

**Determinants of Ghana's Rural Banking
Industry Liquidity: Panel Data Analysis**
**Determinants of liquidity of rural and
community banks in Ghana**

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 their market jurisdiction as a moderating variable. Using 114 rural and community bank-specific rural panel data from 2005 – 2013, the panel least square fixed effect-model method of estimation was used, after liquidity equation and its conceptual framework was modeled. The results suggests that capital adequacy, asset quality, management efficiency and gross domestic product has a significant positive relationship and effect on liquidity. It finds evidence to establish that profitability and management efficiency reveal contradictory outcomes on banks liquidity performance depending on periods of study. It also support banks performance studies that, macroeconomic variables have mixed outcomes on bank's performance. Further, it indicates that, investment when not done carefully has a negative effect on RCBs liquidity. Also, market jurisdiction of rural community banks has a significant effect on their liquidity performance.

Keywords: CAMEL, Rural Community Banks (RCBs), Liquidity determinants, Ghana

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. In the world of banking, the 2007-2008 financial crisis was partly attributable to the inadequate liquidity buffers of banks (World Finance, 2015.) to accommodate a degree of responsibility of the financial economy they operate. Of what extent is liquidity of relevance to the banks; this is demonstrated by the Western financial crisis and evidence is there for us as stated earlier. According to Khalfaoui & Saada, (2015) liquidity allows banks to meet their obligations and to fulfill economic functions and that the greater the liquidity ratio the higher the bank is expected to perform. Similarly, Bordeleau & Graham, (2010) said liquidity was a major cause of the 2007 financial crisis. The tenet of a Bank's assets is that assets are predominantly deposits held in trust of their clients and demandable us and when clients required such funds. This arguably is considered as has been seen as the core function of

30 banks. In recent times the creation of liquidity ~~In this respect liquidity creation in recent times~~
31 has received enough attention by scholars (Balasubramanyan & VanHoose, 2013; Calomiris,
32 Heider, & Hoerova, 2012; Khemraj, 2013; Moussa, 2015; Munteanu, 2012). ~~Ever since the~~
33 ~~works of Diamond & Dybvig, (1986) in respect to deposits insurance, the use of demand~~
34 ~~deposits as an insurance of turning illiquid assets to liquid assets has demanded a critical~~
35 ~~look.~~ Liquidity in the banking sector ~~before~~ was viewed as a simple asymmetric information
36 model in the mid 1980's which to Diamond & Dybvig, (1983) is a liquidity demand that
37 literature has failed to capture. This raises concerns that banks dependency on "instance
38 deposits" as a means of fulfilling clients banks demand is an unreliable measure due to
39 information asymmetry.

40 From the above, interest on the level of banks liquidity required to be ~~by banks to~~ maintained
41 by banks ~~as a~~ healthy financial ~~environs~~ institution has received some attention. This is ~~has~~
42 ~~been~~ confirmed ~~by the interest showed~~ by the Basel Committee on Banking Supervision of
43 the Bank for International Settlement of Switzerland (Goodhart, 2011; ICAEW, 2009). ~~This~~
44 ~~indicates that liquidity may stands for the capacity of a bank to meet its claims as and when~~
45 ~~they are due.~~ Primarily, banks required liquidity as a means of boosting deposits and
46 shareholders confidence. In Ghana banks are required to keep 9% of their deposits as
47 primary reserves with the Bank of Ghana by law (Banking Act, 2004).

48 ~~Particularly,~~ Banks required liquidity ~~for: i)~~ to: i) cover withdrawal of funds by customers, ii)
49 meet unforeseen borrowing request from their customers, iii) satisfied inter-bank
50 indebtedness, which may arise daily due to payment clearing system, iv) sustain normal
51 cash flow interruptions (Amengor, 2010). The Bank for International Settlements (BIS) (2008)
52 defines liquidity as "the ability of a bank to fund increases in assets and meet obligations as
53 they come due, without incurring unacceptable losses". According to BIS the principal
54 function of banks in the maturity transformation of short-term deposits into long term loans
55 makes banks innately susceptible to liquidity risk not only at the institutionally-specific nature
56 but also its repercussions on the market at large.

