

Determinants of Liquidity of Rural and Community Banks in Ghana

Eric Kofi Boadi^{1,2*}, Yao Li¹ and Victor Curtis Lartey^{1,2}

¹School of Management and Economics, University of Electronic Science and Technology of China (UESTC), No. 4 Section 2, North Jianshie Road, Chengdu, 610054, People Republic of China.

²Faculty of Business and Management Studies, Koforidua Polytechnic of Ghana, P.O.Box 981, Koforidua, Ghana.

Authors' contributions

This work was carried out in collaboration with all authors. Author EKB wrote the research design and the first draft. Author YL supervised the work and assisted in analysis. Author VCL contributed in the literature searches and in the conclusion. All authors read and approved the final manuscript.

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ABSTRACT

This study analyses the determinants of Rural and Community Banks (RCBs) liquidity performance in Ghana using the CAMEL regulatory measures and macroeconomic variables with RCBs' market jurisdiction as a moderating variable. 114 rural and community bank-specific panel data from 2005 – 2013 and the panel least square fixed effect method estimation were used for the research. The result suggests that capital adequacy, asset quality, management efficiency and gross domestic product have significant positive relationship and effect on liquidity. It finds evidence to establish that profitability and management efficiency studied within a period reveal contradictory outcomes on banks' liquidity performance. It also supports studies on performance of banks which show that macroeconomic variables on their performance have mixed outcomes. Further, it indicates that, whenever an investment is not done carefully it has a negative effect on RCBs' liquidity performance. Also, market jurisdiction of rural and community banks has a significant effect on their liquidity performance.

*Corresponding author: E-mail: boadikofieric@gmail.com;

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1. INTRODUCTION

This paper aims to study the principal determinants of Rural Community Banks' (also referred to as RCBs or Small Banks or Rural Banks) liquidity in Ghana. These RCBs are special unit banks which champion formal financial intermediation in rural areas in Ghana. According to Khalfaoui & Saada, [1] liquidity allows banks to meet their obligations and to fulfill economic functions such that the greater the liquidity ratio the better the bank is expected to perform. Similarly, Bordeleau & Graham, [2] said liquidity was a major cause of the 2007 financial crisis. The tenet of a Bank's assets are predominantly deposits held in trust of their clients and are demandable and when clients required such funds Diamond & Dybvig [3]. This arguably is considered as the core function of banks. In recent times, the creation of liquidity has received enough attention by scholars (Balasubramanyan & VanHoose, [4]; Calomiris, Heider & Hoerova, [5]; Khemraj, [6]; Moussa, 2015 [7]; Munteanu, [8]). Liquidity in the banking sector was viewed as a simple asymmetric information model in 1980's which to Diamond & Dybvig, [9] is a liquidity demand that literature has failed to capture. This raises concerns that banks dependency on "instance deposits" as a means of fulfilling clients demand is an unreliable measure due to information asymmetry.

From the above, interest on the level of liquidity requirement by banks to maintain a healthy financial position has received some attention. This is confirmed by the Basel Committee on Banking Supervision of the Bank for International Settlement of Switzerland (Goodhart, [10]; ICAEW, [11]). Primarily, banks require liquidity as a means of boosting deposits and shareholders' confidence. In view of this, banks in Ghana for instance are required by law to keep 9% of their deposits with Bank of Ghana as a primary reserve (Banking Act, [12]).

Banks require liquidity to: i) cover withdrawal of funds by customers, ii) meet unforeseen borrowing request from their customers, iii) satisfy inter-bank indebtedness which may arise daily due to payment clearing system, iv) sustain normal cash flow interruptions (Amengor, [13]). The Bank for International Settlements (BIS) [14] defines liquidity as "the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable

losses". According to BIS the principal function of banks in transforming maturity of short-term deposits into long term loans makes banks innately susceptible to liquidity risk not only at the institutionally-specific nature but also its repercussions on the market at large.

In this study, we seek to determine the drivers of RCBs' liquidity since these banks seem much vulnerable in mobilizing deposit. The study also seeks to analyze the effect of the influencing factors of such RCBs' liquidity on RCBs' performance. The problem is that, in Ghana about 6% of RCBs have been liquidated for not meeting the requirements of the Bank of Ghana, hence were declared bankrupt as per World Bank working paper on Rural Banking in Ghana (Nair & Fissaha, [15]).

Rural and Community Banks in Ghana possess some distinctive characteristics from universal banks in Ghana. This is partly attributable to the regulatory measures of Bank of Ghana. These were also noted by (Adusei, [16]) as follows i) they are unit banks, (i.e. not legally enforced to have or open branches), ii) formerly they had a terrestrial jurisdiction for their operations within a 20-mile radius. However, these restrictions seem to have been waived by the Bank of Ghana. Emphasis now is on viability in areas such as adequate population, enough infrastructure and vibrant economic environment, iii) ownership and management are in the hands of the indigenous people within the area and iv) they are restricted to only their scope of operations, especially with regards to international transactions unless they operate through a universal/commercial bank.

