger it level of profitability.

4.4. Regression analysis

In an attempt to answer the final and main objective of the study which is to determine the impact of liquidity on profitability, the panel regression was used to achieve this objective. This adjusted R-Square is 79% for the first model and 63% for the second model meaning that the independent variables have a high explanatory power. The overall F-Statistics which measure the fitness of the model had a probability coefficient of 0.000 meaning that the models are well fit. The results of the random effect generalised regression results are show below.

Table 4. Panel corrected results for ROA and independent variables

Variable	Coefficient	Std. Error	Z-values
LIQD1	0.00511***	0.00091	5.59
LIQD2	0.03400***	0.0221	0.548
NIM	0.190509***	0.083557	2.28
CAR	0.2977638**	0.082792	3.6
SIZE	0.0219581***	0.006609	3.32
OWN	0.13969**	0.06574	2.125
Constant	0.3527	0.18636	1.89257
R-Square	Within	0.8343	
	Between	0.9424	
	Overall	0.7892	
Wald Chi2(7)		-48.77	
Probability		0.000	

*** Significant at 1%, **Significant at 5%, * significant at 10%

Table 5. Panel corrected results for ROE and independent variables

Variable	Coefficient	Std. Error	Z-values
LIQD1	0.23578	0.20517	1.15
LIQD2	-0.021454	0.04029	-0.53
NIM	0.325315*	0.0178	1.83
CAR	0.0143*	0.00799	1.79
SIZE	0.212227***	0.06228	3.4076
OWN	0.441115***	0.20517	2.15
Constant	-1.2897	0.74566	-1.73
R-Square	Within	0.7363	
	Between	0.0.8254	
	Overall	0.0.6345	
Wald Chi2(6)		41.3	
Probability		0.000	

*** Significant at 1%, **Significant at 5%, * significant at 10%

The results of the regression analysis show that there is a positive association between the two measures of bank liquidity and profitability. The association is statistically significant at 1% for the two liquidity measures in the first model. However, in the second model liquid fund to total assets was positively associated with return on equity but statistically insignificant. The ratio of liquid funds to interest bearing liabilities was however negatively associated with bank profitability but statistically insignificant. Overall, it can be argued that holding reasonable level of liquid assets by commercial banks in Ghana improves their profitability. The result is contrary to the expectations of finance theory that seeks to link risk to returns and hence profitability. On the control variables, net interest margin was positively associated with return on assets and return on equity. The association was significant at 1% for the return on assets model but 10% for the return on equity model. The results suggest that banks with higher interest spread have higher profit margins compared with those with lower interest spread. The next control variable is capital adequacy ratio (CAR). The results of the regression analysis revealed a positive association between capital adequacy ratio and the profitability of commercial banks in Ghana. The association is significant at 1% for the return on assets model and 10% for the return on equity model. The results suggest that banks that have a reasonable level of capital adequacy ratio are more profitable than banks with lower capital adequacy ratio.

The next control variable is the size of the bank which is one of the most important determinants of bank profitability in literature for most studies in Ghana and other jurisdictions. As expected, the results showed a positive and significant association between bank size and return on assets and return on equity. The result shows that larger banks are more profitable than smaller banks. This could be attributed to economies of scale enjoyed by larger banks as compared to their smaller counterparts and also their ability to take risky projects and finance larger projects that have huge margins. Another possible reason could be the visibility that these banks command in Ghana which in effect contributes to their brand image. This therefore allows big banks to undertake large ticket and riskier transactions. The last control variable is ownership of banks which was measured using foreign ownership. The regression results as expected revealed a positive and statistically significant association between foreign ownership and bank performance in Ghana. The results suggest that foreign banks operating in Ghana are more profitable compared to their Ghanaian indigenous banks.

4.5. Discussion of findings

The results from the correlation and regression analysis show a positive association between liquidity and bank performance. The association is however very strong for return on assets as compared to return on equity. Liquid assets to interest bearing liabilities were negatively associated with return on equity even though the association was statistically insignificant. The positive association between liquidity and return on assets shows that banks that hold reasonable amount of liquid assets have an improved profitability as compared to those that do not. The result is contrary to the theoretical view that seeks to establish an inverse relationship between bank liquidity and profitability. Theoretically, it is argued that there is a trade-off between liquidity and profitability especially in the short term (Islam, 2008). The results of the study are consistent with the results of Khan and Ali (2016) where their study reported a positive association between bank liquidity and profitability in Pakistan. The result is also consistent with the findings of Lartey *et al.* (2013) study on listed banks in Ghana where they reported a positive association between liquidity and bank profitability. The reason for this positive association is because higher liquidity reduces banks liquidity risk and financial crisis. It makes the bank more resilient to withstand any unforeseen shocks and still remain profitable. The results are also similar to the results of Bordeleau and Graham (2010) who argued that banks that hold some amount of liquid funds have improved profitability but that there is a limit or a point at which holding additional liquidity will reduce profitability. In essence the study agreed that reasonable level of liquidity is necessary to enhance bank profitability. The study also is in line with the results of Warrad *et al.* (2015) who also reported a positive relationship between bank liquidity and profitability based on a sample of Jordanian banks. In addition to the above, the results is also consistent with the results of Ibrahim (2017) who also found a positive association between liquidity and bank profitability based on a sample of Iraq banks. Other studies that reported a positive association between liquidity and profitability include; Oluwasegun and Samuel (2015); Sur *et al.* (2016); Ishmail (2016); Umobong (2015); Malik *et al.* (2016) etc.

