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Electronic Banking and Bank Performance: Botswana Context

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Abstract

Electronic banking has redefined banking operations in many countries around the world. This paper investigates the relationship between e-banking and commercial bank performance in Botswana. Specifically, this was a descriptive study which seeks to find out if specific electronic banking indicators such as use of Automated Teller Machines (ATMs), Cheque Clearance (CHQ), Electronic Funds Transfer (EFT), and Card & Electronic Funds Transfer at Point of sale (EFTPOS) have an effect on financial bank performance. A 10 year aggregate quarterly commercial bank data as provided by Bank of Botswana Financial Statistics Reports was used in this study. A multiple regression procedure was used to determine the significance of the relationship between the independent variables (electronic banking indicators) and the profitability measures of return on assets (ROA) and return on equity (ROE) as the dependent variables. The findings were that only CHQ was statistically significant at 0.05% level under both ROA and ROE models with p-values of 0.0002 and 0.0000 respectively. However, the predictive power of ROE was found to be higher than ROA using adjusted r-square and d-statistic. The other three remaining variables (EFT, ATMs and EFTPOS) were statistically insignificant ($p > 0.05$). The results show that at an aggregate level commercial banks in Botswana widely use the traditional banking methods such as use of cheques. The results are expected to inform bank managers on the need to discover the optimal supply of electronic banking services such as EFT clearing, EFTPOS and ATM payment systems in order to improve bank performance. The study will further inform policy makers on the need to improve on Information and Communication Technology (ICT) in order to cater for optimal use of electronic banking service in Botswana.

Keywords:
Descriptive study
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1. Introduction

In recent years online banking seems to have become more important despite having begun in the 1990s Franklin and Philip (2002). In addition, other factors such as automated teller machines(ATMs) have impacted the way consumers interacted with banks despite being in use since the 1970s Franklin and Philip (2002). The Internet has been a main contributing factor towards the change in landscape in provision of financial services; consumers are looking for more convenient ways to carry out their transactions. Claessens, Glaessner, and Klingebiel (2002b) and Vennila (2011) agree that the internet can also pose a threat as it has also brought about more competition among financial service providers while bringing large benefits to commercial and retail consumers. The use of Electronic communication has been in use as far back as 1918, the Fedwire payment system allowed electronic settlement of payments between banks over telegraph this has become the norm as more transactions between banks are done electronically Franklin and Philip (2002). In many developed countries electronic payment systems are widely used by consumers while in less developed countries paper based check clearing method is still widely used Franklin and Philip (2002).

What exactly is e-finance? According to the United Nations Conference on Trade and Development (UNCATD), e-finance was defined as financial services delivered through internet or online. E-finance includes online brokerage, banking, insurance and other financial services (UNCTAD, 2002). In simple terms it is financial services provided through online communication or computation (Stijn, Glaessner, & Klingebiel, 2002a). Another dimension to e-finance is the use of electronic money (e-money) which encompasses the new value transfer system, where alternative monies are offered to consumers through the miracle of electronics (Santomero & Seater, 1996). The use of credit and debits cards (c-money) has been widely accepted and used but in contrast e-money has emerged due to the prevalence of the internet (Prinz, 1999). In addition, Prinz (1999) emphasizes the advantage of these developments is lower transaction costs; there is no longer a need for physical presence.

Among the biggest players in e-finance is the commercial banking sector. The use of information technology in banking operations is called electronic banking. Electronic banking is the use of electronic and telecommunication networks to deliver a wide range of value added products and services to bank customers (Steven, 2002). Information technology in banking brings with it the promise of reduced operational costs, improved customer service and relations (Bakare, 2015). E-banking at simple level encompasses Automated Teller Machines (ATMs), deposit machines and online banking which allows customers to check balances and make payments remotely contributing to a cashless society where it is no longer necessary carry cash on hand (Aduda & Kingoo, 2012). In the developed world and some developing countries banks offer various e-services with high level of sophistication, while some countries are taking long to move past the web presence stage (Boateng & Molla, 2006).

