Business, Management and Economics Research
ISSN(e): 2412-1770, ISSN(p): 2413-855X
Vol. 2, No. 8, pp: 155-162, 2016
URL: http://arpgweb.com/?ic=journal&journal=8&info=aims

The Impact of Bank-Specific Determinants on Commercial Banks' Liquidity in Namibia

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Abstract: This paper examined the bank-specific determinants for commercial bank's liquidity in Namibia. The study was based on quarterly data covering the period 2001:Q1 to 2014:Q2, utilizing the technique of unit root and ordinary least squares. The results of the unit root test showed that all variable were stationary in levels and thus, the ordinary least squares technique was used to conduct the estimation. The results revealed a statistical insignificant negative relationship between commercial bank's liquidity and return on equity as a measure of commercial bank's profitability. Furthermore, the results also showed a positive relationship between commercial bank's liquidity and capital adequacy as well as between commercial bank's liquidity and non-performing loans though statistical insignificant.

Keywords: Bank-specific; Commercial bank's liquidity; Namibia; Unit root; Ordinary least squares.

1. Introduction

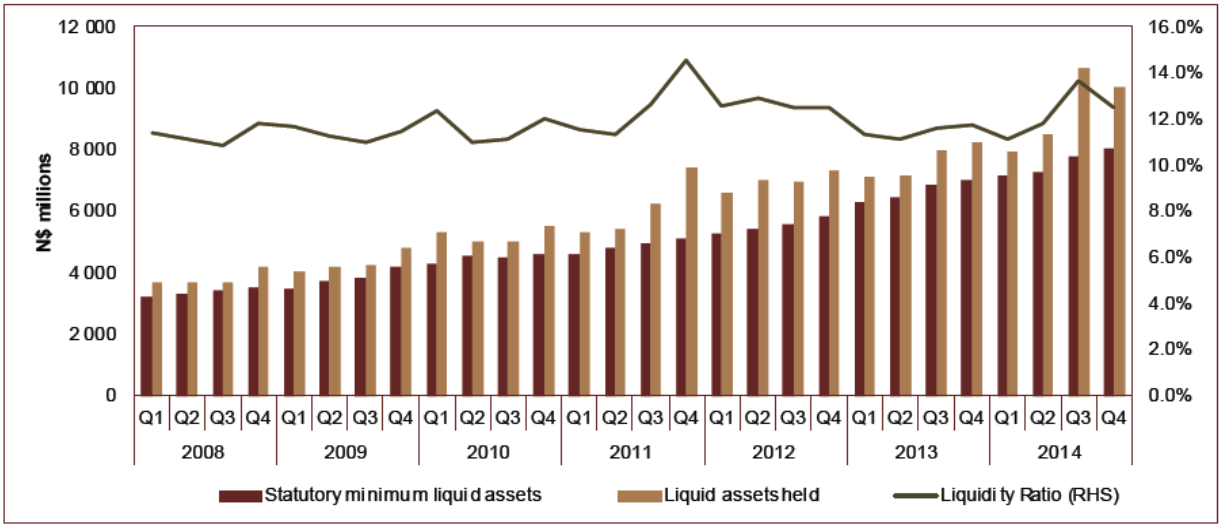
Bank liquidity can be defined as the ability by the bank to fund increasing assets and meet its obligations on time, without incurring undesirable losses. A situation where a bank fails to manage its liquidity results in liquidity risk. In other words, liquidity risk is associated with all risks that results from a bank failing to meet its obligations when due or even worse only being able to do so by emergency borrowing at a high cost (Chikoko, 2013).

According to Wojcik-Mazur and Szajt (2015) prior to the outbreak of the sub-prime crisis, liquidity risk was investigated in the context of it being a determinant (explaining variable) of the commercial bank's profitability. However, the crisis that erupted as a result of credit crisis associated with the subprime mortgage credit quickly transformed itself into a liquidity crisis which caused bankruptcies, quasi-bankruptcies and nationalizations of large financial institutions. Thus, the financial turbulences of 2007 have demonstrated the greater importance of establishing a level of liquidity sufficient to cope with adverse conditions (Ferrouhi and Lahadiri, 2014).

Historically, considerable effort has been put in designing bank capital regulation. For example, the Basel Committee has proposed a tighter capital requirement 7.25% for business and consumer loans in 1989. This requirement increased to 8% even way before 1993 in order to facilitate the insolvency of banks. In particular, the Basel I Accord (Bank of International Settlement, 1988) set out the regulatory standards on market risk and credit risk. The Basel II Accord (Bank of International Settlement, 2004) further considered the operational risk and not liquidity risk. Despite all these efforts and banks having adequate capital, most banks still experienced financial distress as a consequence of poor liquidity management (Choon *et al.*, 2013). The lesson from this experience is that proper liquidity management on both financial market and the banking sector is of greater importance.

