

Analysis of Determinants of Profitability of Commercial Banks in Botswana

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Abstract This study had dual purposes: (1) to examine relationship between profitability and internal and external factors of commercial banks in Botswana and (2) to perform trend analysis of factors indicating banks' performance. The study analysed the secondary data obtained from Bank of Botswana reports. Profitability measures were return on assets (ROA), return on equity (ROE) and net interest income (NIM) as dependent variables. The independent variables comprised internal factors: bank liquidity, capital adequacy, credit risk, bank size, market profit opportunity, cost efficiency, and bank diversification as well as the external factors: economic growth, inflation and bank interest. We utilised regression technique to analyse the relationship between bank performance and internal and external variables presented in 3 models: ROA, ROE and NIM. The results suggest that ROE is the best measure of the bank profitability followed by ROA and NIM. The combination of inflation, cost efficiency, bank liquidity, credit risk, market profit opportunity and bank diversification was the best predictor of bank profitability as represented by ROE. The implications drawn from this study are that banks should match their operating expenses with revenue growth, and try to strike a balance between asset, liquidity, and liability management in order to remain competitive and earn higher profits. As for the regulator, effective controls should be placed on deposit rates, bank charges, inflation, and banks rates.

Key words Bank profitability, Botswana, commercial banks, liquidity, credit risk, market profit opportunity, cost efficiency, diversification and inflation

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1. Introduction

Financial institutions are engines of economic growth in every country since they play a crucial intermediary role of receiving customers' savings and channelling them to lucrative investment ventures (Dawood, 2014; Jordan, 1991; Rahman *et al.*, 2015). Financial institutions comprise depository institutions (commercial banks), contractual savings institutions (insurance companies, pension funds) and investment intermediaries (investment banks, mutual funds, finance companies), to mention just a few (Eakins and Mishkin, 2012). Financial institutions' sustainable profitability is not only essential for their survival but also for propelling the overall productive capacity of the economy leading to national development. However, on the other flip of coin, financial institutions' weak performance can trigger financial tragedy as the world witnessed in 1997 and 2008 financial crises (San and Heng, 2013). In most countries the dominant segment of the financial institutions are commercial banks whose main business activities include accepting deposits, providing security, offering credit and acting as payment agents at a fee. By and large commercial banks' management stimulate their profitability positions depending on the types of products offered and the fees charged. Internal factors have been found to have a significant effect on overall bank profitability (Abreu and Mendes, 2001; Bourke, 1989; Kosmidou *et al.*, 2005). Furthermore, studies done in emerging markets and Africa indicated that macroeconomic variables also have a bearing on the performance of commercial banks (Frederick, 2015; Ongore and Kusa, 2013; San and Heng, 2013). This study focuses on determining the relationship between commercial banks' performance and management decisions and macroeconomics factors in Botswana. The motivation for this study is to ascertain whether the observations made in the previous studies from other jurisdictions could be replicated in Botswana

environment given its peculiar circumstances characterised by for example, prolonged periods of high profitability, relative stability during global financial crisis and foreign ownership dominance.

Since 1975 when Botswana established its own financial system the banking sector has been characterised by rapid growth and high level of profitability as compared to other countries in Africa (Moffat, 2009). This has been achieved on account of good credit management policies, high bank fees, lack of effective competition and very low risk market conditions (Jefferis, 2007). According to Jefferis (2009) the contribution of banking industry to GDP doubled from 4% in 1995/96 to 8% in 2007/8. The banking sector in Botswana has also been commended for the critical role it plays in the Botswana Stock exchange through its dominance in market capitalisation. The down side of the banking sector in Botswana, however, is that it has remained small with high levels of concentration in relation to the economy size (Moffat, 2009). The sector is made up of 10 commercial banks which are dominated by foreign ownership, investment banks, and statutory banks.

According to Bank of Botswana (2013) the banking sector managed to maintain stability, soundness and solvency despite the global financial crisis of between 2007 and 2012. However, in the past five years since 2011 banks profitability started declining due to subdued global demand of commodities, particularly diamonds which have been the main export of Botswana, low interest rates and sharp decrease in market liquidity (Modiakgotla, 2017). Moreover, the fall in profitability might have been contributed to by a two year moratorium on banking fees and charges placed on shoulders of commercial banks in 2014 by the Bank of Botswana. This onerous factor might have strained the banks' earnings although the intention might have been to revitalise the borrowings by the public. There are numerous studies on bank profitability and its determinants around the globe (see for example, Almumani, 2013; San and Heng, 2013; Staikouras and Wood, 2011), but scanty in Botswana despite peculiarities pertaining to Botswana financial sector as alluded above. Therefore, this study intends to add to the knowledge available regarding the factors influencing bank performance and to contribute to the literature about commercial banking sector in Botswana.

1.1. Objectives

The purposes of this study are to: (1) examine the relationship between profitability and internal and external factors of commercial banks operating in Botswana and (2) to perform trend analysis of factors indicating commercial bank performance over the period from July 2011 to October 2016.

