

# The Relationship between Deposit and Lending Rates in Namibia

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**ABSTRACT**— *This paper analyses the relationship between deposit interest rates and lending interest rates in Namibia. The objective is to test whether a linear and symmetric relationship holds for Namibia in the long run. Using monthly data for the period 1992:01 – 2012:12, the paper employed time series techniques, namely, unit root tests, and the cointegration test. The unit root test revealed that the series are non-stationary. The cointegration test showed that there is no cointegration among the variables. Hence, there is no long-run relationship between the deposit interest rate and the lending interest rate in Namibia. The study rejects the hypothesis of a linear and symmetric relationship in the Namibian context. In the absence of cointegration the study could not proceed with the Granger causality test.*

**Keywords**— Deposit interest rate, lending interest rate, linear, symmetric, imperfect competition, mark-up theory, error correction models, Namibia.

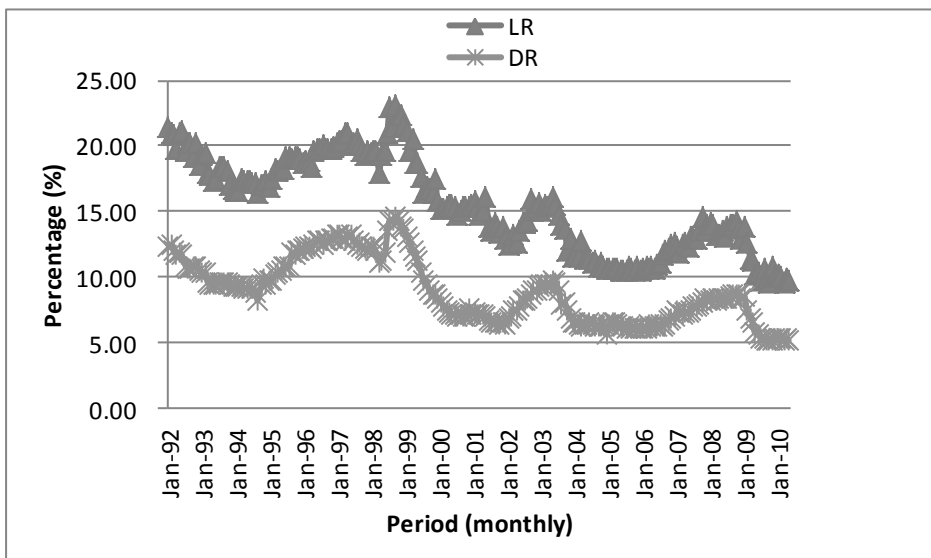
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## 1. INTRODUCTION

Lending and deposit rates are retail interest rates or the price determined by banks (Misati, Nyamongo and Kamau, 2011). These rates refer to the cost of borrowing for those who need resources and the reward for lending to those with savings (Bulus, 2010). Bulus (ibid.) elaborates how economic agents respond to these interest rates. Low interest rates attract more people to borrowing and spending more. Individuals take out loans to purchase automobiles, etc. while corporations issue more bonds and use the profits to expand. However, when interest rates rise, people tend to save more and spend less. The cycle of raising expenditure when interest rates are low and reducing expenditure when interest rates are high warrant interest rates volatility to cause instability in output. Interest rates volatility implies higher risk which then translates into a higher risk premium on long-term bonds. Risk hardens financial decisions, lowers productivity and makes the economy less efficient. Thus, central banks are in the position to control risk by controlling short-term interest rates to stabilize the economy. These events are critical to the monetary policy transmission process. However, firms' and households' behaviors are more related to retail interest rates rather than the policy short-term interest rate (Sweidan, 2012). It indicates that commercial banks have a crucial role in the monetary transmission mechanism by setting deposit and lending rates which are vital for lenders and borrowers. Some empirical investigations have found that in certain countries when policy interest rates are rising, retail lending rates respond quickly but deposit rates remain sluggish, while the opposite holds when policy interest rates are declining (Amarasekara, 2005).

In the Namibian context there seem to be a puzzle regarding the responses to rising policy interest rates as shown by figure 1 below. In comparing the Namibian lending rate against the Namibian deposit rate, the two variables move in the same direction for the entire period. The lending-deposit spread narrowed as the horizon increased. If the scenario described by Amarasekara (2005) holds, then it is expected that the two retail rates move in opposite directions in some instances when banks manipulate them for their own gains. The lending-deposit margin would be widening as the horizon increases. The earlier case seems to suggest that Bank of Namibia (BON) has a symmetric control and effect on deposit and lending rates to keep their spread within a certain margin. Hence, a long-run relationship between deposit and lending rates in Namibia is expected. These trends seem to suggest some kind of special relationship between the two retail rates. Hence, an empirical verification of the kind of relationship that holds between these two rates is necessary.

