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Bank Capital Buffers and Bank Risks: Evidence from the Namibian Banking Sector

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ABSTRACT

Purpose:
This paper analysed the effects of bank's risk on capital buffer in Namibia, in the absence of the consensus on the cyclical behavior of capital buffers.

Design/methodology/approach:
The study employed the autoregressive distributed lag (ARDL) modelling technique on quarterly data for the period 2001 to 2019.

Findings:
The study found the following: First, there is a long run relationship **between the dependent variable and the independent** variables. Second, the study showed that the ratio of NPLs to gross total loans negatively affect capital buffers in the short run, while it positively affects capital buffers in the long run. Furthermore, return on assets and liquidity negatively affects capital buffers in both the short and long run. On the contrary, bank size in form of log of total loans positively affects capital buffers in both the short and long run.

Research limitations/implications:
The unavailability of data of a long-term span is not desirable. Moreover, the limited data of certain variables narrowed the choice of a variety of variables that could be included in the study.

Originality/value:
The paper contributes to the hypothesized theory of countercyclical. The policy implication from these findings is that the presence of countercyclical relationship is in support of the transition from Basel II to Basel III to mitigate the procyclical as experienced under Basel II accords as documented in the literature. Future studies should focus on using a variety of variables to assess this relationship and see whether or not the outcome will be different.

1. Introduction

The banking sector is known for the important role it plays in the economy. One such role is that of intermediation, by collecting funds from the depositors or savers and giving the funds to the borrowers in the form of loans/credit (Sadalia et al., 2017). For example, commercial banks in Namibia are relatively large and they contribute around 70% to GDP (Paavo, 2018). The banking sector in Namibia is relatively well developed and sophisticated in comparison to her peers. The Bank of Namibia (BoN), the Central Bank, regulates the banking sector and publishes supervisory reports on regular basis to inform the public on the status quo. For the most part, capital and liquidity levels remained well within the regulatory standards as prescribed. Of greater importance was the compulsory and applicable new capital rules introduced by the Central Bank (BoN) in September 2018, in accordance with Basel III. This was applicable to all banking institutions and bank-controlled companies deemed to be of national systemic importance. Therefore, this makes the subject important to study.

However, for the mere fact that banks are also business entities like any others. Their main aim is to make profits from the spread between lending and borrowing, which comes with risks. Thus, the perceived risky activities have encouraged and seen increase in government's control over the banking sector over the years (Noreen et al., 2016).

From an international perspective, this has resulted in the establishment of supervisory body for banks. According to Noreen et al., (2016), the international committee (Basel committee) was established to assume the role of supervising banking institutions. Specifically, on matters including the monitoring of the general strength of the banks as well as their risk-management skills. In executing the supervisory role, the committee is guided by the Basel

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accords (I[1], II[2] and III[3]) which provided the specifications in terms of required capital adequacy for banks. Hence, the rules on bank capital forms the major part of such regulation (Tabak et al., 2011).

The after effects of the economic crises in 2008 raised concerns on the strength of capital regulations as well as the minimum capital requirements as prescribed by Basel II (2004) (Rahman et al., 2018). This is due to the fact that most countries increased their reliance on capital buffers during business cycle fluctuations. Basically, there was countercyclical behavior by the banks over the business cycle such that bank capital buffer decreases with economic upswing and increases with economic downswing. This implied that, banks that are capitalized below-par resorts to increase their capital buffer by reducing lending activities to the market rather than the usual costly way of issuing new equity. This pose a major threat to lending activities which can be considered as a bank risk and also economic stability (Kontbay-Busun & Kasman, 2015). On the other hand, literature reveals that the procyclicality[4] nature of the financial system can also result in macroeconomic disturbances that leads to financial instability (Whyte, 2013).

