MACROECONOMIC DETERMINANTS OF COMMERCIAL BANKS' LIQUIDITY IN NAMIBIA

Johannes P. S. Sheefeni[1] & Jacob M. Nyambe
University of Namibia
NAMIBIA

ABSTRACT

Searching for new ways remains a primary concern among scholars. In this paper the macroeconomic determinants of commercial banks' liquidity in Namibia were considered and analysed. The unit root, bound test for cointegration and error correction model were employed using quarterly data covering the period 2001 to 2014. The results revealed that real gross domestic product is the main determinant of commercial banks' liquidity in Namibia. It was also found that monetary policy rate is positively related to banks' liquidity though statistically insignificant. On the contrary, the results revealed a negative relationship between inflation and commercial banks' liquidity.

Keywords: Macroeconomic, commercial banks' liquidity, Namibia, bound test cointegration, error correction model.

INTRODUCTION

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 of the commercial bank's profitability. However, the crisis that erupted as a result of the credit crisis that was 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 need and importance of establishing a level of liquidity sufficient to cope with adverse conditions (Ferrouhi and Lehadiri, 2014).

Vodova (2013) define liquidity as commercial banks' ability to fund increases in assets and meet obligations as they come due, without bearing undesirable losses. Tabari, Ahmadi and Emami (2013) stated that recent studies have showed that liquidity risk resulted from commercial banks' inability to accommodate decreases in liabilities or to fund increases in assets. That is why an illiquid bank cannot obtain sufficient funds by either increasing liabilities or converting assets promptly, at a reasonable cost. They further stated that in times of inadequate liquidity, commercial banks would be to meet the desired level of the required resources from debt without converting the assets into liquidity by reasonable cost. Thus, under critical conditions, lack of enough liquidity even results in a bank's bankruptcy.

It is generally known that liquidity risk and its management has been given less attention or none at all, comparing with other types of risks. However, in the wake of the 2007 financial crisis that new changes emerged with the focus shifting to the importance of adequate liquidity risk measurement and management becoming more apparent and explicit (Vodova, 2011). These acts are in-line with the view that there are more benefits to holding more liquid assets when economic conditions deteriorate (Mugenyah, 2015). Therefore, even though the ultimate objective of commercial banks is to maximize their profits, preserving liquidity is

[1] Corresponding author

equally an important objective (Goodhart, 2008).

Literature informs on the role that commercial banks play in terms of financial intermediation, liquidity transformation and risk transformation. In Namibia commercial banks dominate the financial sector implying that the process of financial intermediation will also be skewed and largely dependent on commercial banks. In specific terms, the Namibian banking industry is characterized by an oligopolistic market structure in which a few institutions dominate the industry (Andongo and Stork, 2005). As of December 2013, the structure of the banking sector continued to be dominated by the four major commercial banking institutions with a Herfindahl- Hirschman Index (HHI) of 2729 (BoN, 2014) in December 2013, compared to 2734 points June 2013. Furthermore, there were no major changes observed in the sector's structure and the larger banking institutions continue to dominate the sector with a Herfindahl-Hirschman Index (HHI) of 2712 in December 2014 compared to 2729 in December 2013 (BoN, 2015).

In the year 2014, the banking sector was reported to hold liquid assets well above the statutory minimum liquid asset requirement of 10 percent of average total liabilities to the public. In particular, the liquidity ratio accelerated from 11.7 at the end of December 2013 to 12.5 percent at the end of December 2014 (BoN, 2015). Furthermore, the key liquidity indicator of loan-to-deposit ratio increased from 90.8 percent to 94.4 percent at the end of December 2014, indicating that lending activities exerted more pressure on core deposits as a source of funding. Thus, the trend in another key liquidity indicator, the loan-to-deposit ratio, warrants close monitoring. Since the actual liquidity and liquidity risk varies from bank to bank therefore, there is a need to investigate the macroeconomic determinants of 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.

LITERATURE REVIEW

Theoretical Literature

The theoretical framework of this study is based on 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).

Diamond and Rajan (2001) supported the idea of keeping sufficient liquidity to insure the commercial banks against liquidity risk that may arise from unexpected massive deposit withdrawal which might be costly for banks to counter on short notice. This is because often commercial banks create liquidity and transform assets by investing into illiquid loans which are financed with liquid deposits. This act in itself creates and involves risk associated with financing illiquid loans with short term deposits. Thus, the mismatch exposes and makes banks prone as well as vulnerable to depositors' confidence.

