Modelling the Impact of Liquidity Trend on the Financial Performance of Commercial Banks and Economic Growth in Cameroon

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Abstract

Recent year statistics have revealed the build-up of excess liquidity in Cameroonian commercial banks for more than two decades now. This has led to renewed interest in liquidity management, as it has implications on the financial performance of commercial banks. This paper is therefore designed to examine the impact of excess liquidity on the financial performance of commercial banks in Cameroon. Using Return on Assets (ROA) as proxy for the measurement of financial performance, secondary data from 1990 to 2016, with the application of the VAR technique, the findings reveals that excess liquidity and total liquid outflows affect ROA negatively. Gross domestic product, interest rate gap, total liquid inflows and previous year ROA had positive effects on ROA. Also from the empirical findings, there is an existing significant negative chain between excess liquidity, commercial bank performance and economic growth in Cameroon based on the Koyck Geometric lag reasoning. To address the negative vicious cycle chain, we therefore recommend guided minimum and maximum liquidity regulatory control and government effort geared towards encouraging moral suasions and special directive of investment by commercial banks in the agricultural, industrial and the educational sectors in Cameroon. Also, commercial banks should set maturity mismatch limits appropriate to the size of excess liquidity observed in each bank. Attempt to reverse the chain is part of the assurance to Cameroon emergence by 2035.

Keywords: excess liquidity, gross domestic product, financial crisis, financial institutions, financial performance, liquid outflows, moral suasion, special directives

1. Introduction

1.1 Background of the Study

The international financial system has for over many decades suffered from severe liquidity crisis. These crises started with the great depression of 1929 to the Russian default episode of 1998 and to the most recent 2007/2008 global financial crisis. Emerging Asia has for instance between 2007 and 2009 witnessed the spill-over effects of the US subprime mortgage market, ranging from a fall in Asian stock markets, depreciation of currencies and a decrease in international bank lending. In 2008, the Philippine Stock Exchange Index fell by 48.3%, reflecting a decline in the ability of the stock market to raise new capital, cost of borrowing in both the primary and secondary bond markets increased and liquidity increased from 29% to 30% in 2009 (Guinigundo, 2009). This global financial meltdown which resulted to financial instability actually unveiled the inefficiencies in the management of liquidity risk in financial institutions.

Sound liquidity management is an important objective of commercial banks, not only because it prevents banks from running in to liquidity shortages but also because it determines their profits. Munyambonera (2010), Olweny and Ongore and Kusa (2013), as cited in Lukorito et al (2014) have not only identified profitability as the primary objective pursued by commercial banks, but have also recognised that profits are a necessity for successful banking in this era of stiff competition in financial markets, and financial managers are committed to meeting that objective. Though, liquidity management has always been a priority in most banks, the aftermath of the global financial crisis and lessons learned from it have renewed concerns on bank liquidity issues. In a state of turmoil in banking markets, customers can withdraw their deposits at any time and this can lead to bank runs that can lead to costly liquidation of assets of even

large banks. The liquidity of banks allows them to grant credits and consequently stimulate investment and growth. To Civelek and Al-Alami (1991), since commercial banks are the primary suppliers of funds to firms, the availability of bank credit at affordable rates is of crucial importance to firm investments, and consequently, to the health of the economy.

Following the matching principle, Bank and Financial Managers therefore need to determine the ideal or the optimal level of liquidity which can satisfy their liabilities when they fall due without hurting the banks' performance especially in terms of profits. A liquidity-profitability trade-off thus exists, since the more liquid an asset is, the less profitable the asset would be. Dittmar and Mahrt-Smith (2007) found that firms with good corporate governance guard their cash resources better, whereas poor governance results in a quick misspend of excess cash in ways that significantly reduce operating performance. The above highlights the relevance and need for a careful liquidity management and monitoring by commercial banks to reduce the uncertainties associated with financial instability and unsystematic risks.

1.2 Problem Statement

The commercial banking sector in Cameroon is still at its infancy, and is dominated by the proliferation of foreign banks. By December 2009, there were twelve Commercial banks operating in Cameroon, with only three namely, National Financial Credit, Afriland First Bank and Commercial Bank of Cameroon as indigenous banks. This makes up about 75% of foreign dominance. The financial landscape of Cameroon has however experienced some evolution over the past decades, particularly in the financial institutions sector, where many microfinance institutions have surfaced. From 400 to about 652 microfinance establishments in the country at the end of 2008, a progress of 10% compared to 2007. Of this number, the Cameroon Cooperative Credit Union League (CamCCUL) occupies a relatively large proportion; 177 credit unions. However, by 2015, there were 418 accredited microfinance institutions in the country (Ministry of Finance (MINFI), 2015). Commercial banking activities have equally increased in coverage and depth with the number of banks increasing from 9 in 1999 to 12 by January 2010 and to 14 in 2016 with branches all over the urban centres in the country. Capital market development has in addition increased the intermediation role of banks within the financial landscape of Cameroon although with only two companies quoted in the capital market, Commercial banks in Cameroon are gradually getting involved in the process of enabling companies to go public through the Initial Public Offering (IPO).

The International Monetary Fund (2016) has observed that there exists excess liquidity within the banking system of Cameroon generated from the oil surpluses which have been growing significantly since 2001. Banks holding reserves in excess of those mandated by the Bank of Central African States (BEAC) have had their reserve ratio increased significantly. That is in Cameroon the liquidity ratio trend as 157%, 198% and 215% respectively in 2001, 2004 and 2005 (Saab and Vacher, 2007). The percentage of liquid assets over short-term liabilities was mandated by BEAC to stand at 100%. However, This phenomenon was further exacerbated by the lack of well-functioning money, inter-bank, and capital markets as well as substantial lags in the monetary policy to address it. In the same vein, the IMF country report No. 09/51 of February 2009, reveals that excess liquidity reached about 25% of total banks' deposits as of April 2007. BEAC then established a deposit standing facility whereby banks can deposit excess liquidity.

