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The Impact of E- Banking on Commercial Banks' Performance in Namibia

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Abstract

This paper examines the impact of e-banking on commercial banks' performance in Namibia using an error correction modelling and granger causality test for the period 2012M1 to 2015M8. The advent of the internet has resulted in paradigm shifts in the banking industry towards electronic banking to create a competitive edge over rivals. Although this rapid development of information technology has made some banking tasks more efficient and cheaper, there are concerns that technological investments are taking a larger share of bank's resources. The finding reports that return on investment is significantly driven by interbank settlement systems, electronic funds transfer and cheques, with an adjustment of 32 percent per month. The direction of causality test reveals a unidirectional causality from return on investment to interbank settlement system and cheques. This indicates that an increase in the return on investment is likely to enhance innovations and development. The study also found a bidirectional causality between the volume of electronic funds transfer and return on investment. Policy implications emanating from this study suggest that stable macroeconomic conditions that enhance return on investment are good stimulant to drive innovations and technology that will ultimately increase economic development.

Keywords: Interbank settlement system; Cheques; Electronic funds transfer; Return on investment.

1. Introduction

The 21st century witnessed a significant transformation in financial institutions from advances in innovation in information technology by using electronic banking (Fonchamnyo, 2012). Information technology is advancing the improvement of banking distribution channels and also refining banks' business policies and marketing plans. In this regard, the fast development in information technology and severe competition for market share in the financial sector has encouraged the acceptance of electronic banking as a good distribution delivery channels for financial services. E-banking serves as an automated, interactive channel by which customers conveniently gratify their demands for bank transactions. In addition, e-banking is a process by which a customer carries out banking transactions electronically without having to physically enter a bank or financial institution (Simpson, 2002).

Both researchers and practitioners in the banking and financial institutions have highlighted the need for banks to expand their branch-based delivery channels by embracing electronic banking (e-banking). E-banking creates unprecedented opportunities for banks in the ways they organize financial product development, delivery, and marketing via the internet and thus enhance bank performance. The common e-banking facilities used in Namibia are card payment system, mobile and computer banking products and electronic fund transfer (EFT) payment system (Namibia Clearing Systems (Namclear), 2017). The card system is a unique electronic payment facility that use smart card devices. Smart cards are plastic devices with embedded integrated circuits used for settlement of financial obligations. Mobile and computer banking products are facilities that enable customers, via telephone, to know the status of their accounts by merely dialling the telephone numbers given to them by their banks. In addition, the phone 'computer' requires a special code given to the customer to identify and authenticate a user before they can receive any requested information.The EFT payment system caters for low-value EFT debits and credits between participating banks and their customers. It includes same-day-value (SDV), one day- (one-day lead time) and dated- (two-day lead time) services.

Electronic banking is generally defined as using telecommunication networks and electronics to provide different kind of value added services and products to commercial bank clients (Candelore *et al.*, 2016). Information and communication technology (ICT) is in the middle of the automated banking applications nowadays. The Namibian financial industry cannot disregard information systems because they show a very important part in the present banking system—the whole cash flow income of all or most commercial banks is associated with information systems. The presentation of information and communication technology ideas, plans, methods and strategy application to all the banking services that has developed a fundamental issues of concerns and significance to most commercial banks and certainly, requirement for international competitiveness and local funding (Connel and Saleh, 2004). The development of information capability has made a substantial part in enhancing the rendering of service, to an extent that customers no longer need to make payment for their goods using hard cash. This is presumed to translate into effective and efficient banking services.

The Namibia's financial sector is developing and diversified. In line with most developing economies, the major components of a functional banking system, including banks, non-financial banking institutions, microfinance

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institutions, and contractual savings. Although the sector is described as significantly diversified in terms of the number of institutions, banking services continue to dominate the sector. According to literature, the use of ICT generates both pros and cons. It is presumed to enhance productivity and bank performance Kariuki (2005); Kamau (2010); Webb-Girard *et al.* (2012) however, critics argue that ICT generates additional costs and security concerns Rahman *et al.* (2017). Davenport (2003); Oshikoya (2007); Jean-Aza (2006) advocate that the use and capital investment in e-banking necessitates balancing capital investment in organization, abilities and modernisation that involves costs and threats which can lessen the bank returns and turnover in the short run.