Figure 1: Namibia's Lending Rate (LR) and Deposit Rate (DR)



The article 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

It is widely acknowledged that banks are part and parcel of any national monetary policy transmission mechanism (Nguyen, Islam and Ali, 2010). The implementation of monetary policy has direct effects on the spread set as well as the relationship between the operations and the levels of profitability of banks. This process of monetary policy transmission constitutes both a credit channel and a money channel, with the former affecting the lending rate and the latter affecting the deposit rate (Chang and Su, 2010). On the relationship between lending rates and deposit rates, Thompson (2006) theorizes that banks set their lending rates as some markup or premium relative to their deposit rates. However, if the financial market perceives such a mark-up as too high or too low, the marketplace will castigate the banking industry to adjust back to some “normal” or equilibrium spread. Neumark and Sharpe (1992) share similar sentiments about lending-deposit rate adjustments by taking a slightly different view that banks in more concentrated markets adjust deposit rates and lending rates at different speeds, which enables them to extract more surpluses from the consumers.

The preceding argument stems from the pre-assumption that banks operate under imperfect competition on markets for loans and deposits. Hence, it is argued that assuming perfect competition in the banking sector is not appropriate because of important barriers to entry, product differentiation, etc. (Freixas and Rochet, 1997 and Hannan and Berger, 1991). So, to a certain extent, banks have some power in price setting for these products, or are assumed to follow a markup pricing rule (Hofmann and Mizen, 2004 and Winker, 1999). For instance, the rates on loans granted may depend on the cost of raising deposits rather than issuing securities. This means that such a deposit-based funding of loan activities could suggest that retail bank rates remain less responsive to market conditions once deposit rates are accounted for. On the contrary, in the case of specialised banks without branches, collecting deposits would set their retail loan rates on the basis of their market-based funding (de Bondt, Mojon and Valla, 2002).

In relation to the mark-up theory, studies measuring banking activity, productivity and efficiency interrogate whether deposits are inputs or outputs in the production process of a banking firm. The asset or intermediation approach argues that deposits are inputs to loan-making (Burgstaller, 2005). However, the production or service provision approach contends that from a customer's point of view the role of deposits as a service to the banks' customers is considered as outputs. This stems from the production or service provision approach (Mlima and Hjalmarsson, 2002).

Rosen (2002) and Callem and Mester (1995) theorized the lending-deposit rates relationship from the consumer perspective particularly, based on the characteristics of the consumers. That is, the greater the proportion of unsophisticated consumers relative to sophisticated consumers (better known as customer reaction hypothesis) in the market, the greater the ability of banks to adjust interest rates to their advantage echoing Neuman and Sharpe's (1992) conclusion. This behavior by the bank is due to the presence of the potential search and switching costs. However, Stiglitz and Weiss (1981) argue that banks operating in the environment with a high rate may fear a negative reaction

from customers in response to lending rate increases. Thus, the presence of asymmetric information may create an adverse selection problem in lending markets because the higher interest rates tend to attract riskier borrowers. There will be expected costs to the banks resultant from not raising the lending rates, when their marginal cost of fund increases. The costs will discourage the higher risk customers to borrow. Hence, the adjustment of lending rates upward is slow when the deposit rates increase.

## **2.2 Empirical Literature**

Having reviewed the theoretical literature regarding lending-deposit rate relationship, it is now appropriate to explore existing findings and experiences with regard to this relationship. There are various studies that have examined the relationship between lending rates and deposit rates. Among these studies is that of Bellando and Lavigne (1992), who conducted an empirical investigation between deposit rates and lending rates in four European countries (Germany, Great Britain, Italy and Spain), where there are no ceilings on deposit rates. The study employed the Granger-causality test. The study demonstrated that the causality depends on the degree of interbank competition. For example, a highly competitive deposit market leads to a one-way causality from deposit rates to lending rates, whereas an oligopolistic behavior on the deposit market weakens the causal relationship which may even be reversed. The Spanish case shows that, at least in the short run, increasing competition in the deposit market strengthens the causality from deposit rates to lending rates.

