

Original Research Article

Determinants of Ghana's Rural Banking Industry Liquidity: Panel Data Analysis

ABSTRACT

This study analyses the determinants of Rural and Community Banks (RCBs) liquidity performance in Ghana using a slightly modified CAMEL regulatory measures in addition to macroeconomic variables, with RCBs market jurisdiction as a moderating variable. Using about 114 specific rural community banks-level panel annual financial data from 2005 – 2013 was obtained from Bank of Ghana through ARP Apex Bank. The fixed effect model method estimation was used after liquidity equation and its conceptual framework was modeled. The results suggests that capital adequacy, asset quality, management efficiency, and real 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 has a mixed outcome on banks performance. Further, it indicate investment/diversification when not carefully embarked on has a negative effect on banks liquidity. More so, that market jurisdiction of rural community banks also has a significant effect on their liquidity performance. The independent variables are relevant determinants of RCBs liquidity as it explain more than 80% of the variability of RCBs liquidity in Ghana.

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

1. INTRODUCTION

This study aims to study the principal determinants of Rural Community Banks' (hereto referred as RCBs or Small Banks or Rural Banks) liquidity in Ghana and bank liquidity as revealed by literature. These RCBs are special unit banks which champion formal financial intermediation in Ghana. In the world of banking, the 2007-2008 financial crisis was partly attributable to the inadequate liquidity buffers of banks [1] 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 [2] liquidity allows banks to meet their obligations and to fulfill economy function and that the greater the liquidity ratio the higher the bank is expected to perform. Similarly, [3] said liquidity was a major cause of the 2007 financial crisis. The tenet of Banks assets is that, assets are predominantly deposits held in trust of their clients and demandable us and when clients required such funds. This arguably has been seen as the core function of banks. In this respect liquidity creation in recent times has received enough attention by scholars [4]–[8]. Ever since the works of [9] in respect to deposits insurance, the use of demand deposits as an insurance of turning illiquid assets to liquid assets has

30 demanded a critical look. Liquidity in the banking sector was viewed as a simple asymmetric
31 information model in the mid 1980's which to [10] is a liquidity demand that literature has
32 failed to capture. This raises concerns that, banks dependency on "instance deposits" as a
33 means of fulfilling clients banks demand is an unreliable measure due to information
34 asymmetry.

35 In Ghana banks are required to keep 9% of their deposits as primary reserves with the Bank
36 of Ghana by law [11].

37 From the above, interest on the level of banks liquidity required by banks to maintain a
38 healthy financial environs has received some attention, and this is confirmed with the interest
39 of Basel Committee on Banking Supervision of the Bank of International Settlement of
40 Switzerland [12], [13] with an international guideline. This indicates that liquidity may stands
41 for the capacity of a bank to meet its claims as and when they are due. Primarily, banks
42 required liquidity as a means of boosting deposits and shareholders confidence. Particularly,
43 banks required liquidity for: i) to cover withdrawal of funds by customers, ii) to meet
44 unforeseen borrowing request from their customers, iii) to satisfied inter-bank indebtedness,
45 which may arise daily due to payment clearing system, iv) to sustain normal cash flow
46 interruptions [14]. The Bank for International Settlements (BIS) (2008) defines liquidity as
47 "the ability of a bank to fund increases in assets and meet obligations as they come due,
48 without incurring unacceptable losses". According to BIS the principal function of banks in
49 the maturity transformation of short-term deposits into long term loans makes banks innately
50 susceptible to liquidity risk not only at the institutionally-specific nature but also its
51 repercussions on the market at large.

52 As researchers we seek to determine the drivers of banks liquidity in respect to small banks
53 which seems much vulnerable in deposit mobilization and to analyses the effect of such
54 RCBs liquidity influencing factors on RCBs performance. The problem is that, in Ghana
55 about 6% of RCBs have been liquidated for not meeting the requirements of the bank of
56 Ghana and hence was declare bankruptcy as per World Bank working paper on Rural
57 Banking in Ghana [15]. To the best of our knowledge few works such us ours have been
58 done in respect to bank liquidity in Africa for well-established commercial banks not to
59 mention small banks in this context rural and community banks particularly in Ghana. The so
60 'big to fail commercial banks' faced some financial crises despite it being seen as well-
61 resourced banks financially in deposit mobilization, human resource wise, large assets and
62 others. The question is '*ceteris paribus*' what the 'faith' of this vulnerable small banks called
63 RCBs in Ghana. Irrespective of their small nature, as researchers we believe such banks
64 provide formal banking services to rural and community dwellers who are predominantly
65 peasant farmers, petty traders, fish mockers, etc. though their total economic growth may
66 not be high compare to the universal banks and other commercial banks in Ghana.
67 Nevertheless, rural localities population out number their urban population in Ghana in eight
68 regions per Ghana population and housing census 2010 report [16]. Hence their
69 significances cannot be undermined as they may contribute to rural development and in
70 reducing urban migration.