Various studies have been performed on the link between electronic banking and bank performance. Surprisingly, studies on this subject matter offered ambiguous results. For example, the study on the impact of e-banking and performance of Jordanian banks revealed a negative relationship, highlighting that bank customers in Jordan depend on traditional channels to carry out their banking operations (Al-Smadi & Al-Wabel, 2011). The negative relationship was also confirmed by a related study on India (Malhotra & Singh, 2009). Meanwhile, a positive relationship has been found in other studies (Aduda & Kingoo, 2012; Kagan, Acharya, Rao, & Kodepaka, 2005). The positive results show that banks that provide extensive online banking services tend to perform better than those that lag behind (Kagan et al., 2005).

However, it is worth noting that most of these studies have been on developed and emerging markets where the use of internet is better. The studies on the developing nations have been limited. Among the studies performed was in Kenya which in general revealed that e-banking has a strong and significant marginal benefits on returns on assets of Kenyan banking industry. Further, Mazana, Rupere, and Kabanda (2016) underscored that customers demand better product delivery, and as is the case in Zimbabwe customers cannot afford to visit a banking hall during working hours, and would like to pay their bills with the least inconvenience and get their money without any hassle. It is on this backdrop that the authors would like to determine the effect of electronic banking on a developing nation. Unlike previous studies which mostly focused on panel data such as Al-Smadi and Al-Wabel (2011) this study uses consolidated commercial banking data.

1.1. Problem Statement

Though to some extent ambiguous, a notable positive relationship has been found between e-banking variables and bank performance (Aduda & Kingoo, 2012; Kagan et al., 2005). The overarching question is: would use of e-banking influence bank performance in a developing nation such as Botswana which is marred by perpetual power outages, "system is down" and low internet bandwidth issues. Further, the relationship continue to be ambiguous as evident in other studies across the globe, so this study explores this relationship further through the use of consolidated bank data as opposed to panel data used in most studies of this nature. The basis of this paper is therefore to assess the relationship between e-banking services and profitability of commercial banks in Botswana. The study is expected to contribute to the limited literature on the developing nations.

1.2. Objectives

The main objective of this study is to determine the relationship between e-banking and commercial bank performance in Botswana.

Specific objectives are to;

1. Determine if there is a link between use of ATMs and commercial bank performance
2. Establish if electronic card & Electronic Funds Transfer at point of sale (EFTPOS) have an effect on commercial bank performance
3. Determine if the use of cheques have an effect on commercial bank performance
4. Assess if Electronic Funds Transfer (EFT) has an influence on commercial bank performance.

1.3. Significance of the Study

Apart from contribution to literature, this study will inform bank practitioners on specific e-banking variables to focus on as a way of providing the intended positive outcome as envisaged by its pioneers. Further, it will inform policy makers on Information and Communications Technology (ICT) improvements that will foster e-banking services and hence improve commercial bank performance.

1.4. Literature Review

As technology becomes more widespread, there is a growing interest as to its influence in one of the most rapidly changing sectors: that is the banking sector (Akhisar, Tunay, & Tunay, 2015). Most banks offer technology based-applications such as internet banking, mobile banking, telephone banking, ATM and POS which when combined with existing products offer benefits to customers (Akhisar et al., 2015). In Botswana these are some of the main technology platforms that banks use to interact and transact with existing customers, sometimes referred to as Self-Service Technology (SST) (Mazana et al., 2016).

Benefits to Customers

Researchers (Frederick, 2012; Guru, Vaithilingam, Ismail, & Prasad, 2001; Ojokuku & Sajuyigbe, 2012; Shittu, 2010) are in agreement that one of the biggest benefits of electronic banking to customers is convenience. Electronic banking has afforded customers the opportunity to transact without visiting the branch; customers who embrace these channels do not have to stand in long queues to make payments or fund transfers as debit cards replace cash. This means customers are now in control, and by banks bringing services closer to them results in improved customer relations. As much as there are numerous benefits for the customer in relation to electronic banking customers have to protect themselves from cybercrime such as identity theft and fraud. Studies have shown that intention to use or adopt electronic banking has been hindered by security/privacy risk (Lee, 2009).

