THE EFFECTS OF INTEREST RATE SPREAD ON NON-PERFORMING LOANS IN NAMIBIA

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ABSTRACT

This paper investigated the impact of interest rate spread on non-performing loans in Namibia. The study employed the techniques of unit root, cointegration and error correction model technique on the quarterly data covering the period 2001 to 2014. The findings show that interest rate spread has a positive and statistical significant effect on non-performing loans in Namibia. Furthermore the study also showed that inflation has a positive though not statistical significant effect on non-performing loans in Namibia. Therefore, the positive impact of interest rate spread suggest that increase in interest margins has potential of increasing the probability of defaulting on loans by clients.

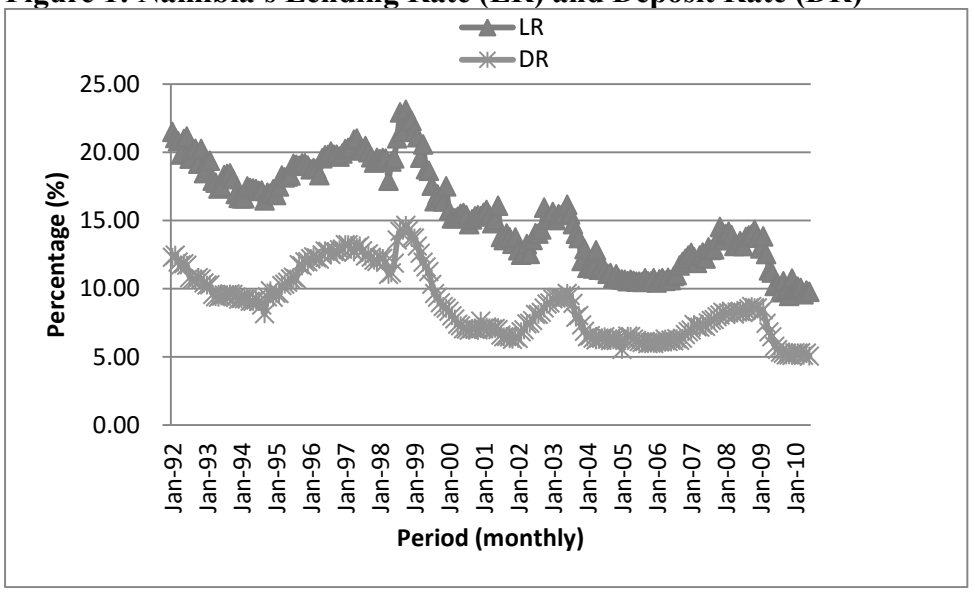
Keywords: Interest rate spread, non-performing loans, commercial banks, Namibia, error correction model.

INTRODUCTION

Interest rate is defined as the cost incurred by the borrower for the use of money they borrowed from a lender or a financial institution (Collins and Wanjau, 2011). This price has an impact on the financial performance of the commercial banks in particular through its assets (loan or credit extended). The effect can be either good or bad. It can be good in the sense that interest rate repayments enhance and increases commercial bank's profitability. However, it can be bad if the borrowers cannot make interest repayments as well as the principal amount which eventually results in defaulting or non-performing assets. "Non-performing loans (NPLs) are those loans which are ninety days or more past due or no longer accruing interest" (Joseph, Edson, Manuere, Clifford and Michael, 2012).

It is generally accepted and acknowledged that commercial banks accept customer's deposits and use those funds to provide loans to other customers or invest in other assets with anticipation of yielding higher returns. Therefore, commercial banks are also in the business of maximising the profits for their shareholders and they can achieve this by enlarging the interest rate spread (lending minus deposit rate) through higher lending rates and lower deposit rates (Irungu, 2013). This is made possible due to the fact that the individual financial institutions are at liberty to set their distinctive interest rate spread. However, it should also be understood that the function of setting deposit and lending rate is critical for monetary policy transmission mechanism. According to Amarasekara (2005) some empirical studies 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.

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



Source: Author's compilation

Figure 1 shows a comparison of the Namibian lending rate against the Namibian deposit rate, the two variables move in the same direction for the entire period. Furthermore, the lending-deposit spread narrowed as the horizon increased. The graph seems to suggest that there is nothing to worry about the spread. However, Namibia is a special case where the financial intermediaries' institutions are dominated by banking industry that is characterized by an oligopolistic market structure in which a few institutions dominate the industry (Andongo and Stork, 2005). This is confirmed by the Financial Stability Report (2014) which shows that as of December 2013, the structure of banking sector is still dominated by the four major commercial banking institutions with a Herfindahl-HirschmanIndex (HHI) of 2729 in December 2013, compared to 2734 points June 2013.