Ewing et al.'s (1998) study showed that the equilibrium spread between the lending rate and the deposit rate certificate is stationary, which implies that the spread returns to its long-run equilibrium position following a shock. Therefore, if banks have market power, they could realize profits higher than usual or abnormal profits. Similarly, Burgstaller (2005) also examined the relationship between the lending rate and deposit rate in Austria for the period March 1995 to June 2003. This study employed Granger-non causality in a vector autoregression framework. In particular, the study followed Toda and Yamamoto (1995) in adding one augmenting lag to the dynamic structure, which is not used by the test but enables valid Granger-noncausality inference to be conducted in models that contain unit roots. The results showed that lending rate responses to deposit rate changes are insignificant for the months after the shock. Deposit rates have no predictive content for lending rates beyond that of market interest rates. The study concluded that the results tend to support that deposits are to be classified as outputs of banks' production process. In other words, this is considered as additional evidence of deposits being outputs in bank production.

Nguyen, Islam and Ali (2010) studied the relationship between the lending rate and the deposit rate in Bangladesh. The study utilizes monthly data for the period 1997:2 to 2010:2 focusing mostly on the post-reform period. An asymmetric error-correction model was estimated to examine short-run and long-run dynamics. The results reveal that the lending rate and the deposit rate affect the movement of each other. The results further suggest that the lending rate adjusts to the long-run equilibrium faster when a shock narrows compared to when it widens the basis. On the contrary, the deposit rate only responds when the basis is widening but not when it is narrowing.

Chang and Su (2010) examined the relationship between the lending rate and the deposit rate in Eastern Europe. In this study, asymmetric error-correction models were estimated to describe the dynamic adjustments to the lending-deposit spreads, particularly the study employed threshold models by Enders and Granger (1998) and Enders and Siklos (2001). The data used in this study are monthly observations on the lending rate (LR), and the 1-month certificate of the deposit rate (DR) from 1998 to 2007. The results reveal that there are indeed such long-run non-linear cointegration relationships between the lending and deposit rates. In the same manner Chang, Chen, Su, Zhu and Liu (2011) used a non-parametric rank test proposed by Breitung (2001), in order to determine whether any non-linear long-run equilibrium relationship exists between the lending and deposit rates of G8 countries. The study further adopted a Threshold Error-Correction Model (TECM) to determine whether a similar relationship is discernible possibly non-linear functions of the lending and deposit rates. Monthly observations for the period covering 1998 to 2009 were used for these estimations. The findings showed that there are indeed long-run non-linear cointegration relationships between the lending and deposit rates and successfully capture the dynamic adjustment in G8 countries.

Eita (2012) investigated the determinants of the interest rate spread in Namibia for the period 1996-2010 using cointegrated vector autoregression (VAR) or multivariate cointegration methods. The investigation reveals that the interest rate spread in Namibia is determined by Treasury bill rate, inflation rate, the size of the economy, financial deepening, bank rate or discount rate and exchange rate volatility. Treasury bill rate, inflation rate and bank rate are associated with an increase in interest rate spread. The size of the economy and financial deepening are associated with a decrease in interest rate spread.

There are lessons to be learned from both theoretical and empirical literature. First, the mark-up theory appears to be dominant. Secondly, studies yield mixed results due to the fact that different methodologies and techniques have been applied. There are two strands. One strand follows a traditional approach where it is assumed that the spread variables, such as the lending-deposit spread, are linear and symmetric. Hence, the variables used in such studies have tended to be linear. Under that assumption the usual techniques of causality and error correction can be used. The other strand

assumes that the variables are non-linear and the adjustment process is asymmetric. Hence, with this assumption, other techniques such as threshold vector autoregression (T-VAR) or threshold vector error correction (T-VAR) etc. were applied. It is important at this stage to point out that results that do not conform to a particular strand do not necessarily imply that the methodology used is wrong. Experience has taught us that different techniques are bound to produce different results at times.

In the case of Namibia, the literature on the relationship between the lending rate and the deposit rate is very limited. The study that comes close to this topic is that by Eita (2012). Although this study does not directly study the relationship between the two variables, it gives an insight into the factors that play a role in widening or narrowing the gap between these two variables. For instance, financial deepening is said to increase interbank competition and subsequently reduce the interest rate spread. This is in line with the proposition that banks operate under imperfect competition on markets for loans and deposits. It is against this background that a study in the context of one of the strands described above is necessary

### 3. METHODOLOGY

#### 3.1 Econometric Framework and Model Specification

This study follows a traditional approach where it is assumed that the spread variables, such as the lending-deposit spread, are linear and symmetric. Under that assumption the usual techniques of causality and error correction can be used. This study will ascertain the existence of such a relationship by implementing the following three-step procedure:

(1) Testing for unit root to determine the order of integration for two variables by employing any of the following tests: the Augmented Dickey-Fuller (ADF), Philips and Peron (PP) and 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.