The distinctive characteristics of RCBs in Ghana as against other kinds of banks have sparked recent attention among academic researchers in Ghana (Adusei, [16]; Afriyie & Akotey, [17]; Akomea & Adusei, [18]; Kadri, Bunyaminu & Bashiru, [19]; Nair & Fissaha, [15]; Owusu-Antwi, Antwi & Crabbe, [20]). Most of these studies centered on drivers of profitability, credit risk management and small sample size of RCBs with little emphasis on liquidity. This provided grounds for the present study. Again, most of the studies did little to examine the contribution of RCBs to economic growth which this paper seeks to unearth. This paper holds that, an optimal level of liquidity is an evidence of a vibrant and stable banking sector devoid of shocks and runs, and that illiquid bank is prone

to banks failures. Rural communities are more than urban centers in eight regions in Ghana. Ghana Housing Census report 2010 [21]. Particularly, we seek to establish that, where there exist low liquidity of RCBs, there is the likelihood of liquidation and in the same vein a high liquidity has the propensity of low profitability. Again, the used of the CAMEL approach as a fundamental measure to evaluate liquidity performance of RCBs has not been used particular in Ghana for RCBs performance evaluation.

The major contribution of this paper is to suggest an optimal liquidity model that can help RCBs in Ghana to withstand liquidity shocks to avoid bankruptcy. Another novelty of this research is to close the gap in literature by firstly determining the key determinants of RCBs liquidity in Ghana, which may open the floodgate for further works. Secondly, to examine the relationship between liquidity and other bank's performance variables, such as capital adequacy, assets quality, management efficiency, earnings ability and investments. Thirdly, RCBs economic growth contribution is covered irrespective of how little it may be with the used of macroeconomic

variables such as Gross Domestic Product (GDP) and inflation.

To achieve the objectives above, hypothetically we seek to test the following Null hypothesis: i). RCBs' liquidity has statistically significant positive effect on banks' profitability, ii). RCBs' liquidity has negative association with banks' profitability, iii). RCBs' liquidity has statistical significant effect on bank's capital adequacy, iv). RCBs' liquidity has positive impact on management efficiency, and v). RCBs' liquidity has a positive effect on Ghana's macroeconomic variables.

Base on the literatures reviewed, we present below, the conceptual framework showing the various associations between the variables. This diagrammatic representation was inspired by a number of empirical works on banks' performance (Baral, [22]; Hughes, [23]; Moussa, [7]; Ongore & Kusa, [24]; Vuillemeij, [25]).

1.1 Conceptual Framework

Graphical relationship of the variables considered for liquidity determinants.

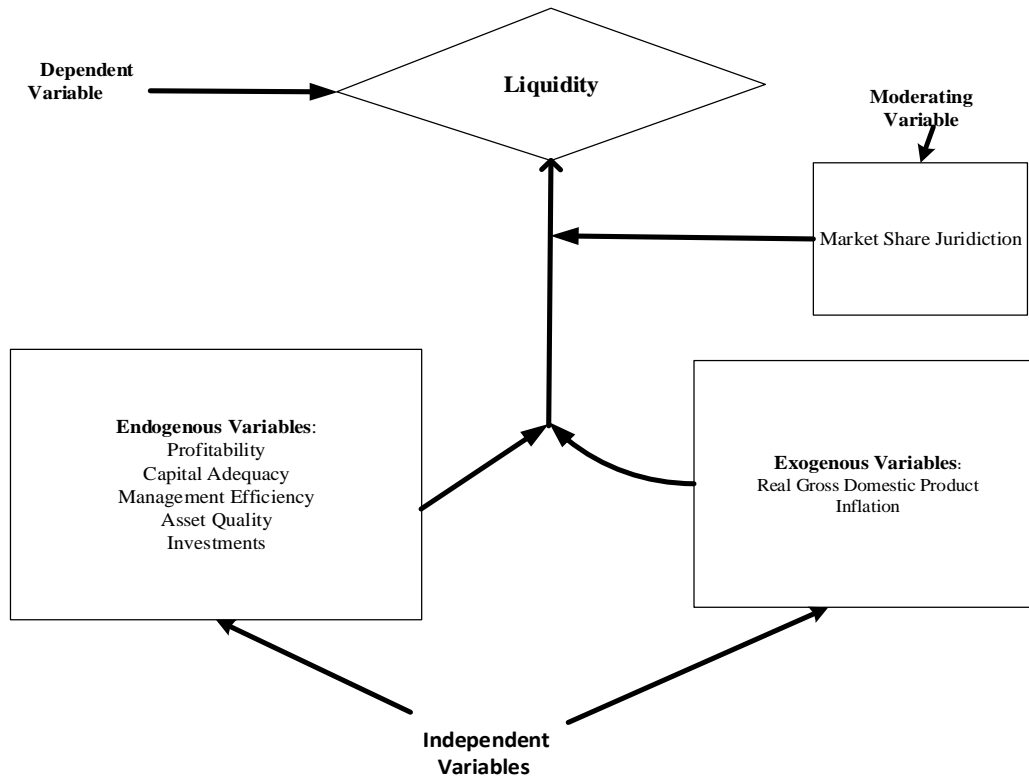


Fig. 1. Diagrammatic representation of liquidity determinants

The study revealed that on average, capital adequacy, assets quality, management efficiency, and bank's size positively influence RCBs' liquidity. On the flip of the coin, profitability and investment have a statistically negative effect on RCBs' liquidity. The macroeconomic indicators have mixed results. Real Gross Domestic Product (GDP) indicated RCBs' liquidity has significant effect on Ghana's economic growth but inflation has a negative effect on RCBs' liquidity.