57 As researchers we seek to determine the drivers of banks liquidity in respect to small banks
58 which seems much vulnerable in deposit mobilization and to analyses the effect of such
59 RCBs liquidity influencing factors on RCBs performance. The problem is that, in Ghana
60 about 6% of RCBs have been liquidated for not meeting the requirements of the Bank of
61 Ghana and hence was declare bankruptcy as per World Bank working paper on Rural
62 Banking in Ghana (Nair & Fisssha, 2010). ~~To the best of our knowledge few works such as~~
63 ~~ours have been done in respect to bank liquidity in Africa for well-established commercial~~
64 ~~banks not to mention small banks in this context rural and community banks particularly in~~
65 ~~Ghana. The so 'big to fail commercial banks' faced some financial crises despite it being~~
66 ~~seen as well-resourced banks financially in deposit mobilization, human resource wise, large~~
67 ~~assets and others. The question is 'ceteris paribus' what is the 'faith' of this vulnerable small~~
68 ~~banks called RCBs in Ghana. Irrespective of their small nature, as researchers we believe~~
69 ~~such banks provide formal banking services to rural and community dwellers who are~~
70 ~~predominantly peasant farmers, petty traders, fish mockers, etc. though their total economic~~
71 ~~growth may not be high compare to the universal banks and other commercial banks in~~
72 ~~Ghana. Nevertheless, rural localities population out number their urban population in Ghana~~
73 ~~in eight regions per Ghana population and housing census 2010 report (Census, 2010).~~
74 ~~Hence their significances cannot be undermined as they may contribute to rural~~
75 ~~development and in reducing urban migration.~~

76 Rural and Community Banks notably referred as Rural Banking in Ghana possess some
77 distinctive characteristics from universal banks in Ghana. This is partly attributable to the
78 regulatory measures of Bank of Ghana. These were also noted by (Adusei, 2015) as follows
79 i) they are unit banks, (i.e. not legally enforced to have or open branches) ii) formerly they
80 had a terrestrial jurisdiction for their operations within a 20-mile radius. However, this

restriction ~~is~~ seem to ~~be~~ 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 in their scope of operations, especially in international transactions unless ~~it's~~ through a universal/commercial bank.

The distinctive characteristics of RCBs in Ghana has spark recent attention among academic researchers in Ghana (Adusei, 2015; Afriyie & Akotey, 2013; Akomea & Adusei, 2013; Kadri, Bunyaminu, & Bashiru, 2013; Nair & Fissaha, 2010; Owusu-Antwi, Antwi, & Crabbe, 2014). Most of these studies centered on profitability drivers, credit risk management and a small sample size with little emphasis on liquidity. This provided grounds for the present study. Again, most of the writers above did little to examine the contribution of RCBs to ~~the~~ 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 bank failures. Particularly we seek to establish that, where there exist low liquidity of RCBs, there is the likelihood of liquidation and in the same vain 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 ~~to the best of our knowledge~~ particular in Ghana for RCBs performance evaluation.

~~In view of the above, the current study's importance cannot be ignored.~~ 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. ~~It also obvious that,~~ 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 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.

~~This work is difference from similar studies in Ghana in that, the scope of RCBs studied of 114 is larger than (Adusei, 2015) of 112 which was on profitability determinants and (Afriyie & Akotey, 2013) on credit risk management and profitability of 10 rural banks in the Brong Ahafo of Ghana. Second the adoption of a credible regulatory measure has not be used in studying RCBs performance. Thirdly, the macroeconomic variables aspect was not use in their studies, and lastly the focus on liquidity determinants~~