Despite the above concerns, banks are globally readjusting their business strategies towards e-banking. If the electronic banking system is effective and efficient, it is bound to bring about rapid growth in financial development and through the multiplier effect to various sectors of the economy, thus enhancing broad based development. Despite the well developed financial system, few studies have been conducted on relation between bank performance and e-banking in Namibia. Notwithstanding the recent increase on online scams and potential risks associated with e-banking as well as the recent global financial crisis empirical studies are very scanty in Namibia. It is against this background that this study sought to examine the effects of electronic banking on the commercial banks' performance in Namibia.

2. Literature Review

Theoretical perspectives on the issues of e-banking and bank performance revolve around the contemporary banking theory, theory of financial intermediation, technology acceptance model, and innovations diffusion theory. The contemporary banking theory suggests that commercial banks, composed with other financial mediators, are crucial in the distribution of wealth in the economy (Bhattacharya and Thakor, 1993). This implies that a well functioning banking industry through ICT has a great potential to enhance bank performance and ultimately broad based development. Moreover it reduces the occurrence of asymmetric information that cause adverse selection and moral hazard complications.

The financial intermediation theory argues that financial mediators happens to maintain the informational asymmetries in marketplaces. Financial organizations as intermediate, need to do different kind of responsibilities connected to information asymmetries, between which are the provisions of liquidity over the payments and the financial supply to homes and businesses in the form of credits and advances (Allen and Santomero, 1998). Current advances in ICT with innovative financial gadgets, have reduced informational asymmetries.

The technology acceptance model (TAM), was firstly proposed by Davis (1986). It is conceived to predict and explain an individual's IT/IS acceptance (Fishbein and Ajzen, 1975). The TAM is an extension of the theory of reasoned action (TRA). TRA was originally proposed by Fishbein and Ajzen (1975) to understand behaviour and predict outcomes. TRA assumes that a person considers the implications of their action before deciding whether to engage in a certain behaviour. It also posits that the main determinant of a person's behaviour is behaviour intention.

The premise of TAM is that people's behavioural intention to accept and use a certain technology is determined by two constructs, namely perceived usefulness and perceived ease of use (Davis *et al.*, 1989). A user's attitude and belief as proposed by TAM is perceived to be a crucial factor which influences the use of new technology. A person whose attitude toward information technology is positive will have a higher acceptance of the use of the technology in question, compared to another person whose attitude towards that technology is negative. The technology acceptance model is generally referred to as the most influential theory in IT and information systems (Benbasat and Barki, 2007).

However, TAM has been criticised for not being able to fully reflect the specific influences of technological and usage-context factors which may alter user acceptance (Davis *et al.*, 1989; Quan, 2010). Others such as Venkatesh *et al.* (2003), Chau and Hu (2002), Moon and Kim (2001) and Mathesion *et al.* (2001) argue that TAM requires extension and adjustment in order to comply with the specific characteristics of the technology under consideration. They further point out that although the findings of TAM's application have been shown to be valid, it is not possible and feasible to apply them to the evaluation of factors affecting the voluntary acceptance of certain e-services by individual end users or customers. This is simply because TAM findings are oriented toward the adoption of technologies in companies.

With regards to the innovation diffusion theory, Clarke (1995) postulated that diffusion of innovation theory attempts to explain and describe the mechanisms of how new inventions, in this case electronic banking, are adopted and become successful. Not all innovations are adopted and even if they are good, it may take a long time for an innovation to be adopted. He further states that resistance to change may be a hindrance to diffusion of innovation and although it might not stop the innovation, it will slow it down. Moreover, Rogers (1995) identified five critical attributes that greatly influence the rate of adoption. These include relative advantage, compatibility, complexity, triability and observability. According to Rogers (1995), the rate of adoption of new innovations will depend on how an organization perceives its relative advantage, compatibility, triability, observability and complexity. If an organization in Namibia acknowledges the benefits of mobile and Internet banking they will adopt these innovations, given other factors such as the availability of the required tools. Adoption of such innovations will be faster in organizations that have Internet access and information technology departments than in organizations without.