In addition, the Basel Committee has also instituted mechanism to encourage liquidity creation by commercial banks in the form of Liquidity Coverage Ratio (LCR). This was aimed at encouraging short-term tolerance on liquidity risk profile of banks and to ensure adequate stock of high-quality assets (HQLA) that can be liquidate easily in private markets in the case of emergency. (Choon *et al.*, 2013).

Figure-1. Liquid Assets and Liquidity Ratio



Source: Bank of Namibia

Figure 1 shows liquid assets and the liquidity ratio for the Namibian banking sector. The figure shows that during 2014, the banking sector still continued to hold liquid assets well above the statutory minimum liquid asset requirement of 10% of average total liabilities to the public. The liquidity ratio increased to 12.5% at the end of December 2014 from 11.7% at the end of December 2013 (Bank of Namibia, 2015). However, the FSR further reports that there are some potential for liquidity risk due to structural factors in the banking sector. First, the ratio of wholesale deposits to retail deposits in the banking sector remains asymmetric at approximately 70:30, suggesting a potential volatile funding source of deposit base. Second, there is an increase in the proportion of the sector's deposits of 10 largest depositors from 25.5 percent to 26.0 percent during the period 2014, indicating an increase in deposit concentration risk. This situation is similar to what Chikoko (2013) describes when there is a mismatch between maturities of assets and liabilities, both on balance sheet and off balance sheet to form a classic mismatch gap which constitutes structural risk. This risk is determined by the character of funding sources, which are short or medium-term, in comparison to long-term lending. Thus, banks are forced to continually roll over short or medium-term on-balance-sheet funding sources, to match them with the assets maturity profile. This act constitutes a liquidity risk which is among the major causes of bank failure. Although there are combinations of different factors that determines liquidity risk. This study draws its primary interest to specifically investigate the bank-specific factors that determines liquidity risk in Namibia. The paper is organized as follows: the next section presents a literature review. Section 3 discusses the methodology. The empirical analysis and results are presented in section 4. Section 5 concludes the study.

2. Literature Review

2.1. Theoretical Literature

The theoretical framework of this study is based on three theories namely inventory theory of capital and liquidity buffer, shift ability theory and risk absorption hypothesis.

The inventory theory of capital and liquidity buffer predicts that the size of liquidity buffer should reflect opportunity cost of holding liquid assets rather than loans as well as the cost of raising funds at a short notice. Furthermore, it should also take into account the distribution of liquidity shocks that commercial banks may encounter. In particular, the size of liquidity should be positively related to the volatility of the funding basis and the cost of raising additional funds. It is for this reason that commercial banks are encouraged to keep a buffer of liquid assets to enable them to adequately manage the liquidity risk underlying their balance sheet structure (Mugenyah, 2015). In support of this argument is Baltensperger (1980) who stated that though it may be costly for commercial banks to keep a stock of liquid assets, it is more beneficial in the sense that it minimises risk of being out of stock in case of deposit withdrawals. Furthermore, Diamond and Dybvig (1983) and Diamond and Rajan (2001) also advocate for commercial banks to keep sufficient liquidity to insure them against liquidity risk that may arise from unexpected massive deposit withdrawal which might be costly for banks to counter on short notice. Hence, keeping a buffer of liquid assets by commercial banks equates the marginal benefit of holding liquid assets to the marginal cost of alternative form of financing.

The shift ability theory of liquidity is also of the view that banks can insulate themselves against massive deposit withdrawals by holding, credit instruments for which there is a ready secondary market as a form of liquidity reserve. Among the liquidity reserve are commercial paper, prime bankers' acceptances and Treasury bills. These instruments are marketable because of their short-terms to maturity and capital certainty (Mugenyah, 2015). Furthermore, this theory enhanced the framework that accommodates new and innovative approaches to business lending by commercial banks. For example the practise of commercial bank loan commitment as it is done and

prevails today is because of the shift ability theory of liquidity. Thus, holding liquid assets with a ready market enables commercial banks to minimize vulnerability to liquidity risk.

The theory is directly linked to function of risk-transformation which commercial banks undertake (Okpala, 2013). This theory follows two strands of literature. The first strand is that liquidity creation exposes commercial banks to risk (Allen and Gale, 2004; Diamond and Dybvig, 1983). It basically implies that the more liquidity is created the higher the probability and greater severity of losses associated with having to sell-off illiquid assets in order to meet the demand of clients. The second strand argues that commercial banks capital absorbs risk and expands banks' risk-bearing capacity (Okpala, 2013; Von Thadden, 2004). The risk absorption hypothesis predicts that higher capital ratios are positively related to liquidity levels and enhances the ability of banks to create liquidity (Mugenyah, 2015).