Benefits to Banks

Most of the emphasis regarding the benefits of these technological developments is in relation to customers and their need or demand for instant access to information (Boateng & Molla, 2006), but banks have also been forced to either innovate or run the risk of losing customers to those banks that are willing to engage with customers using these platforms (Shah, 2009).

Electronic banking can be seen as an avenue to attract customers with higher educational background who are assumed to have a higher income bracket which will then lead to increased income for the bank (Kheng, Mahamad, Ramayah, & Mosahab, 2010). These types of customers will then demand better product delivery, as is the case in Zimbabwe where customers cannot afford to visit a banking hall during working hours, and would like to pay their bills with the least inconvenience and get their money without any hassle (Mazana et al., 2016). Customers who prefer electronic banking are willing to acquire skills to use these channels of banking in their own time using their own initiative (Akhisar et al., 2015).

Among the other benefits that banks can derive from having an attractive website and various innovative products is an overall enhanced image of the organization (Dörner, Gassmann, & Gebauer, 2011). Other researchers are also in agreement that technology based platforms create an opportunity to increase the customer base, as more people realise the convenience associated with certain products or services (Berry, Seiders, & Grewal, 2002).

The expectation is that as customers are able to access services themselves the need to visit the physical branch decreases this will then reduce the workload of the branch staff and the overall overheads associated with certain products channel (Mazana et al., 2016).

Performance of Banks

As the demand and use of electronic banking increases as more banks appreciate that electronic based banking delivers relatively low risk, high return and low cost advantages (Akhisar et al., 2015). However in the context of developing countries such Zimbabwe telecommunications infrastructure is not well developed (Mazana et al., 2016). The same can be said about Botswana which is the basis of this study. This telecommunication infrastructure may lead a non-realisation of cost-effectiveness and profitability associated with electronic banking due to limited technology infrastructure (Akhisar et al., 2015). The implication is that banks will have to make a high initial investment infrastructure before realising the benefits in terms cost effectiveness and performance.

Various studies have been done in terms of the relationship of electronic banking and its impact on the performance of banks. As expected results of such studies vary, and some researchers have concluded that results are contradictory. Early research such as the one carried out by Marenzi, Hickman, and Dehler (2000) found that a definite conclusion cannot be made that internet banking results in a more profitable bank; this was based on the fact that the number of customers using these channels is not significant enough to impact the bank's profitability.

On the other hand, DeYoung, Lang, and Nolle (2007) carried out a comparative study in the US between banks that adopted transactional websites in the late 1990s and how their profits performed in the period of 1999-2001. The results of this study indicate that the adoption of internet banking has increased the profitability of community banks under study mainly due to deposit charges.

Another approach that has been adopted in research is to separate the findings of banks in the developed world from those in the developing countries in order to make an informed comparison (Akhisar et al., 2015). Studies such as those carried out in India and Romania (Karimzadeh & Sasouli, 2013; Stoica, Mehdian, & Sargu, 2015) show electronic banking as reducing operational costs and hence resulting in higher profits.

This is consistent with studies carried out in Africa particularly Nigeria (Oyewole, El-maude, Gambo, & Abam, 2013) and Kenya (Okiro & Ndungu, 2013), where results indicate that banks that have adopted from electronic banking has enhanced their performance through increased efficiency and productivity. It is against this backdrop that this paper seeks to determine the effect of electronic banking among commercial banks in Botswana.

2. Methodology

Introduction

This is a descriptive study based on secondary data. Secondary data consists of information that has already been put together and is available without or with minimal restrictions from other individuals or sources (Ut, 2013). The purpose of using secondary research is to mine or source; needed data, facts, specify relationships between variables and lastly making use of IT to discover trends from the collected data (Ut, 2013). It follows that secondary information will be cheaper, faster and require fewer activities. Due to the presented data being in a numeric form, the need arose for statistical tests to be used in order to make effective comments concerning the information. These include descriptive statistics such as mean, median, and standard deviation, but can also include inferential statistics like t-tests, ANOVA and regression analysis. Unlike previous studies which mostly focused on panel data such as Al-Smadi and Al-Wabel (2011) this study uses consolidated quarterly data on commercial banking industry in Botswana.