(2) Testing for cointegration to determine if there is cointegration relationship among the variables. This can be established by applying either the Engle-Granger test, the cointegrating regression Durbin-Watson (CRDW) test and the Johansen cointegration can be applied in this respect.

(3) Granger-causality. That is if there is cointegration there should be Granger-causality in at least one direction.

#### 3.2 Data and Data Sources

This study used monthly time-series data covering the period 1992:01-2012:12. The variables included are interest rates: deposit rates and lending rates. The data series were obtained from various issues of Bank of Namibia's Quarterly Bulletins and Annual Reports.

## 4. EMPIRICAL ANALYSIS AND RESULTS

#### 4.1 Unit Root Tests

In testing for unit root the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests are applied. The KPSS was added as confirmatory tests due to the fact that the ADF and PP statistic has limitations of lower power and successive or persistent unit roots respectively. They tend to under-reject the null hypothesis of unit roots. The results of the unit root test in levels are presented in Table 1.

**Table 1:** Unit root tests: ADF and PP in levels and first differences

Variable	Model Specification	ADF	PP	ADF	PP	Order of integration
		Levels	Levels	First Difference	First Difference	
lnLR <sub>t</sub>	Intercept and trend	-2.53	-2.53	-21.02**	-20.39**	1
	Intercept	-0.53	-0.80	-21.05**	-20.42**	1
lnDR <sub>t</sub>	Intercept and trend	-2.09	-2.19	-8.17**	-14.51**	1
	Intercept	-0.72	-0.87	-8.17**	-14.52**	1

Source: Author's compilation and values obtained from Eviews. Notes: \*\* means the rejection of the null hypothesis at 5%.

Table 1 shows that the series were found to be non-stationary in level form. After differencing data the unit root test shows that the series became stationary. This is also confirmed by the KPSS test as the results show in table 2 below.

**Table 2:** Unit root tests: KPSS in levels and differences

Variable	Model Specification	KPSS		
		Levels	First Difference	Order of integration
lnIR <sub>t</sub>	Intercept and trend	0.15	0.05**	1
	Intercept	1.34	0.05**	1
lnCP <sub>t</sub>	Intercept and trend	0.12**	0.05**	1
	Intercept	0.58	0.05**	1

Source: Author's compilation and values obtained from Eviews

Notes: (a) at 5% the critical value 0.15 (intercept and trend. 0.46(intercept) for all variables. (b)\*\* implies rejection of the null hypothesis at 5%.

#### 4.2 Testing for Cointegration

Table 3 presents the results for the Johansen cointegration test based on trace and maximum eigen value test statistics. The results for both the maximum eigen values and trace test statistic reveal that there are no cointegration equations, because the test statistics are less than the critical values hence, accepting the null hypothesis of no cointegrating variables.

**Table 3:** Johansen Cointegration Test Based on Trace and Maximum Eigen Values of the Stochastic Matrix

Maximum Eigen Test				Trace Test			
H <sub>0</sub> :rank = r	H <sub>a</sub> : rank = r	Statistic	95% Critical Value	H <sub>0</sub> : rank = r	H <sub>a</sub> : rank = r	Statistic	95% Critical Value
r = 0	r = 1	7.82	14.26	r = 0	r >= 1	8.85	15.49
r <= 1	r = 2	1.02	3.84	r <= 1	r >= 2	1.02	3.84

Source: Author's compilation using Eviews.

Note: Trace tests and Max-eigenvalue indicate no cointegrating equations at the 0.05 level.

Since there is no cointegration among the variable, it implies that the long run relationship between deposit interest rate and lending interest rate is non-existent. This also suggests that the assumption of linear and symmetric does not hold in the case of Namibia. Moreover, these variables may not be causally related at least in one direction. Hence, there is no need to conduct the Granger-causality test. One can safely conclude that there is no causality between the lending rate and the deposit rate in the Namibian context.

## 5. CONCLUSIONS

The study looked at whether Bank of Namibia (BON) has a symmetric control and effect on deposit and lending rates to keep their spread within a certain margin. This was done by testing whether there is a long-run relationship between deposit and lending rates in Namibia. The study utilized the following techniques, unit root, cointegration and Granger-causality on monthly data for the period 1992:01 to 2012:12. The study shows that there is no cointegration among the variables, implying that the long-run relationship between the deposit interest rate and lending interest rate is non-existent. This also suggests that Bank of Namibia does not have symmetric control on the two variables and there is also no linear relationship between them. In the absence of cointegration, one can safely conclude that there is no causality between the lending rate and deposit rate in the Namibian context.

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