71 Rural and Community Banks notably referred as Rural Banking in Ghana possess some
72 distinctive characteristics from universal banks in Ghana. This is partly attributable to the
73 regulatory measures of Bank of Ghana. These were also noted by [17] as follows i) they are
74 unit banks, (i.e. not legally enforced to have or open branches) ii) formerly they had a
75 terrestrial jurisdiction for their operations within a 20-mile radius. However, this restriction is
76 seem to be have been waived by the Bank of Ghana. Emphasis now is on viability in areas
77 such as adequate population, enough infrastructure and vibrant economic environment, iii)
78 ownership and management are in the hands of the indigenous people within the area and iv)
79 they are restricted in their scope of operations, especially in international transactions unless
80 it's through a universal/commercial bank.

81 The distinctive characteristics of RCBs in Ghana has spark recent attention among
82 academic researchers in Ghana [15], [17]–[21]. Most of these studies centered on their
83 profitability drivers and credit risk management with little emphasis on liquidity. This provided
84 grounds for the present study. Again, most of the writers above did little to examine the
85 contribution of RCBs to the economic growth which this paper seeks to unearth. This paper
86 holds that, an optimal level of liquidity is an evidence of a vibrant and stable banking sector
87 devoid of shocks and runs, and that illiquid bank is prone to bank failures. Particularly we
88 seek to establish that, where there exist low liquidity of RCBs, there is the likelihood of
89 liquidation and in the same vain a high liquidity has the propensity of low profitability. Again,
90 the used of the CAMEL approach as a fundamental measure to evaluate liquidity
91 performance of RCBs has not been used to the best of our knowledge particular in Ghana
92 for RCBs performance evaluation.

93 In view of above, the current study importance cannot be ignored. The major contribution of
94 this paper is to suggest an optimal liquidity model that can help RCBs in Ghana to withstand
95 liquidity shocks to avoid bankruptcy. It also obvious that, another novelty of this research is
96 to close the gap in literature by firstly determining the key determinants of RCBs liquidity in
97 Ghana, which may open the floodgate for further works. Secondly, to examine the
98 relationship between liquidity and other bank performance variables, such as capital
99 adequacy, assets quality, management efficiency, earnings ability and investments. Thirdly,
100 RCBs economic growth contribution is covered irrespective of how little it may be with the
101 used of macroeconomic variables such as Gross Domestic Product (GDP) and inflation.

102 This work is difference from similar studies in Ghana in that, the scope of RCBs studied of
103 114 is larger than [17] of 112 which was on profitability determinants and [18] on credit risk
104 management and profitability of 10 rural banks in the Brong Ahafo of Ghana. Second the
105 adoption of a credible regulatory measure has not be used in studying RCBs performance.
106 Thirdly, the macroeconomic variables aspect was not use in their studies, and lastly the
107 focus on liquidity determinants