Literature also highlight on a number of bank-specific determinants of liquidity risk. Among these are bank size, liquid assets ratio, asset quality, capital adequacy and ownership type. Mugenyah (2015) discussed each of the determinants as briefly explained as follow. First, bank size measured in terms of total assets has an impact on liquidity levels as it has an effect on the commercial banks' ability to mobilise funds and the cost that comes along. Second, the nature of the commercial banks' assets, especially the propensity or flexibility to transform them into very liquid assets also affects its liquidity risk. Third, the quality of loan portfolio determines the commercial banks' liquidity risk since loans are the major assets of commercial banks where huge incomes are derived. Fourth, capital adequacy is said to be the measure of commercial banks' internal strength so as to withstand losses during crises, operational costs and fund liquidity. Thus, higher capital ratio is associated with less liquidity risk while the opposite applies. Lastly, ownership structure of the commercial banks also determines liquidity risk. For instance, commercial banks with external affiliation tend to manage their liquidity much better, because of opportunity of getting assistance from their foreign partners in times of need. This may not be the same for local owned banks.

2.2. Empirical Literature

A number of studies have empirically looked at the various bank-specific determinants of commercial bank's liquidity. Below is a list of few selected empirical studies on the abovementioned subject.

Table-1. List of selected empirical studies

Author	Country	Period and Frequency	Methodology	Findings
Vodova (2011a)	Czech Republic	2001-2009 (annual)	Panel data model	There is a positive relationship between bank liquidity and capital adequacy, share of non-performing loans and interest rates on loans and on interbank transaction. However, the relation between size of banks and liquidity is ambiguous.
Vodova (2011b)	Slovakia	2001-2010 (annual)	Panel data model	Bank liquid assets decreases with higher bank profitability, higher capital adequacy and with the size of bank. Liquidity of banks increases with bank profitability while interest margin and the level of non-performing loans have no statistically significant effect on the liquidity.
Al-Khouri (2012)	Gulf Cooperation Council countries	1998-2008 (annual)	Panel data model	Credit risk, equity, market concentration and gross total assets positively influence liquidity. However, bank size and bank profitability negatively affects liquidity.
Bhati *et al.* (2013)	India	1996-2012 (annual)	Panel data model	Capital to total assets and log of total assets are significant in affecting liquidity. Others factors have very little influence

				on liquidity of banks.
Chikoko (2013)	Zimbabwe	2009-2012 (monthly)	Panel data model	Capital adequacy and size have negative significant influence on liquidity risk. Non-performing loans have a positive significant relationship with liquidity risk.
Choon *et al.* (2013)	Malaysia	2003-2012 (annual)	Panel data model	The bank-specific factors used in this study include size of bank, capital adequacy, profitability and credit. The results revealed that all factors included are significant except interbank rate. Among these factors non-performing loans and profitability positively affects bank liquidity. On the other hand bank size and capital adequacy influence bank liquidity negatively.
Ferrouhi and Lahadiri (2014)	Morocco	2001-2012 (annual)	Panel data model	Liquidity is mainly determined by size of banks, share of own bank's capital of the bank's total assets, external funding to total liabilities and return on assets. In this regard, liquidity is positively correlated with bank's size, share of own bank's capital of the bank's total assets, external funding to total liabilities while negatively correlated with return on assets. However, bank's return on equity and equity to total assets has no impact on bank's liquidity.
Vodova (2013)	Hungary	2001-2010 (annual)	Panel data model	Bank liquidity is positively related to capital adequacy, interest rate on loans and bank profitability, while negatively related to the size of the bank, interest margin and interest rate on interbank transactions.
Mousa (2015)	Tunisia	2000-2010 (annual)	Panel data model	Financial performance, capital, loans / total assets and operating expenses / total assets have a significant impact on bank liquidity, however size, total deposits/total assets, financial expenses / total loans does not have significant impact on bank liquidity.

Source: compiled by the author

Table 1 reports the empirical studies on the subject matter. The lessons to be learnt from these studies are that there is evidence of the existence of the relationship between commercial bank's liquidity and bank-specific determinants. Among the determinants that were identified include capital adequacy, non-performing loans, interest rates on loans, interest rates on interbank transactions, size of the banks, bank profitability, credit risk, market concentration, gross total assets and share of owner's capital. The extent to which the effect occurs varies from country to country. For example in some instances the effect appears to be positive while in other appears to be negative. However, the most notable trend observed is that capital adequacy, size and bank profitability appeared to negatively affect commercial bank's liquidity in most cases. To date the researcher is not aware of any study on Namibia that has specifically examined this relationship. This in itself is a good reason for a research on this subject in Namibia to answer the question about the main bank-specific determinants of commercial bank's liquidity in Namibia.