Despite recent BEAC actions, excess liquidity has continued rising in banks. In 2006 for example, excess liquidity rose by 37.5% from 489,038 million in 2005 to 672,363 million. In 2008, the upward trend persisted when it rose to the tune of 838,610 million FCFA, representing a 0.13% increase (COBAC report, 2008). The 2008 value showed that the measures put in place by the monetary authorities were inadequate to properly address the problem. World Bank statistics reveals that the average bank liquid reserves to bank assets ratio between 2008 and 2014 is about 34%. It therefore remains paradoxical that at a time the world's financial system is generally in liquidity crisis, Cameroonian commercial banks are swimming in a pool of excess liquidity with infinitesimal real growth rate of the GDP per capita.

The recent build-up of excess liquidity in the Cameroon commercial banking sector signifies that little funds actually flow from surplus units to deficit units to take advantage of profitable investment opportunities. The implication is a disconnection between the banking sector and the real sector of the economy. This disconnection principally should enhance the adverse effects on the banking sector's profits as well as on the growth of the whole economy. This is because while the banking sector is said to fuel the real sector of the economy, the performance of the real sector is also important to the growth of banks. World Development Indicators statistics (2016) shows that between 1990 and 2014 for instance, domestic credit provided by financial sector was on the average 16% whereas the average GDP growth rate was -0.2%.

Amongst the studies which have investigated the implications of liquidity on the performance of commercial banks visited by this study are those of Bourke (1989); Civelek and Al-Alami (1991); Demirgüç-Kunt and Huizinga (1999);

Agu (1992); Flamini et al. (2009), Bordeleau and Graham (2010), Ibe (2013), Lukorito (2014) and Marozva (2015). However, few of such works have been carried out in Cameroon among which is that of Yemngang (2015). All of the above studies cited have used descriptive statistics or uni-directional estimation technique which does not provide an in-depth analysis or the required causality between the financial variables under investigation. Thus, the question, "what is the effect of excess liquidity on the profitability of Commercial banks in Cameroon" is important.

1.3 Objectives and Significance of the Study

This study investigates the impact of liquidity trend on the financial performance of commercial banks and economic growth in Cameroon. Specifically, this study intends to determine the effects of liquid inflows, liquid outflows, excess liquidity, gross domestic product (GDP) growth and interest rate gap on the return on assets (ROA) of selected commercial banks in Cameroon.

To project the real situation on ground as well as to close the existing knowledge gap, it is necessary to undertake a study to assess the impact of excess liquidity on the performance of Commercial banks in Cameroon using the system estimation techniques, particularly the Vector Auto-Regressive (VAR) technique. Based on the above estimation technique, we are convinced that the findings are relevant, thus recommendations made by the study are competent in providing lasting solutions to financial management in Cameroon. The study expands the frontiers of knowledge on the effects of commercial bank liquidity on the financial performance of commercial and economic growth in Cameroon.

1.4 Organization of the Study

After this introductory section, the rest of this manuscript is structured thus; the literature on bank liquidity and commercial bank performance is reviewed in section two. The analytical methods employed in this study are discussed in section three. In section four, the empirical results are presented. Discussion of results is done in section five while section six focuses on policy recommendations and conclusion.

2. Literature Review

2.1 Empirical Literature

Flamini et al. (2009) examined the determinants of commercial bank performance in Sub Saharan Africa (SSA) using a selected sample of 389 banks in 41 SSA countries. Return on assets (ROA) was used to measure commercial bank performance. Both bank-specific as well as country-specific determinants common to all SSA were used. The bank-specific variables included credit risk, bank activity mix, capital, bank size and market power. Macroeconomic determinants included inflation, GDP per capita to control for different levels of economic growth in each country and year. Using Ordinary Least squares technique, it was found that apart from credit risk, higher returns on assets are associated with larger bank size, activity diversification and private ownership. Bank returns are affected by macroeconomic variables, suggesting that macroeconomic policies that promote low inflation and stable output growth do boost credit expansion. The results also indicate moderate persistence in profitability. Causation in the Granger sense from returns on assets to capital occurs with a considerable lag, implying that high returns are not immediately retained in the form of equity increases. To strengthen financial stability, support to a policy of imposing higher capital requirements in the region was recommended.

Bordeleau and Graham (2010) assessed the effects of liquid asset holdings on the profitability of banks for a sample of 55 U.S and 10 Canadian banks from 1997 to 2009 using a panel two‐step Generalized Method of Moment procedure. The results point to a non-linear relationship between liquid asset holdings and profitability, measured as Return on Equity (ROE). Bank profitability increases with an increase in liquid asset holdings up to a certain point after which further increases in liquid asset holdings diminish the bank profitability. Robustness checks were carried out using profitability ratios like Return on Assets (ROA) and the ratio of outstanding repurchase agreements to total liabilities, with similar outcomes. Empirical results further suggested that this relationship varies depending on the bank's business model and state of the economy. The main policy implication drawn from this work is that the tradeoff between resilience to liquidity shocks and cost of holding lower-yielding liquid assets must be considered as the latter may influence the banks' ability to generate revenues, increase capital and extend credit.

The impact of liquidity management on the profitability of banks in Nigeria was also investigated by Ibe (2013) using a random sample of three banks with data spanning from 1995 to 2010. Cash and short term fund, bank balances and treasury bills and certificates were used as the proxies for liquidity management while profit after tax was used as the proxy for profitability. Using multiple regression analysis, the results suggested that liquidity management is a crucial problem in the Nigerian banking industry. On the basis of the findings, it was therefore recommended that banks should engage competent and qualified personnel who are capable of adopting the optimal level of liquidity and still maximizing profits.