Also, considering relationship, liquidity of RCBs has a weak positive relationship with profitability which is consistent with (Lartey, Antwi & Boadi, [26]). However, its effect on liquidity is negative. Similarly investment also has a negative effect on liquidity.

The remaining of the paper is structured as follows: The second part presents review on related literature under specific sub headings. The third part provides the methodology and data issues of the study. The fourth part presents the empirical findings and the fifth part covers the conclusions, policy implications and future research.

2. LITERATURE REVIEW

There appears to be deficit in literature on studies of determinants of banks' liquidity on both single countries and panel countries as compared to works on banks' profitability determinants. Thus, when considered from banks performance perspective this two aspects have been partly covered in a number of studies (Lartey et al., [27]; Ongore & Kusa, [24]; Raluca Busuic Witowski & Alexandru Luca, [28]; Ramadan, Kilani & Kaddumi, [29]). However, we also acknowledges studies by (Bis, [14]; Calomiris et al. [5]; Delechat, Arbelaez, Muthoora, & Vtyurina, [30]; Munteanu, [8]) on bank's liquidity.

2.1 Bank Specifics Determinants of Liquidity

2.1.1 Liquidity and profitability

Some studies found that liquidity is positively related to profitability though with varying levels in respect to financial institutions (Boadi, Antwi & Lartey, [26]; Bourke, [31]; Lartey et al. [27]; Ongore & Kusa, [24]). Also, other studies found a negative relationship between liquidity and profitability of financial institutions particularly banks (Moussa, [7]; Owusu-Antwi et al. [20]).

This shows that there is inconsistency in respect to the relationship that has been established and this makes the current study a great importance. From our point of view, the relationship should not be strong as a strong relationship makes banks have high probability to invest deposits of customers. In this case, when demand of customers arise and banks are unable to pay, it demonstrates poor financial health of the banks. This relationship therefore needs to be empirically established. Apart from this, we may expect such a relationship to be negative, as banks' liquidity limit investment prospects which has the likelihood of increasing banks' profitability.

2.1.2 Liquidity and capital adequacy

Another aspect of the liquidity determinants is its relation with banks capital. A higher liquidity and capital level requirements has the likely restriction of limiting excess bank capital and bank liquidity (Berben, Bierut, & Kakes, [32]). This may result to an adjustment on the assets column of banks' balance sheets, such that there is a decline in risk grade assets or there would be banks credit restrictions. On the basis of theories, banks capital hamper the liquidity creation process because it leads to a fall in the financial fragility that promotes liquidity creation (Diamond & Rajan, [33]). This from the perspective of Gorton & Andrew [34] refers to "crowd out" of deposits. This two scenario has also been referred to as the theory of financial fragility- crowding out for expositional purpose (Berger & Bouwman, [35]). On the other hand, empirically it has been established that a higher capital improves the capacity of banks in liquidity creation (Diamond & Dybvig, [9]). Another theory established empirically is that, higher capital absorbs risk, and hence helps banks to create more liquid funds (Repullo, [36]; Von Thadden, [37]) and this is called the risk absorption hypothesis. This type of theory together with the financial fragility crowd-out hypothesis theory has different influence on the size of banks. For instance, whiles the financial fragility –crowding out effect arguably expects to have a comparatively higher effects on small banks due to their inability to raise capital on capital markets but from local funding, it is rather not the case with larger banks. This suggest that, there is a greater likelihood that larger banks capital crowds out deposits. Larger banks has a comparatively higher risk absorption due to regulatory and market discipline that has the likelihood to affect their risk absorption capacity.

These two scenarios has been supported by (Berger & Bouwman, [35]).

2.1.3 Liquidity and asset quality

The significant of liquidity and assets quality of banks are crucial for their stability. So, the relationship between them has influence on banks' performance. A bank's total liquid assets to total assets, reveals bank's capacity to withstand liquidity shocks when it occurs. According to Chagwiza [38] a higher liquidity ratio is a good indicator that customers' request for withdrawals would be met. With regards to asset quality defined as total loans to total assets reveals the proportion of the total loans of the bank to the bank's assets. To the best of our knowledge, there is lack of empirical relationship and significance to support liquidity and asset quality of banks either positive or vice versa.

2.1.4 Liquidity and management efficiency

Banks interest expense to their total deposits indicates the amount of customers' deposits that the managers of banks use to settle the operating expense of their banks. A high ratio is a great cause of management failure as it demonstrate inefficiencies of management performance. It is expected that management efficiency would have a positive relationship with liquidity and subsequently increase liquidity of RCBs. Again to the best of our knowledge, there is lack of such relationship established.

2.1.5 Liquidity and investment

Investment measurement is not wholly considered in the CAMEL framework as part of the regulatory measure. This study defines investment of banks in terms of short term investment in treasury bills and other liquid investments that are due within one year. Banks collect customers' deposits and also customers' demand(s) for their deposits are not expected to be delayed. A delay in payment raises concerns of the financial health of the banks. Banks are not expected to lock up customers' deposits in long term investments. In this respect, a decline in investment expects to have a positive effect on banks' liquidity by increasing liquidity. Investment has been measured to be a diversification by Adusei, [16]) but little or no association was drawn between diversification and liquidity of RCBs. Also lack of evidence exist between liquidity and investment of banks in literature to

the best of our knowledge. This research expects to add to the empirical findings of this relationship and the effect of liquidity on banks investment portfolio.