2. Literature review

There is a myriad of investigations on the determinants of bank profitability, with earlier studies being provided by Short (1979) and Bourke (1989). However, recent literature has divided such studies into two main categories, namely; 1) studies about bank profitability and internal factors (Almumani, 2013) and/or 2) studies on bank profitability and external factors (San and Heng, 2013; Staikouras and Wood, 2011). Internal factors are related to bank management decisions while external factors reflect economic and legal environment that affects the operations and performance of banks (Anbar and Alper, 2011).

Further, the literature has identified some empirical studies on bank profitability which have focused on specific countries, while others have focused on a panel of countries. For example, recent studies that focused on bank profitability and specific countries include among others; the United States (Hoffmann, 2011), Malaysia (San and Heng, 2013), Pakistan (Dawood, 2014; Tariq *et al.*, 2014), Jordan (Almumani, 2013), Albania (Duraj and Moci, 2015), Kenya (Ongore and Kusa, 2013), and Uganda (Frederick, 2015). In contrast, earlier studies were mostly studies that use panel data (Athanasoglou *et al.*, 2008; Claeys and Vennet, 2008; Goddard *et al.*, 2004; Molyneux and Thornton, 1992). This study concentrates on internal and external determinants of bank profitability in Botswana. The prominent internal factors are capital adequacy, bank liquidity, cost efficiency, asset quality and size, while external factors include economic growth, inflation and market interest rate. Next, we will explore these internal and external variables that literature has found to have a relationship with bank performance.

2.1. Internal determinants of bank performance

Mamatzakos and Remoundos (2003) pointed out that the variables that directly relate to strategic planning of the bank are important in explaining profitability of the bank. Such factors are regarded as internal or bank specific factors and we will explore prominent ones below:

Capital adequacy. Prior studies have indicated that banks that maintain high level of equity relative to capital register desirable performance (Abreu and Mendes, 2001; Bourke, 1989; Kosmidou *et al.*, 2005). The reason advanced by these studies is that with higher capital ratios the banks tend to face lower costs of funding due to lower prospective bankruptcy costs. Similarly, Atasoy (2007), Sayilgan and Yildirim (2009) and Tunay and Silpar (2006) on their studies on the Turkish banking sector, also established a positive effect of the equity to assets ratio on the return on assets of the banks. Sayilgan and Yildirim (2009) used multi-variable single-equation regression method to investigate factors determining return on assets (ROA) and return on equity (ROE) in Turkish banks for the 2002-2007 period using monthly data and aggregate balance sheet of the banks. The results showed that the ratio of equity to total assets affect profitability indicators positively in a statistically significant manner. In a similar study carried out in Pakistan, Tariq *et al.* (2014) posits that the capital strength of a bank is of utmost significance in affecting its performance, because a well-capitalized bank is considered to be less risky and such edge lead to high profitability. In contrast, the earlier work of Anbar and Alper (2011) had established a negative relationship between return on equity and capital adequacy. In summary, mixed results exist about the relationship between capital adequacy and bank profitability. However, we anticipate a negative relationship based on theoretical view that an increase in equity should reduce profitability as measured by return on equity.

Size. Banks that are larger tend to have a higher reported return on assets and on equity. A positive and significant relationship between the size and the profitability of commercial banks has also been established in some studies (Anbar and Alper, 2011; Kosmidou *et al.*, 2006; Kosmidou *et al.*, 2005; Tariq *et al.*, 2014). This was under the notion that larger banks are likely to have a higher degree of product or loan diversification compared to smaller banks and this is mainly as a result of the economies of scale. Similarly, San and Heng (2013) investigated the impact of bank-specific characteristics and macroeconomic conditions on Malaysian commercial banks' financial performance, during the period of 2003 to 2009, using three ratios which represent profitability measures of return on assets (ROA), return on equity (ROE) and net non-interest margin (NIM). The results were that all the bank specific factors under consideration showed significant expected relationships, with bank size showing a positive relationship in the ROE model. The positive relationship between bank profitability and bank size has also been confirmed by Athanasoglou *et al.* (2008) and Kosmidou *et al.* (2005). In contrast, Dawood (2014) used the ordinary least square (OLS) method to look into the impact of cost efficiency, liquidity, capital adequacy, deposits and size of the bank on the profitability (ROA) of the commercial banks in Pakistan and found out that bank size did not have any significant relationship with bank profitability. Further, Kosmidou *et al.* (2005) found an inverse significant relationship between bank size and profitability, and this suggests that larger banks tend to earn lower margins and profits. This was found to be consistent with prior evidence suggesting either economies of scale/scope for smaller banks or diseconomies for larger banks (Kosmidou *et al.*, 2005). In conclusion, though the extant literature provides an ambiguous relationship between bank profitability and size, we anticipate a positive relationship since majority of the studies reviewed revealed a positive relationship.