Lukorito et al (2014) assessed the effect of liquidity on the profitability of commercial banks in Kenya using 43 commercial banks which made up the commercial banking population from 2009 to 2013. The ROA ratios were used to measure profitability. Using the Ordinary Least Squares Technique, findings showed that liquidity has a statistically significant and positive relationship with banks' profitability. The study therefore recommended that banks should invest heavily in assets if huge gains have to be made, maintain adequate levels of liquidity in the form of short term marketable securities so as to realize profits and aggressively identify viable investment opportunities and link such opportunities to customer deposits.

Marozva (2015) investigated the relationship between liquidity and bank performance for South African banks from 1998 to 2014. Employing the Autoregressive Distributed Lag (ARDL)-bound testing approach and the Ordinary Least Squares (OLS) technique, the study observes a negative significant deterministic relationship between net interest margin and funding liquidity risk. The results also show that an insignificant long run relationship exists between net interest margin and the two measures of liquidity utilised; market liquidity and funding liquidity. It was recommended that financial institutions should not only treat liquidity as a short-run phenomenon but that further research should focus on liquidity in the context of asset- liability mismatches.

Yemngang (2015) carried out a study to examine the effects of managing liquidity risk on the financial performance of commercial banks in Cameroon, with Afriland First Bank as the case study. With data collected from the financial statements of the bank from 2003 to 2013, the multiple regression analysis, results showed that the profitability of Afriland First Bank is inversely related to cash and leverage but positively related to customer deposit. It was therefore, recommended that banks should widen their scope of operations by creating more branches in the country.

2.2 Theoretical Literature

The liquidity preference theory, the portfolio theory and the liquid asset theory are at the forefront of theories that have provided insights in explaining the links between liquidity and financial performance in the banking system.

The liquidity preference theory of John Maynard Keynes (1936) is out to explain why people hold money in liquid form. According to Keynes, there are three motives behind the desire of the public to hold liquid cash: (1) the transaction motive, (2) the precautionary motive, and (3) the speculative motive. The transactions motive relates to the demand for cash for the current transactions of individuals and businesses. Individuals hold cash in order to bridge the gap between receipts of income and its expenditure. The demand for money for transactions depends on income and interest rate. The precautionary motive for holding money refers to the desire to hold cash balances for unforeseen contingencies. Individuals hold some cash to provide for illnesses, accidents, unemployment and other unforeseen circumstances. Keynes holds that the transaction and precautionary motives is known as the active balance and are relatively interest inelastic, but is highly income elastic. The amount of money held under these two motives (M_1) is a function (L_1) of the level of income (Y) and is expressed as $M_1 = L_1(Y)$. The speculative demand for money suggested by Keynes relates to the desire to hold one's resources in liquid form to take advantage of future changes in the rate of interest or bond prices. Bond prices and the rate of interest are inversely related to each other. If bond prices are expected to rise, the rate of interest is expected to fall, thus people will buy bonds to sell when the price later actually rises. If, however, bond prices are expected to fall, people will sell bonds to avoid losses. According to Keynes, the interest rate and the speculative demand for money are inversely related. Algebraically, Keynes expressed the speculative demand for money as $M_2 = L_2(r)$ where, L_2 is the speculative demand for money, and r is the rate of interest. The total liquidity is denoted by M, that is the transactions plus precautionary motives by and the speculative motive by M_2, then $M = M_1 + M_2$. Since $M_1 = L_1(Y)$ and $M_2 = L_2(r)$, the total liquidity preference function is expressed as $M = L(Y, r)$. However, this is limited since the demand for money has gone beyond M_1 and M_2 in most advanced economies to include M_3 and M_4. That is the holding of money in form of other assets such as land, buildings, petrol bong, government bonds, discountable bills of exchange among others.

The portfolio theory suggests that banks, as financial intermediaries generate financing from depositors, equity-holders and debt-holder and then allocate these funds to a credit portfolio made up of securities, loans and mortgages. As in any portfolio allocation, banks face a risk-return trade-off. Specifically, for a given level of risk, banks attempt to maximum returns. Equivalently, banks minimize risk for a given level of return. Banks' investment portfolios can provide liquidity in three ways: (1) by the maturity of securities (2) the sale of securities for cash (3) the use of securities as collateral in a repurchase agreement or other borrowings. The exact amount of liquidity that a commercial bank should hold is difficult to determine. One approach of dealing with uncertainty in project returns is to increase the required rate of returns on risky investments. Hence, a risk adjusted discount rate can be used in any situation involving risk. The portfolio theory can be used to identify the optimal portfolio of assets and liability that will yield the desired return.

The central model within the portfolio theory is the Capital Asset Pricing Model (CAPM). The CAPM aims at predicting the relationship between expected returns and risk of investments. The most important assumption of the CAPM is that all investors are risk averse. Hence investors are mean-variance efficient in their attitudes towards risk and return (Bodie et al. 2004). The CAPM observes that no investor can affect prices in the market because every investor's wealth is small compared to the whole market, thus everybody is a price taker, everybody's holding periods are the same, portfolios are created from the same publicly traded assets, taxes or transaction costs are not regarded (so gains from stocks, bonds and dividends and capital gains are not considered different by investors), all investors are mean-variance optimizers and securities are analyzed in the exact way by all analysts and they share the same view of the economic prospects. The CAPM builds on the fact that the total risk of a stock, measured by the variance of stock returns, can be broken down into two categories; unsystematic risk and systematic risk. The unsystematic risk is firm-specific risk, i.e. factors that only affect the single company and not the market as a whole; this risk can be lowered and eliminated only by diversification. The systematic risk, also called market risk, are factors that affect the whole market such as interest rates or government crisis and this risk can therefore not be eliminated by diversification. This systematic risk is the only risk that CAPM cares about and it is measured by the beta coefficient in the CAPM not presented here due to space. The higher the beta the larger is the portfolio's volatility compared to the market, and vice versa.