2.2 Exogenous Factors

These are macroeconomic factors of Ghana, a developing country. They include, stability policy measures such as Real Gross Domestic Product, Inflation, Interest Rate and Political instability which influence banks' performance. Macroeconomic factors are normally factors which banks have no absolute control and which affect individual banks' outputs. For instance, some researches have reveal that GDP and rates of inflation do have some trend in a bank's performances (Athanasoglou, P.P., Sophocles, N.B., Matthaïos, [39]; Flamini, Schumacher, & McDonald, [40]; Ongore & Kusa, [24]). Particularly, it has been established that in a period where GDP growth decreases, the demand for credit also declines which then adversely affects profitability of banks (Athanasoglou, P.P., Sophocles, N.B., Matthaïos, [39]). Notwithstanding this, in a rapid economic growth as indicated by positive GDP growth, the demand for credit is high due to the nature of business cycle. A similar study on financial performance of Kenya's commercial banks by Ongore & Kusa, [24]), reveals that GDP has no significant relationship with profitability determinants of ROA and ROE as it also recorded a negative coefficient parameters respectively. This shows that banks' contribution to economic growth still remain questionable in Sub-Saharan African.

In a study of profitability determinants of commercial banks in Sub-Saharan African, it was discovered that inflation has a significantly positive effect on banks' returns (Flamini et al. [40]), which indicates that banks in Sub-Saharan Africa predict future changes in inflation rightly and promptly enough to make room for changes in interest rates and margins. A contrary evidence was found for a single country though it was significant but inflation rate had a negative effect on profitability (Ongore & Kusa, [24]).

From the forgone discussions, it is clear that lack or perhaps no proof of linkage has been established between the macroeconomic factors and liquidity so a study in Ghana is worth pursuing in respect to liquidity determinants of banks.

3. METHODOLOGY

The study uses the quantitative method technique. It uses financial ratios computed based on the audited financial accounts of RCBs obtained from Bank of Ghana. This data covered the period 2005 to 2013. The macroeconomic variables were retrieved from the World Bank database website.

The sample size of the data consisted of 114 RCBs operating from 2005 to 2013. To manage the data, the necessary extracts with respect to the variables needed were entered into excel spreadsheet. This facilitated the clearing and computation of the various financial ratios used for the research. The analysis of the study was made with the aid of Stata 13.1 and Econometric View 7. A linear multiple regression model was developed based on a modified CAMEL regulatory measure which is in line with the Basel Accord on Banking supervision of the Bank for International settlement (Baral, [22]) and other relevant variables based on empirical studies. It also adopted the panel data methodology which assisted in studying a group of RCBs (Neuman, [41]).

3.1 Specifications of Variables Used in Estimating Bank Liquidity

To determine the liquidity determinants of the RCBs the CAMEL model used by regulators and which is line with the recommendations of Basel Committee on Bank Supervision of the Bank of International Settlement was used as a baseline model. This model is developed based on the empirical works on financial soundness, and health of Banks ((Baral, [22]),(Atikoğullari, [42]); (Roman & Şargu, [43]); (Mishra, [44]);(Albulescu & others, [45]) ; (Olweny, [46]); (Ongore & Kusa, [24])). The baseline model based on the cited above was formulated as:

$$L_{it} = \alpha_0 + \alpha_1 CA_{it} + \alpha_2 AQ_{it} + \alpha_3 ME_{it} + \alpha_4 Pro_{it} + \alpha_5 INV_{it} + \alpha_6 GDP_{it} + \alpha_7 INF_{it} + \varepsilon_{it} \quad (1)$$

Where

$L_{i,t}$ denotes Liquidity Management of bank i cross sectional and t time identifier.

α_0 = constant or Intercept of the equation.

α_1 to α_7 = Coefficients parameters.

$CA_{i,t}$ = Capital Adequacy of bank i at time t

AQ_{it} = Asset Quality of bank i at time t

Pro_{it} = Performance of Bank i at time t as expressed by: ROA= Returns on Assets,

ME_{it} = Management efficiency of bank i at time t

INV_{it} = Investment Size of bank i at time t

GDP_t = Real Gross Domestic Product rate (GDP) at time t

INF_{it} = Consumer Price index at time t

ε_{it} = Stochastic Error term

3.2 Extended Model for Estimations

Using jurisdiction base on the market location of RCBs as a moderating variable, we proxy that regions with more municipal assemblies has the propensity of enhancing the rural community banks' performance. This may be due to high population, increase in economic activities and developmental progress in such regions.

As a result, if liquidity is much more in respect to jurisdiction then the extended mathematical formulation below is expected to have a greater impact on rural community banks performance as compared to equation (1)

$$L_{it} = \alpha_0 + \alpha_1(CA_{it} * JUR) + \alpha_2(AQ_{it} * JUR) + \alpha_3(ME_{it} * JUR) + \alpha_4(Pro_{it} * JUR) + \alpha_5(INV_{it} * JUR) + \alpha_6(GDP_{it} * JUR) + \alpha_7(INF_{it} * JUR) + \varepsilon_{it} \quad (2)$$

3.3 Description and Measurement Definitions of Variables

This section presents the measurements that would be used to define the variables used.