The shift ability theory of liquidity postulate 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. This includes commercial paper, prime bankers' acceptances and Treasury bills. These instruments are marketable because of their short-terms to maturity and capital certainty Furthermore, the practise of commercial bank loan commitment as it is done and prevails today is because of the shift ability theory of liquidity (Mugenyah, 2015).

This theory follows two strands of literature. The first strand is that liquidity creation exposes commercial banks to risk (Diamond and Dybvig, 1983; Allen and Gale, 2004). This basically means 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 (Von Thadden, 2004; Okpala, 2013). 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. Vodova (2013) identified factors such as inflation rate, monetary policy interest rate, lending interest rate, unemployment rate and interest rate spread. Trenca, Petria and Corovei (2015) also reflect on a few more macroeconomic factors such as public deficit, unemployment rate and gross domestic product.

Empirical Literature

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

Table 1: List of selected empirical studies

Author	Country	Period and Frequency	Methodology	Findings
Vodova (2011)	Czech Republic	2001-2009 (annual)	Panel data model	There is a negative impact of inflation rate, business cycle and financial crisis on liquidity.
Vodova (2011)	Slovakia	2001-2010 (annual)	Panel data model	Bank liquidity decreases mainly due to financial crisis. Liquidity of banks increases with the growth of gross domestic product and decreases with higher unemployment. However, interest rates and rate of inflation have no statistically significant effect on the liquidity.
Al-Khouri (2012)	Gulf Cooperation Council countries	1998-2008 (annual)	Panel data model	Real GDP growth and inflation positively influences liquidity while, government ownership negatively affects liquidity.
Bhati, Zoysa and	India	1996-2012 (annual)	Panel data model	Call rate, cash reserve ratio and statutory liquidity ratio, gross

Jitaree (2013)				domestic products significantly affects liquidity among the macroeconomic factors. Cash reserve ratio has a positive relationship with liquidity ratios.
Chikoko (2013)	Zimbabwe	2009-2012 (monthly)	Panel data model	Spreads have positive influence on liquidity risk. Reserve requirement ratios and inflation were also significant in explaining liquidity risk during the studied period.
Choon, Hooi, Murthi, Yi and Shven (2013)	Malaysia	2003-2012 (annual)	Panel data model	The study included macroeconomic factors such as GDP, interbank rate, financial crisis. The results revealed that all factors included are significant except interbank rate. Among these factors GDP positively affects bank liquidity while financial crisis influence bank liquidity negatively.
Ferrouhi and Lehadiri (2013)	Morocco	2001-2012 (annual)	Panel data model	Liquidity is mainly determined by foreign direct investment, monetary aggregate M3, foreign assets, growth rate of gross domestic product, public deficit, inflation ratio and the effects of financial crisis. Liquidity is positively correlated with monetary aggregate M3, foreign assets, foreign direct investment and negatively correlated with inflation rate, growth rate of GDP, public deficit and financial crisis. However, unemployment rate have no impact on bank's liquidity.
Vodova (2013)	Hungary	2001-2010 (annual)	Panel data model	Bank liquidity is positively related to monetary policy interest rate, while the relationship between growth rate real GDP and liquidity is ambiguous.
Mousa (2015)	Tunisia	2000-2010 (annual)	Panel data model	Growth rate of GDP and inflation rate have a significant impact on bank liquidity.

On the basis of the afore-mentioned literature on the macroeconomic determinants, one can safely say the following: There are mixed findings due to the variation of the environment and data included in various studies ranging from those for the view and otherwise. There are

also different methodological approaches depending on whether it is cross-country or individual country's studies. There is variation in terms of data frequency used. Notably, most studies employed bank data-level and few used aggregated data. On the identified factors, namely inflation rate, growth rate in real GDP, financial crisis and monetary policy interest rate, so far there seem to be no study on Namibia that has specifically looked at such. It is against this background that this study will serve to fill the gap and add to empirical literature for Namibia.

METHODOLOGY

In order to analyse the relationship between macroeconomic factors and commercial bank's liquidity variables, the study employed the autoregressive distributive lag (ARDL) model. The adoption of this approach is informed and dictated by the nature of the macroeconomic data. Therefore, unlike most empirical studies highlighted in the empirical literature, the study did not follow panel data modelling approach.

Econometric or Analytical Framework and Model Specification

It is advisable that the very first step before conducting any estimation should be to construct the liquidity ratio. This approach was also used by Ferrouhi and Lehadiri (2014), Vodova (2013).