According to the liquid asset theory, banks must hold large amounts of liquid assets as reserves against possible demands for payments. The original intention was to keep enough gold reserves in the safe with which to redeem any notes presented for payment. Banks today, in line with this theory hold cash and other liquid assets like money at call, bills discounted to meet up with liquidity demands. The theory is however limited in that in the present world setting, it is difficult to determine the exact amount of cash to hold. In addition, the theory is one sided, as it focuses only on the assets side of the balance sheet. With very active money markets, banks may not need to tie up funds in cash since assets can be turned at considerable speed and time to meet up with demands. Banks therefore rely on well-functioning financial markets.

Going by the real bill doctrine, commercial banks in their lending activities should extend credit only for short periods and for purposes which result in the self – liquidation of the credit. The primary function of commercial banks is to create funds needed to complete the processing of goods, to bring them to the market, to transfer them to the possession of the final consumers and provide a means of final payment for all material and services involved in the production and marketing of the goods. Investment loans therefore according to this theory, were considered inappropriate. The theory is based on the fact that bank deposits are demand or near demand liabilities and are therefore best committed in obligations that are self-liquidating. This theory persisted into the twentieth century. It was however limited in that it did not recognize the fact that withdrawal demands at a point in time may exceed the total loan repayment.

In 1920, the shiftability doctrine was formulated, emphasiing the shiftability or marketability or transferability of bank assets as a more appropriate guide for investing bank funds. This was in cognizance of the long term and more permanent type of financing provided especially by investment banks. Hence the degree of shiftability or marketability of bank loans and investment provided the liquidity base for bank operations. This theory ran into serious problems in 1930 when the whole banking system faced liquidity crisis as a consequence of the great depression. Like the commercial bill theory, the shiftability theory is attacked as a one sided theory which focuses only on the asset side.

The assets and liability management theory (LMT), deals with continuously arranging and rearranging the assets and liabilities of the bank without infringing the liquidity and safety of the bank and with the purpose of maximizing the bank's profits Bülent (2008). Measuring and managing liquidity needs are vital activities of commercial banks. By assuring a bank's ability to meet its liabilities as they become due, liquidity management can reduce the probability of an adverse situation developing. The importance of liquidity transcends individual institutions, as liquidity shortfall in one institution can have repercussions on the entire system. Bank management should measure not only the liquidity positions of banks on an ongoing basis but also examine how liquidity requirements are likely to evolve under crisis scenarios. It is observed from experience that assets commonly considered as liquid like government securities and other money market instruments could also become illiquid when the market and players are unidirectional. Therefore liquidity has to be tracked through maturity or cash flow mismatches. For measuring and managing net funding requirements, the use of a maturity ladder and calculation of cumulative surpluses or deficits of funds at selected maturity dates is adopted as a standard tool.

3. Methodology

3.1 Scope and Data Sources for the Study

This study employs time series data over a period of 27 years running from 1990 to 2016 inclusive. This period is carefully selected to include the economic crisis of the late 80s which stretched to the early 90s, the recent 2007 financial crisis as well as the 2007 BEAC reforms to manage excess liquidity. This period is long enough to sustain the rigorous analysis adopted by the system estimation approach of the Vector Autoregressive Methodology. Based on the range of the time selected and the application of the Koyk Geometric Distributive Lag, the Nerlove Partial Adjustment and the Cagan Adaptive Expectation Principles, the findings from this study are expected to be realistic for policy valuation. The data used in this study are obtained from BEAC documents, COBAC annual reports, records of the National Credit Council of Cameroon and Etudes et Statistiques Economiques and World Bank publications. Variables employed in this study involve ratios based on the financial statements of banks. Financial ratio analysis has been widely used to evaluate a firm's performance, make credit risk assessment decisions, and predict bankruptcy and merger targets.

3.2 Model Specification

This study adopts the Return on Assets (ROA) as a measure of bank financial performance as predicted by the Capital Assets Pricing Model (CAPM). Return on Assets is defined as the after tax profit over total assets of a bank. Since profits are a flow variable generated over the year, as opposed to the stock of total assets, this ratio is measured based on end of the period values. Return on assets has been selected as the main proxy for bank performance, instead of return on equity (ROE) because an analysis of ROE disregards financial leverage and the risks associated with it. The Return on assets measures how well a bank employs all resources at its disposal to generate returns regardless of who owns the resources. In addition, researchers such as Alexakis et al. (1995), Loan and Dragoş (2009), Demirgüç-Kunt and Huizinga (1999), Flamini et al. (2009) amongst others adopted ROA as measure of financial performance. Though the ROA may be biased due to off-balance-sheet activities, such activities are negligible in Cameroon banks, while on the contrary, the risk associated with leverage is likely to be substantial despite the institutional innovations that these financial institutions incorporate in order to compensate for informational asymmetries.

The functional relationship between the ROA, liquidity measures and other fundamental factors affecting ROA is specified as follows;

$$ROA_t = f(TIF, TOF, IG, GDP, EL) \quad (1)$$

The above function is transformed in to a model as shown on equation 2.

$$ROA_t = \beta_0 + \beta_1 TIF_t + \beta_2 TOF_t + \beta_3 IG_t + \beta_4 GDP_t + \beta_5 EL_t + U_1 \quad (2)$$

A priori: $\beta_0 \neq 0$, $\beta_1 < 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 < 0$

The variables of the function (1) as specified in model (2) are supported by both theoretical and empirical literature as presented above.

The variables are defined as follows:

ROA_t is Return on Assets (ROA) which measures bank's profitability relative to its assets and thus the bank's overall performance. It is the ratio of net income to total assets of the bank. **TIF_t** is Total Liquid Inflows in the current period. This variable incorporates the liquid assets of banks like interbank operations, deposits with subsidiaries and non-subsidiaries financial institutions, current account deposits with the central bank. It should be noted that the stock of money or cash in till was considered as an element of total inflow. This was so because just like the other components of inflows, it is a liquid asset.