Data and Sampling Method

In order to examine the impact of electronic banking indicators on commercial bank performance in Botswana, we collected consolidated commercial bank data as compiled by Bank of Botswana Financial Statistics over a ten year quarterly period from 2007 to 2016 (Botswana, 2017). Therefore the data was comprised of all commercial banks in each year. There are currently ten commercial banks in Botswana (Botswana, 2017).The data was compiled on monthly basis for most of the variables under study such as EFT and EFTPOS. However, the data used in this study was restricted to quarterly since data on Payment Systems (EFTPOS and ATMS) were only reported on quarterly basis. We adopted a non-probability sampling technique which does not involve the use of randomization and hence is unable to depend on the principle of probability (Neill, 2003). Purposive sampling was chosen for the study, as it is a subjective sampling technique and allows focus to be on what the study requires. In this respect, elements from a pre-specified group are purposively pursued and tested (Neill, 2003).

The financial items that we purposefully used to compile required ratios and financial statements were extracted under Banking System section in the Bank of Botswana Financial Statistics Database. Specifically, total assets and equity capital data were extracted from the respective balance sheets, net income was obtained from the income statement and electronic banking data was found under Electronic Clearing Houses (ECH)-(Cheque and EFT) and Payment Systems (Card & EFTPOS and ATMS). In cases where monthly data was available especially for current periods, it was appropriately converted to quarterly data.

Variables used and their Measurement

Dependent Variables

The study seeks to establish the impact of electronic banking on bank performance; hence bank performance is the dependent variable.

The return on equity (ROE) is the commonly used measure of bank performance (Al-Smadi & Al-Wabel, 2011). The study will likewise use the return on equity as a measure of bank performance. The premise on this is that the overall goal of the firm is to maximize shareholders equity.

The return on assets (ROA) has also been repeatedly used in a number of studies as a measure of bank performance (Aduda & Kingoo, 2012; Boateng & Molla, 2006) and would also be used as a measure of commercial bank performance.

Independent Variables

A set of e-banking variables have been identified by literature and contextualized to Botswana. These are as follows;

Automated Teller Machines (ATMs): E-banking at simple level encompasses Automated Teller Machines (ATMs), deposit machines and online banking which allows customers to check balances

and make payments remotely contributing to a cashless society where it is no longer necessary carry cash on hand (Aduda & Kingoo, 2012).ATMs have thus impacted the way consumers interact with banks. As a result, number of ATMs installed by banks have been used in some studies as a measure of electronic banking (Aduda & Kingoo, 2012), and would be used in this study. Since ATMs improves bank efficient by reducing physical bank presence, a positive relationship is expected.

Electronic Funds Transfer (EFT): The use of Electronic communication has been in use as far back as 1918, where the Fedwire payment system allowed electronic settlement of payments between banks over telegraph and this has become the norm as more transactions between banks are done electronically Franklin and Philip (2002). In many developed countries electronic payment systems are widely used by consumers while in less developed countries paper based check clearing method is still widely used Franklin and Philip (2002). Prinz (1999) emphasizes the advantage of these developments is lower transaction costs, hence EFT is expected to increase bank profitability, hence a positive sign is expected.

Cheques cleared (CHQ): It follows from Franklin and Philip (2002) that the number of cheques cleared would be used as a variable; especially that Botswana is classified as a less developed nation therefore paper based cheque clearing is still widely used. The paper based clearing is expected to increase transaction costs; hence a negative sign is expected.

Cards & Electronic Payment at Point of Sale (EFTPOS): The use of credit and debits cards (c-money) has been widely accepted and used but in contrast e-money has emerged due to the prevalence of the internet (Prinz, 1999).These methods reduce transaction costs, hence a positive sign is also expected.