3.4 Estimation Issues

This study adopt a panel data methodology. According to Baltagi, [47] one merit of panel data method is its adjustments dynamics which provides better understanding. This is similarly supported by Gujarati [48]. In respect to the estimation method, a robust regression was run with the help of STATA 13.1 software and also with econometric views 7 software. Before the running, the data was sorted and cleaned to ensure we have a good data. We again checked for asymptotical normality of stochastic errors-

terms, the heteroskedasticity and adjusted for autocorrelation in the model. For instance we performed a robust regression on the full sample to check heteroskedasticity and multicollinearity using STATA 13.1 and used the consumer price inflation index to deflate the GDP to derive the Real GDP for stationary purposes. We used Levin-Lin-Chu test, Fisher type and Harris-Tzavalis in Eviews 7 to confirm that there were no unit root problem as are associated to macroeconomic variables.

Again, to decide the model fitness between random effect and fixed effect panel least square, the hausman test was performed and it review a $\text{Prob} > \chi^2$ of 0.0000, hence we fail to reject the H_0 and therefore accept fixed effect panel least square because the p -value = 0.05.

4. RESULTS AND DISCUSSION

Under this section we discuss empirically the results based on our descriptive statistics, correlation matrix and panel data estimations derived from the transformed secondary data of RCBs of Ghana.

4.1 Results and Discussion of Descriptive Statistics

4.1.1 Description of RCBs liquidity performance in Ghana

As can be observed from Table 2, averagely the liquidity of RCBs in Ghana for nine years is about

55%. This is an indication that RCBs in granting loans and advances 55% of such funds are mobilized from their customer deposits. This could give RCBs a fair idea of the quantum of loans and advances to be granted to their clients and prospective customers based on their customer deposits. In short it reveals that RCBs use about 55% of customer deposits for lending.

4.1.2 Descriptive statistics of independent variables

Table 3 presents the descriptive statistics of the independent variables used for the liquidity determinants of RCBs. As can be observed below from Table 3, RCBs capital adequacy, assets quality, management efficiency, profitability and investment recorded 14%, 46%, 15%, 3%, and 1% averagely in performance respectively. In Ghana, RCBs as at 2013 are required to maintain a capital adequacy of 10% but as observed they could maintain averagely 14% which is beyond the expected 10%. The average asset quality of RCBs is 46% which is not much far from 50% an indication that their exposure to credit risk is not very bad as compared to the high exposure of Kenya commercial banks which was 15.52% (Ongore & Kusa, [24]). This could be attributed to the efficient supervisory monitoring system by the Bank of Ghana deeply assisted by the ARB Apex Bank of Ghana.

Table 1. Variables used in the empirical liquidity estimation

Variables	Representation	Measurement	Expected outcome	
Liquidity	L	Total loans and advances to total customer deposits		
Profitability: Return on assets	ROA	Net profit before interest and taxes to its total assets	-	
Capital adequacy	CA	Equity capital to total assets	+	
Investment size	INV	Total investments to total deposits (total investment divided by total Assets)	+	
Assets quality /credit risk	AQ	Total loans and advances to total assets	+	
Management efficiency	ME	Operating expenses / total deposits	+	
Moderating variable: Market share jurisdiction	JUR	Dummy variable if the bank is located in a region with 5 or more municipal assemblies =0, if not 1	?	
Macroeconomic variables: Gross Domestic Product	GDP	Real gross domestic product rate (deflated Gross domestic product)	+	
	Inflation	INF	Consumer price index	-

Note: Where (+) indicate positive expected outcome, (-) Indicates negative expected outcome and (?) Unknown outcome

Table 2. Nine years average of Rural Community Banks (RCBs) liquidity in Ghana

	Liquidity
Mean score	0.55

**Source: Researchers computation, (2015)*

4.2 Results and Discussion of Correlation Matrix

As part of determining the relationship that exist between liquidity and the various determinants, a correlation matrix was done as shown in Table 4 below. On average, the matrix revealed that, there was a very weak positive relationship between liquidity and profitability, capital adequacy, and gross domestic product. In respect to asset quality and management efficiency, the level of relationship was relatively high and positive. In addition as can be observed from the relationship matrix below, inflation had a weak negative relationship.

Profitability (which is measured by Return on Assets as the net income before tax and interest to total assets) and liquidity positive relationship though weak means, more loans and advances necessitated an increase in interest income hence resulting in an increase in net income. We therefore fail to reject the Null hypothesis that, liquidity has positive relationship with banks profitability in rural community banks in Ghana. This confirms similar studies by Lartey et al. [27] and Afriyie & Akotey, [17] on banks in Ghana. It however contradicts similar studies by Adusei, [16] and Ongore & Kusa, [24]. Our observation reveals that the measurement of liquidity was slightly different in the various studies and hence the interest of the writers' variable definitions contributed to the divergence empirical findings.

Another revelation was the inverse relationship between bank liquidity and investment. This implies as RCBs liquidity increases both of its short term (Securities that fall due within a year) and long term investments decrease.