TOF_t is Total Outflows at time t. This variable is taken to include the outflows of liquid assets from commercial banks (the interbank operations, refinancing at BEAC, current payables and accruals, current withdrawals obligations). **IG_t** is the Interest Rate Gap or Spread. The interest rate spread is lending rate minus deposit rate. Interest rate gap or spread is the interest rate charged by banks on loans to prime customers minus the interest rate paid by commercial or similar banks for demand, time, or savings deposits. This variable measures the profitability margin. **GDP_t** is The Gross Domestic Product in the current period. This is a proxy for measuring the economic performance of a country. The performance of commercial banks has implications for a country's economic performance.

EL_t= Excess liquidity at time t. This variable captures the gap between the liquid assets and the current liabilities of the banks. It shows the extent of mismatch in liquid assets. **Δ is** the first difference or second difference where applicable; **U** is the stochastic or error term which is assumed to be normally distributed with constant variance and zero mean; **L**

is log transformation of the non-negative or ratio variables which enable us to interpret our coefficients estimated as elasticities or degrees of responsiveness. The parameters $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the coefficients to be estimated. Based on the conditions that most macroeconomic time series data are often non-stationary and could only achieve stationarity after their first or second difference and that the results are reported as elasticities and not properties or returns to scale, the final model to be estimated is given as;

$$\Delta LROA_t = \beta_0 + \beta_1 TIF_t + \beta_2 \Delta LTOF_t + \beta_3 \Delta LIG_t + \beta_4 \Delta LGDP_t + \beta_5 \Delta LEL_t + U_t \quad (3)$$

3.3 Estimation and Validation Techniques

This study employs the vector Auto-regression (VAR) technique in estimating the coefficients of the model. The tools used by the VAR technique are very important in understanding the interrelationships among financial variables. The reduced form VAR model is an *n*-equation *n*-variable linear model in which each variable in the regression model is said to be explained by its lagged plus current and past values of the remaining *n-1* variables (Stock and Watson, 2001). The model therefore treats all variables symmetrically. Generally, a multivariable VAR system can be expressed in the following form;

$$y_t = a_1 y_{t-1} + a_2 y_{t-2} + a_3 y_{t-3} + \cdots + a_p y_{t-p} + \varepsilon_t \quad (4)$$

Z_t is a vector of endogenous variables at time t, a_i where *(i=1, 2,..., p)* are vectors of the coefficient of the variables, p is the number of lags in the system and ε_t is a vector of the residual terms.

Empirical research based on time series data assumes the stationarity of the time series in question. A time series $Y_1, Y_2, Y_3, \ldots, Y_n$ is stationary if its variance is constant over time and the value of the covariance between the two time periods depends on their lag and not on the actual time at which the covariance is computed (Gujarati, 2004). Before estimating the VAR model, tests of stationarity were therefore carried out on the variables. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were conducted to test for stationarity after ascertaining whether the series displayed drift or not. These tests compute the tau statistic (τ) at 1%, 5% and 10% levels of significance which is compared with its critical values. If the calculated tau values of the ADF and the PP test statistic are more negative than test critical values at a chosen percent significant level, the null hypothesis of no unit root is rejected otherwise it is accepted. The PP unit root test is a confirmatory test (Forgha et. al, 2016).

This study employs goodness of fit tests such as the adjusted R^2, t-tests, and F-statistic to test the reliability of the estimates. Adjusted R^2 measures the percentage of the total variation in the dependent variable explained by the joint variation of the explanatory variables in the model. The t-statistic test is used in testing for the significance of the estimated coefficients. The F-test is used to test for the significance of the adjusted R-squared. The VAR residual test of the Langragian Multiplier (LM) is used to test for serial correlation. The correlation matrix table is used in the work to determine the degree of multicollinearity between the variables. The Breusch-Pagan-Godfrey residual heteroskedasticity test is employed to test for the presence of heteroskedasticity while the VAR Granger causality test is employed to test for causality between liquidity and commercial bank performance.

4. Results

Results for unit root tests based on the ADF and PP tests are shown on table 1 and 2 respectively. These results are generated after the graphs of the individual variables have been plot to determine the nature of their trends and to evaluate whether they are with drift or without drift. These graphs are not presented due to space.

Table 1. Augmented Dickey-Fuller on the variables

Variables	Test Statistic	P-Value	Remark
ROA	-1.807442	0.0678***	I (0)
TIF	-3.508104	0.0012*	I (1)
TOF	-1.830050	0.0648***	I (1)
IG	-3.852422	0.0005*	I (1)
GDP	-2.767776	0.0078*	I (1)
EL	-3.717358	0.0007*	I (1)

* = significant at 1%, **= significant at 5%; ***=significant at 10%.

Table 2. Phillips-Perron Unit Root Test on the variables

Variables	Test Statistic	P-Value	Remark
ROA	-1.729187	0.0793***	I (0)
TIF	-3.556637	0.0010*	I (1)
TOF	-5.010515	0.0000*	I (1)
IG	-3.831222	0.0005*	I (1)
GDP	-2.613206	0.0113**	I (1)
EL	-3.771864	0.0006*	I (1)

* = significant at 1%, **= significant at 5%; ***=significant at 10%.

Based on the ADF and PP unit root tests presented on table 1 and table 2 respectively, TIF, TOF, IG, GDP and EL are nonstationary at level but become stationary after first difference, meaning that they are I(1) processes whereas ROA achieves stationarity at level implying it is an I (0) process. The p-values of the test statistic are significant. The correlation matrix results show the absence of strong multicollinearity between the explanatory variables in the model, with a significantly low value of 0.59.

The empirical results of this study, based on the VAR model are therefore presented on Table 3.