Liquidity. The relationship between bank liquidity and profitability has shown some mixed results over time. A positive significant relationship between bank liquidity and profitability has been found by some studies (Anbar and Alper, 2011; Bourke, 1989). Liquidity is also found to be the determinant of profitability in ROA and NIM profitability measuring models (San and Heng, 2013). Ibid showed that liquidity improves the profitability performance of banks since banks with sufficient liquidity assets have lower risk to become insolvent as they can withstand financial risk (San and Heng, 2013). This is so because they can lower the cost of borrowing from external sources which in turn results in higher profit. Zopounidis and Kosmidou (2008) while examining the determinants of performance of Greek banks during the period of EU financial integration (1990-2002), found out in relation to liquidity that return on average assets (ROAA) was negative and significant when they considered only bank's characteristics, and it became positive but insignificant when the macroeconomic and financial structure variables entered the equation.

Thus, the results imply that less liquid banks have lower ROAA, showing a positive relationship which was inconsistent with their expectations. On the contrary, Molyneux and Thornton (1992) established that there is a negative correlation between liquidity and profitability. In a nutshell, a positive relationship tends to exist between bank liquidity and profitability.

Cost efficiency. This variable, mostly measured by cost to income ratio, determines the costs associated with running the bank (Pasiouras and Kosmidou, 2007). According to San and Heng (2013) cost to income ratio has a negative and significant relationship with ROA and this suggests that cost to income ratio is an essential variable in ROA measure of bank profitability. However, negative significant relationship was found between cost efficiency and profitability with the NIM model. Furthermore, Kosmidou *et al.* (2006) found that cost to income ratio has a negative effect on UK banks' performance. As a result, banks must manage their expenses efficiently. Pasiouras and Kosmidou, (2007) stated that "As expected the coefficient of the cost to income ratio (COST), which appears to be the most significant determinant of profitability for foreign banks, is negative showing that an increase (decrease) in these expenses reduces (increases) the profits of banks operating in the EU to a large extent". In support of this view, Guru *et al.* (2002) and Kosmidou *et al.* (2006) also found poor expenses management to be among the main contributors to poor profitability. Overall, a negative relationship between cost to income ratio and bank profitability seem to be the norm.

Credit risk. This variable measures asset quality and it has been used in some studies with different proxies or ratios (Almumani, 2013; Frederick, 2015; San and Heng, 2013; Staikouras and Wood, 2011). For example, Frederick (2015) and Staikouras and Wood (2011) in their studies on banking sector determinants and profitability in Uganda and Europe respectively used the ratio of loan loss provisions to total loans, while Almumani (2013) used provision for credit facilities plus interest to total credit facilities. The results about the effect of credit risk on profitability have been mixed as expected since on one hand more loans may result in more interest being earned which increases profit. But on the other hand increased lending accompanied by high probability of default may trigger higher loan loss provisions leading to lower earnings. (Tariq *et al.*, 2014) found that assets quality, as measured by the loan loss provisions, affects the performance of the Pakistan banks positively and the outcome was statistically significant. According to San and Heng (2013) another determinant of ROA model is loan loss reserves (LLR) which has an inverse relationship with ROA. This is so because the higher LLR means that the bank has to set aside more reserves to cover the bad loans and therefore lower the bank profitability. Thus, LLR has a negative impact on bank profitability even though the impact of LLR on bank profitability is not clear-cut as in the same study NIM model found that LLR is positively correlated to NIM (San and Heng, 2013). Meanwhile, Frederick (2015) found out that loan loss provision to total loan (LLPTL) has a significant negative coefficient, which was found to be consistent with the findings of Ongore and Kusu (2013); Samina and Ayub (2013); Trujillo-Ponce (2012); Davydenko (2011), and Sufian (2010). Asset quality was determined to have had a significant negative impact on financial bank performance measured by ROA. Overall, negative relationship is expected between loan loss provisions to total loans and bank profitability.

Other internal factors. Found in literature which we adopted in our study as they seem to appeal more to Botswana context are Market Profit Opportunity (which measures deposits to total assets) and Bank diversification (measured by the ratio of non-interest income to total income (Frederick, 2015). In theory, increase in customer deposits and more diversification efforts by management are expected to yield more bank profits, other factors held constant.

2.2. External determinants of bank profitability

The external factors on the other hand relate to the economic and legal environment that affects the performance and operation of the bank and the most common ones are economic growth, inflation and market interest rate.

Economic growth. Though the use of gross domestic product (GDP) growth as a variable did not feature extensively in earlier literature in accordance with (Staikouras and Wood, 2011), it has however been included in most recent studies. Economic growth as measured by GDP has had positive significant influence on the performance of commercial banks (Duraj and Moci, 2015; Kosmidou *et al.*, 2006). The work of (Staikouras and Wood, 2011) revealed that GDP growth was significant and negative in the case of

commercial and savings banks, and the GDP growth was significant and positive for co-operative banks in European banks. In contrast the study by San and Heng (2013) discovered that the effect of the macroeconomic determinants such as GDP growth and inflation on Malaysian commercial banks' profitability seemed insignificant. Hence, the results of GDP and bank profitability are ambiguous.