Based on the above discussion, two regression models are developed to measure the relationship and are mathematically expressed in equation 1 and 2;

$$ROE_t = \beta_0 + \beta_1 ATMs_t + \beta_2 EFT_t + \beta_3 CHQ_t + \beta_4 EFTPOS_t + \varepsilon_t \quad (1)$$

$$ROA_t = \beta_0 + \beta_1 ATMs_t + \beta_2 EFT_t + \beta_3 CHQ_t + \beta_4 EFTPOS_t + \varepsilon_t \quad (2)$$

Where;

ROE_t =return on equity at time t

ROA_t =return on assets at time t

$ATMs_t$ = Number of ATM outlets installed by commercial banks in Botswana at time t

EFT_t =Volume of EFT transactions made in time t

CHQ_t =Volume of cheques issued at time t

EFTPOS=Number of cards and EFT transactions made at point of sale at time t

β_1, β_t=coefficients

β_0 and ε_t =constant and error terms respectively

The dependent variable is bank performance as measured by ROE and ROA at the end of each quarterly period t. Table 1 summarizes measurement of variables and their expected signs.

Table-1. Variables used and their hypothesized relationship.

Type of variable	Variable	Measurement	Expected sign
Dependent	ROE	Net income/equity capital	
	ROA	Net income/total assets	
Independent	ATMs	Number of ATM outlets installed by commercial banks in Botswana	+
	EFT	Volume of EFT transactions made	+
	CHQ	Volume of cheques cleared from commercial banks in Botswana	-
	EFTPOS	Number of cards and EFTPOS outlets in Botswana	+

Data Processing

The multiple regression method will be adopted in the analysis of this study as was used by Aduda and Kingoo (2012) to investigate electronic banking and bank performance in Kenya. The variables will first be tested for stationary using the Augmented Dickey-Fuller (ADF) unit root test. The ADF test is conducted under the assumption that the error terms are correlated (Gujarati, 2009) The ADF test will be conducted both with intercept, and with intercept and trend. Non-stationary variables will be corrected to be stationary through differentiation. After the variables have been found to be stationary, hence none spurious, the model will be tested for autocorrelation. To establish how well the model is performing, we carry out residual diagnostic tests.

The Durbin Watson test will be used to test for auto (serial) correlation. The Durbin Watson statistic is a number that tests for autocorrelation in the residuals. Finally an OLS model will be conducted when all the above has been carried out. The data will be analysed using E-views 8 statistical package. The descriptive statistics, stationary tests and autocorrelation will be performed before running the regression analysis.

Limitations of the Study

We did not consider other e-banking platforms such as internet banking, mobile banking and telephone banking as the trio are still not widely used in Botswana and hence the data does not readily exist. They were therefore not separately documented in the aggregate data provided by Bank of Botswana. Furthermore, we were restricted to use of quarterly data instead of monthly data since the data on ATMS and EFTPOS was only reported on quarterly basis for all the 10 year period under consideration (2007-2016), which resulted in only a total of 40 observations.

3. Data Analysis and Findings

This section presents the data analysis and test results.

Descriptive Statistics

The descriptive analysis of the data is presented in Table 2.

Table-2. Descriptive statistics.

	ROE	ROA	CHQ	ATMS	EFT	EFTPOS
Mean	0.074082	0.006315	553136.3	294.1250	1159742.	3450.075
Median	0.073875	0.006743	588155.0	298.0000	1052100.	3720.000
Maximum	0.162122	0.010465	762900.0	427.0000	2006500.	4271.000
Minimum	0.025063	0.002284	285300.0	152.0000	591100.0	2391.000
Std. Dev.	0.034400	0.001921	155200.3	56.85032	411557.5	605.8161
Skewness	0.515288	-0.386905	-0.332867	0.140127	0.458016	-0.363594
Kurtosis	2.671496	2.611755	1.674343	4.360928	1.966450	1.567179
Jarque-Bera	1.950004	1.249192	3.667613	3.217777	3.178897	4.302962
Probability	0.377192	0.535478	0.159804	0.200110	0.204038	0.116312
Sum	2.963264	0.252607	22125450	11765.00	46389660	138003.0
Sum Sq. Dev.	0.046150	0.000144	9.39E+11	126046.4	6.61E+12	14313513
Observations	40	40	40	40	40	40

Source: e-views.