Table 3. Empirical results of the ROA Equation based on the VAR Technique

Dependent Variable: ROA_t

Method: Vector Autoregression

Sample (adjusted): 1993-2016

Included observations: 23 after adjustments

Variables	Coefficients	Standard Error	t-Statistic	P-Value
ROA(-1)	0.240505	0.146950	1.636642	0.0327
ROA(-2)	0.061649	0.185106	0.333046	0.7460
D(LOG(TIF(1)))	0.166834	0.096462	1.729535	0.0344**
D(LOG(TIF(2)))	0.437562	0.145468	3.007962	0.0132**
D(LOG(TOF(1)))	0.204474	0.039093	2.672433	0.0234**
D(LOG(TOF(2)))	0.318100	0.044812	2.735428	0.0249**
D(IG (-1)))	0.003206	0.001834	1.748113	0.1110
D(IG (-2)))	0.000843	0.001185	0.711078	0.4933
D(LOG(GDP(1))	0.051765	0.106597	0.485610	0.6377
D(LOG(GDP(2))	0.436232	0.090716	4.808779	0.0007*
D(LOG(EL(-1)))	-0.119080	0.071213	-1.672161	0.1254
D(LOG(EL(-2))	-0.321576	0.104526	-3.076524	0.0117**
C	0.010798	0.002440	4.424915	0.0013*
	Diagnostic Tests			
			Prob(F-statistic)	0.000146*
Adjusted R^2	0.869040		Prob. Chi-Square(2)	0.0958
F-statistic	13.16584		Prob. Chi-Square(14)	0.4617
B-G LM Test (Obs*R^2)	4.691425			
B-P-G Test (Obs*R-squared)	13.83978			

* = significant at 1%, **= significant at 5%; ***=significant at 10%.

From the findings, commercial bank performances (ROA) in the lagged one and two-year periods have positive effect on the current year performance of commercial banks in Cameroon. This is in line with the a priori theoretical expectation. Holding other factors constant, previous year's commercial bank performances have enhanced current year commercial bank performance in Cameroon. Precisely, a percentage increase in commercial bank performance in the one year lagged period has resulted to a 0.24 percentage increased in commercial bank performance. Similarly, a percentage increase in the performance of commercial banks in the lagged two-year period resulted to a 0.062 percentage increased in current year commercial bank performance. Both commercial bank performance in the one year lagged and two year lagged period are however insignificant in impacting current year commercial bank performance given that the critical p-values are less than their calculated P-value at 5% significance level.

From the above results, profits are reinvested to boast future performance of commercial banks in Cameroon so that profits turns to adjust fairly fast to their preceding average levels. The only limitation is that the reinvested profit is not adequate enough to impact significant changes in the commercial banks performance in particular and the economy of Cameroon in general. This means that the equity or capital base of the commercial banks is one of the determinants of commercial banks performance. This finding is consistent with those of Athanasoglou, et al. (2006) for Greek commercial banks while weaker evidence for profit persistence is found in European banks by Goddard, et al. (2004). The result is however contrary to that of Flamini et al (2009) who found out that abnormal returns earned by Sub Saharan African (SSA) banks are not immediately reinvested in the system to increase capital ratios and financial stability, and if any reinvestment occurs, this only happens with a substantial lag.

Our findings also show that TIF in the lagged one-year and lagged two-year period positively affects the performance of commercial banks in Cameroon thus, in agreements with the theoretical a priori expected. Precisely, the results show that in the lagged one-year period, a 1% increase in TIF would result to a 0.167% increase in the performance of commercial banks in the current year period. This result is significant given the calculated p-value of 0.0344 which is less than 0.05 its critical value. In the lagged two-year period, a 1% increase in TIF would also result to a 0.438% increase in commercial bank performance in the current year period, all things being equal. This result is significant at 5% level of significance. Furthermore based on the VAR Granger Causality test results, TIF in the lagged one year and the lagged two year periods jointly exert significant effects on the performance of commercial banks in Cameroon, with a p-value of 0.0061 hence, significant at 5% level of significant. This suggests that causality runs from TIF to bank performance in Cameroon.

This explains the growing propensity for commercial bank savings in Cameroon due to the confidence Cameroonians have had with their banking sector. This is in agreement with the works of Samad (2000) and Vento and Ganga (2009). The finding agree with the works of Lukorito et al. (2014) and Oluwasegun and Samuel (2015)who found that an increase in liquidity would bring about increase in the performance of commercial banks in Nigeria.

Furthermore, in the lagged one-year and lagged two-year period, TOF positively influenced current year performance of commercial banks in Cameroon. This is also in agreement with the a priori theoretical expectation. Current year performance of commercial banks would rise by 0.10% for a unit increase in TOF in the lagged one-year period, everything being equal. Also, in the lagged two-year period, a percentage increase in TOF is expected to enhance bank performance in the current year period by about 0.12% all things been equal. Both results are significant at 5% level of significant. Also, causality significantly flows from TOF to the performance of commercial banks in Cameroon since the calculated p-value of TOF for VAR Granger Causality test is 0.0174 which is significant at 5% level of significant. This findings reveal that any policy designs to enhance commercial banks' performance in Cameroon must promotes total outflows of liquid assets from commercial banks the interbank operations, refinancing at BEAC, current payables and accruals, current withdrawals obligations. There is also a strong causality between TOF and ROA as explains by their relative P- values.

Interest rate gap (IG) in the lagged one year and lagged two-year period both have a positive effect on bank performance. This is in line with a priori theoretical banking expectation. Bank profitability is expected to increase, the greater the interest rate gap. Quantitative results show that in the lagged one year period, a 1% increase in IG would result to a 0.032% increase in bank performance while in the lagged two-year period a 1% increase in IG would bring about a 0.008% increase in bank performance all things being equal. Both IG in the lagged one and two-year periods are at 5% level of significant. The study therefore concludes that, interest rate spread insignificantly affects commercial bank performance in Cameroon within the period of study, as such should not be a serious policy issue. Thus causality does not flow from IG to the performance of commercial banks in Cameroon.