Inflation. The results about the impact of inflation on banks' profitability are also mixed. Inflation measured by consumer price index (CPI) has a positive significant impact on return on equity for domestic commercial banks in Uganda (Frederick, 2015). The results are consistent with the findings of Athanasoglou *et al.* (2008) ; Davydenko (2010); and Claey's and Vennet (2008). However, inflation appears to be significant and negatively related to the bank profitability in Albania and Pakistan respectively (Duraj and Moci, 2015; Tariq *et al.*, 2014). For example, inflation affects the bank's profitability inversely as increased inflation affects banks costs positively leading to a reduction in profit (Tariq *et al.*, 2014). But the increase in inflation can prompt the hike in interest rates that have potential of increasing banks' revenue. According to Anbar and Alper (2011) no significant relationship was between inflation and profitability. Anbar and Alper (2011) Hence, the overall results on inflation and bank profitability is a bit ambiguous though leaning more towards a positive relationship.

Interest rates. Various measures have been used such as the bank rate, prime rate, and average interest rates. Staikouras and Wood (2011) observed a significant positive effect of the level of interest rates on profitability. Similarly, (Anbar and Alper, 2011) found that among macroeconomic variables of GDP growth and inflation, only real interest rate was found to be significantly affecting ROE at 5% level of significance. Higher real interest rates can lead to higher bank profitability due to higher rates of return from assets such as loans.

From the above discussion we hypothesize as follows:

- H₁ 1: Positive significant relationship exists between bank liquidity and bank profitability*
- H₁ 2: Negative significant relationship exists between capital adequacy and bank profitability*
- H₁ 3: Negative significant relationship exists between credit risk and bank profitability*
- H₁ 4: Positive significant relationship exists between bank size and bank profitability*
- H₁ 5: Positive significant relationship exists between market profit opportunity and bank profitability*
- H₁ 6: Negative significant relationship exists between cost efficiency and bank profitability*
- H₁ 7: Positive significant relationship exists between bank diversification and bank profitability*
- H₁ 8: Positive significant relationship exists between inflation and bank profitability*
- H₁ 9: Positive significant relationship exists between bank interest rate and bank profitability*

3. Methodology of research

This study investigated the relationship between bank profitability as dependent variables and internal and macroeconomic factors as independent variables using the Ordinary Least Square regression model (See Table 2). The literature review revealed extensive use of linear function when analyzing the relationship between banks performance and internal and external factors (Staikouras and Wood, 2011). We used the monthly aggregate secondary data provided in the Bank of Botswana Reports to calculate the ratios of variables chosen for analysis. The data was for the period July 2011 to October 2016, giving us 64 observations. The aggregate figures reflect the commercial banks industry position rather than specific banks information. This approach is a deliberate deviation from the practice of using bank-specific data which is widely used by prior works to study the determinants of banks profitability. The authors used industry data to see whether the results would suggest a different picture from that exhibited by studies that make use of bank-specific data. Our approach, however, excludes the most commonly used variable, the GDP growth, in this type of study as an independent macroeconomic factors influencing banks performance (San and Heng, 2013). The monthly GDP figures were not provided in the Bank of Botswana reports reviewed. The data was for 10 commercial banks which were in operation in Botswana at the end of 2015 (Bank of Botswana, 2015) as shown on Table 1. All these banks are foreign controlled although four of them (African Banking Corporation of Botswana Limited, Barclays Bank of Botswana Limited, First National Bank of Botswana Limited and Standard Chartered Bank Botswana Limited) are listed on Botswana stock exchange allowing citizens to have some ownership.

Table 1. Names of Banks

Bank Name	
1	African Banking Corporation of Botswana Limited(trading as 'BancABC')
2	Bank Gaborone Limited
3	Bank of Baroda (Botswana) Limited
4	Bank of India (Botswana) Limited
5	Barclays Bank of Botswana Limited
6	Capital Bank Limited
7	First National Bank of Botswana Limited
8	Stanbic Bank Botswana Limited
9	Standard Chartered Bank Botswana Limited
10	State Bank of India (Botswana) Limited

Variables analysed were obtained from literature about the determinants of bank profitability and where a variable was used by more than two article papers it was picked for analysis.

Table 2. Dependent and Independent Variables Used in the Study

Type of Variables	Variables	Measure	Notation	Expected impact
Dependant variable	Profitability	Return on Assets (Net profit/ Total assets)	ROA	
		Return on Equity (Net profit/Total equity)		
		Net income margin (Net interest income less interest expense to total assets)	ROE	
			NIM	
Independent variables (Internal)	Bank liquidity	Total loans to Total assets	LA	+
	Capital adequacy	Equity to Total assets	EA	-
	Credit risk	Loan loss provisions to Total loans	LLPTL	-
	Bank size	Natural Logarithm of Total assets	LNASSETS	+
	Market Profit			
	Opportunity	Deposits to Total assets	DEPTA	+
	Cost Efficiency	Total cost less interest expense to Total income	NCTI	-
	Bank Diversification	Non-interest income to Total income	NIITI	+
Independent variables (External)	Annual Inflation rate	Consumer Price Index	CPI	+
	Bank Interest Rate	Bank rate	BIR	+

Source: Authors

The authors computed descriptive statistics including mean, variances, standard deviations and Skewness to measure the degree of dispersion among the variables. The constructed regression model was as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \epsilon \quad (1)$$

Where:

Y presents profitability measure, that is, Return on Assets (ROA) or Return on Equity (ROE) or Net Interest Margin (NIM);

α represents the value that Y will have when all independent variables are equal to zero;

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ and β_9 represent the quantified effect that the independent variables have on the profitability;

X_1 represents Bank Liquidity; X_2 represents Capital adequacy; X_3 represents Credit risk;

X_4 represents Bank size; X_5 represents Market profit Opportunity; X_6 represents Cost Efficiency;

X_7 represents Bank Diversification; X_8 represents Annual Inflation; X_9 represents Bank Interest Rate.