Brownbridge (1998) indicated that most empirical researches supports and confirms that most banking failure or banking crisis has been caused by non-performing loans. Thus, the bone of contention in this case is the fact that there is such dominance of banking sector and the assets of banking institutions are highly concentrated in mortgage loans where banks derive most profits. This creates potential credit risk in a form of non-performing loans. There is potential conflict of either manipulating the profit margins and the probability of defaulting resulting from high interest rates. In view of banking failure resulting from non-performing loans, any failure in the sector has enormous potential effect on the economy. It is of greater importance to analyse the relationship between interest rate spread and non-performing loans 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 two theories namely, the Profit maximization model extended by Klein (1971) and Monti (1972), the Dealership model of Ho and Saunders (1981).

The monopoly model is also referred to as the Klein-Monti model. This theoretical approach posits that monopolistic banks main aim is to produce deposits and loan services as their products to meet the demands of their clients. In this case, however, banks can borrow on the interbank market when they shortage or insufficient deposits to offer more loans. This suggests that banks have monopolistic power in both deposits and loans (credit) market and this obviously affect their business operations. Furthermore, it also means that this monopolistic power manifest itself in interest rate spreads. According to Samahiya and Kaakunga (2014), banks have the power and able to charge higher prices than their marginal costs. Thus, the presence of monopolistic power empowers large commercial banks to exercise control over smaller banks and influence interest rate spread (price). Collins and Wanjau (2011) also share similar sentiments that depending on the market structure and risk management, commercial banks (firms) are assumed to maximize "either the expected utility of profits or the expected profits". Moreover, depending on the market structure, the interest rate spread component varies.

The dealership model views are that commercial banks are intermediaries between the borrowers and lenders. However, in this case banks are faced with two types of uncertainty. First, the uncertainty in the absence of harmonization between the loans and deposits which brings about interest rates for the banks. Second, commercial banks faces default risk by its clients. Therefore, this model basically postulates that commercial banks lacks knowledge about the likelihood of default by its clients in the credit market. This poses credit to the commercial banks. The implication is that when commercial banks feels to exposed to default risk, they are inclined to widen the interest rate spread in order to cushion themselves against the risk (Samahiya and Kaakunga, 2014). This implies that there is a positive or direct relationship between interest rate spread and non-performing loans, thus the wider the interest rate spread the higher the NPLs.

Collins and Wanjau (2011) also discussed various attributes of non-performing loans such regulations, cost of assets and credit risks. For example, regulation of the financial sector is precisely aimed at minimizing irresponsible actions by the commercial banks of charging higher interest rates, insider lending and reducing asset defaults. In terms of cost of assets, interest rate spread is actually a measure of profitability between cost of short-term borrowing and the return on long-term lending. The natural thing commercial banks do is transferring these costs to the borrowers of who might be in no position to repay the loan. On the other hand, credit risk constitutes a risk of loss to a debtor's non-payment of an asset or other line of credit. In this case the default events may include among others delay in repayments, restructuring of borrower's repayments and bankruptcy. However, the implication is that interest rate affect credit risk of which the borrower might not be keen to pay or might find such assets expensive in the future.

Empirical Literature

A number of studies have empirically looked at the impact of interest rate spread on non-performing loan of commercial banks in different countries. 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
Collins and Wanjau (2011)	Kenya	1999-2008 (annual)	Descriptive statistics and ordinary least squares	Interest rate spread affect non-performing assets in banks as it increases the cost of loans charged on borrower.
Vogiazas and Nikolaidou (2011)	Greece	2001-2010 (monthly)	Ordinary least squares	Interest rates indicators did not to possess explanatory power on non-performing loans.
Warue (2013)	Kenya	1995-2009 (annual)	Panel data model	Interest rate spread was significant and positively affected non-performing loans across all bank categories. Similarly, interest rate spread across bank ownership categories was found significant and positively related to non-performing loans in both pooled and fixed effect models.
Kamunge (2013)	Kenya	2008-2012 (annual)	Descriptive statistics and ordinary least squares	Interest rate spread was statistical significant and positively elated to non-performing loans.
Kanyinji (2014)	Czeck Republish	2002-2014 (monthly)	Ordinary least squares	Interest rate has a positive and statistical significant effect on non-performing loans.
Chege (2014)	Kenya	2009-2013 (annual)	Descriptive and inferential statistics, correlation analysis and ordinary least squares	Negative and good linear relationship between commercial bank's non-performing loans and interest rate spread.
Mondal (2016)	Bangladesh	2005-2014 (annual)	Descriptive statistics, correlation analysis, Granger causality and regression analysis	Interest rate spread is negatively related to non-performing loans