4.3 Results and Discussion of Regression Output

This part is divided into two. We first present and analyze the regression result of liquidity without using the market share geographical jurisdiction as a moderating variable. The second part examine liquidity moderated by the market share jurisdiction.

4.3.1 Regression results of liquidity without jurisdiction as a moderating variable

As can be observed from the regression output below in Table 5, the dependent variable liquidity (L) is explained by the independent variables by about 88%. About 77.8% of the independent variables are significant and shows a good fit of the results. Also, the persistence of the Durbin Waston statistics approximation almost at 2 indicates no normality issues as the choice of the variables in the main and extended model revealed. Hausman test for model estimation was inconsistent with the random effect but was consistent with the Fixed effect with $\chi^2(5) =$ and p- value of 0.000. Hence the fixed panel effect was used in our estimations.

4.3.2 Discussions of regression results without jurisdiction as a moderating variable

Bank's capital and liquidity performance are important concepts that are pivotal to understanding what banks do. These are two major aspects such that any risk associated with them will require prompt attention by the banks and their regulators. The impact of capital adequacy reveals mixed reaction. For the full period, capital adequacy had a significant effect on RCBs liquidity. This shows that its takes more than 5 years for RCBs liquidity to enhance their capital adequacy. This was clear from the regression output as 2005-2008 and 2009 – 2013 periods estimation indicates that, capital adequacy has no significant effect statistically on liquidity management. Based on the above, the null hypothesis that liquidity has positive effect on capital adequacy was varied based on the regress periods. In the first instant, we fail to reject the hypothesis and we state that capital adequacy positively impact on RCBs liquidity by about 34% increase for the full period of 9 years with about 99% confidence interval. However, in respect to the results based on 2005-2008 and 2009-2013 period it had no statistical significant. Hence, we reject the Null hypothesis that liquidity positively impact on capital adequacy for the two periods at an alpha value of 5%.

Assets Quality which was measured as total loans and advances to total assets has a statistically significant effects on RCBs liquidity performance with about 99% confidence interval in all the three periods considered with the coefficients 115%, 58% and 15% for the periods 2005 to 2013, 2005 to 2008 and 2009 to 2013 respectively. Hence, we fail to reject the Null

Hypothesis that RCBs liquidity has a statistically significant positive effects on assets quality. This shows more loans and advances are granted and given out. This is a great satisfaction to RCBs customer based. However, as loans and advances are granted, the loans and advances are also slowing collection as their deposits which is an important factor of their assets declines. The results would be a gradual increase in non-performing loans. Again the relationship between liquidity and Assets quality was fairly moderate as revealed by the correlation matrix of 0.59. It indicates that deposits are marginally collected and its quantum do not instantaneously increase RCBs assets base. This would not be a good sign though it could be that RCBs do not 'harass' their customers and that RCBs grants their customers enough grace period to make payments based on their nature of business. Most RCB customers are peasant agricultural farmers, fish mockers, fishermen's, and petty traders and may demand ample time to make payment.

Again, Management Efficiency which is measured as total operating expenses which management has absolute control to total deposits has a statistically significant effect on liquidity management of RCBs. The positive coefficients of 0.95, 3.17 and 3.69 at an alpha value of 1% were all significant with 99% confidence interval. This means that, for every marginal increase in management efficiency (that is increase in operating expense), RCBs liquidity

management declines by 95%, 317% and 369% for the periods 2005-2013, 2005-2008 and 2009-2013. This is an indication of weak management as this ratio was expected to be low. A high value represents inefficient management with bad control of operating expenses with respect to RCBs total deposits. This was confirmed with the relationship matrix which was highly positive. This indicates that, as total operating expenses increase total loans and advances of RCBs equally increase and vice versa. We therefore reject the null hypothesis that management efficiency in RCBs have a positive effect on RCB liquidity management. This may be accounted for by inadequate caliber of professionals and low educational training of RCBs management and employees to frequently check their expenses.

Profitability is also considered as an important performance measure in this study. This study measured profitability as the returns associated with RCBs assets (ROA). The study indicates a negative effect on profitability to RCBs liquidity with varying degree of statistical significant as could be observed from the regression output in Table 5. This shows an increase in profitability results to a decrease in liquidity of RCBs by about 24%, 148% and 46% for the three periods respectively. This means, as RCBs offer more loans their interest income decreases which is bad and hence their Net Profit decreases. One observable results could be staff loans. Staff taking too much loans and paying very low interests compared to RCBs customers.

Table 3. Summary statistics of independent variables

	CA	AQ	ME	ROA	INV	GDP	INF
Mean	0.14	0.46	0.15	0.03	0.01	10.44	23.37
Median	0.12	0.42	0.14	0.03	0.01	10.46	16.48
Maximum	16.43	14.58	1.53	1.19	0.07	10.67	80.75
Minimum	-0.57	0.00	0.00	-0.27	0.00	10.03	12.96
Std. Dev.	0.53	0.68	0.09	0.05	0.01	0.18	20.42

*Source: Researchers computation, (2015)

Table 4. Correlation matrix

	LQ	CA	ASSQUA	ME	ROA	INV	GDP	INF
LQ	1							
CA	0.01	1						
AQ	0.59	0.14	1					
ME	0.56	0.02	0.50	1				
ROA	0.06	0.23	0.56	0.07	1			
INV	-0.10	0.07	0.01	0.04	0.23	1		
RGDP	0.11	0.01	0.09	-0.05	0.15	-0.01	1	
INF	-0.23	-0.01	-0.03	0.01	-0.07	0.00	-0.25	1