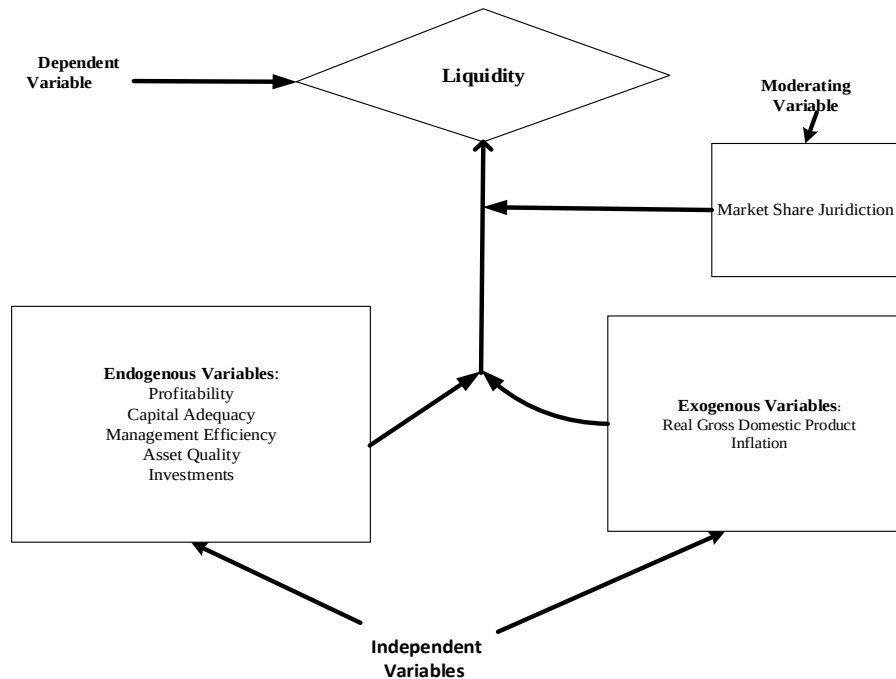
To achieve the objectives above, hypothetically we seek to test the following Null hypothesis: i). RCBs liquidity has statistically significant positive effect on banks profitability, ii). RCBs liquidity has negative association with banks profitability, iii). RCBs liquidity has statistical significant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

Based 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 empirically works on banks performance (Baral, 2005; Hughes, 2013; Moussa, 2015; Ongore & Kusa, 2013; Vuilleme, 2014).

1.1 Conceptual Framework

Graphical relationship of the Variables considered for liquidity determinants.

129 Figure 1.



130

131 The study revealed that on average, statistically there is about 95% confidence interval that,
 132 capital adequacy, assets quality, management efficiency, and banks size positively
 133 influenced RCBs liquidity. On the flip of the coin, profitability and investment have a
 134 statistically negative effect on RCBs liquidity, with about 95% confidence interval. The
 135 macroeconomic indicators have a mixed results. While as Real Gross Domestic Product
 136 (GDP) indicated RCBs liquidity significantly has statistically has significant effect on Ghana's
 137 economic growth but inflation has a negative effect on RCBs liquidity.

138 Also in respect to relationship, liquidity of RCBs had a weak positive relationship with
 139 profitability which was consistent with (Lartey, Antwi, & Boadi, 2013). study on listed
 140 commercial banks in Ghana. However, its effect on liquidity was negative. and significant at
 141 5%. Similarly investment also had a negative effect on liquidity, and was also statistically
 142 significant at 95% confidence interval.

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

147 2. LITERATURE REVIEW

148 Empirical literature below shows that banks liquidity determinants in general is limited
 149 compared to banks profitability determinants. There appears to be deficit in literature on
 150 banks liquidity determinants studies on both single countries and panel countries compared
 151 to works on banks profitability determinants. This clearly reveals a gap and the relevance of
 152 the current study on banks liquidity and banks determinants of RCBs especially. Thus, when
 153 considered from banks performance perspective this two aspects have been partly covered
 154 in a number of studies (Lartey et al., 2013; Ongore & Kusa, 2013; Raluca Busuioc Witowski
 155 & Alexandru Luca, 2015; Ramadan, Kilani, & Kaddumi, 2011). However, we also

acknowledges studies by (Bis, 2008; Calomiris et al., 2012; Delechat, Arbelaez, Muthoor, & Vtyurina, 2012; Munteanu, 2012) on bank liquidity.