Table 1 show the empirical study on the effect of interest rate spread on non-performing elsewhere in the world. The notable findings are that most studies revealed a linear relationship between interest rate spread and non-performing loans. In particular, most of

these studies showed a positive relationship between the variables of interest. However, other studies also show a negative relationship between the two variables. This in itself is a bone of contention empirically. Nevertheless, it is evident that the empirical literature specifically looking at this subject matter is very limited, more so in developing countries. This is due to the fact that most studies concentrated on either of the following; bank-specific determinants or bank-industry determinants or macroeconomic determinants of non-performing loans. Other studies only looked at the impact of interest rate on non-performing loans in general or the effect of interest rate spread on the performance of the commercial banks.

In the case of Namibia Eita (2012) investigated the determinants of interest rate spread using quarterly data for the period 1996 to 2010. The findings were that macroeconomic variables are important in explaining interest rate spread. Another study by Samahiya and Kaakunga (2014) examined the bank-specific determinants of commercial bank's interest rate spread in Namibia for the period 2004 to 2011. In their study, panel data modeling approach was used and it was shown that deposit market share, liquidity levels and operating costs were the main determinants of interest rate spread in Namibia. Sheefeni (2015) study evaluated the impact of bank-specific factors on non-performing loans in Namibia using quarterly data for the period 2001:Q1 to 2014:Q2. Time-series econometric techniques of unit root, co-integration, impulse response functions and forecast error variance decomposition were used. The results revealed that return on assets, return on equity, loan to total asset ratio, log of total assets are the main determinants of non-performing loans. Similarly, Sheefeni (2015) looked at the macroeconomic determinants of non-performing loans in Namibia. The study was based on quarterly data covering the period 2001:Q1 to 2014:Q2, utilizing the technique of unit root, co-integration, Granger causality, impulse response functions and forecast error variance decomposition. The results revealed that all the macroeconomic determinants plays a role in determining non-performing loans, while in the short run only log of gross domestic product and exchange rate. The aforementioned studies on Namibia provide insight about interest rate spread and/or non-performing loans. None of these studies specifically examined the impact of interest rate spread on non-performing loans. Therefore this study intends to fill the gap.

METHODOLOGY

This study followed a similar approach as that of Mondal (2016) but slightly modified to suit the objective of this study. In particular, this study evaluates the effect of interest rate spread on non-performing loans by means of regression analysis based on the co-integration and Error Correction Model (ECM) of Engle and Granger (1987). The framework of analysis is discussed below.

Econometric or Analytical Framework and Model Specification

The equation describing the relationship between interest rate spread and non-performing loans can be specified as:

$$NPL_t = \alpha_0 + \alpha_1 IRS_t + \alpha_2 INF_t + \varepsilon_t \quad \ldots 1$$

Where NPL_t represents non-performing loans, IRS_t represents interest rate spread and INF_t represents inflation rate.

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 macroeconomic 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. 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. If the series are stationary at level, equation one can be estimated using ordinary least squares (OLS). On the contrary, if the series were found to be non-stationary in level then the series must be differenced until they become stationary. This suggests that the econometric technique to be used for estimating Equation (1) will be dictated by the properties of time series data.

The next step would be to conduct cointegration test, especially if the series is differenced. This test is necessary 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 but the Engle-Granger residual based approach is common for single equation error correction based models. If there is cointegration relationship among the variables, it can be interpreted that there is a long-run equilibrium to which the system converges over time, and that the residual obtained from the long-run equation can be interpreted as the distance that the system is away from the equilibrium position at time *t*. Therefore, equation (1) can be re-parameterised as an error correction model which will contain both short- and long-run effects expressed as:

$$\Delta(NPL)_t = \beta_0 + \beta_1\Delta(IRS)_t + \beta_2\Delta(INF)_t + \lambda EC_{t-1} + \varepsilon_t \quad \ldots 2$$

where Δ is the first-difference operator. In equation (2), λ is the speed of adjustment parameter and EC is the residual that are obtained from the estimated cointegration model of equation (1). 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.

Data, Data Sources and Data Measurements

The data used in this paper are of quarterly frequency for the period 2001:Q1 to 2014:Q3. Secondary data were obtained from the Bank of Namibia's various statutory publications. Data on non-performing loans, interest rate spread (average lending rate minus average deposit rate) and inflation rate were collected.