Empirical results further confirm our priori expectation that the GDP in the lagged one year and lagged two year period on bank performance are positive. Increase in GDP in the lagged one year and lagged two year period would lead to

increase in the performance of commercial banks in Cameroon and vice versa. A 1% increase in GDP in the lagged one year period would bring about a 0.052% increase in the performance of commercial banks, ceteris paribus. In the case of the lagged two year period, a 1% increase in GDP is expected to increase performance of commercial banks by 0.436%. Both results are significant at 5% level. From the VAR Granger Causality test results, the p-value of GDP is 0.0000 which is far less than 0.05 implying that causality runs from GDP to the performance of commercial banks of Cameroon commercial banks within the period under consideration. This implies GDP in the lagged one and lagged two year periods jointly affect the commercial banks performance significantly.

The implication of this result is that increased economic growth stimulates financial performance as such any policy aimed at increasing economic growth in Cameroon must target commercial banks performance. The literature on finance and growth has it that while finance spurs growth, a healthy economy would also increase the volume of financial services in an economy. As the economy grows, there is an increased demand for financial services; people save more, investment also increases as well as other financial services, which triggers financial performance. This is in agreement with the works of Bordeleau and Graham (2010), and Tabari et al. (2013).

Important in this work is the link between EL and the performance of commercial banks. The findings reveal that EL in the lagged one year and lagged two year period impacts negatively on the performance of commercial banks in Cameroon. An increase in excess liquidity in commercial banks would lead to a decrease in the profitability of those banks. In the lagged one-year period, if EL increases by 1%, the performance of commercial banks would fall by 0.0119% while in the lagged two-year period it would fall by 0.032%. The results are significant at 5% level. Thus, both EL in the lagged one year and lagged two year periods jointly affect the performance of commercial banks significantly. This implies that any policy measures aimed at improving upon commercial bank performance in Cameroon must consider the level of excess liquidity (EL).

Results also show a negative significant link between excess liquidity and performance of banks over the period of study. This inverse relationship is consistent with the a priori specification and general convention as well as with studies conducted by Vento and Ganga (2009), Loan and Dragoş (2009), Bourke (1989), Samad (2000). This result is also in line with the Keynesian liquidity preference theory which considers that the opportunity cost of holding money is the forgone interest the money would have earned if it was invested. On the basis of this result, the null hypothesis that excess liquidity has no significance impact on the financial performance of commercial banks in Cameroon is rejected. The implication of this result is that as banks built up excess liquidity, their performance is retarded. This is supported by the fact that cash has a finance cost which increases as the excess liquidity rises thereby resulting to a negative influence on bank performance. However, it must be noted that illiquidity or low levels of liquidity can also be sources of poor performance.

Table 4. Empirical results of GDP Equation based on the VAR Technique

Dependent Variable: D(LOG(GDP))

Method: Vector Autoregression

Sample (adjusted): 1993-2016

Included observations: 23 after adjustments

Variables	Coefficients	Standard Error	t-Statistic	P-Value
ROA(-1)	0.400672	0.100214	2.635771	0.0002
ROA(-2)	0.501194	0.033848	2.642348	0.0020
D(LOG(TIF(1)))	-0.721424	0.413689	-1.743881	0.1118
D(LOG(TIF(2)))	-0.946213	0.623857	-1.516716	0.1603
D(LOG(TOF(1)))	0.226717	0.167656	1.352269	0.2061
D(LOG(TOF(2)))	0.223054	0.192184	1.160630	0.2727
D(IG (-1)))	0.002972	0.007865	0.377834	0.7135
D(IG (-2)))	-0.001077	0.005083	-0.211995	0.8364
D(LOG(GDP(1))	0.051476	0.457155	2.112601	0.0556
D(LOG(GDP(2))	0.215699	0.389045	0.554430	0.5915
D(LOG(EL(-1)))	-0.530425	0.305408	-1.836778	0.1031

D(LOG(EL(-2))	-0.708576	0.448271	-1.580685	0.1450
C	0.001582	0.010465	0.151175	0.8828
	Diagnostic Tests			
Adjusted R^2	0.752650		Prob (F-statistic)	0.0.064
F-statistic	16.73489		Prob. Chi-Square(2)	0.4283
B-G LM Test (Obs*R^2)	5.034791		Prob. Chi-Square(14)	0.0807
B-P-G Test (Obs*R-squared)	17.38872			

* = significant at 1%, **= significant at 5%; ***=significant at 10%.

From the results of the GDP equation found on table 4, the coefficient of ROA in the lagged one year is 0.4. This means a 1% increase in ROA in the lagged one year period will result to a 0.4% increase in the current year GDP of the country, all things being equal. In the lagged two year period, the value of ROA is 0.5 indicating that a 1% increase in ROA will result to a 0.5% increase in current year GDP. Both ROA in the first year and second year lag are significant at 5% significance level. The implication of this result is that bank profitability has significant effect on the real sector of the economy in Cameroon. In other words, banking sector activities in Cameroon do produce the desired effect on the real sector of the economy. This result makes some sense because within the Cameroonian context, informal financial sector groupings such as the "Njangi" houses dominate the informal financial sector with commercial banks dominating the formal sector. This dominance of informal financial activities could be interpreted as indicator of many core poor dominant of the total population.

The results also show that total liquid outflows (TOF) in the lag one and the lag two year periods have positive effects on Cameroon GDP. An increase in TOF would lead to an increase in GDP and vice versa. Precisely, a 1% increase in TOF in the lag one year and lag two year periods will each to a 0. 0.226717% and 0.223054% increase in GDP in the current year period, everything being equal. The TOF in both the lag one and the lag two year periods are respectively insignificant thus, this result is expected in the case of Cameroon because the presence of excess liquidity in commercial banks is an indication of the fact that liquidity doesn't flow out to finance economic activities in Cameroon in the volume in which it is expected.