2.1 Bank Specifics Determinants of Liquidity

This section consider the endogenous factors that affects banks liquidity. Banks which are liquid has a greater lending rate compare to an illiquid bank. Most of this determinants literature is partially or wholly based on the CAMEL regulatory framework and some other banking sector indicators. The literature below tries to establish the close linkages of such bank factors to liquidity and its management.

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, & Larney, 2013; Bourke, 1989; Larney et al., 2013; Ongore & Kusa, 2013). Also other studies found a negative relationship between liquidity and profitability of financial institutions particularly banks (Moussa, 2015; Owusu-Antwi et al., 2014). This shows that there is inconsistency in respect to the relationship that has been established and this make the current study of greater importance. From our view as researchers, the relationship should not be strong as a strong relationship has the probability of banks investing deposits of customers which when demand arose and their inability to pay, demonstrate poor financial health and this must 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, 2010). This may results to an adjustments 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, 1999). This from the perspective of Gorton & Andrew (2014) 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, 2006). On the other hand, empirically it has been established that a higher capital improves the capacity of banks in liquidity creation (Diamond & Dybvig, 1983). Another theory established empirically is that, higher capital absorbs risk, and hence helps banks to create more liquid funds (Repullo, 2004; Von Thadden, 1999) 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, which is 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, 2006).

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 have influence on banks performance. A banks total liquid assets to total assets, reveals bank's capacity to withstand liquidity shocks when it occurs.

203 According to Chagwiza (2014) a higher liquidity ratio is a good indicator that customer's
204 withdrawals would be met. In respect to asset quality a total loans to total assets reveals the
205 proportion of the total loans of the bank to the bank's assets. To the best of our knowledge,
206 there is lack of empirical relationship and significant to support liquidity and asset quality of
207 banks either positive or vice versa.

208 **2.1.4 Liquidity and Management Efficiency**

209 Banks interest expense to their total deposits indicates the amount of customer's deposits
210 that the managers of banks used to settle the operating expense of banks. A higher ratio is a
211 great cause of management failure as it's demonstrate inefficiencies of management
212 performance. It is expected that management efficiency would has a positive relationship
213 with liquidity and subsequently increase liquidity of RCBs. Again to the best of our
214 knowledge, lack of relationship has been established in this aspect.

215 **2.1.5 Liquidity and Investment**

216 Investment measurement is not wholly considered in the CAMEL framework as part of the
217 regulatory measure. This study defines investment of banks in terms of short term
218 investment in treasury bills and other liquid investments that falls due before one year.
219 Banks collect customers' deposits and customers' demand(s) for their deposits are not
220 expected to be delayed. A delay in payment raises concerns of the financial health of the
221 banks. Banks are not expected to lock up customers deposits in long term investments. In
222 this respect a decline in investment expects to have a positive effect on banks liquidity by
223 increasing liquidity. Investment has been measure as diversification by Adusei, (2015) but
224 little or no association was drawn between diversification and liquidity of banks RCBs. Also
225 lack of evidence exist between liquidity and investment of banks in literature to the best of
226 our knowledge. This research expects to add to the empirical findings of this relationship and
227 the effect of liquidity on banks investment portfolio.