There is no consensus in literature on the cyclicality of capital buffers; that is, whether bank capital buffers are generally procyclical or countercyclical in nature. However, Tabak, et al., (2011) study provides empirical evidence of countercyclical behaviour with respect to business cycle in Brazil during the period 2000-2010. On the other hand, Whyte's (2013) study on the Jamaican banking sector provides empirical evidence of procyclicality behavior with respect to business cycle in the Jamaican banking sector during the period 2000-2012. On the subject of capital buffers visa-a-visa banks' risk, Jokipii and Milne (2009) use the non-performing loan ratio to total loans and credits (NPL) to proxy the bank risk. The paper showed a negative relationship between capital buffers and banks' risk. On the contrary, Kontbay-Busun & Kasman (2015) results suggest a positive effects of banks' risk on capital buffer. This shows that there are mixed findings in this regard, too.

In the absence of a consensus on the cyclical behavior of capital buffers, this study specifically focuses on the relationship between capital buffers and banks' risk. Particularly, the study analyses the effect of banks' risk on capital buffers. The paper is comprised of the following sections in the order of literature review, methodology, empirical analysis, results and the conclusion.

2. Review of Literature

2.1 Theoretical Review

There is literature that links the bank capital buffers, bank risk and economic cycle. This subsection reviews the theories and some of the empirical studies on the subject matter. In this study, two theories were reviewed, namely, the moral hazard theory and the charter value theory.

Moral hazard refers to a situation in which one party decides to take risk knowing that someone else will bear the cost if things go wrong (Hossain & Chowdhury, 2015). The moral hazard theory presents two possibilities. First, the theory hypothesizes that bank capital buffers, lessens the agency costs that may arise due to conflict of interest between shareholders and managers. For example, a well-capitalised bank has less incentives toward moral hazards because it tends to practice good managements traits (Danarsari et al., 2018). However, there is a contrary view that bank capital can be counterproductive. An increase in bank capital to meet the capital requirements encourages adjustments of bank's asset risk by bank managers, such that some of these acts are excessive risk-taking activities (Berger & Bouwman, 2013). That is why, a negative relationship between bank capital and bank risk refers to the 'moral hazard hypothesis' whereby banks tend to act in such a manner (Bouheni & Rachdi, 2015). Therefore, because of the abovementioned viewpoint, the enactment of capital regulations for a good purpose may also result in unanticipated unfavourable effects (Danarsari et al., 2018).

In most cases, well-capitalised banks usually hold more bank capital than it is required in order to shield themselves during downturns periods as well as to handle the default risk. This, alongside with the behaviour of managing risks, is not explained by the moral hazard theory but by the charter theory. According to Danarsari et al. (2018), the charter theory hypothesizes that banks have a potential to lose out a lot. This is due to the fact that bankruptcy results in loss of future earnings to a number of parties, including the stakeholders. For this reason, banks usually hold bank capital in excess of what is required by the regulation. This hypothesis is known as charter value - "a value placed on future assets of a business" (Danarsari et al., 2018).

In addition, the charter theory further hypothesizes that the relationship between capital buffer and risk, in the long term, can either be positive or negative. On the other hand, the same relationship in the short term depends on the degree of bank capitalization. For instance, well-capitalised banks would depict a positive relationship, while poorly-capitalised banks or approaching the required level would depict the opposite. Therefore, this theory argues that increasing the regulatory capital requirements in the short run leads to a decrease in capital buffer, which result in the same impact as direct reduction in the capital buffer (Jokipii & Milner, 2009).

2.2 Previous studies

[1] Set out the regulatory standards on market risk and credit risk.
[2] Further considered the operational risk and not liquidity risk.
[3] New capital reforms in Basel III and negative capital buffer requirement restrictions, within a range of 0-2.5% imposed on banks.
[4] Pro-cyclicality of the financial system can be defined as amplification of swings in the economic cycle caused by financial sector activities.

There are a number of empirical studies that support the aforementioned hypotheses as presented below. The first set of empirical studies looks at the relationship between capital buffers and bank risk. The second discussion of empirical studies looks at the relationship between capital buffers and business cycles. The third and last set of empirical studies discusses the relationship between bank risk and business cycles.