3. Empirical Literature

Most of the recent literature on electronic money and banking has the shortcoming of a narrow focus. Electronic banking is ignored completely and associates electronic currency with the replacement of money over electronic

devices like virtual currency and smart cards. For instance, Freedman (2000) suggests that electronic money and electronic banking comprises of three different kind of devices as follow: access devises, warehoused value cards and network money. Similarly, Santomero and Seater (1996), Prinz (1999); Shy and Tarkka (2002) reported that current models that recognise circumstances above substitute electronic payments with alternatives of money.

Fonchamnyo (2012) explored the driving force to the customer's insight of e-banking acceptance in Cameroon. The findings report that security, cost of service, trust, usefulness and accessibility have important influence on customers' behaviour and hence adoption of e-banking, Furthermore, the study indicated that physical characteristics such as education, age and marital status have considerable effect on customers' attitudes. In the same view, Jalil, Jalil *et al.* (2014) reported that shared dependence has the toughest result on the customer variables and that a consumer's belief has a direct effect on intentions towards electronic banking. This supports Baraghani (2007) findings who investigated customers' adoption of Internet banking services with the framework of technology acceptance behaviour and trust. The outcome shows that attitude, perceived behaviour control, perceived ease of use and trust considerably impact customers' intentions concerning adopting Internet banking.

Existing empirical literature reports varying findings on the impact of ICT on bank performance in short term and long term. Kariuki (2005), Kamau (2010) presented the constructive effects of ICT on banking performance looking at bank profits and incomes as degree of performance. These studies concluded that e-banking leads to higher profits in the long term but not in the short term because of high ICT investment costs. While Kamau (2010) saw that banks that are having high income progress were more likely to use different kinds of advanced ICTs.

Other studies (Davenport, 2003; Jean-Aza, 2006; Oshikoya, 2007). Used different measures of performance such as return on asset (ROA) to examine the effect of ICT capital investment on banking performance. They argued that ROA is the preferred measure for performance since it measures returns realized from an investment and ROA is a more accurate measure for performance rather than profits and turnover. Furthermore, it provides information on how efficiently a firm is being run because it indicates average profits generated by each dollar of assets. The findings report that investment in ICT needs balancing investments in innovation, skills, organization and investment but transformation involves threats and expenses which can decrease bank profits in short term.

4. Methodology

This section outlines the estimation techniques employed in the study. The time series (unit root and cointegration tests) properties of the data, model specification and data description are discussed.

4.1. Unit Root Test

To test the stationarity of the data, the paper uses the Augmented Dickey Fuller (ADF) unit root testing procedure (Dickey and Fuller, 1979; Dickey and Fuller, 1981) and the Phillips-Perron (PP) test (Perron, 1991) In both the ADF and the PP tests, the size of the coefficient $\delta 2$ is the one that we want to determine in the following equation:

$$\Delta Z_t = \delta_0 + \delta_1 t + \delta_2 Z_{t-i} + \sum_{i=1}^{n} \beta_i \Delta Z_{t-i} + \varepsilon_t \qquad [1]$$

The ADF regression tests for the existence of unit root of Zt, in all model variables at time *t*. The variable $\Delta Zt{-}1$ expresses the first differences with n lags, εt is the variable that adjusts The null and the alternative hypothesis for the existence of unit root in variable Zt, is:

$$H_0: \delta_2 = 0 \quad , H_1: \delta_2 \neq 0$$

The other method used to test for unit roots is the Phillips-Perron method, which corrects for serial correlation and heteroscedasticity in the error terms by directly modifying the test statistics without including lags (Gujarati, 2006). Thus, the equations and hypothesis to be tested are like the ones for the ADF above except that the lags of the variables are excluded from the models.

$$\Delta Z_t = \delta_0 + \delta_1 t + \delta_2 Z_{t-i} + \varepsilon_t \qquad [2]$$

4.2. Cointegration Test

There are various techniques for conducting cointegration analysis among variables. The approaches are the residual-based approach proposed by Engle and Granger (1987) and the maximum likelihood-based approach proposed by Johansen and Julius (1990). The paper uses the Engle-Granger cointegration test.