228 **2.2 Exogenous Factors**

229 These are macroeconomic factors of Ghana as a developing country. It includes stability
230 policy measures such as Real Gross Domestic Product, Inflation, Interest Rate and Political
231 instability that influences banks performances. Macroeconomic factors are normally factors
232 which banks have no absolute control and which affect individual banks outputs. For
233 instance some researches have reveal that GDP and inflations rate do have some trend in
234 bank performances (Athanasoglou, P.P., Sophocles, N.B., Matthaïos, 2005; Flamini,
235 Schumacher, & McDonald, 2009; Ongore & Kusa, 2013). Particularly it has been establish
236 that in a period where GDP growth decreases, the demand for credit also declines which
237 then adversely affects profitability of banks (Athanasoglou, P.P., Sophocles, N.B., Matthaïos,
238 2005). Notwithstanding, in a rapid economic growth as indicated by positive GDP growth, the
239 demand for credit is high due to the nature of business cycle. A similar study on financial
240 performance of Kenya's commercial banks by Ongore & Kusa, (2013), reveal GDP has no
241 significant relationship with profitability determinants of ROA and ROE as it also recorded a
242 negative coefficient parameters respectively. This shows that banks contribution to economic
243 growth still remain questionable in Sub-Saharan African.

244 In a determinants of profitability study of commercial banks in Sub Saharan African it was
245 discovered that inflation has a significantly positive effect on banks returns (Flamini et al.,
246 2009) , which indicates was an indication that banks in Sub Saharan African predict future
247 changes in inflation rightly and promptly enough to make room for interest rates and margins.
248 A contrary evidence was found for a single country though it was significant but inflation rate
249 had a negative effect on profitability (Ongore & Kusa, 2013).

From the forgone discussions is clear that, lack or perhaps no proof of linkage has been established between the macroeconomic factors and liquidity and 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 financial data collected from the audited financial accounts of RCBs obtained from Bank of Ghana. from the bank scope database consolidated by Bank of Ghana through it appointed supervisory body ARP Apex Bank of Ghana. This data covered the period 2005 to 2013. The macroeconomic variables was retrieved from the World Bank database website.

The unit of analysis is therefore all RCBs recognized by the Bank of Ghana as licensed for rural community banking from 2005 to 2013 from the ten regions in Ghana whose data was accessible.

The sample size of the data consisted of 114 RCBs operating from 2005 to 2013. Due to some RCBs non-meeting of regulatory requirements some were closed during the period leading to non-availability of data, hence 114 RCBs was used out of 135 by Bank of Ghana. To managed 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 inter line with the Basel Accord on Banking supervision of the Bank for International settlement (Baral, 2005) and other relevant variables based on empirical studies. It also adopted the panel data methodology which assisted in studying a group of RCBs (Neuman, 2007). The data was unbalance in nature and it covered a period of 9 years and is also across space as are recognized in panel data methodology (Baltagi, 2005; Gujarati, 2003).

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 in intern 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, 2005),(Atikoğullari, 2009); (Roman & Şargu, 2013); (Mishra, 2012);(Albulescu & others, 2010) ; (Olweny, 2011); (Ongore & Kusa, 2013)). The baseline model based on the cited above was formulated us:

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

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

α_0 = constant or Intercept of the equation.

$\alpha_1 - \alpha_7$ = Coefficients parameters

CA_{it} =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

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

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

293 INF_{it} = Consumer Price index at time t

294 ε_{it} = Stochastic Error term

295 3.2 Extended Model for Estimations

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

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

304

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

305 3.3 Description and Measurement Definitions of Variables

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

307 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.

3.4 Estimation Issues

This study adopt a panel data methodology. According to Baltagi, (2005) one merit of panel data method is its adjustments dynamics which provides better understanding. 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 Prob>chi2 of 0.0000, hence we fail to reject the Ho 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 below, 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.

Table 2: Nine Years Average of Rural Community Banks (RCBs) Liquidity in Ghana

	Liquidity
Mean Score	0.55

*Source: Researchers computation, (2015).

Descriptive Statistics of Independent Variables

Description of RCBs Liquidity Determinants in Ghana

Table 3 below 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, 2013). This could be attributed attributable to the efficient supervisory monitoring system by the Bank of Ghana deeply assisted by the ARB Apex Bank of Ghana.

Descriptive Statistics of Independent Variables

Table 3: Descriptive 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).