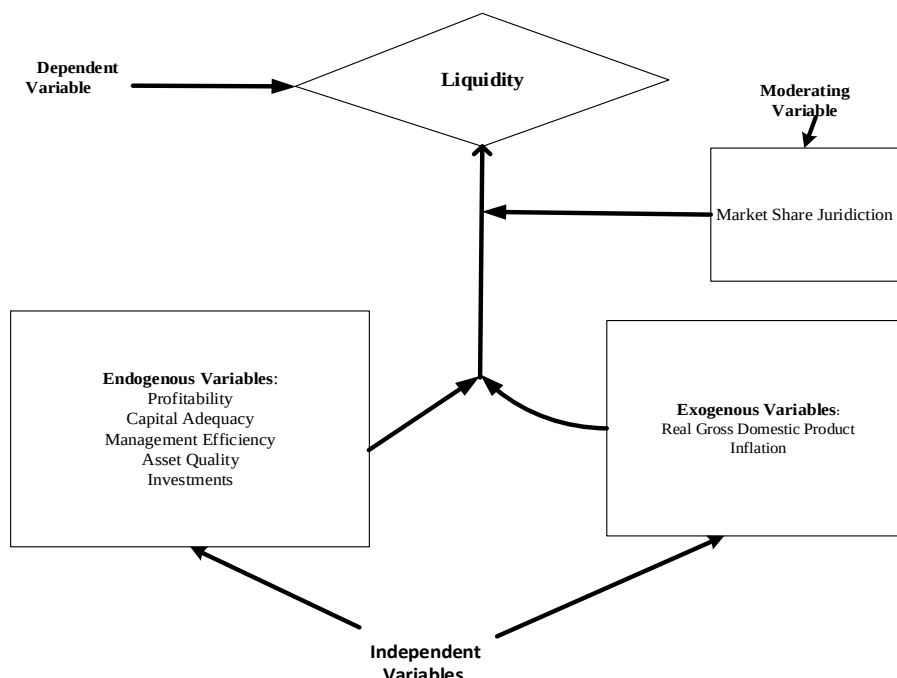
108 To achieve the objectives above, hypothetically we seek to test the following Null hypothesis:
109 i). RCBs liquidity has statistically positive significant with banks profitability, ii). RCBs liquidity
110 has negative association with banks profitability, iii). RCBs liquidity has statistical significant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

114 Based on the literatures reviewed in section two, we present below the conceptual
115 framework showing the various associations between the variables. This diagrammatic
116 representation was inspired by a number of empirically works on banks performance [7],
117 [22]–[25].
118

119 **1.1 Conceptual Framework**

120 Graphical relationship of the Variables considered for liquidity determinants.

121 Figure 1.



122

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

130 Also in respect to relationship, liquidity of RCBs had a weak positive relationship with
 131 profitability which was consistent with [26] study on listed commercial banks in Ghana.
 132 However, its effect on liquidity was negative and significant at 5%. Similarly investment also
 133 had a negative effect on liquidity and was also statistically significant at 95% confidence
 134 interval.

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

139 2. LITERATURE REVIEW

140 Empirical literature below shows that banks liquidity determinants in general is limited
 141 compared to banks profitability determinants. There appears to be deficit in literature on
 142 banks liquidity determinants studies on single countries and panel countries compared to
 143 works on banks profitability determinants. This clearly reveals a gap and the relevance of the
 144 current study on banks liquidity and banks determinants of RCBs especially. Thus, when
 145 considered from banks performance perspective this two aspects have been partly covered
 146 in a number of studies [22], [26]–[28]. However, we also acknowledges studies by [5], [8],
 147 [29], [30] on bank liquidity.

148 2.1 Bank Specifics Determinants of Liquidity

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

154 **2.1.1 Liquidity and Profitability**

155 Some studies found that liquidity is positively related to profitability though with varying levels in
156 respect to financial institutions [22], [26], [31], [32]. Also other studies found a negative relationship
157 between liquidity and profitability of financial institutions particularly banks [7], [21]. This shows that
158 there is inconsistency in respect to the relationship that has been established and this make the current
159 study of greater importance. From our view as researchers, the relationship should not be strong as a
160 strong relationship has the probability of banks investing deposits of customers which when demand
161 arose and their inability to pay, demonstrate poor financial health and this must be empirically
162 established. Apart from this, we may expect such a relationship to be negative, as banks liquidity limit
163 investment prospects which has the likelihood of increasing banks profitability.