The relationship between bank risk and capital buffers has been explored in a number of studies around the world. For instance, Guidara et al. (2013) found no strong relationship between capital buffers and risk among the six largest Canadian chartered banks for the period 1982 to 2010. Therefore, they attributed excess capital held by banks to market discipline. However, Kontbay-Busun & Kasman's (2015) results revealed a positive effects of bank risk on capital buffer, but a negative effect of capital buffers on bank's default risk. These findings were for Turkey during the period 2002 to 2012. The positive relationship found in Kontbay-Busun & Kasman (2015) results are also supported by Belem and Gartner (2016) who examined 121 Brazilian banks during the period 2001 to 2011. Their study found a positive relationship between bank risk and capital buffers. This implies that the two variables moved in the same direction such that increasing capital buffers happened when there was a greater risk. Similarly, the negative relationship in the findings by Kontbay-Busun and Kasman (2015) are supported by Bouheni and Rachdi (2015) whose results revealed an inverse relationship between capital buffers and bank risk-taking. Particularly, the study showed that an increase in capital buffer was proceeded by less incentives in bank risk-taking during the period 2000 to 2013 in Tunisia. Other studies that found a negative relationship between bank risk and capital buffers were conducted on Pakistan (Noreen et al., 2016), Bagladesh (Rahman et al., 2018), and Indonesia (Danarsari et al., 2018). The negative relationship between the two variables simply implies that an increase in capital buffers leads to a reduction in bank risk-taking behavior.

Numerous studies also examined capital buffers vis-à-vis and business cycle. Guidara et al. (2013) used quarterly data for the period 1982 to 2010. The results revealed that the capital buffers for the six largest Canadian chartered banks exhibit a positive co-movement with business cycles. Similarly, Noreen et al. (2016) also examined the relationship between capital buffers and business cycle for 24 commercial banks during the period 2007 to 2012 in Pakistan. The results also revealed a procyclical behavior or a positive relationship between capital buffers and business cycle. Lastly, a recent study by Adesina and Mwamba (2018) examined the cyclical nature of capital buffers for 14 African banks covering the period 2004-2014. The findings support the procyclical behavior, like in the preceding studies. That is, there is a positive relationship between the capital buffers and the business cycle, implying that banks increase their capital buffer during economic booms in order to use them during economic recessions. However, there are studies with findings contrary the procyclical view; for example, the studies on Baltic countries (Braslins & Arefjevs, 2014), Turkey (Kontbay-Busun & Kasman, 2015), Pakistan and Tasman (Riaz et al., 2019), Indonesia (Tasman et al., 2019). For some countries, the level of capital buffers required was at the upper bound of 2.5 per cent.

Lastly, the relationship between bank risk and business cycle has also received some attention in the empirical literature. A study by Kontbay-Busun and Kasman (2015) established that the relationship between bank risk and business cyclical was countercyclical during the period 2002 to 2012 for the Turkish economy. However, the recent study by Riaz et al. (2019) showed that business cycle fluctuations had no significant impact on portfolio risk for the Pakistani banks.

It is clear from the theoretical literature that a relationship between the capital buffers, bank risk and economic cycle does exist. However, from the three strands of empirical literature discussed above, there is no consensus about their interrelations. Secondly, there is no study that has been yet conducted on Namibia. Thus, it is of greater importance, given the current economic downturn that Namibia had experienced and continues to experience, that this study addresses this literature gap.

3. Methodology

3.1 Model Specification and Econometric Framework

This study adapted a model by Riaz et al. (2019). The model was modified to suit the Namibian context as follows.

$$CBF_t = \beta_0 + \beta_1 LNA_t + \beta_2 ROA_t + \beta_3 LIQ_t + \beta_4 NPL_t + \mu_t \quad (1)$$

Where, CBF is capital buffer; LNA is log of total assets; ROA is return on assets; LIQ is liquidity; NPL is non-performing loans. The operational definitions for the variables are presented in Table 1 below.

Table 1: Operationalization and measurements of variables

Variables and Proxy	Source	Description
Capital buffer	Rahman et al., (2018), Riaz et al., (2019)	This is capital-to-risk-weighted-assets ratio minus minimum capital ratio. The capital regulation in Namibia, banks have to maintain minimum capital requirement which is 10 per cent of RWA.
Bank size	Bouheni and Rachdi	Natural log of total assets

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	(2015), Riaz et al., (2019)	
Profitability (return on assets)	Bouheni and Rachdi (2015), Rahman et al., (2018), Riaz et al., (2019)	Ratio of annual net profit to total assets
Liquidity	Bouheni and Rachdi (2015) Raza et al., (2019)	Total loan over total assets
Bank's risk	Rahman et al., (2018) Riaz et al., (2019)	Ratio of non-performing loans to total assets

Source: (Author's construct, 2022)

The variables of interest are capital buffers and bank's risk. However, the other variables, such as total assets, return on assets and liquidity, are internal bank control variables as also used in the above cited studies. The steps involved are discussed in detail below.