The profitability measures of ROE and ROA recorded means and standard deviations of 0.074082 (0.0063) and 0.00344 (0.00192) respectively. Further, ROE was rightly skewed whereas ROA was skewed to the left. This was evident in a positive and negative skewness values respectively. The multivariate normal distribution is actually characterized by skewness equal to 0 and kurtosis equal to 3 (Patrick, West, & Finch, 1996). Table 2 therefore suggests that the data is non-normal. For example, volume of cheques (CHQ) has a skewness, kurtosis and Jarque Bera values of -0.3328, 1.674343 and 1.950004 respectively, all of which dismisses the normality in the distribution of the series. Similarly, the remaining 5 data series of ROE, ROA, ATMS, EFT and EFTPOS dismissed normality of the data.

Next, we tested all variables for stationarity using the Augmented Dicky-Fuller (ADF) test. The Augmented Dickey-Fuller (ADF) test constructs a parametric correction for higher-order correlation by assuming that the *y* series follows an AR (ρ) process and adding ρ lagged difference terms of the dependent variable to the right-hand side of the test regression 3, for more details see (Dickey & Fuller, 1979, 1981).

$$\Delta yt = \propto yt - 1 + x't\delta + \beta 1\Delta yt - 1 + \beta 2\Delta yt - 2 + \cdots + \beta\rho\Delta yt - \rho + vt \qquad (3)$$

The results for the ADF unit root test are shown in Table 3:

Table-3. ADF Test Results.

AUGMENTED DICKEY-FULLER (ADF)						
	Intercept			Intercept & Trend		
Variable	**Levels**	**First Difference**	**Integrated order**	**Levels**	**First Difference**	**Integrated order**
	t-statistic, t_α	***t-statistic,*** t_α	***I(d)***	***t-statistic,*** t_α	***t-statistic,*** t_α	***I(d)***
ROE	-1.936015	-9.620638 ***	I(1)	-4.511944***		I(0)
ROA	-3.032968	-8.744204***	I(1)	-4.365371***		I(0)
ATMS	-0.952335	-6.668579***	I(1)	-2.370328	-6.588527***	I(1)
EFT	2.895618	-5.878793***	I(1)	-2.710014	-7.317839***	I(1)
CHQ	0.327914	-2.529859	I(2)	-3.503848*,**		I(0)
EFTPOS	-1.144570	-6.259661***	I(1)	-2.172099	-6.230320***	I(1)
Test critical values:	1% level	-3.632900				
	5% level	-2.948404				
	10% level	-2.612874				

*, **, ***, means significant at 10%, 5% and 1%, respectively.
Source: E-views.

All variables are represented in their natural form. The order I (0) means the variable is stationary at levels i.e. integrated of order zero. Meanwhile I (1) means the variable is stationary at first difference i.e. integrated of order one, and I (2) means stationary after second difference or integrated of order 2.

Note that if the statistic t_α value is **greater** than the critical values, we do not reject the null hypothesis of a unit root at conventional test sizes. As shown in Table 1, the results of the unit root test (with intercept) show that all the variables are non-stationary at levels. This is so because all the test statistics (t_α) are greater than the critical values at 1%, 5% and 10% respectively. In order to ensure that the results are stationary, they were differenced once hence are integrated of order one i.e. I (1), meaning that they are all significant at first difference. In that respect, the entire variables were stationary after first difference, except volume of cheques (CHQ) which was only stationary at second difference (I2). This outcome necessitated checking unit root both with intercept and trend, especially if integration occurs at higher lags.

Nonetheless, the results for the unit root test (with intercept and trend) show that ROA, ROE and CHQ were stationary at levels whereas the rest of the variables were stationary at first difference. Since the variables are all stationary, that means we can estimate the model without any possibility of spurious results. Stock and Watson (1988) posited that the usual techniques of regression analysis can result in highly misleading conclusions when the variables contain stochastic trends. This has been known as the problem of spurious regressions. Largely influenced by the techniques of Box and Jenkins, the accepted solution to the problem of non-stationarity (integration) has been to transform the variables so that they appear to be stationary; in practice this typically means using first differences of the series, as cited in (Mapharing & Otuteye, 2015). Newbold and Granger (1974) further affirmed that usually the first difference of the time series is used whenever the variables are assumed not to be stationary. Even though it does not always provide a solution, Newbold and Granger (1974) asserted that this has been widely used in most studies. As a result, differentiation was used as E-views allowed for ADF adjustment in that regard.