4.3. Model specification

The general functional form of the model is:

$$\mathrm{ROE} = \mathrm{F}(\mathrm{EFT}, \mathrm{NISS}, \mathrm{CHEQUE}) \qquad [3]$$

Where

ROE = return on investment proxied by return on equity

EFT = Electronic Funds Transfers

NISS = Namibia Interbank Settlement System

CHEQUE = Cheques issued

The long run linear equation of the general functional form is expressed as;

$$ln\mathrm{ROE} = \beta_0 + \beta_1 ln\mathrm{EFT} + \beta_2 ln\mathrm{NISS} + \beta_3 ln\mathrm{CHEQUE} + e_t \qquad [4]$$

Where β_0, β_1, β_2 and β_3 are the parameters in the model , e_t is the stochastic error term, *ln* is the natural logarithm and all variables are as defined before..

After estimating the long run equation [4] ,residuals (errors) were generated and tested for unit roots. If the cointegration property is supported, the error correction model (ECM) will be specified and estimated. The general specification of an error correction model is given by the following expression:

$$\Delta ln\text{ROE} = \alpha_0 + \sum_{i=1}^{n} \alpha_i ln\text{EFT}_{t-i} + \sum_{j=1}^{p} \alpha_j ln\text{NISS}_{j-i} + \sum_{k=1}^{q} \alpha_k ln\text{CHEQUE}_{k-i} + \lambda ECT_{t-1} + u_t \quad [5]$$

Where α_0, α_i, $\alpha_j$and α_k are the coefficients of the variables and their lags and λ is the coefficient of the error correction term which is expected to be negative and significant for the model to be stable. Lastly, u_t is a white noise error term for the error correction model.

Granger causality will be applied in order to determine the direction of causality among the variables and show whether change in any series is unidirectional or bidirectional.

$$ROE = \sum_{i=1}^{n} \alpha_i \, Cheque_{t-i} + \sum_{i=1}^{n} \beta_j \, ROE_{t-1} + \varepsilon_{it} \quad (6a)$$

$$Cheque_t = \sum_{i=1}^{n} \varphi_i + ROE + \sum_{i=1}^{n} \partial_j \, Cheque_{t-1} + \varepsilon_{it} \quad (6b)$$

From Equation *6a* & *6b* if only $\alpha_i$is significant then there is unidirectional causality from Cheque to ROE. Similary if only φ_i is significant the causality runs from ROE to Cheque. A bi-directional causality will exists if both φ_i and α_i are significant. While if none are significant, the variables are said to be independent. The study uses the same principle described above to interpret equation 7a and 7b as well as 8a and 6b.

$$ROE = \sum_{i=1}^{n} \alpha_i \, NISS_{t-i} + \sum_{i=1}^{n} \beta_j \, ROE_{t-1} + \varepsilon_{it} \quad (7a)$$

$$NISS_t = \sum_{i=1}^{n} \varphi_i + ROE + \sum_{i=1}^{n} \partial_j \, NISS_{t-1} + \varepsilon_{it} \quad (7b)$$

$$ROE = \sum_{i=1}^{n} \alpha_i \, EFT_{t-i} + \sum_{i=1}^{n} \beta_j \, ROE_{t-1} + \varepsilon_{it} \quad (8a)$$

$$EFT_t = \sum_{i=1}^{n} \varphi_i + ROE + \sum_{i=1}^{n} \partial_j \, EFT_{t-1} + \varepsilon_{it} \quad (8b)$$

4.4. Data Sources and Description of Variables

The scope of the data covers the period from the first month of 2012 (2012:M1) to the eighth month of 2015 (2015:M8). The availability of the data dictated the choice of the period studied. The data used was sourced from the Bank of Namibia.

Return on equity (ROE) is the amount of net income returned as a percentage of shareholders' equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. Electronic fund transfers refer to the electronic transfer of money from one bank account to another, either within a single financial institution or across multiple institutions, via computer-based systems, without the direct intervention of bank staff. EFTs are known by a number of names**.** Interbank funds settlement systems are arrangements through which funds transfers are made between banks for their own account or on behalf of their customers. Of such systems, large value funds transfer systems are usually distinguished from retail funds transfer systems that handle a large volume of payments of low value in such forms as cheques, automated clearing house transactions and electronic funds transfers at the point of sale. The average size of transfers through large value funds transfer systems is substantial and the transfers are typically more time critical, not least because many of the payments are in settlement of financial market transactions. The larger the volume of transactions under the interbank settlement system the more they affect the return on investment. Cheques issues refers to an order to a bank to pay a stated sum from the drawer's account, written on a specially printed form. The higher the volume of cheques issued the higher will be the return on investment.