The autoregressive distributed lag (ARDL) modelling technique was used (Pesaran et al., 2001). The choice of this approach, as opposed to the one predominant in the empirical literature, is due to the fact that the data in the public domain is only aggregated. The Central Bank has a clause in agreement with the commercial banks not to share bank-level data because the banking sector is small. It might cause frictions in the sector and deter competition. In addition, this test is suitable for variables with a mixture of order of integration below 2, small sample size (as in this case) and it caters for short and long-term relationships simultaneously.

The unrestricted error correction model (UECM) of ARDL model used to examine the long run and the short run relationship takes the following form.

$$\Delta CBF_t = \gamma_0 + \gamma_1 LNA_{t-1} + \gamma_2 ROA_{t-1} + \gamma_3 LIQ_{t-1} + \gamma_4 NPL_{t-1} + \sum_{i=1}^{q} \theta_1 \Delta CBF_{t-i} + \sum_{i=1}^{q} \theta_2 \Delta LNA_{t-i} + \sum_{i=1}^{q} \theta_3 \Delta ROA_{t-i} + \sum_{i=1}^{q} \theta_4 \Delta LIQ_{t-i} + \sum_{i=1}^{q} \theta_5 \Delta NPL_{t-i} + \varepsilon_t \quad (2)$$

The first part of the equation (2) with γ_1- γ_4 refers to the long run coefficients and the second part with θ_1- θ_5 refers to the short run coefficients.

The long run relationship among the variables is tested using the F-test for the joint significance of the coefficients of the lagged levels of variables, i.e. (Null hypothesis of no cointegration: $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$) as against (Alternative hypothesis of cointegration: $\gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq 0$). If there is a long-run relationship, the conditional ARDL long run model can be estimated as:

$$\Delta CBF_t - \gamma_0 + \sum_{i=1}^{q} \gamma_1 CBF_{t-i} + \sum_{i=1}^{q} \gamma_2 LNA_{t-i} + \sum_{i=1}^{q} \gamma_3 ROA_{t-i} + \sum_{i=1}^{q} \gamma_4 LIQ_{t-i} + \sum_{i=1}^{q} \gamma_5 NPL_{t-i} + \varepsilon_t \quad (3)$$

Finally, the short run dynamic parameters are obtained by estimating an error correction model with the long run estimates using the following specification below:

$$\Delta CBF_t - \tau_0 + \sum_{i=1}^{q} \tau_1 \Delta CBF_{t-i} + \sum_{i=1}^{q} \tau_2 \Delta LNA_{t-i} + \sum_{i=1}^{q} \tau_3 \Delta ROA_{t-i} + \sum_{i=1}^{q} \tau_4 \Delta LIQ_{t-i} + \sum_{i=1}^{q} \tau_5 NPL_{t-i} + \emptyset ECT_{t-i} + \varepsilon_t \quad (4)$$

Where τ_1- τ_5 refers to the short run dynamic coefficients to equilibrium and $\emptyset$ refers to the speed of adjustment coefficient.

3.2 Data and Data Sources

The period of study is 2001 quarter 1 to 2019 quarter 4. The data for the following variables were collected from the website of the central bank, Bank of Namibia. The variables are capital buffer, total assets, return on assets, liquidity and non-performing loans. All the variables are in ratios with the exception of total assets which was converted to natural logarithms. The choice of the period was influenced by data availability for non-performing loans for the Namibian banking sector.