$L_2 = \frac{Loan}{Total\ assets} * 100$, measures the share of loans in total assets. It shows the percentage of the bank's assets related to illiquid loans. When this ratio is high, it means the bank is less liquid.

The aim is to identify the macroeconomic determinants of commercial banks' liquidity in Namibia. Therefore, upon constructing the measure of liquidity, the next step would be to estimate the previously defined ratio using the bounds testing or autoregressive distributed lag (ARDL) cointegration procedure. The estimation of an ARDL model is based on the following three reasons. First, the bounds test procedure is considered simple than the other multivariate cointegration techniques. Furthermore, it allows the cointegration relationship to be estimated by OLS once the appropriate lag length order of the model is identified. Second, the bounds test allows for testing for the existence of a relationship between variables in levels using a combination of I(1) and I(0) variables as regressors. That is, the order of integration of the time series data is not required. Third, this technique is efficient in estimations that involve small or finite sample size. Furthermore, it allows for the estimation of long-run and short-run components of the model simultaneously.

The equation for the macroeconomic determinants of commercial bank's liquidity can be specified as:

$$LTA_t = \alpha_0 + \alpha_1 GDP_t + \alpha_2 INF_t + \alpha_3 RR_t + \varepsilon_t \quad \ldots 1$$

Where LTA_t represents liquidity ratio, GDP_t represents growth rate of real GDP, INF_t represents inflation rate and RR_t is monetary policy rate. As for the $_t$ it is generically for the time element.

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, namely, tests devised by Augmented Dickey-Fuller (ADF), Philips and Peron (PP), Kwiatkowski-Phillips-Schmidt-Shin (KPSS), modified Dickey-Fuller (DF) test, based on generalised least squares (GLS) detrending series (commonly called the DF-GLS test) and the Ng and Perron tests for unit root.

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 co-integration, among them are: the Johansen maximum likelihood approach, the Engle-Granger approach, the cointegrating regression Durbin-Watson (CRDW) test and the error-correction based test. 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.

In order to examine the long- and short-term dynamics, equation (1) is transformed into an ADL specification reparameterized as an ECM (John and Pokhariyal, 2013). The ADL model is specified as:

$$\Delta(LTA)_t = \beta_0 + \beta_1(LTA)_{t-1} + \beta_2(GDP)_{t-1} + \beta_3(INF)_{t-1} + \beta_4(RR)_{t-1} + \sum_{i=1}^{p}\alpha_1\Delta(LTA)_{t-i} + \sum_{i=0}^{q}\alpha_2\Delta(GDP)_{t-i} + \sum_{i=0}^{q}\alpha_3\Delta(INF)_{t-i} + \sum_{i=0}^{q}\alpha_4\Delta(RR)_{t-i} + \mu_t \quad \ldots 2$$

Where Δ is the first-difference operator and u_t is a white-noise disturbance term. In this regard, equation (2) can be viewed as an ARDL of order (p, q_1, $q_3 \ldots q_n$) and it indicates that a bank's liquidity is explained by its past values. The order (p, q_1, $q_3 \ldots q_n$) are structural lags established by using minimum Akaike's Information Criteria (AIC). Those maximum lags are determined by using one or more of the "information criteria" - Hannan-Quinn (HQ), Schwarz Information Criterion (SC), AIC, Final Prediction error (FPE) and Likelihood Ratio (LR). These criteria are based on a high log-likelihood value, with a "penalty" for including more lags to achieve this. The form of the penalty varies from one criterion to another. Each criterion starts with -2log(L), and then penalizes, so the smaller the value of an information criterion the better the results. The Schwarz (Bayes) Criterion (SBC) is generally used in this regard because of its consistency.

Any autoregression model need to be tested if it is dynamically stable by checking if all of the inverse roots of characteristic equation associated with the model are strictly within the unit circle. Thereafter, one can perform a Bounds test by performing an "F-test" of the null and alternative hypotheses as follows:

$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ (no long-run relationship)
Against the alternative hypothesis
$H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$ (a long-run relationship exists)

The computed *F*-statistic value is evaluated with the critical values for the *asymptotic* distribution of the F-statistic. Based on the numbers of variables, (k + 1)), there are lower and upper bounds on the critical values. The lower bound is based on the assumption that all of the variables are I(0), while the upper bound is based on the assumption that all of the variables are I(1). If the computed F-statistic falls below the lower bound of I(0), it means there is no co-integration. If the F-statistic exceeds the upper bound I(1), it suggests the existence of co-integration. However, if the F-statistic falls between the bounds, the test is inconclusive.