164 **2.1.2 Liquidity and Capital Adequacy**

165 Another aspect of the liquidity determinants is its relation with banks capital. This part
166 considers the empirical evidences based on theories. A higher liquidity and capital level
167 requirements has the likely restriction of limiting excess bank capital and bank liquidity [33].
168 This may results to an adjustments on the assets column of banks' balance sheets, such
169 that there is a decline in risk grade assets or there would be banks credit restrictions. On the
170 basis of theories, banks capital hamper the liquidity creation process because it leads to a
171 fall in the financial fragility that promotes liquidity creation [34]. This from the perspective of
172 Gorton & Andrew (2014) refers to "crowd out" of deposits. This two scenario has also been
173 referred to as the theory of financial fragility- crowding out for expositional purpose [36]. On
174 the other hand, empirically it has been established that a higher capital improves the
175 capacity of banks in liquidity creation [10]. Another theory established empirically is that,
176 higher capital absorbs risk, and hence helps banks to create more liquid funds [37], [38] and
177 this is called the risk absorption hypothesis. This type of theory together with the financial
178 fragility crowd-out hypothesis theory has different influence on the size of banks. For
179 instance, whiles the financial fragility –crowding out effect arguably expects to have a
180 comparatively higher effects on small banks due to their inability to raise capital on capital
181 markets but from local funding, which is not the case with larger banks. This suggest that,
182 there is a greater likelihood that larger banks capital crowds out deposits. Larger banks has
183 a comparatively higher risk absorption due to regulatory and market discipline that has the
184 likelihood to affect their risk absorption capacity. These two scenarios has been supported
185 by [36].

186 **2.1.3 Liquidity and Asset Quality**

187 The significant of liquidity and assets quality of banks are crucial for their stability so the
188 relationship between them have influence on banks performance. A banks total liquid assets
189 to total assets, reveals bank's capacity to withstand liquidity shocks when it occurs.
190 According to [39] a higher liquidity ratio is a good indicator that customer's withdrawals
191 would be met. In respect to asset quality a total loans to total assets reveals the proportion of
192 the total loans of the bank to the bank's assets. To the best of our knowledge, there is lack of
193 empirical relationship and significant to support liquidity and asset quality of banks either
194 positive or vice versa.

195 **2.1.4 Liquidity and Management Efficiency**

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

202 **2.1.5 Liquidity and Investment**

203 Investment measurement is not wholly considered in the CAMEL framework as part of the
204 regulatory measure. This study defines investment of banks in terms of short term
205 investment in treasury bills and other liquid investments that falls due before one year.
206 Banks collect customers' deposits and customers' demand(s) for their deposits are not
207 expected to be delayed. A delay in payment raises concerns of the financial health of the
208 banks. Banks are not expected to lock up customers deposits in long term investments. In
209 this respect a decline in investment expects to have a positive effect on banks liquidity by
210 increasing liquidity. Investment has been measure as diversification in [17] but little or no
211 association was drawn between diversification and liquidity of banks. Also lack of evidence
212 exist between liquidity and investment of banks in literature to the best of our knowledge.
213 This research expects to add to the empirical findings of this relationship and the effect of
214 liquidity on banks investment portfolio.

215 **2.2 Exogenous Factors**

216 These are macroeconomic factors of Ghana as a developing country. It includes stability
217 policy measures such as Real Gross Domestic Product, Inflation, Interest Rate and Political
218 instability that influences banks performances. Macroeconomic factors are normally factors
219 which banks have no absolute control and which affect individual banks outputs. For
220 instance some researches have reveal that GDP and inflations rate do have some trend in
221 bank performances [22], [40], [41]. Particularly it has been establish that in a period where
222 GDP growth decreases, the demand for credit also declines which then adversely affects
223 profitability of banks [41]. Notwithstanding, in a rapid economic growth as indicated by
224 positive GDP growth, the demand for credit is high due to the nature of business cycle. A
225 similar study on financial performance of Kenya's commercial banks by [22], reveal GDP had
226 no significant relationship with profitability determinants of ROA and ROE as it also recorded
227 a negative coefficient parameters respectively. This shows that banks contribution to
228 economic growth still remain questionable in Sub-Saharan African.

229 In a determinants of profitability study of commercial banks in Sub Saharan African it was
230 discovered that inflation has a significantly positive effect on banks returns [40] , which was
231 an indication that banks in Sub Saharan African predict future changes in inflation rightly and
232 promptly enough to make room for interest rates and margins. A contrary evidence was
233 found for a single country though it was significant but inflation rate had a negative effect on
234 profitability [22].

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

238 3. METHODOLOGY

239 The study uses the quantitative method technique using financial ratios computed based on
240 secondary financial data collected from the audited financial accounts of RCBs from the
241 bank scope database consolidated by Bank of Ghana through it appointed supervisory body
242 ARP Apex Bank of Ghana. This data covered the period 2005 to 2013. The macroeconomic
243 variables was retrieved from the World Bank database website.