A trend analysis was performed to examine how the variables fluctuated over the period under study. For each year from 2011 to 2016 averages were computed to establish whether there were specific patterns exhibited by the data.

4. Results and Analysis

4.1. Correlations

Table 3 shows the correlations among the variables. Most variables were positively and significantly correlated. Inflation had a high positive and significant relationship with Bank interest rate ($r = 0.959$, $p = 0.000$) and market profit opportunity ($r = 0.845$, $p = 0.000$) and a high negative significant correlation with bank size ($r = -0.942$, $p = 0.000$) and cost efficiency ($r = -0.822$, $p = 0.000$). Moderate negative significant relationships were revealed between inflation and bank liquidity ($r = -0.778$, $p = 0.000$), capital adequacy ($r = -0.635$, $p = 0.000$) and bank diversification ($r = -0.533$, $p = 0.000$). These findings are contrary to those of San and Heng (2013) who found very weak and insignificant relationships between inflation and most of both internal and external variables in Malaysian commercial banks. Inflation is of one of the macroeconomic factors that perversely impact banks performance. As inflation rises it reduces the purchasing power of the public leading to curbing borrowings, triggering loan losses and consequently diminishing banks' earnings (Staikouras and Wood, 2011).

Table 3. Correlation among Variables

		ROA	ROE	NIM	CPI	BIR	LA	EA	LLPTL	SIZE	DEPTA	NCTI	NIITI
ROA	Pearson Correlation	1											
	Sign. (2-tailed)												
ROE	Pearson Correlation	.980**	1										
	Sign. (2-tailed)	.000											
NIM	Pearson Correlation	.827**	.769**	1									
	Sign. (2-tailed)	.000	.000										
CPI	Pearson Correlation	.821**	.875**	.719**	1								
	Sign. (2-tailed)	.000	.000	.000									
BIR	Pearson Correlation	.815**	.842**	.761**	.959**	1							
	Sign. (2-tailed)	.000	.000	.000	.000								
LA	Pearson Correlation	-.528**	-.669**	-.265*	-.778**	-.667**	1						
	Sign. (2-tailed)	.000	.000	.035	.000	.000							
EA	Pearson Correlation	-.349**	-.522**	-.110	-.635**	-.518**	.899**	1					
	Sign. (2-tailed)	.005	.000	.386	.000	.000	.000						
LLPTL	Pearson Correlation	.019	.130	-.102	.049	-.142	-.434**	-.453**	1				
	Sign. (2-tailed)	.881	.307	.420	.700	.262	.000	.000					
SIZE	Pearson Correlation	-.827**	-.855**	-.761**	-.942**	-.961**	.654**	.487**	.093	1			
	Sign. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.463				
DEPTA	Pearson Correlation	.776**	.814**	.666**	.845**	.816**	-.712**	-.563**	.064	-.829**	1		
	Sign. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.613	.000			
NCTI	Pearson Correlation	-.892**	-.916**	-.586**	-.822**	-.823**	.689**	.501**	-.007	.817**	-.754**	1	
	Sign. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.958	.000	.000		
NIITI	Pearson Correlation	-.355**	-.374**	-.480**	-.533**	-.589**	.416**	.278*	.059	.530**	-.456**	.512**	1
	Sign. (2-tailed)	.004	.002	.000	.000	.000	.001	.026	.643	.000	.000	.000	

Source: Authors

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Bank Interest rate had a similar relationship as inflation with most of the variables. For example it had high negative significant relationship with bank size ($r = -0.961$, $p = 0.000$) and cost efficiency ($r = -0.823$, $p = 0.000$) implying that as bank interest rises it negatively impacts loan and advances bank can issue and thus reducing the bank revenues. A high positive and significant relationship was observed between bank liquidity and capital adequacy ($r = 0.899$, $p = 0.000$) while a medium positive and significant correlation was detected between bank liquidity and bank size ($r = 0.654$, $p = 0.000$) and cost efficiency ($r = 0.689$, $p = 0.000$). A medium negative significant correlation was also observed between bank liquidity and market profit opportunity ($r = -0.712$, $p = 0.000$). Generally, the bank diversification had medium to low

negative significant relationship with most of the variables except bank size ($r = 0.530$, $p = 0.000$) and cost efficiency ($r = 0.512$, $p = 0.000$) which displayed a medium positive significant relationship.

While capital adequacy, bank size, market profit opportunity, cost efficiency, inflation and bank interest exhibited expected impact on profitability, bank liquidity, credit risk and bank diversification did not conform to the expectations. It is not clear what was behind unexpected effects.