4. Results

4.1 Descriptive Statistics

Table 2: Descriptive statistics

	CBF	LNA	ROA	LIQ	NPL
Mean	5.133	17.640	3.325	13.368	2.531
Median	5.000	17.680	3.250	10.200	2.650
Maximum	7.500	18.701	4.900	31.800	5.600
Minimum	3.600	16.301	1.500	8.900	1.100

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Standard Deviation	0.824	0.689	0.633	6.472	0.974
Skewness	0.776	-0.184	0.430	1.589	0.687
Kurtosis	3.214	1.932	3.601	3.968	3.612
Observations	72	72	72	72	72

Source: (Author's construct, 2022)

Table 2 above shows that the variables are relatively normally distributed. The variable LNA has the highest mean and median values, while the NPL has the lowest mean and median values. The variable LIQ has the highest standard deviation, which suggest some possible high variations, while ROA has the lowest standard deviation.

4.2. Correlation Matrix Analysis

Table 3: Correlation matrix

	CBF	LNA	ROA	LIQ	NPL
CBF	1				
LNA	-0.0295	1			
ROA	-0.0284	-0.3546	1		
LIQ	0.2710	0.7015	-0.0618	1	
NPL	0.4491	-0.7068	0.2528	-0.2042	1

Source: (Author's construct, 2022)

Table 3 shows a negative correlation between assets size and banks' capital buffers. Similarly, there is also an inverse relationship between return on assets and banks' capital buffers. On the contrary, the results show a positive correlation between liquidity and banks' capital buffers as well as between the ratio of non-performing loans to total assets and banks' capital buffers.

4.3 Unit Root

Table 4: Unit root tests: ADF in levels, first and second differences

Variable	Model Specification	ADF		Order of integration
		Levels	First difference	
CBF	Intercept and trend	-3.170**	-8.774**	0
	Intercept	-3.220**	-8.794**	0
LNA	Intercept and trend	-2.971	-11.076**	0
	Intercept	-4.038**	-10.481**	1
ROA	Intercept and trend	-5.363**	-10.708**	0
	Intercept	-5.215**	-10.782**	0
LIQ	Intercept and trend	-0.853	-8.009**	1
	Intercept	0.761	-7.649**	1
NPL	Intercept and trend	-1.539	-7.427**	0
	Intercept	-3.032**	-6.783**	1

Source: (Author's construct, 2022).
Note: * and ** means the rejection of the null hypothesis at 10 and 5 per cent respectively.

The results in Table 4 above reveal the following: First, the variables capital buffers and return on assets are stationary in level, (I (0)). Second, total assets and non-performing loans have a combination order zero with the model specification of intercept and trend. However, they are I (1) when the model specification is intercept only. Third, liquidity is stationary in first difference, (I (1)). The conclusion deduced from Table 4 is that there is a mixture of different order of integration amongst the variables.

4.4 ARDL Bound Testing Cointegration

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Table 5: Autoregressive distributed lag (ARDL) Result of Cointegration

Test Statistic	Value	Level of Significance	Lower Critical Value I(0)	Upper Critical Value I(1)
F-statistic	10.47902	10%	2.320	3.232
		5%	2.725	3.718
		1%	3.608	4.860

Source: (Author's construct, 2022)

Table 5 above presents the Bound testing cointegration. In particular, the F-test statistic shows that there is cointegration (long-run relationship). This is because the calculated value of 10.479 is greater than both the lower and upper critical values at all levels of significance, though the findings would still hold if it was greater at least one of the levels of significance. Thus, a conditional ARDL model that includes both the long and short run can be estimated.

Table 6 shows a positive long run relationship between the ratio of NPLs to gross total loans and capital buffers. Thus, the two variables move in the same direction such that when the ratio of NPLs to gross total loans increases, so does the capital buffers. This positive relationship was also found by Kontbay-Busun & Kasman (2015) in their study on Turkey as well as by Belem and Gartner (2016) on Brazil.