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 show 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 above 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 fails 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., (2013) on listed commercial banks in Ghana, and Afriye & Akotey, (2013) on rural banks in the Brong Ahafo Region in Ghana. It however contradict similar studies by Adusei, (2015) on profitability insights in rural banking in Ghana and Ongore & Kusa, (2013) on financial performance of Commercial banks in Kenya. 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 that as RCBs liquidity increases its both short term (Securities that fall due within a year) and long term investment decreases.

379 **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

380 *Authors computation (2015)

381 4.3 Results and Discussion of Regression Output

382 This part is divided into two. We first present and analyze the regression result of liquidity
383 without using the market share **geographical jurisdiction** as a moderating variable. The
384 second part **seek to** examine **whether there was any significant difference when** liquidity is
385 moderated by the market share jurisdiction.

386 4.3.1 Regression Results of Liquidity without Jurisdiction as a Moderating Variable

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

395 **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

396

Observations	1026	456	570
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R²	0.880842	0.932275	0.879171
Adjusted R²	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.

4.3.2 Discussions of Regression Results without Jurisdiction as a Moderating Variable

Bank capital and liquidity performance are important concepts that are pivotal to understanding what banks do. They are two aspects that any risk associated to them requires prompt attention by the banks themselves 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 it 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 collected 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. As indicated in the introduction, 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 increases total loans and advances of RCBs equally increases 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 to RCBs assets (ROA). The study indicates a negative effect of profitability to RCBs liquidity with varying degree of statistical significant as could be observed from the regression output in table 5 above. 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. Such a practice deprive RCBs gains. Arguably, banks staffs loans is 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 as 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 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 diversification diversifying investment is good because its safeguard firms against risk but the post-modern portfolio is considered more prudent in diversification of investment (Omisore, Yusuf, & Christopher, 2012). 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, & Holzhäuser, (2010) and Sufian & Habibullah, (2009) reveal studied, show that diversification has effect on banks profitability. In our case it had a negative effects on RCBs liquidity performance. This means that if RCBs increases their short and long term investments to total assets, their liquidity decreases. This has effect from two main perspectives, that is the namely shareholders view and socioeconomic view. From the maximization of shareholders wealth angle angle, an increase in investment may increase their returns as the banks' earnings appreciate. However, from the socioeconomic spirit, investments 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, (2006) when analyzing Italian banks. Their study indicated that, diversification of banks assets do not guaranteed banks superior performance and/or risk reduction. Also, Stiroh (2004) studied a sample of US community banks and observed diversification benefits within broader activity classes but not between them. Additionally, Stiroh (2004) established that increased variations in banks performance

arises from shifting into non-interest activities such as trading. Lastly in respect to diversification Stiroh & Rumble, (2006) find **found** 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 (2004). This makes studies on banks investment portfolio an unending and ongoing study. Unlike a similar study by Adusei (2015) on RCBS profitability insights **which** finds diversification contributing to profitability. **our** This study on liquidity determinants reveals that, investment do not support RCBs liquidity which makes economic sense in the banking industry.

The other predictors where the macroeconomic factors which we considered 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 fails to reject the null hypothesis that macroeconomic variables has positive effect on liquidity for GDP and but for inflation we reject. This results is similar to bank performance studies by Athanasoglou, Brissimis, & Delis, (2008) and Ongore & Kusa, (2013) which used macroeconomic variables and had similar outcomes.

4.3.3 Results of the Extended Model with Market Jurisdiction as a Moderating Variable

With respect to the table 6 below, 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 **pre and post western financial crisis by** 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, (2015). 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, (2013) 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.

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	Difference

R²	0.880842	0.251975	0.628867
Adjusted R²	0.879905	0.246091	0.633814

*Source: Authors Computation, (2015)

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

5.0 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 introduce 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 then 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 its 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 of the 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. ~~and maybe on liquidity over a longer period then studied.~~

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 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, the Bank of Ghana should continue the new directives of revising and introducing new minimum capital requirements of RCBs as macroeconomic factors changes to ensure they contribute to economic growth. Thirdly, we recommend the training of management and staff on operating expenses management. This results from the 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.

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