From the estimation of unrestricted error correction models (UECM) (equation 2), the long-run elasticities are the coefficient of one lagged explanatory variable (multiplied by a negative sign) divided by the coefficient of one lagged dependent variable. For example, in equation (2), the long-run inequality, elasticities are $(\beta_2/\beta_1), (\beta_3/\beta_1)$ and (β_4/β_1) respectively. The short-run effects are captured by the coefficients of the first-differenced variables in equation (2) according to ((Misati, Manyongo & Kamau, 2011).

Following Hendry (1995), equation (2) is reparameterized as an ECM to yield:

$$\Delta(LTA)_t = \beta_0 + \sum_{i=1}^{p} \alpha_1 \Delta(LTA)_{t-1} + \sum_{i=1}^{q} \alpha_2 \Delta(GDP)_{t-1} + \sum_{i=1}^{q} \alpha_3 \Delta(INF)_{t-1} + \sum_{i=1}^{q} \alpha_4 \Delta(RR)_{t-1} +$$
$$+ \lambda EC_{t-1} + \varepsilon_t$$
$$\ldots 3$$

In equation (3), λ is the speed of adjustment parameter and EC is the residual obtained from the estimated cointegration model of equation (2). 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.

Data, Data Sources and Data Measurements

The data used in this paper are of quarterly frequency for the period 2001:Q1 to 2014:Q2. Secondary data were obtained from the Bank of Namibia's various statutory publications and Namibia Statistics Agency's statutory publications. In analysing determinants of commercial bank's liquidity, the measure of liquidity indicator (loans/total assets (LTA)) was used as regressand. The regressors are real GDP, inflation rate (INF) and monetary policy rate (repo rate) (RR).

EMPIRICAL ANALYSIS AND RESULTS

Unit Root Test

In this case, the ARDL technique did not require to pre-tested but it was necessary to investigate the univariate characteristics of the series using the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. This was done to ensure that the series adhere to the condition of an ARDL estimation which require a mixture of I(0) and I(1), but not I(2) or higher order. Table 1 shows the results of the test statistic and it is confirmed that there is a mixture of the different order of integration and thus, one can proceed with ARDL estimation.

Table 1: 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	
LTA	Intercept	-3.67**	-5.88**	-8.88**	-47.06**	0
	Intercept and Trend	-5.24**	-6.73**	-7.94**	-48.67**	0
LNGDP	Intercept	-0.70	-0.75	-10.28**	-10.23**	1
	Intercept and Trend	-2.78	-2.70	-10.19**	-10.14**	1
INF	Intercept	-3.09	-2.32	-3.98**	-4.07**	1
	Intercept and Trend	-3.09	-2.26	-3.96**	-4.47**	1
RR	Intercept	-2.02	-1.43	-4.02**	-3.97**	1
	Intercept and Trend	-2.61	-2.37	-3.93**	-3.87**	1

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

The next step is of estimating equation (1) using the ordinary least squares to examine the long-run relationship between bank liquidity and the identified macroeconomic determinants. Furthermore, the lag length criterion was also used to determine the optimal lag length to be included in the conditional error correction model while ensuring that there is no serial correlation. In this regard, the lag length of 1 was suggested when using the ratio of total loan to total assets as a measure of commercial banks' liquidity. Moreover, the cointegration test using the bound test reveals an existence of the long-run relationship among the variable. The calculated *F*-statistic (*F*-statistic = 4.95) is higher than the upper bound critical value at 5 per cent level of significance (3.99), using unrestricted intercept and no trend. Similarly, when using unrestricted intercept and trend the calculated *F*-statistic is higher than the upper bound critical value at 5 per cent level of significance (4.36). This suggests that the null hypothesis of cointegration was rejected at 5 and 10 percent levels respectively and thus, there is a long-run relationship among the variables as confirmed in table 2.

Table 2: F-statistic of Cointegration

Test statistic	Value	Lag	Significance level	Bound Critical values* (unrestricted intercept and no trend)		Bound Critical values* (unrestricted intercept and trend)	
F-statistic	**4.953**	1		**I(0)**	**I(1)**	**I(0)**	**I(1)**
			1	-3.43	**-4.60*** **	-3.96	-4.96
			5	-2.86	**-3.99** **	-3.41	**-4.36** **
			10	-2.57	**-3.66***	-3.13	**-4.21***

Source: authors' compilation
*Notes: (a)***, ** and * means the rejection of the null hypothesis at 1%, 5% and 10% respectively.*