4.5 Estimated Long-Run and Short-Run

Table 6: Long-run Estimated Coefficients (dependent variable: capital buffers)

Variable	Coefficient	t-Statistic	Prob.
LNA	0.472	0.175	0.861
ROA	-0.067	-0.519	0.606
LIQ	-0.036	-1.488	0.143
NPL	0.194	0.773	0.443
C	-26.411	-3.980	0.000
Robustness Indicators			
R^2	0.782		
Adjusted R^2	0.708		
F-Statistic	10.575 [0.000]		
D.W Statistic	2.259		
Serial Correlation, F	1.437 [0.248]		
Heteroscedasticity, F	0.279 [0.997]		
Ramsey RESET, F	0.526 [0.472]		
Normality, F	0.802 [0.669]		

Source: (Author's construct, 2022)

This relationship suggests that banks increase capital buffers when there is greater risk as a result of increases in the ratio of NPLs to gross total loans. Similarly, the study also shows a positive relationship between log of total assets and capital buffers. These findings support that of Raza et al. (2019); Noreen et al. (2016) and imply that the bank size, specifically an increase in bank working assets (size) leads to an increase in the buffer capital amount. On the contrary, the study revealed a negative relationship between return on assets and capital buffers as well as between liquidity and capital buffers in Namibia. The latter results support that of Noreen et al. (2016) on Pakistan where a negative relationship between liquidity and capital buffers was found.

Table 7: Short run Estimated Coefficients (dependent variable: capital buffers)

Variable	Coefficient	t-Statistic	Prob.
D(LNA)	0.472	0.248	0.805
D(LNA (-1))	5.587	3.244	0.002**
D(ROA)	-0.067	-0.614	0.542
D(LIQ)	-0.036	-1.721	0.092*
D(NPL)	0.194	0.899	0.373
D(NPL (-1))	-0.627	-2.367	0.022**
ECT (-1)	-0.977	-8.316	0.000**
Robustness Indicators			
R^2	0.640		

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Adjusted R^2	0.562
F-Statistic	10.479 [0.010]
D.W Statistic	2.259

Source: (Author's construct, 2022)

Table 7 above presents the results for the short run relationship between capital buffers and the other variables. The table shows that the ratio of NPL to gross total loans positively affects capital buffers similar to the long run relationship results. However, the results show that a lagged variable of the ratio of NPL to gross total loans affects capital buffers negatively and statistically significant. This simply suggests that banks reduce capital buffers in times when there is high risk. For instance, they can extend more credit during economic downturn. This stimulates aggregate demand via consumption and in turn stimulate growth. Furthermore, the variable LNA also positively affects capital buffers though it became statistically significant after lagged once. The positive relationship affirms the findings from the long run model too. Similarly, as it is the case from the long run estimates, the variables ROA and LIQ negatively affect capital buffers; with the latter it is statistically significant.

The short run adjustment process is examined from the ECM coefficient which is (-0.977) and is statistically significant at 5 per cent level of significance. This suggests that it takes about 98 per cent each quarter for capital buffers to correct itself towards equilibrium. Lastly, as it is general practice, the model was checked for stability using various diagnostic tests. The results for normality were confirmed by the Jarque-Bera normality test. The results for autocorrelation confirmed that there is no correlation between the variables. The heteroscedasticity test also confirmed the absence of it in the model and the Ramsey RESET confirmed that the functional form of the model does not suffer from omitted variables. Finally, the adjusted R-squared confirmed the model's ability to explain the total variation in the dependent variable.

4.6 Stability Diagnostic Test

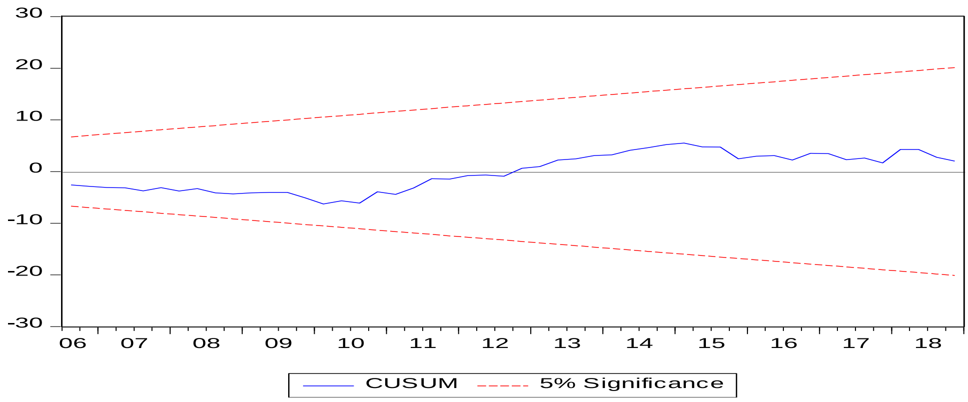

Figure 1: Cumulative Sum (CUSUM)

It is general practice to also ascertain the parameter constancy. Figures 1 and 2 show that the parameters are stable as shown by the cumulative sum (CUSUM) and cumulative sum of square (CUSMUSQ) tests.