The study is however inconsistent with finance theory and with some previous studies. For instance, Abdullah and Jahan (2014) found no significant association between bank liquidity and profitability based on a sample of Bangladesh banks. Pradhan and Shrestha (2015) study of sampled banks from India reported a negative association between liquidity and profitability of commercial banks. The results show that bank with higher liquidity ratios take calculated risk, hence are able to improve their performance in terms of profitability. The result is however, consistent with the hypothesis of the study which expects a positive association between bank liquidity and profitability. The result was also inconsistent with some studies that reported no significant association between bank liquidity and profitability (Abdullah and Johan, 2014; Lartey *et al.*, 2013, Shen *et al.*, 2010). On the control variables, the study reported a positive association between net interest margin and profitability. The results suggest those banks that are able to keep a significant portion of their interest income are more profitable than banks that does otherwise. The result seems to confirm the reason why interest rate spread in Ghana is the highest or among the highest in Africa. Banks in Ghana still pay little on deposits but charge high rates on loans and advances to the public. The spread earned by Ghanaians banks therefore is high and considered to be the highest in Africa and other parts of the world. For instance, the result is consistent with findings of Musah *et al.* (2018) who reported a positive association between interest rate spread measured by interest margin and profitability of commercial banks in Ghana. This result is also consistent with the finding of Raharjo *et al.* (2014) who had a positive and significant relationship between the two variables. This indicates that in order to improve profitability, the bank will seek to increase net interest margin by increasing interest income. The bank will also raise interest margin to cover increases in operating costs, thus the increase in ROA will encourage banks to raise interest margin. The result is also consistent with the results of Malik *et al.* (2014) study on Pakistan banks. Also the result of similar to the findings of Khan and Sattar (2014) study on Pakistan banks where a positive association was reported between net interest margin and bank profitability.

On the other hand, the result is contrary to the finding of Obidike *et al.* (2015) study in Nigerian banks where the study reported a negative association between net interest margin and profitability of commercial bank. The next control variable that reported a significant association with bank profitability is capital adequacy ratio. This ratio is very important as it seeks to protect the monies of depositors and is one of the regulated ratios in Ghana. The bank of Ghana required capital adequacy ratio for commercial banks operating in Ghana is 10%. The results from the study showed a positive association between capital adequacy ratio and bank profitability. On the capital adequacy ratio which had significant relationship with profitability, the finding is consistent with the findings of Barnor and Odonkor (2013) study where they evaluated the effect of capital adequacy ratio on banks performance in Ghana. The results are also consistent with the findings of Naceur (2003) who found a significant relationship between CAR and banks profitability. Buser *et al.* (1981) argue in theory that banks generally have an optimal capitalization ratio and need to remain well-capitalized when they have a high franchise value. This outcome is in line with earlier work done by Karkrah and Ameyaw (2010) on profitability determinants of commercial banks in Ghana which indicated that the equity ratio which determines the capital strength of the banks has

positive relationship with the ROA of the commercial banks in Ghana. The positive relationship between the commercial banks profitability and their level of capital adequacy exhibited by the result is also in line with the findings of Suffian *et al.* (2008); Staikouras and Wood (2003), Goddard *et al.* (2004), Pasiouras and Kosmidou (2007), and Kosmidou (2008). Berger (1995) and Dermerguç-Kunt and Huizinga (1999) found a positive relationship between bank performance and capitalization. This positive influence implies that the higher the capital adequacy of banks (lower leverage), the more profitable the banks become. This result is consistent with the findings of Berger (1995), and Hassan *et al.* (2003). Consistent with the previous evidence, the study confirmed the positive relationship whether used return on assets as a dependant variable and in all specifications. This may indicate that well-capitalized banks support lower expected bankruptcy costs for themselves and their consumers, which reduce their cost of capital. According to Molyneux (1993); banks with high level of equity can reduce their cost of capital through the offering of safety net to depositors and interbank market, hence could increase profitability. Moreover, a commercial bank with enough capital is also able to take higher risks which attract high income and also absorb shocks emanating from liquidity and credits risks hence high profitability. These prove that it is obvious for Ghanaian banks with their high level of capital to make profit.

The next control variable is the size of commercial banks which also had positively and statistically significant relationship with bank profitability. This implies that bank size induces economies of scale thereby making larger banks more profitable. Economies of scale will reduce the cost of gathering and processing information. The larger the bank size, the more profitable the bank. It could also mean that bank size is associated with diversification which may impact favourably on risk and product portfolio. The result is consistent with previous studies in Ghana on bank profitability determinants and other similar studies in other jurisdictions (Amidu, 2007; Musah, 2017; Musah *et al.*, 2018). Finally, on the last control variable which is bank ownership, the results of the study showed foreign banks are more profitable than local banks. This finding is contrary to findings by Gyamerah and Amoah (2015) using all banks in Ghana where the results showed a negative association. The implication of this finding is that foreign ownership is somehow more efficient as argued compared to literature on developing markets. This suggest that perhaps the recent influx of foreign banks are have outstripped the needed returns to compensate for their investment, these foreign banks can be said to be penetrating the market and would in due course compete effectively with the local banks. The inverse relationship could also be an indication of saturation within Ghanaian banking landscape. The results show that these banks have more knowledge and expertise that help them to outperform the local indigenous banks.

5. Conclusions

The study reveals that bank liquidity is very important as its affect their profitability. The study revealed a positive association between bank liquidity and profitability consistent with the study hypothesis and several previous studies especially in developing countries. The results however should be interpreted with caution as previous studies have suggested that there is a limit to which bank liquidity improves profitability. This means that even though bank liquidity improves profitability, at some stage increase in liquidity could be counterproductive and will reduce the profitability of banks. The study implies that banks must take critical look at their liquidity if they want to improve their performance in terms of profitability. The results revealed that variables such as net interest margin, capital adequacy ratio, the size of the banks and foreign ownership have positive relationship with bank profitability. The results have several implications to banks and their managers as well as regulators of the sector.

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