4.5. Model Robustness Checks

The study checked for the robustness of the error correction model using various post-estimation analyses, such as autocorrelation, heteroscedasticity, normality, parameter stability and RAMSEY Reset test.

4.6. Empirical Analysis and Interpretations

This section presents the results obtained in the study and the discussion thereof. The descriptive statistics of the data, time series properties of the data, estimation and robustness check of the results are examined.

4.7. Descriptive Statistics

Table 1 present the descriptive statistics, of interest from these descriptive statistics is the Jarque-Bera statistic and its probability. It should be noted that if the Jarque-Bera probability value is greater than 5 percent there is failure to reject the null hypothesis of normally distributed errors. Table 1 below shows that all the four variables are normally distributed since their P-values are all greater than 5 percent.

Table-1. Descriptive statistics

	LNROE	LNEFT	LNNISS	LNCHEQUE
Mean	0.606654	23.38912	17.63865	14.76430
Median	0.581055	23.42597	17.61614	14.76853
Maximum	0.722168	23.75580	18.00100	14.99019
Minimum	0.541103	22.79696	17.25604	14.48245
Std. Dev.	0.060994	0.222100	0.165564	0.108793
Skewness	0.522996	-0.482062	0.230858	-0.298934
Kurtosis	1.780648	2.668711	2.730510	3.160016
Jarque-Bera	4.731679	1.905362	0.523980	0.702262
Probability	0.093870	0.385706	0.769519	0.703892
Sum	26.69276	1029.121	776.1005	649.6294
Sum Sq. Dev.	0.159974	2.121125	1.178686	0.508947
Observations	44	44	44	44

Table 2 reports the unit root test results using the Augmented Dickey Fuller test and the Phillips-Perron test. The results using both tests concur that the interbank settlement system (NISS), the electronic funds transfers (EFT) and the return on investment (ROE) are all integrated of order one i.e. I(1) meaning that they became stationary after first differencing. The reason for carrying out these stationarity tests is to enable the use of the variables in the equations in levels at which they are stationary so that correct results are obtained. In addition, the variable cheque is stationary in levels, implying that it does not need to be differenced to become stationary. This result corroborates the informal test results discussed above.

Table-2. Unit Roots Test

Variable	Model	Log-level	First Difference	Integration
Augmented Dickey Fuller (ADF) Test				
LNROE	Intercept	-1.72334	-5.8412***	I(1)
	Intercept & trend	-1.85353	-5.7658***	I(1)
LNEFT	Intercept	-0.445313	-5.6662***	I(1)
	Intercept & trend	-2.393771	-5.5974***	I(1)
LNNISS	Intercept	-1.845634	-4.2298**	I(1)
	Intercept & trend	-1.744753	-4.4590***	I(1)
LNCHEQUE	Intercept	-3.809***		I(0)
	Intercept & trend	-3.765**		I(0)
Phillips-Perron (PP) Test				
LNROE	Intercept	-1.44478	-5.9428***	I(1)
	Intercept & trend	-1.56479	-6.3388***	I(1)
LNEFT	Intercept	-0.46807	-5.6416***	I(1)
	Intercept & trend	-2.55151	-5.5658***	I(1)
LNNISS	Intercept	-2.11132	-2.85246*	I(1)
	Intercept & trend	-1.332456	-3.06598*	I(1)
LNCHEQUE	Intercept	-3.854**		I(0)
	Intercept & trend	-3.811**		I(0)

*Notes: ***, ** and * denote significance at 1%, 5% and 10% levels of significance respectively*

4.8. Cointegration Test

The method used to test for cointegration is the Engle-Granger cointegration test. The results indicate that the errors from the long run model were stationary in levels. This implies that the variables used in the model are cointegrated. Hence an error correction model is estimated.