EMPIRICAL ANALYSIS AND RESULTS
Unit Root Test

The Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests were used to investigate the statistical properties of the variables, to ascertain the order of integration. In this regard, the use of more than one test statistic for unit root is to ensure robustness of the results thereof.

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	
NPL	Intercept	-2.68*	-2.67*	-6.22**	-6.23**	0
	Intercept and trend	-3.57**	-3.62**	-6.31**	-6.36**	0
IRS	Intercept	-3.80**	-4.13**	-6.06**	-7.24**	0
	Intercept and trend	-2.77	-3.68**	-6.27**	-7.63**	1
INF	Intercept	-3.03**	-2.33	-4.12**	-4.19**	1
	Intercept and trend	-3.10	-2.29	-4.07**	-4.15**	1

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

Table 1, reports the results of both the ADF and PP unit root tests. The results reveal a combination of zero and first-order of integration. In specific terms, NPL was stationary in levels, INF was stationary in first difference while IRS has a combination of both levels and first difference.

Testing for Cointegration

Upon establishing the order of integration of the variables, the next step was to test for cointegration among the variables. However, the first step was to estimate the long-run model from which the residual can be derived. Thereafter, the residual was then tested for unit root and it must be stationary in levels for cointegration to exist. This is referred to as the residual based test for cointegration.

Table 2: The Engle-Granger residual based test for cointegration

			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-2.845209	0.0588
Test critical values:	1% level		-3.557472	
	5% level		-2.916566	
	10% level		-2.596116	

Source: author's compilation and values obtained from Eviews
*Note: *MacKinnon (1996) one-sided p-values.*

Table 2 presents the results for cointegration and it is shown that cointegration exist, since the residual is stationary at 10% level of significance. In particular, the calculated t-statistic is greater than the critical value at 10% level of significance. This suggests that an error correction model can be estimated.

Error Correction Model

Table 3 reports the results of the short-run error correction model. The coefficient of the interest rate spread is positive and statistical significant, suggesting that interest rate spread positively affects non-performing loans. These finding are similar to that of Warue (2013),

Kamunge (2013) and Kanyinji (2014). The positive relationship between interest rate spread and non-performing loans implies that the higher the interest rate margins the higher the probability of defaulting on loans. This is in line with the dealership theoretical argument. The coefficient of inflation is also positive though statistical insignificant, meaning inflation also affects non-performing loans positively.

Table 3: Error Correction Model

	Independent variables		
	ΔIRS	**ΔINF**	**ΔEC_{t-1}**
Dependent variable: ΔNPL	0.209*	0.010	-0.213**

Source: author's compilation and values obtained from Eviews
*Notes: ** and * means significant at 5% and 10% respectively.*

The lagged error correction term is negative and statistical significant at 5% level of significance. The coefficient of -0.213 indicates that roughly over 20% of the deviations from the ECM would adjust towards its long-run equilibrium on average. This indicates a moderate rate of convergence or speed of adjustment to equilibrium. The model has also passed a number of diagnostic tests as there was no evidence of serial correlation, heteroskedasticity. Moreover, the model also passes the Jarque-Bera normality test, implying that the errors are normally distributed. The goodness fitness of the model is explained by the value 0.88. This means 88% of variations in non-performing loan explained by the variations in interest rate spread, inflation as well as well as the residual error term. Therefore, it can be concluded that interest rate spread positively affects non-performing loans in the Namibian context.

CONCLUSION

This study examined the effect of interest rate spread on non-performing loans in Namibia. The study was based on quarterly data covering the period 2001:Q1 to 2014:Q3, utilizing the technique of unit root, cointegration and error correction model. The results revealed that the effect of interest rate spread is positive and statistical significant. This study was very critical for Namibia because of the nature of market structure where financial intermediaries' institutions are dominated by banking industry, characterized by an oligopolistic market structure in which a few institutions dominate the industry. The risk here is that the assets of the banking institutions are highly concentrated on mortgage loans where they derive most profits. The risk here is that any action of manipulating profit margins increases the probability of defaulting on loans by clients. This in-turn may result in banking failure resulting from non-performing loans, with subsequent enormous potential effect on the economy. It is common knowledge that commercial banks are profit maximizing firms. Hence, there is potential conflict of either manipulating the profit margins to earn more and this comes at a higher price of increased probability of defaulting. It is in view of this that the recommends that central bank has to strengthen its regulatory functions on the banking industry to mitigate the potential occurrence of such. Future studies should rather use disaggregated data of the commercial banks to test for this relationship and compare the results. Moreover, a larger sample could also enrich the findings of studies of this nature for future research.

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