Empirical results of the long-run model obtained by normalizing on liquidity are presented in Table 3. The results show that only economic activities appear to have a negative statistical significant impact on commercial bank's liquidity. This implies that bank liquidity decreases with an increase in economic activities. These findings are similar to that of Ferrouhi and Lehadiri (2014) in Morocco. Moreover, Bhati, Zoysa and Jitaree (2013) also found that economic activities significantly affected commercial bank's liquidity India, while Mousa (2015) found similar results for Tunisia. On the contrary, the findings of this study revealed that inflation positively affected bank's liquidity. Al-Khouri (2012) found similar results for the GCC countries. This simply suggests that inflation in Namibia is not yet at the level of hurting liquidity for the banks. Similarly, the relationship between interest rate and bank's liquidity was found to be negative, implying that an increase in the repo rate strains liquidity, while a decrease in the repo rate relief pressure of liquidity for commercial banks.

Table 3: Long-run Model

	Independent variables		
	INF	**RR**	**LNGDP**
Dependent variable: (LTA)	0.497 (1.426)	-0.625 (0.908)	-6.184** (2.325)

Source: author's compilation and values obtained from Eviews
*Notes: t-values in parentheses and ** significant 5%.*

The results of the error correction model for the relationship between commercial bank's liquidity and the macroeconomic determinant are presented in table 4.

Table 4: Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.163776	0.695585	-0.235451	0.8149
D(LTA(-1))	-0.028686	0.148278	-0.193464	0.8474
D(INF(-1))	-1.007740	0.559379	-1.801535	0.0782
D(RR(-1))	1.268055	1.356602	0.934729	0.3548
D(LNGDP(-1))	2.588325	8.987388	0.287995	0.7746
ECT(-1)	-0.918238	0.205640	-4.465272	0.0001
R-squared	0.509990	**Mean dependent var**		-0.073225
Adjusted R-squared	0.456728	**S.D. dependent var**		6.541801
S.E. of regression	4.821765	**Akaike info criterion**		6.092324
Sum squared resid	1069.473	**Schwarz criterion**		6.317468
Log likelihood	-152.4004	**Hannan-Quinn criter.**		6.178639
F-statistic	9.575121	**Durbin-Watson stat**		2.089201
Prob(F-statistic)	0.000003			

Source: Authors' compilation and value obtained from Eviews

In Table 4, the coefficient for real gross domestic product is statistical significant suggesting that economic activities have a significant positive impact on bank's liquidity as it is the case for many empirical studies. To be specific, the positive relationship between the two variables has also been found by Choon et al (2013) and Al-Khouri (2012) for Malaysia and GCC countries respectively. This supports the view that economic expansion enhances the commercial bank's ability to fund additional assets and meet its obligations at a desirable cost, otherwise the opposite applies. The relationship between monetary policy rate and commercial banks' liquidity was found to be positive but statistical insignificant. The negative relationship was also found by Vodova (2013) for Hungary. On the contrary, inflation has a negative impact on commercial banks' liquidity in Namibia, though statistically insignificant. The negative relationship between the two variables was also found in studies by Vodova (2011) for Czech Republic as well as Ferrouhi and Lehadiri (2014) for Morocco. The lagged error correction term is negative and statistically significant at all levels of significance. The coefficient of -0.9182 indicates high rate of convergence to equilibrium. The model has also passed a number of diagnostic tests as there was no evidence of serial correlation and heteroskedasticity. Moreover, the model also passed the Jarque-Bera normality test, implying that the errors are normally distributed. The goodness of fitness of the model is explained by about 51 per cent. Therefore, it is concluded that real gross domestic product is the main macroeconomic determinant for commercial banks' liquidity in the Namibian context.

CONCLUSION

This study was premised on examining the macroeconomic determinants of commercial banks' liquidity in Namibia. This was done with the purpose of establishing which among identified determinants affects banks' liquidity mostly. The study was based on quarterly data covering the period 2001:Q1 to 2014:Q2, utilizing the technique of unit root, bound test for cointegration and error correction model. The results reveal that real gross domestic product is the main determinant of commercial bank's liquidity in Namibia and this relationship was positive as well as statistically significant. This suggests that economic expansion enhances the commercial bank's ability to fund additional assets and meet its obligations at a desirable cost and economic contraction yields the opposite results. The relationship between monetary

policy rate and commercial bank's liquidity was found to be positive but statistical insignificant. On the contrary, inflation has a negative impact on commercial bank's liquidity in Namibia, though statistically insignificant. The study recommends that real gross domestic product should be used as an indicator or used to signal the direction of commercial banks' liquidity in Namibia. This will be novel for Namibia but will only contribute to knowledge in terms of searching for new ways of assessing for banks' liquidity. It is recommended that future research should use other ratios or measures of liquidity to compare with the results for this study. Moreover, future studies should also use disaggregated data to uncover the macroeconomic determinants of commercial banks' liquidity in Namibia.