3. Methodology

In order to analyse the long-run relationship between bank-specific factors and commercial bank's liquidity variables, time series econometric methods has been used. In particular, the study employed the error correction model. The methodology applied is dictated by the nature of the data available. Thus, unlike most empirical studies highlighted in the empirical literature, the study did not follow panel data modelling approach.

3.1. Econometric or Analytical Framework and Model Specification

Prior to the estimation of the ARDL model, the first step is to construct the liquidity ratio that will represent the regressand. This approach has also been use by Ferrouhi and Lahadiri (2014), Vodova (2013) and many others. The study acknowledges that there numerous ratios that can be used but this study used the one type as presented below:

$L_1 = \frac{Liquid\ assets}{Total\ assets} * 100$, measures the ability of a bank to absorb liquidity shocks. A high ratio means a high ability to absorb shocks which can be interpreted as bank's efficiency since liquid assets yield lower income and incur high opportunity costs for the bank.

The aim is to identify the determinants of commercial bank's liquidity in Namibia. Therefore, upon constructing the different measures of liquidity, the next step would be to estimate each of the previously defined ratios using the error correction model. The equation for the bank-specific determinants of commercial bank's liquidity can be specified as:

$$LQA_t = \alpha_0 + \alpha_1 CA_t + \alpha_2 NPL_t + \alpha_3 ROE_t + \varepsilon_t \quad \ldots 1$$

Where LQA_t represents liquidity ratio of liquid assets to total assets, CA_t represents capital adequacy ratio, NPL_t represents non-performing loans, ROE_t is return on equity representing bank's profitability.

Equation (1) may be estimated using the Engle-Granger two-step procedure to obtain the coefficients of interest (for the regressors). However, it is not automatic, since most financial data are trended and they are potentially non-stationary. Granger and Newbold (1974) have established that regression analysis from non-stationary variables yield spurious (nonsensical) results. Hence, the first step is to investigate the unit root properties of the variables in question. This suggests that the econometric technique to be used for estimating Equation (1) will be dictated by the properties of time series data. There are numerous tests for unit root but the ADF and PP were used in this study.

Upon establishing that the series are stationary at levels, Equation (1) will be estimated using Ordinary Least Squares (OLS) technique. But should the series be found non-stationary at level, but stationary at first difference, the test of cointegration will be conducted to establish whether or not the pair of the series is cointegrated. If the pair of the first differenced stationary series is not cointegrated, then Equation (1) will be estimated with the first differenced series to avoid the problem of spurious regression. There are various tests for cointegration, however, the residual based to cointegration test was used in this case. If there is cointegration relationship among the variables, it can be re-parameterised as an Error-Correction Model (ECM) which will contain both short- and long-run effects. Following Hendry (1995), the error correction model is reparameterized as:

$$\Delta(LQA)_t = \beta_0 + \sum_{i=1}^{p} \alpha_1 \Delta(LQA)_{t-1} + \sum_{i=1}^{q} \alpha_2 \Delta(CA)_{t-1} + \sum_{i=1}^{q} \alpha_3 \Delta(NPL)_{t-1} + \sum_{i=1}^{q} \alpha_4 \Delta(ROE)_{t-1} + \lambda EC_{t-1} + \varepsilon_t \quad \ldots 2$$

In equation (2), λ is the speed of adjustment parameter and EC is the residual that are obtained from the estimated a long-run model. The error correction coefficient λ is expected to be less than zero, which implies cointegration relation. The model will be tested for robustness by employing various diagnostics tests such as serial correlation, functional form and heteroscedasticity. The CUSUM and CUSUMSQ tests to the residuals of the equation will be applied in order to test the stability. For stability of the long-run and short-run coefficients, the plot of the two statistics must stay within the 5% significant level.

3.2. Data, Data Sources and Data Measurements

The study used quarterly frequency for the period 2001:Q1 to 2014:Q2. Secondary data were obtained from the Bank of Namibia's various statutory publications. The liquidity indicator (liquid assets/total assets (LQA)) was used as a regressand. The regressors are capital adequacy (CA), non-performing loans (NPL) and return on equity (ROE).