Table-3. The short run model: Dependent variable: LNROE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-1.204601	1.416130	-0.850629	0.4025
ΔLNROE(-1)	1.318168	0.314761	4.187839	0.0003
ΔLNNISS	0.003632	0.004770	0.761578	0.4529
ΔLNNISS(-1)	0.055632	0.043287	1.285178	0.2096
ΔLNNISS(-2)	0.010423	0.004592	2.270022	0.0314
ΔLNNISS(-3)	0.011603	0.004832	2.401320	0.0235
ΔLNEFT	0.010762	0.005662	1.900797	0.0681
ΔLNEFT(-1)	0.021273	0.037802	0.562735	0.5783
ΔLNEFT(-2)	0.004747	0.005617	0.845225	0.4054
ΔLNEFT(-3)	0.026208	0.006079	4.311061	0.0002
LNCHEQUE	-0.013843	0.005543	-2.497335	0.0189
ECT(-1)	-0.318299	0.315748	-2.408079	0.0245
R-squared	0.964452	Mean dependent variable		0.609456
Adjusted R-squared	0.943424	S.D. dependent variable		0.063302
Probability (F-statistic)	0.000000			

Table 3 above, present the results of the short run error correction model for the return on investment. The optimal lag length was based on the Schwarz Information Criterion (SIC). First, the results show that previous levels of return on investment significantly and positively affect current levels of return on investment at 1 percent level of significance. Second, the results show that the second and third lags of the interbank settlement system explain return on investment at 5 percent level of significance. This implies that the higher the transactions using the interbank settlement system in any month the higher are the returns on investment. Third, the results also show that electronic funds transfer instantaneously and positively affect return on investment at 10 percent level of significance. In addition, the third lag of the electronic funds transfer also positively and significantly affect return on investment at 1 percent level of significance. The fact that electronic funds transfer variable and its lags are all positively related to the return on investment means that the higher the volume of electronic funds transactions, the higher will be the return on investment. Fourth, the volumes of cheques used in a given financial year affect return on investment at 5 percent level of significance. It appears as if the higher the volume of cheques used the greater the return on investment.

Finally, the error correction term has a coefficient which is negative and significant at 5 percent level of significance. This means that the return on investment adjusts towards its long run equilibrium at the rate of 32 percent per month.

4.9. Granger Causality Results

The Granger causality results in Table 4 shows that electronic funds transfer Granger causes return on investment at 1 percent level of significance and also that return on investment Granger causes electronic funds transfer at 5 percent level of significance. This implies that there is bidirectional causality between return on investment and the volume of electronic funds transfers. Furthermore, there is unidirectional causality from the volumes of the interbank settlement system to return on investment. Similarly, there exists unidirectional causality from volume of cheques to return on investment, however it is only significant at 10% significance level.

Table-4. Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
LNEFT does not Granger Cause LNROE	42	7.12344	0.0024
LNROE does not Granger Cause LNEFT		3.64236	0.0360
LNNISS does not Granger Cause LNROE	42	1.11738	0.3379
LNROE does not Granger Cause LNNISS		4.75335	0.0145
LNCHEQUE does not Granger Cause LNROE	42	0.29237	0.7482
LNROE does not Granger Cause LNCHEQUE		2.83123	0.0718