*Authors computation (2015)

Table 5. Regression results

Variables		Full model (2005-2013)	2005-2008 period (before and during western world financial crises)	2009– 2013 period (after the western world financial crises period)
C	α_1	-.3985193*	-3.09469*	-1.2524**
	Standard error	.119713	0.35350	1.6307
	t-statistics	-3.33	-8.75455	-0.7680
CA	α_1	0.34095*	0.00218	0.2595
	Standard error	0.0224774	0.01026	0.0917
	t-statistics	15.17	0.21209	-2.8307
AQ	α_2	1.152251*	0.58030*	0.1516*
	Standard error	0.009873	0.03825	0.0224
	t-statistics	116.71	15.17250	6.7598
ME	α_3	.9507562*	3.17192*	3.6876*
	Standard error	.0514272	0.15147	0.3345
	t-statistics	18.49	20.94139	11.0255
ROA	α_4	-.2448754*	-1.48798**	-0.4621**
	Standard error	.0686532	0.48413	0.1703
	t-statistics	-3.57	-3.07350	-2.7130
INV	α_5	-3.109534*	-10.55334	-14.6783*
	Standard error	.3728307	2.24051	1.7973
	t-statistics	-8.34	-4.71024	-8.1667
GDP	α_7	.0355528**	0.29672**	0.1243**
	Standard error	.0113134	0.03511	0.1541
	t-statistics	3.14	8.45039	0.8066
INF.	α_8	-.0037432*	-0.00502*	-0.0058*
	Standard error	.0000976	0.00019	0.0059
	t-statistics	-38.36	-26.39364	-0.9721
Observations		1026	456	570
R ²		0.880842	0.932275	0.879171
Adjusted R ²		0.879905	0.931063	0.877448
Durbin-Watson		1.9	2.3	1.9
F-statistics		939.7388	769.15	510.2397
Prob. (F. statistics)		0.00	0.00	0.00

*Source: Authors computation, (2015)

Note: Statistically significant at levels *, ** and *** representing 1%, 5%, 10 respectively

Such a practice deprive RCBs gains. Arguably, banks staffs' loans are good for their motivation but should be scrutinized thoroughly so that they are not channeled back to the banks' customers for a higher interest which end up being in the pockets of individual workers in the bank. In whatever way, such a practice is extremely bad for the growth and stability of RCBs. This could be resolved with well-structured internal control mechanisms.

Another factor considered is RCBs level of investment which some researchers measured and considered diversification. This is denoted by RCBs short and long term securities which was also deflated. From the data collected, RCBs investment is relatively small. This is because their primary objective is not necessarily to be doing investment banking but to provide loans to its jurisdictional customers as a means of dealing with poverty through the provision of formal

financial intermediation services to the rural dwellers. Considering modern portfolio management theory, usually diversifying investment is good because it safeguard firms against risk but the post-modern portfolio is considered more prudent in diversification of investment (Omisore, Yusuf & Christopher, [49]). However, its empirical results in respect to banks performance has mostly been viewed from the profitability perspective with no or little evidence to support banks' liquidity based on our knowledge. For instance, Elsas, Hackethal & Holzhauser, [50] and Sufian & Habibullah, [51] reveal that diversification has effect on banks profitability. In our case, it had a negative effects on RCBs liquidity. This means if RCBs increase their short and long term investments, their liquidity decrease. This has effect from two main perspective, namely shareholders view and socioeconomic view. From the maximization of shareholders wealth angle, an increase in

investment may increase their returns as the banks' earnings appreciate. However, from the socioeconomic spirit, investment is seen as a secondary choice of RCBs after wholeheartedly satisfying their rural financial intermediation role. In the contest of the reported results, similar observation was made by Acharya, Hasan, & Saunders, [52] when analyzing Italian banks. Their study indicated that, diversification of banks' assets do not guarantee banks superior performance and/or risk reduction. Also, Stiroh 2004a [53] studied a sample of US community banks and observed diversification benefits within broader activity classes but not between them. Additionally, Stiroh 2004b [54] established that increased variations in banks performance arises from shifting into noninterest activities such as trading. Lastly, in respect to diversification Stiroh & Rumble, [55] find that, no evidence existed with increase in diversification in reference to US financial holding companies and that the negative relationship between shifts into non-interest activities and risk-adjusted performance still persist as observed by

Stiroh 2004b [54]. This makes studies on banks investment portfolio an unending and ongoing study. Unlike a similar study by Adusei [16] on RCBS profitability insights, which finds diversification contributing to profitability. This study on liquidity determinants reveals that, investment do not support RCBs liquidity which makes economic sense in the banking industry.

The other predictors were the macroeconomic factors which we considered as GDP and Inflation based on the consumer price. Whereas GDP show a positive effect statistically at 5% significant level for the period, inflation revealed a negative effect on RCBs liquidity. We therefore fail to reject the null hypothesis which states that macroeconomic variables have positive effect on liquidity for GDP. Meanwhile, in the case of inflation, we reject the hypothesis. This result is similar to banks' performance studies by Athanasoglou, Brissimis, & Delis, [56] and Ongore & Kusa, [24] which used macroeconomic variables and had similar outcomes.