Excess liquidity (EL) in the lag one and lag two year periods have negative effects on economic growth in Cameroon. This means any increase in EL is expected to retard the level of GDP of the country and vice versa. Quantitative results reveal that in the lagged one year period, a 1% increase in EL would lead to 0.53% fall in GDP and in the lagged two year period it would bring about a fall in GDP by 0.70%. The results are significant at 10% level of significant. The VAR granger causality test at 5% significance level finds a strong causality moving from EL to GDP and vice versa in Cameroon. This implication for this finding is that any policy aimed at enhancing economic growth in Cameroon must reduce excess liquidity in Cameroon to advantage of the real sector.

The value of adjusted R-squared (0.752650) indicates that more than 75% variation in GDP is explained by variations in return on asset, total liquid inflows, total liquid outflows, interest rate gap, gross domestic product and excess liquidity. The F-statistic is significant at 1% level of significance which reveals that our findings are more than 99% reliable. The p-value of the B-G LM test for serial correlation is 0.0807 therefore we fail to accept that there is any autocorrelation in the GDP model. The White's heteroskedasticity test result indicates the absence of heteroskedasticity in the GDP model since the p-value of 0.4283 is insignificant at 5% level.

The value of adjusted R-squared (0.869040) indicates that about 87% of the variations in the performance of commercial banks is explained by variations in previous year return on asset, total liquid inflows, total liquid outflows, interest rate gap, gross domestic product and excess liquidity, with 13% being explained by the random terms. This result is reliable as confirmed by the P-value of the F-statistic of 0.000146 which is significant. Following the B-G LM test for serial correlation, we fail to accept that there is any autocorrelation in the model at 5% significance level, with a p-value of 0.0958. The Breusch-Pagan-Godfrey heteroskedasticity test result indicates the absence of heteroskedasticity in our model since the p-value of 0.4617 is insignificant at 5% level.

5. Policy Recommendations

Based on our findings, it is recommended that;

Maturity mismatch limits should be set appropriate to the size, business and financial condition of each bank. To achieve this, an Asset - Liability Committee (ALCO) consisting of a bank's senior management including the chief executive officer (CEO) should be responsible for ensuring adherence to this limit which must strongly abide to the COBAC regulation in the domain of bank performance.

Any liquidity deficiencies must be arrested in a timely manner to avoid possibilities of bank runs. Any excess liquidity above the appropriate limit should be geared towards real sector investment because such surpluses retard performance. In order to reduce liquidity which is in excess of operational requirements, management should ensure it has exhausted all credit granting opportunities, without compromising on credit quality. Alternatively, the banks should undertake long term drives to expand loan demand. Where the promotion of credit does not fully utilize excess liquidity, interim investment of funds should generally be made in short-term investments, so that conversion to new loans may readily occur.

Bank managers should consider an effective way of managing liquidity by examining the array of available sources both on the asset and liability sides of the balance sheet. This is because if liquidity plans are focused only on the adjustments of the asset side of the balance sheet, sometimes less costly sources of liquidity will be ignored. Conversely, focusing solely on the liability side or depending too heavily on purchased wholesale funds can leave the bank vulnerable to market conditions and influences beyond its control. To effectively manage liquidity, guided adjustment in cash flow needs for the immediate future (one year) should be condition by previous year's liquidity fluctuations (at least two years); expected increases/decreases in loan demand; income estimates for the year; the volume of deposit and withdrawals by customers; volume of institutional deposits and large deposits should not be left out. In examining the above, bank management should understand the characteristics of their fund providers, the funding instruments they use, and any market or regulatory constraints on funding.

The monetary and regulatory authorities should also institute deposit insurance policies. This will encourage deposits and reduce moral hazards associated with information asymmetry. Uninsured demand deposit contracts are able to provide liquidity, but leave banks vulnerable to runs. This vulnerability occurs because there are differing levels of confidence among bank customers.

Given that market and bank liquidity are directly related, a modern capital market will allow commercial banks to develop financial assets for the investment of excess liquidity to generate returns. The Cameroon government should therefore direct efforts towards strengthening the capital market in Cameroon. This can be done by ensuring that a proper and functional judicial system as well as a reliable regulatory and supervisory authority is put in place to guide the functioning of this market.

We urge the Cameroonian authorities to in addition to the reliance on statutory advances from the regional Bank of Central African States (BEAC), start issuing government securities. These securities will serve as a secured means for banks to invest their surpluses and enable the government to channel these funds to activities that will foster growth. Commercial banks in Cameroon should participate in corporate social responsibility, encouragement of academic excellent, research for development, mortgaging among other. All these will reverse the adverse effects of the excess liquidity dictated in the commercial banks in Cameroon on economic growth over the years.

6. Conclusion

This study set out to investigate the causality between excess liquidity, financial performance of commercial banks and economic growth in Cameroon with time series data spanning from 1990 to 20156 using the VAR approach. From the empirical findings, the is an existing significant negative chain between excess liquidity, commercial bank performance and economic growth in Cameroon based on the Koyck Geometric Lag reasoning. To addressed the negative vicious cycle chain that runs between excess liquidity, commercial bank performance and economic growth in Cameroon within our period of study, we there recommend guided minimum and maximum liquidity regulatory control and government effort geared towards encouraging moral suasions and special directive of investment by commercial banks in the agricultural, industrial and the educational sectors in Cameroon. *Also, commercial banks should set maturity mismatch limits appropriate to the size of excess liquidity observed in each bank. Attempt to reverse the chain is part of the assurance to Cameroon emergence by 2035.*

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