REFERENCES

Al-Khouri, R. (2012) Bank characteristics and liquidity transformation: The case of GCC banks. *International Journal of Economics and Finance*, *12*, 114-120.

Andongo, J., & Stork, C. (2005) Factors Influencing the Financial Sustainability of Selected Microfinance Institutions in Namibia, Namibian Economic Policy Research Unit.

Bank of Namibia. (2014) *Financial Stability Report*. Windhoek.

Bank of Namibia. (2015) *Financial Stability Report*. Windhoek.

Bhati, S., Zoysa, A., & Jitaree, W. (2013) Determinants of Liquidity in Nationalised Banks in India. [Accessed 20th February 2016] Available from World Wide Web: http://www.google.com

Chikoko, L. (2013) Zimbabwean Commercial Banks Liquidity Risk Determinants after Dollarisation. *Journal of Applied Finance & Banking*, *6*, 97-114.

Choon et al. (2013) The Determinants Influencing Liquidity of Malaysia Commercial Banks, and its Implication for Relevant Bodies: Evidence from 15 Malaysia Commercial Banks. Honours Unpublished Thesis. Universiti Tunku Abdul Rahman.

Diamond, W., & Rajan, G. (2001) Liquidity risk, liquidity creation, and financial fragility: A theory of banking. *Journal of Political Economy*, *2*, 287–327.

Diamond, W., & Dybvig, P. (1983) Bank runs, deposit insurance, and Liquidity. *Journal of Political Economy*, *91*, 401–19.

Ferrouhi, E., & Lahadiri, A. (2014) Liquidity Determinants of Moroccan Banking Industry. *International Research Journal of Finance and Economics*, *118*, 103-112.

Goodhart, C. (2008) Liquidity Risk Management. *Financial Stability Review*, *11*, 39-44.

Granger, C., & Newbold, P. (1974) Spurious Regressions in Econometrics. *Journal of Econometrics*, *2*, 111-120.

Hendry, D. (1995) *Dynamic Econometrics*. Oxford University Press: Oxford.

John, M., & Pokhariyal, G. (2013) Two Stage Interest Rate Pass Through In Kenya. *Journal of Emerging Trends in Economics and Management Sciences*, *4*, 54-61.

Misati, R., Nyamongo, E., & Kamau, A. (2011) Interest Rate pass-through in Kenya. *International Journal of Development Issues*, *10*, 170 – 182.

Mousa, M. (2015) The Determinants of Bank Liquidity: Case of Tunisia. *International Journal of Economics and Financial Issues*, *5*, 249-259.

Mugenyah, L. (2015) Determinants of Liquidity Risk of Commercial Banks in Kenya. Unpublished Masters Thesis. University of Nairobi.

Okpala, K. (2013) Consolidation and Business Valuation of Nigeria Banks: What consequences on Liquidity Level. *International Journal of Business and Social Science*. *12*, 312-320.

Tabari, N., Ahmadi, M., & Emami, M. (2013) The Effect of Liquidity Risk on the Performance of Commercial Banks. *International Research Journal of Applied and Basic Sciences*. *6*, 1624-1631

Trenca, I., Petria, N., & Corovei, E. (2015) Impact of Macroeconomic Variables Upon the Banking System Liquidity. *Procedia Economic and Finance*. *32*, 1170-1177.

Vodova, P. (2011) Liquidity of Czech Commercial Banks and its Determinants. *International Journal of Mathematical Models and Methods in Applied Sciences*, *5*, 1060-1067.

Vodova, P. (2011) Determinants of Commercial Banks Liquidity in Slovakia. Project GACR P403/11/P234.

Von Thadden, E. (2004) Bank Capital Adequacy Regulation Under the New Basel Accord. *Journal of Financial Intermediation*. *13*, 90-95.

Vodova, P. (2013) Determinants of Commercial Bank Liquidity in Hungary. *Financial Internet Quarterly* "*e-Finanse*", *9*, 64-71.

Wojcik-Mazur, A., & Szajt, M. (2015) Determinants of Liquidity Risk in Commercial Banks in the European Union. *Argumenta Oeconomica*, *35*, 26-47.

View publication stats