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

247 The sample size of the data consisted of all RCBs operating from 2005 to 2013. Due to
248 some RCBs non-meeting of regulatory requirements some were closed during the period
249 leading to non-availability of data, hence 114 RCBs was used out of 135 by Bank of Ghana.
250 To managed the data, the necessary extracts with respect to the variables needed were
251 entered into excel spreadsheet. This facilitated the clearing and computation of the various
252 financial ratios used for the research. The analysis of the study was made with the aid of
253 Stata 13.1 and Econometric View 7. A linear multiple regression model was developed
254 based on a modified CAMEL regulatory measure which is inter line with the Basel Accord on
255 Banking supervision of the Bank for International settlement [24] and other relevant variables
256 based on empirical studies. It also adopted the panel data methodology which assisted in
257 studying a group of RCBs which is an advantage [42]. The data was unbalance in nature
258 and it covered a period of 9 years and is also across space as are recognized in panel data
259 methodology [43], [44].

260 3.1 Specifications of Variables used in Estimating Bank Liquidity

261 To determine the liquidity determinants of the RCBs the CAMEL model used by regulators
262 and which is in intern line with the recommendations of Basel Committee on Bank
263 Supervision of the Bank of International Settlement was used as a baseline model. This
264 model is developed based on the empirical works on financial soundness, and health of
265 Banks ([24],[45]; [46]; [47];[48] ; [49]; [22]). The baseline model based on the cited above
266 was formulated us:

$$267 \quad L_{it} = \alpha_0 + \alpha_1 CA_{it} + \alpha_2 AQ_{it} + \alpha_3 ME_{it} + \alpha_4 Pro_{it} + \alpha_5 INV_{it} + \alpha_6 GDP_{it} + \alpha_7 INF_{it} + \varepsilon_{it} \dots (1)$$

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

269 α_0 = constant or Intercept of the equation.

270 $\alpha_1 - \alpha_7$ = Coefficients parameters

271 CA_{it} =Capital Adequacy of bank i at time t

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

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

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

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

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

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

278 ε_{it} = Stochastic Error term

279 3.2 Extended Model for Estimations

280 Using jurisdiction base on the market location of RCBs as a moderating variable, we proxy
281 that regions with more municipal assemblies has the propensity of enhancing the rural
282 community banks performance. This is due to factors such as population, economic and The
283 reason being the high population, increase in economic activities and developmental
284 progress. in such regions.

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

288

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

289 3.3 Description and Measurement Definitions of Variables

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

291 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: 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 ()	+
	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 unbalance 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 to 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 variable.

Again, to decide the model fitness between random effect and fixed effect, 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 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.

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, investment and bank size recorded 14%, 46%, 15%, 3%, and 1% averagely in performance. 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% [22]. This could be 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

From table 3 below, One significant factor was the management efficiency (ME) measured by operating expense to customer deposits. This was 15% which was very low and its reveals that in Ghana about 15% of RCBs customer deposits is used to settle operating expenses. A low rate is a good indication of management efficiency and this could be partly

340 attributable to proper monitoring and supervision by the Bank of Ghana assisted by the ARP
341 Apex Bank of Ghana

342 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

343

344

**Source: Researchers computation, 2015.*

345 4.2 Results and Discussion of Correlation Matrix

346 As part of determining the relationship that exist between liquidity and the various
347 determinants, a correlation matrix was done as show in table 4 below. On average, the
348 matrix revealed that, there was a very weak positive relationship between liquidity and
349 profitability, capital adequacy, and gross domestic product. In respect to asset quality,
350 management efficiency, the level of relationship was relatively high and positive.

351 In addition as can be observed from the relationship matrix above, inflation had a weak
352 negative relationship.

353 Profitability (which is measured by Return on Assets as the net income before tax and
354 interest to total assets) and liquidity positive relationship though weak means, more loans
355 and advances necessitated an increase in interest income hence resulting in an increase in
356 net income. We therefore fails to reject the Null hypothesis that liquidity has positive
357 relationship with banks profitability in rural community banks in Ghana. This confirms similar
358 studies by [26] on listed commercial banks in Ghana, and [18] on rural banks in the Brong
359 Ahafo Region in Ghana. It however contradict similar studies by [17] on profitability insights
360 in rural banking in Ghana and [22] on financial performance of Commercial banks in Kenya.
361 Our observation reveals that the measurement of liquidity was slightly different in the various
362 studies and hence the interest of the writers' variable definitions contributed to the
363 divergence empirical findings.