Table 6. Regression results based on jurisdiction moderation

Variables		Model 1 Non moderated liquidity management model	Model 2 moderated liquidity with bank jurisdiction (dummy)
C	α_1	-.3985193*	0.551774*
	Standard error	.119713	0.013996
	t-statistics	-3.33	39.42280
CA*JUR	α_1	.34095*	0.000740 ^{NS}
	Standard error	0.0224774	0.024793
	t-statistics	15.17	0.029842
AQ*JUR	α_2	1.152251*	0.446912*
	Standard error	.009873	0.112615
	t-statistics	116.71	3.968486
ME*JUR	α_3	.9507562*	3.754339*
	Standard error	.0514272	0.552329
	t-statistics	18.49	6.797285
ROA*JUR	α_4	-.2448754*	-1.649258*
	Standard error	.0686532	0.701858
	t-statistics	-3.57	-2.349845
INV*JUR	α_5	-3.109534*	-13.15802*
	Standard error	.3728307	5.933970
	t-statistics	-8.34	-2.217405
RGDP *JUR	α_7	.0355528**	-0.057771*
	Standard error	.0113134	0.007787
	t-statistics	3.14	-7.418496
Inf.*JUR	α_8	-.0037432*	-0.004744*
	Standard error	.0000976	0.001415
	t-statistics	-38.36	-3.352734
Observations		1206	1206
R²		0.880842	0.251975
Adjusted R²		0.879905	0.246091
			Difference
			0.628867
			0.633814

*Source: Authors computation, (2015)

Statistically significant at levels *, ** and *** representing 1%, 5%, and 10% respectively

4.3.3 Results of the extended model with market jurisdiction as a moderating variable

With respect to Table 6, it can be observed that the jurisdiction of RCBs per their respective regions has a generally significant effect on their liquidity performance. This is indicated by about 63% of the variability in the adjusted R^2 when the equation was moderated with jurisdiction. The individual predictor variables show somehow different significant level. Whiles capital adequacy was statistically significant at 1%, the jurisdiction moderation conformed to the 2005-08 and 2009-13 period of being non-significant. This finding support the later requirements of Bank of Ghana to license RCBs which found themselves in a good and vibrant economic environment with continues increase in the community population due to its economic attraction as cited by Adusei, [16]. It also indicates that, RCBs which found themselves in a less vibrant business economic activity area has the propensity to suffer from liquidity challenges and this may inevitably affect their profitability and capital adequacy performance.

Similar approach was used by Ongore & Kusa, [24] where ownership was used as moderating variable. Their study reveal that ownership has no significant effect on Kenya's Commercial banks performance. In our case, the market jurisdiction of RCBs as a yardstick of RCBs liquidity performance measurement reveals that, the location of the RCBs has a great significant effect on their performance so far as liquidity is concern. We attribute such a finding to the uniqueness of economic activities in this rural community areas where these banks mostly operate.

5. CONCLUSIONS AND RECOMMENDATIONS

This study examines whether the CAMEL framework variables representing Capital adequacy, Assets quality, Management Efficiency, Earnings ability (profitability) and Liquidity can form the nucleus of RCBs liquidity determinants. This paper studied liquidity drivers and hence introduces investment in place of liquidity so the CAMEL became CAMEI. Other variables considered in addition were the macroeconomic variables. The data covered annual financial reports of 114 RCBs from 2005-2009 in Ghana. These banks have been selected based on their data availability. Also, after the

hausman test, the fixed effect estimation of the Panel Least Square regression was more appropriate than the random effect estimation.

On average, the results show that for the full period capital adequacy, assets quality, management efficiency, profitability, investment, gross domestic product and inflation are significant predictors of rural community bank liquidity. This support the various literature on banks performance. Also, it reveals that the jurisdiction of rural community banks in Ghana has significant impacts on RCBs liquidity performance. The effect of macroeconomic variables on RCBs liquidity determinants indicated GDP has positive impact whiles inflation has a negative effect considering the 9 years period studied. Again, the statistical significant evidence suggests that the strength of RCBs liquidity determinants varies in respect to duration of time for the study.

Additionally, the investment portfolio of RCBs do not support their liquidity strengths within the 9 year period though it may have impact on their profitability.

Following the conclusions of the results above four major policy implications is worth suggesting. Firstly, the liquidity management of RCBs should be prioritized in the daily management activities of rural community banks. It's worth mentioning that the Bank of Ghana liquidation of some RCBs set a clear signal to other RCBs to improve on their liquidity performance. Secondly, Bank of Ghana should continue the new directives of revising and introducing new minimum capital requirements of RCBs as macroeconomic factors change to ensure they contribute to economic growth. Thirdly, we recommend the training of management and staff on managing operating expenses. As the results indicated high operating expenses to total assets which suggests weak management of their core business expenses. Lastly, we suggest, they explore other investment options to increase their income levels outside interest incomes whiles being mindful of their liquidity positions.

This paper suggest future research should focus on other macroeconomic variables effect on RCBs liquidity like interest rates and on national level financial structure indicators such as money supply, credit provided by the banking sector and others.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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