Table 4. Descriptive Statistics

Variables	Observations	Minimum	Maximum	Mean	Std. Deviation	Skewness
ROA	64	.0009	.0041	.002589	.0008336	-.193
ROE	64	.0083	.0443	.024473	.0086899	.107
NIM	64	.0029	.0055	.004345	.0005971	-.307
CPI	64	2.6000	9.2000	5.171875	2.1530686	.410
BIR	64	5.5000	9.5000	7.796875	1.4412262	-.063
LA	64	.4827	.6633	.606731	.0478365	-1.080
EA	64	.0911	.1172	.106963	.0063433	-.924
LLPTL	64	.0212	.0304	.024713	.0022402	.642
SIZE	64	10.8400	11.2900	11.076250	.1461734	.068
DEPTA	64	.7570	.8401	.800825	.0221553	.063
COSR	64	.3036	.6409	.485473	.0716177	-.040
NIITI	64	.2315	.3985	.290481	.0315127	.949

Table 4 shows the descriptive statistics of twelve variables investigated by the current study. The ROA for the commercial banks in Botswana for the past five and half years ranged from 0.0009 minimum value to 0.0041 maximum value with a mean of 0.002589 and standard division of 0.0008336 with negative Skewness. The results imply that ROA over the study period did not fluctuate much from the mean but most of the values over the period were below the mean which could be construed as either net income remaining low or total assets remaining high over the period under study. The mean of ROE was 0.024473 while its minimum and maximum values were 0.0083 and 0.0443 respectively and standard deviation was 0.0086899 with positive Skewness which could be interpreted as net incomes continuing to be high or equity being kept low for the bigger part of the period under study. Net Interest Margin statistics reflected a mean of 0.004345, minimum and maximum values of 0.0029 and 0.0055 respectively and standard deviation of 0.0005971 indicating the lowest variation from the mean. Net Interest Margin also reflected the negative Skewness implying that during the period under study most values were below the mean signifying either subdued interest income and total assets, or higher interest expenses. Annual inflation over the study period had a mean of 5.171875 with minimum and maximum values ranging from 2.6 to 9.2. The variations around the mean of annual inflation were 2.1530686 with a positive Skewness signifying that for the bigger portion of the period inflation was above 5.17. This rate is within the Bank of Botswana target range of between 3 to 6 (DZIMIRI, 2014) which is a catalyst for economic stimulation. Over the period under study the Bank Interest Rate fluctuated between minimum value of 5.5 and maximum value of 9.5 with a mean value of 7.796875 and standard deviation of 1.4412262. It had a negative Skewness implying that for the bigger portion of the period under study the bank interest rates were kept below 7.9.

The mean of Bank liquidity for commercial banks for the period under study was 0.606731. The minimum and maximum values were 0.4827 and 0.6633 while the standard deviation was .0478365 indicating low variation from the mean. Furthermore, the Bank liquidity data reflected a negative Skewness which could mean that for most part of the period either monthly loans were lower or total assets were higher than average. The mean of capital adequacy was 0.106963 while the minimum and maximum values stood at 0.0911 and 0.1172 respectively with minimal fluctuations observed as demonstrated by low standard deviation of 0.0063433. Capital adequacy reflected a negative Skewness signifying most values being below the mean for the greater part of the period. Implications are that equity capital could have been kept low or total assets remained high than average. The credit risk data displayed a mean of 0.024713 with minimum value of 0.0212 and maximum value of 0.0304. Standard deviation stood at 0.0022402 and a positive Skewness was witnessed. The data of loan loss provision to total loans exhibited a

very low variation and most values being above the mean for the larger portion of the period under study. The Bank size represented by natural logarithm of total assets had a mean value of 11.076250, a minimum value of 10.8400 and maximum value of 11.2900. The bank size data also displayed a positive Skewness and a standard deviation value of 0.1461734 indicating a low variation from the mean.

The market profit opportunity data displayed a mean of 0.800825, a minimum and maximum values of 0.7570 and maximum value of 0.8401 respectively. Standard deviation of 0.0221553 and positive Skewness are also revealed for the deposits to total assets data. The cost efficiency data revealed a mean of 0.485473, minimum value of 0.3036 and maximum value of 0.6409. Its standard deviation stood at 0.0716177 implying low fluctuations and a negative Skewness which could either mean that for the greater part of the period total costs were below or interest expenses and total income were above average. Bank diversification is a ratio of non-interest income to total income showing the extent to which banks have expanded their services from the dominance of interest earning activities. The ratio reflected a mean value of 0.290481, minimum value of 0.2315 and maximum value of 0.3985. The standard deviation exhibited by bank diversification data was 0.0315127 which signifies a very low variation from the mean. The Skewness was positive which implies that most values were above the mean (29%).