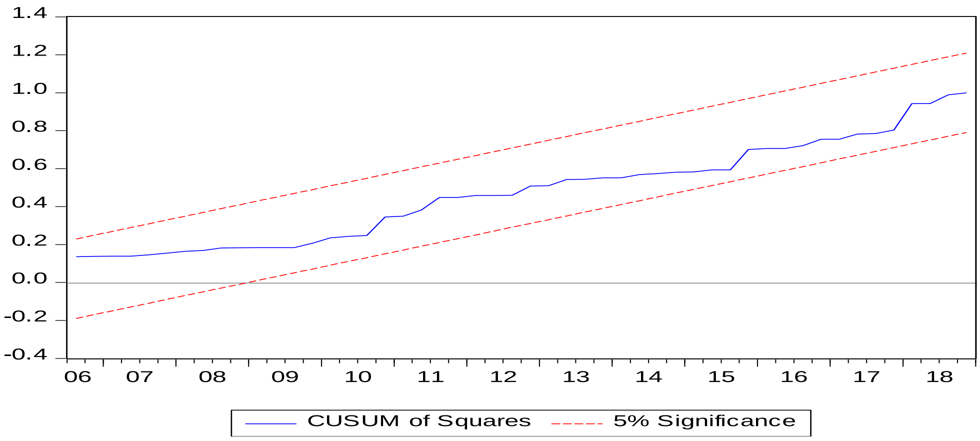

Figure 2: Cumulative Sum of Square (CUSUMSQ)

5. Conclusion and Recommendations

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This paper attempted to quantify the effect of bank's risk on capital buffers in Namibia. Using quarterly data between 2001 and 2019, the study employed time series econometric techniques such as unit root, Bound testing cointegration and error correction modelling. The results of the unit root tests revealed a combination of different order of integration. The cointegration test also revealed that the variables do exhibit a long run equilibrium relationship. The results for the long run model show that banks' risk positively affect capital buffer. This is to say, an increase in risks induces banks to increase capital buffers. This could be interpreted as bank's withholding funds that they could lend out in form of credit in order to resuscitate the economy via aggregate demand. Similarly, bank size in form of assets also positively affects capital buffers in the long run. This is usually associated with bank loans. Since most assets of the banks are made up of loans, it simply means more assets implies more capital buffers. On the contrary, return on assets and liquidity negatively affects capital buffers in the long run.

The results from the short run estimates revealed that banks' risk negatively affects capital buffers. This suggests that an increase in the ratio of NPL to gross total loans increases, and capital buffers decreases because banks extend further credit during economic downturn in order to stimulate aggregate demand in the economy in the short run. The effects of return on assets and liquidity remains negative as in the long run. Similarly, the effect of bank size in form of bank assets also positively affects capital buffers in the short run. The policy implication from these findings is that the presence of countercyclical relationship is in support of the transition from Basel II to Basel III to mitigate the procyclical as experienced under Basel II accords as documented in the literature.

5.1 Managerial implication

In practical terms, a positive relationship between bank's risk and capital buffer would imply that an increase in risks induces banks to increase capital buffers. Managers are inclined to cushion the bank's capital buffer by not lending out more in form of credit, which in turn suppress the growth in the economy. Therefore, managers have to rethink about this approach.

5.2 Theoretical implication

This study contributes to literature on banking and finance. The policy implication is that these findings are in support of the transition from Basel II to Basel III to mitigate the procyclical as experienced under Basel II via countercyclical. Although this study sheds some light on the subject matter, future studies should use disaggregated data for the individual commercial banks to see whether or not the outcomes differ.

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