Regression Analysis

The regression output with ADF adjustment is presented next. The two models in section 2 were run, one with ROA and then ROE as dependent variable.

The results with ROA as dependent variable are presented in Table 4.

Table-4. Regression output.

Estimation Dependent: ROA			
Variable	**Coefficient**	**t- Statistic**	**P-value**
ATMS	6.10E-06	0.640562	0.5259
CHQ	8.71E-09	4.1777317***	0.0002
EFT	-3.56E-10	-0.165747	0.8693
EFTPOS	3.09E-08	-0.034748	0.9725
Adjusted R-squared	0.316965		
Durbin-Watson stat	1.404353		

Source: E-views.

Diagnostic tests were performed on the regression model. For example, the model was diagnosed for problems of serial correlation, homoscedasticity and goodness of fit. The adjusted R-square of 0.32 shows that 32% of the variation in the dependent variable (ROA) is determined by the variation in the independent variables combined. This lower adjusted r-squared should be used with other diagnostic tests to arrive at a concrete answer in terms of the goodness of fit. The model was thus checked further for serial correlation using the Durbin Watson statistic. The Durbin-Watson statistic is always between 0 and 4. A value of 2 means that there is no autocorrelation in the data, and values approaching 0 indicate positive autocorrelation and values toward 4 indicate negative autocorrelation, for more insight see (Durbin & Watson, 1951). The results from the ROA model show a Durbin Watson value of 1.404353. This outcome means that there is positive autocorrelation in the residuals. However, a rule of thumb is that test statistic values in the range of 1.5 to 2.5 are relatively normal and values outside of this range could be cause for concern. Meanwhile Field (2009) suggests that values under 1 or more than 3 are a definite cause for concern. In this case we are not concerned about serial correlation because the Durbin-Watson value is above 1. Since the necessary diagnostic tests are satisfied, we proceed to interpret the coefficients of the variables.

The variable ATMs has a positive coefficient of $6.10 \times 10^{-6} = 0.000061$. Though the coefficient shows an expected sign, the p-value is greater than 0.05 significance level (p=0.5259).

This result means that the variable is statistically insignificant which is a bit surprising. It perhaps suggests that number of ATMS installed is still not sufficient to influence aggregate bank performance. Only CHQ has a p-value which is less than 0.05 (p=0.0002), meaning that it is statistically significant. However this positive relationship was unexpected. This positive sign is consistent with a notion that in many developed countries electronic payment systems are widely used by consumers while in less developed countries paper based check clearing method is still widely used. Though the coefficient is very small (0.00000000871), it means that a 1 unit increase in CHQ will result in a near zero unit increase in ROA.

Though the increase is very small, it is statistically significant. The EFT and EFTPOS variables showed unexpected negative signs, though insignificant with p values of 0.8693 and 0.9725 respectively. The negative sign between e-banking and bank profitability was confirmed in Jordanian banks by Al-Smadi and Al-Wabel (2011) and in India by Malhotra and Singh (2009) hence an indication that banks in those countries used traditional banking methods as opposed to e-banking. The insignificant results on three e-banking variables (ATMs, EFT, and EFTPOS) may indicate that consumers in Botswana still prefer traditional methods of banking, hence no coincidence that CHQ is the only significant variable in the ROA model.

Next, we perform regression analysis in model 2 using ROE as a dependent variable and the results are likewise presented in Table 5.

Table-5. Regression output.

Estimation Dependent: ROE			
Variable	**Coefficient**	**t- Statistic**	**P-value**
ATMS	8.00E-06	0. 062600	0.9504
CHQ	1.91E-07	6.823135	0.0000
EFT	3.08E-08	1.070799	0.2914
EFTPOS	-2.03E-05	-1.700217	0.0977
Adjusted R-squared	0.616539		
Durbin-Watson stat	1.172761		

Source: E views.