4.2. Regression analysis

Table 6. Regression Analysis of ROA, ROE and NIM Models

		Collinearity Statistics				Model Summary		ANOVA	
Variables	Coefficient	t-value	Sig	Tolerance	VIF	R-Square	Adjusted R-Square	F	Sig
ROA						0.949	0.941	112.612	0.000
	CPI	0.429	2.661	0.010	0.036	27.807			
	BIR	0.242	1.345	0.184	0.029	34.535			
	LA	0.587	5.534	0.000	0.083	12.001			
	EA	0.069	0.882	0.382	0.154	6.490			
	LLPTL	0.278	5.807	0.000	0.408	2.450			
	LNASSETS	0.091	0.737	0.464	0.061	16.302			
	DEPTA	0.235	3.863	0.000	0.254	3.944			
	NCTI	-0.773	-12.80	0.000	0.257	3.888			
	NIITI	0.191	4.786	0.000	0.589	1.699			
ROE						0.961	0.955	149.005	0.000
	CPI	0.371	2.627	0.11	0.036	27.807			
	BIR	0.142	0.903	0.371	0.029	34.535			
	LA	0.510	5.503	0.000	0.083	12.001			
	EA	-0.125	-1.839	0.071	0.154	6.490			
	LLPTL	0.274	6.528	.000	0.408	2.450			
	LNASSETS	-0.037	-0.345	0.752	0.061	16.302			
	DEPTA	0.175	3.297	0.002	0.254	3.944			
	NCTI	-0.709	-13.42	0.000	0.257	3.888			
	NIITI	0.176	5.038	0.000	0.589	1.699			
NIM						0.863	0.840	37.760	0.000
	CPI	0.512	1.927	0.059	0.036	27.807			
	BIR	0.685	2.315	0.024	0.029	34.535			
	LA	0.932	5.339	0.000	0.083	12.001			
	EA	0.149	1.161	0.251	0.154	6.490			
	LLPTL	0.425	5.393	0.000	0.408	2.450			
	LNASSETS	0.002	0.008	0.994	0.061	16.302			
	DEPTA	0.347	3.466	0.001	0.254	3.944			
	NCTI	-0.005	-0.052	0.959	0.257	3.888			
	NIITI	-0.098	-1.496	0.140	0.589	1.699			

The original regression results for commercial bank profitability were as reflected on Table 6. The results suggest that all three models regressing return on assets, return on equity and net interest margin as dependent factors with seven internal and two external independent variables were good predictors of commercial banks profitability and were all statistically significant. ROE generated the highest Adjusted r-squared of 0.955 and F factor of 149.005, $p = 0.000$ followed by ROA with adjusted R-squared of 0.941 and F Factor of 112.612, $p = 0.000$. NIM yielded the lowest statistics, adjusted R-squared of 0.840 and F factor of 37.760, $p = 0.000$.

ROE model with inflation and bank interest rate as external independent factors and bank liquidity, capital adequacy, credit risk, bank size, market profit opportunity, cost efficiency and bank diversification as internal independent factors displayed the highest Adjusted R-squared (0.955) and F-Factor (149.005) making it the best predictor among the three models. These findings support the results of Frederick (2015) regarding commercial banks in Uganda but are inconsistent with outcomes of Dawood (2014) and San and Heng (2013) who found ROA to be the strongest predictor of banks' performance in Pakistan and Malaysia respectively. However, scrutinizing the original results further revealed that the three models contained some independent variables which were highly correlated to each other creating the problem of multi-collinearity. For example, the high and significantly correlated variables included inflation and bank interest rate ($r = 0.959$); bank liquidity and capital adequacy ($r = 0.899$); and bank size with inflation ($r = -0.942$) and with bank interest ($r = -0.961$).

Therefore, due to their low coefficient values, statistical insignificance and high collinearity statistics (Variance Inflation Factor VIF) bank interest, capital adequacy and bank assets were excluded from the model which used ROE as profitability proxy. However, CPI was retained as it appears to have higher coefficient and lower VIF as compared to bank interest rate. Moreover, the hypothesis relating to the three dropped variables were not tested. The model, therefore which was used to test the factors determining the commercial banks profitability in Botswana was reduced to six independent variables, consisting 5 internal and 1 external and was constructed as follows:

$$ROE = \alpha + \beta_1 LA + \beta_2 LLPTL + \beta_3 DEPTA + \beta_4 NCTI + \beta_5 NIITI + \beta_6 CPI + \varepsilon \quad (2)$$

The Regression analysis results of this model are exhibited on Table 7.

The linear function of the model is:

$$ROE = -0.081 + 0.388LA + 0.246LLPTL + 0.175DEPTA - 0.699NCTI + 0.172NIITI + 0.535CPI + \varepsilon$$

As per Table 7, the model produced R-squared of 0.958 which means that 95.8% of variations in the dependent variable ROE is explained by a combination of independent internal factors consisting of bank liquidity, credit risk, market profit opportunity, cost efficiency and bank diversification and independent macroeconomic factor, inflation. These findings agree with those of Frederick (2015) who reported that 91.5% of changes in ROE in Ugandan commercial banks were accounted for by the combined effect of independent variables. The model generated a statistically significant F factor ($F = 214.743$, $p = 0.000$) implying a strong predictive power of the model. All variables had collinearity statistics which were within acceptable range of below 5 VIF except inflation whose VIF of 6.171 was slightly higher. Overall, the results indicate that there was no multi-collinearity problem in the revised model.