4. Empirical Analysis and Results

4.1. Unit Root Test

The Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests were used to investigate the statistical characteristics of the variables as well as to ascertain the order of integration. The use of more than one test is to ensure robustness of the results thereof. Table 2, reports the results of both the ADF and PP unit root tests. The results show that all variables are stationary in levels suggesting they are integrated of order zero.

Table-2. Unit root tests: ADF and PP in levels and first difference

Variable	Model Specification	ADF	PP	ADF	PP	Order of Integration
		Levels	Levels	First Difference	First Difference	
NPL	Intercept	-2.78**	-2.76**	-6.13**	-6.13**	0
	Intercept and Trend	-3.51**	-3.57**	-6.25**	-6.29**	0
ROE	Intercept	-5.07**	-5.06**	-8.96**	-19.90**	0
	Intercept and Trend	-5.52**	-5.49**	-8.87**	-22.12**	0
LQA	Intercept	-3.50**	-4.23**	-8.90**	-9.33**	0
	Intercept and Trend	-3.36**	-3.41**	-9.07**	-11.49**	0
CA	Intercept	-3.62**	-3.60**	-9.36**	-15.07**	0
	Intercept and Trend	-3.75**	-3.74**	-9.27**	-14.83**	0

Source: author's compilation and values obtained from Eviews
Notes:(a)*, ** and *** means the rejection of the null hypothesis at 10%, 5% and 1% respectively.

4.2. Regression Model Results

Upon establishing that the series are stationary at levels, Equation (1) was estimated using Ordinary Least Squares (OLS) technique on the account that the series are integrated of order zero (i.e. I(0)). This is exactly what the OLS requires and thus, it was appropriate to conduct such estimations. In other words, the estimations resulting from these data are reliable. On this basis, there was no need to conduct a test for cointegration as it was only going to be necessary if the series were found to be non-stationary in levels, but stationary when differenced once or a number of times.

Table-3. Model Results with LQA as a Regressand

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.183990	2.664041	0.444434	0.6587
LQA(-1)	0.696879	0.103255	6.749114	0.0000
ROE	-0.004726	0.010292	-0.459197	0.6482
CA	0.105078	0.159304	0.659608	0.5127
NPL	0.031871	0.125740	0.253467	0.8010
R-squared	0.530992	Mean dependent var		8.869979
Adjusted R-squared	0.491908	S.D. dependent var		0.894987
S.E. of regression	0.637952	Akaike info criterion		2.028481
Sum squared resid	19.53517	Schwarz criterion		2.214357
Log likelihood	-48.75474	Hannan-Quinn criter.		2.099960
F-statistic	13.58592	Durbin-Watson stat		2.100082
Prob(F-statistic)	0.000000			

Source: Author's compilation and values obtained from Eviews

Table 3 shows the results of the relationship between bank liquidity and its covariates. The notable finding in this study is that all the regressors appears to be statistical insignificant except for the lagged regressand. To be specific, the study shows a negative relationship between bank liquidity and bank's profitability measured by return on equity similar to the findings of Vodova (2011a) for Czech Republic. This suggests that bank liquidity decreases with higher bank profitability. Moreover, the study revealed a positive relationship between bank liquidity and capital adequacy in the Namibian context. This finding is similar to that of Chikoko (2013) for the Zimbabwean economy. In addition, the relationship between bank liquidity and non-performing loans was found to be positive, similar to the findings by Vodova (2013) for the Hungarian economy. The r-squared of 0.53 shows that about 53% of variation in bank liquidity is due to variation in return on equity, capital adequacy and non-performing loans. The Durbin-Watson statistic test shows no evidence of autocorrelation as confirmed by the *d*-value of 2.1

5. Conclusion

This study examined the bank-specific determinants for commercial bank's liquidity in Namibia. This was done with the purpose of establishing which of the determinant mainly affects commercial bank's liquidity. The study was based on quarterly data covering the period 2001:Q1 to 2014:Q2, utilizing the technique of unit root and ordinary least squares. The results of the unit root test showed that all variable were stationary in levels. Thus, the basic ordinary least squares technique was used to conduct the estimation and not the autoregressive distributive lag model technique. The results revealed a statistical insignificant negative relationship between commercial bank's liquidity and return on equity as a measure of commercial bank's profitability. Furthermore, the results also showed a positive relationship between commercial bank's liquidity and capital adequacy as well as with non-performing loans. Although the results are statistical insignificant the direction of the relationship conveys a strong and important message for policy decision. In this regard, the study recommends that Namibia should continue closely monitoring the determinants identified. These results should be interpreted with caution due to the fact that aggregated data. Therefore, this study recommends that future studies should use disaggregated data to conduct similar analysis.

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