4.10. Diagnostic Tests

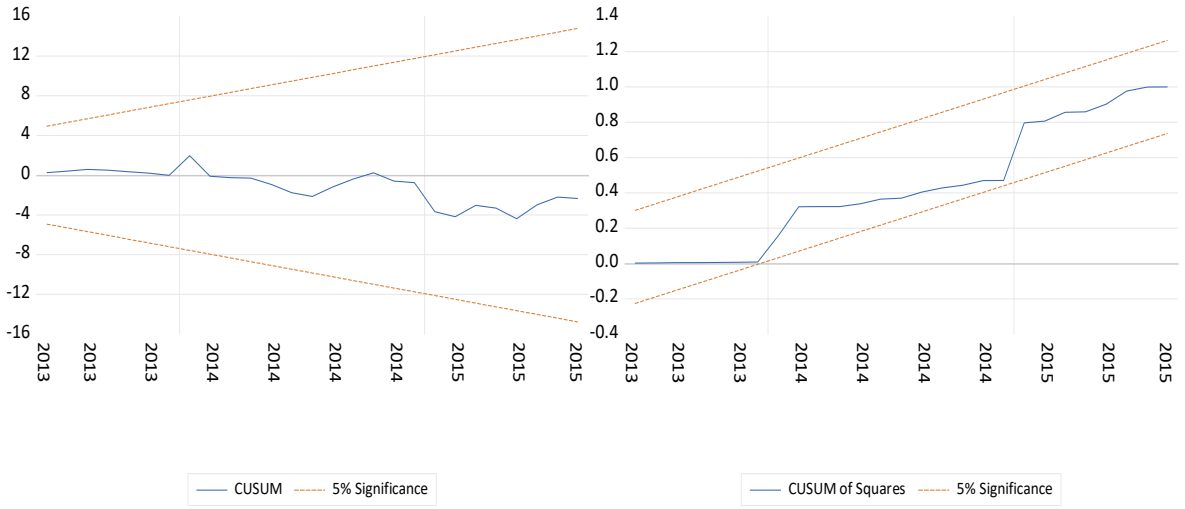
To test for the robustness of the results, the study used tests for autocorrelation, normality, misspecification, heteroscedasticity, stability tests and the Ramsey RESET test. From Table 5 the coefficients of determination for the equation is above 60 percent, which is considered as the cut-off for good models. Second, the Durbin-Watson statistic and the Breush-Godfrey LM test show that the model do not suffer from autocorrelation. Third, the study fails to reject the null hypothesis of normally distributed residuals using the Jarque-Bera normality test. Moreover there is no sufficient evidence to reject the null hypothesis of homoscedastic (ARCH test). The Ramsey RESET test indicates an absence of the general specification errors in both models.

Table-5. Diagnostic tests

Diagnostic test	Value
Adjusted R-squared	0.943424
Durbin-Watson stat	2.032892
Diagnostic test	F-Value (P-value)
Ramsey REST test (2) Model misspecification	0.2823 (0.6066)
Jarque-Bera normality test	0.8160 (06654)
Breush-Godfrey LM test (autocorrelation)	1.0246 (0.3823)
ARCH test (2) heteroscedasticity	0.1771 (0.6745)
CUSUM test for parameter stability	Stable**
CUSUM of squares test parameter stability	Stable**

*** denotes significance at the five percent level of significance*

Figure-1. The CUSUM and the CUSUM of Squares



On Figure 1, the estimated model was also subjected to the CUSUM and CUSUM of squares to check the parameter stability of the model. The model appears to be correctly specified and stable as neither the CUSUM and CUSUM of squares exceeded the bounds of 5 percent level of significance

5. Conclusions and Policy Recommendations

The main purpose of the research was to analyse the impact of electronic banking on commercial banks' performance in Namibia using and error correction modelling and the granger causality test for the period 2012M1 to 2015M8. The study concluded that there exists strong evidence that interbank settlement system, cheques, and electronic funds transfer were all positively related to the return on investment. The granger causality test, reported a bidirectional causality between the volume of electronic funds transfer and return on investment. Whereas a unidirectional causality from the volumes of the interbank settlement system to return on investment was reported. Finally, the study concluded that all the diagnostic tests of the error correction model performed very well, meaning that the results of the study are robust, reliable and authentic. Policy recommendations emanating from the study suggest that the benefits of electronic banking will be realised if the volumes of electronic funds transitions are increased. Moreover, electronic banking plays a pivotal role in enhancing bank performance which will ultimately positively affects the macroeconomic fundamental. it has been established that they are positively and significantly related to the return on investment. Therefore, electronic funds transfer should be further enhanced by even encouraging the poor and the low-income earners to do their transactions electronically.

5.1. Areas for Further Research

Despite the best efforts made to make the current study analytically plausible, it has a few limitations, as do many other scientific empirical studies. The study lumped all the commercial banks together and studied them collectively. It is suggested that future researchers may replicate this study by using panel data model modelling which allows the analysis of individual banks, while also allowing the collective analysis of the data for all the banks. This way it will be possible to see which banks have a strong relationship between returns on investment and electronic funds transfers. Future researchers could also consider adding alternative variables than only the ones used in the current study to explain returns on investment, such as profitability and/or dividends.

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