It is noteworthy that the results in Table 5 are in principle analogous to ROA model, albeit with higher adjusted r-squared value of 0.617 and a Durbin Watson statistic of 1.172761 respectively. In this respect, the outcome confirms ROE as a better predictor than ROA. Likewise, volume of cheques cleared (CHQ) is the only significant variable (p=0000) with a positive and expected sign. The positive and significant coefficient (1.91×10^{-7}) indicates that a one unit increase in volume of cheques cleared will results in 1.91×10^{-7} increase in ROE. This outcome of ROE model may reiterate the notion that consumers in Botswana prefer traditional methods of banking such as use of cheques and cash transactions. This finding is to some extent similar to Al-Smadi and Al-Wabel (2011) who found a negative relationship with e-banking variables and hence indicating that Jordanian banks use traditional banking methods. ATMs and EFT showed expected positive signs while EFTPOS showed unexpected negative sign, but with all the 3 variables statistically insignificant with p-value higher than 0.05 significant level as shown in Table 5.

In a nutshell, commercial banks in Botswana create more value to shareholders and consumers through traditional banking methods such as use of cheques. Use of e-banking is still found inadequate at aggregate level, though some of the big banks are actively using it.

Summary of Findings

ROA Model: the estimation results indicate no statistically significant relationship between e-banking and performance in terms of ROA. This study shows a positive relationship between the ATM and bank performance but use of ATM has no influence on the bank performance. Cheque is the only method of transaction which is widely accepted by the customers. Only CHQ has a p-value which is less than 0.05 meaning that it is statistically significant. This positive sign is consistent with a notion that in many developed countries electronic payment systems are widely used by consumers while in less developed countries paper based check clearing method is still widely used. Electronic card and electronic funds transfers (EFTPOS) have negative influence on the performance which indicated that customers in Botswana still prefer traditional methods of Banking.

ROE model: in case of ROE as bank performance, cheque is the only variable which has significant positive influence on the bank performance and all other variables like ATM, EFT, and EFTPOS have no influence on the return of equity as a measure of bank performance and have statistically insignificant value. This outcome of ROE model may reiterate the notion that consumers in Botswana prefer traditional methods of banking such as use of cheques and cash transactions. Return on Equity was determined bitter prediction on bank performance than the Return on Assets. It can be perceived that banks should increase the number of ATM points in Botswana in short run.

4. Conclusions and Recommendations

The study aimed to assess the influence of e- banking on the performance of commercial banks in Botswana. Specifically, the study sought to find out if: 1) there is a link between use of ATMs and commercial bank performance, 2) electronic card & Electronic Funds Transfer at point of sale (EFTPOS) have an effect on commercial bank performance 3) the use of cheques have an effect on commercial bank performance and 4) Electronic Funds Transfer (EFT) has an influence on commercial bank performance. The Return of Equity (ROE) and Return of Assets (ROA) were used the two measure of commercial bank performance.

The analysis indicated several significant differences in the profile of commercial banks that offer internet banking and banks that do not. The findings of study have indicated that cheque is the only variable which has

significant and positive influence on both methods of assessing the performance and all other methods or e-banking variables like ATM, EFT and EFTPOS have no significant and positive influence on the bank performance. The above shows that customers in Botswana prefer traditional methods of banking, to some extent similar to Al-Smadi and Al-Wabel (2011) findings about Jordanian banks. ATM has positive insignificant relationship between bank performance indicating that customers still prefer ATM as method of transactions and therefore it is recommended that bank can still continue to increase the numbers of ATM machines with in the country.

However, in modern digital global market and banking sector, it is recommended that banks should encourage the consumers' use of electronic ways of banking including EFT and EFTPOS. In developed countries, the adoption of digital route such as internet banking reduces operating expenses, increases non-interest income, and consequently increases banks' profitability. Therefore, there is a need to develop effective strategies for customers to shift from traditional to electronic banking and discourage the use of cheques which increase lot of paper work.

4.1. Areas for Future Research

A future research can be conducted to identify the factor influencing the use of ATM, EFT and EFTPOS banking in Botswana. Furthermore, the study could be enhanced by using values of transactions undertaken through ATMS, EFT and EFTPOS instead of number of units. This will add value in that number of units of ATMS, EFT and EFTPOS does not necessarily translate into value of transactions. Therefore, a further study could be undertaken in this regard, and with extended dataset instead of 10 year period.

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