364 Another revelation was the inverse relationship between bank liquidity and investment. This
365 implied that as RCBs liquidity increases its both short term (Securities that fall due within a
366 year) and long term investment decreases in respect to its total assets. RCBs primarily do

not used customer deposits for loans and advances as they strike to ensure they have a sustainable liquidity to settle customer deposits. As more loans and advances granting has the propensity to increase their assets base with its returns.

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	0.85	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

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 as a moderating effect. The second part seek to examine whether there was any significant difference when liquidity is moderated by the market share.

4.3.1 Regression Results of Liquidity without Jurisdiction as a Moderating Variable

As can be observed from the regression output below, 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. The persistence of the Durbin Waston statistics approximation almost at 2 indicates no normality issues as the choice of the variables in the model as 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.

Table 5: Regression Results based on unbalance data

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
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Observations	1026	456	570
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

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*Source: Authors Computation, (2015)

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

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4.3.2 Discussions of Regression Results without Jurisdiction as a Moderating Variable

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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 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 output 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%.

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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

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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 is good because its safeguard firms against risk but the post-modern portfolio is considered more prudent in diversification of investment [50]. 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 [51] and [52] studies show that diversification has effect on banks profitability. In our case it had a negative effects on RCBs 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 perspective that is the shareholders view and socioeconomic view. From the maximization of shareholders wealth angel, an increase in investment may increase their returns as the banks' earnings appreciate. However, from the socioeconomic spirit, investments is a secondary choice after wholeheartedly satisfying their rural financial intermediation role. In the contest of the reported results, similar observation was made by [53] when analyzing Italian banks. Their study indicated that, diversification of banks assets do not guaranteed banks superior performance and/or risk reduction. Also [54] studied a sample of US community banks and observed diversification benefits within broader activity classes but not between them. Additionally, [55] 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) 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 [55]. This makes studies on banks investment portfolio an unending and ongoing study. Unlike a similar study by [17] on RCBS profitability insights which finds diversification contributes to profitability, our 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 RGDP 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 [57] and [22] 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 pre and post western financial crisis by 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 [17]. 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 [22] 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.

513 **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	α_7	.0355528**	-0.057771*
	Standard error	.0113134	0.007787

*JUR	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

515 **Source: Authors Computation, (2015)**

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

517 **5.0 Conclusions and Recommendations**

518 This study examines whether the CAMEL framework variables representing Capital
519 adequacy, Assets quality, Management Efficiency, Earnings ability (profitability) and Liquidity
520 can form the nucleus of RCBs liquidity determinants. This paper studied liquidity drivers and
521 hence introduce investment in place of liquidity so the CAMEL became CAMEI. Other
522 variables considered in addition were the macroeconomic variables. The data covered
523 annual financial reports of 114 RCBs from 2005-2009 in Ghana out of 135 RCBs. These
524 banks have been selected based on their data availability. Also, after the hausman test, the
525 fixed effect estimation of the Panel Least Square regression was more appropriate then the
526 random effect estimation.

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

536 Additionally, the investment portfolio of RCBs do not support their liquidity strengths within
537 the 9 year period though it may have impact on their profitability, and maybe on liquidity over
538 a longer period then studied.

539 Following the conclusions of the results above four major policy implications is worth
540 suggesting. Firstly, the liquidity management of RCBs should be prioritized in the daily
541 management activities of rural community banks. It worth mentioning that the Bank of Ghana
542 liquidation of some RCBs set a clear signal to other RCBs to improve on their liquidity

543 performance. Secondly, the Bank of Ghana should continue the new directives of revising
544 and introducing new minimum capital requirements of RCBs as macroeconomic factors
545 changes to ensure they contribute to economic growth. Thirdly, we recommend the training
546 of management and staff on operating expenses management. This results from the high
547 operating expenses to total assets which suggests weak management of their core business
548 expenses. Lastly we suggest, they explore other investment options to increase their income
549 levels outside interest incomes whiles being mindful of their liquidity positions.

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

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