Table 7. Regression Analysis of ROE Model

		Collinearity Statistics				Model Summary		ANOVA	
Variables	Coefficient	t-value	Sig	Tolerance	VIF	R-Square	Adjusted R-Square	F	Sig
						0.958	0.953	214.743	0.000
(Constant)	-0.081	-4.044	0.000						
LA	0.388	6.686	0.000	0.220	4.540				
LLPTL	0.246	6.814	0.000	0.570	1.753				
DEPTA	0.175	3.321	0.002	0.268	3.726				
NCTI	-0.699	-13.873	0.000	0.293	3.411				
NIITI	0.172	5.244	0.000	0.691	1.447				
CPI	0.535	7.898	0.000	0.162	6.171				

Cost efficiency registered the highest coefficient of the model and had a significant negative effect on banks' performance ($\beta = -69.9\%$, $p = 0.000$). This led to the acceptance of the hypothesis that a negative significant relationship exists between cost efficiency and bank profitability. The negative coefficient of cost efficiency underscores the importance of keeping the operating expenses under control in order to boost

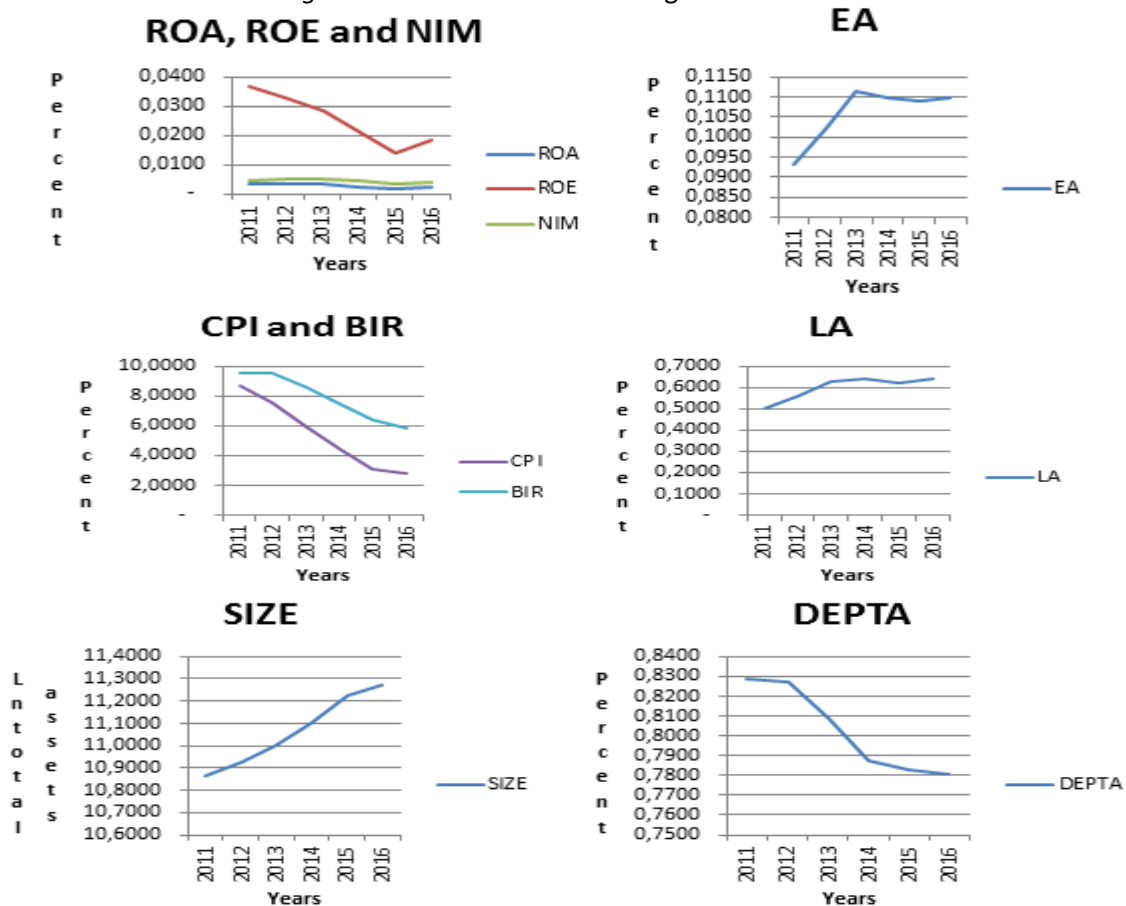
banks' performance. Several prior studies reported similar results regarding cost efficiency (see Syafri (2012) ; Dawood, 2014; Frederick, 2015). Inflation recorded the second highest coefficient of the model which was positive and statistically significant ($\beta = 53.53\%$, $p= 0.000$). Therefore, the hypothesis that positive significant relationship exists between inflation and profitability was accepted. Bank liquidity ranked third in predicting bank profitability in ROE model as it accounted for around 40% of variations. It yielded a positive and statistically significant coefficient ($\beta = 38.8\%$, $p= 0.000$). Therefore the hypothesis that positive significant relationship exists between bank liquidity and profitability was accepted as well. This demonstrates the importance of maintaining appropriate levels of bank liquidity on performance of the banks.

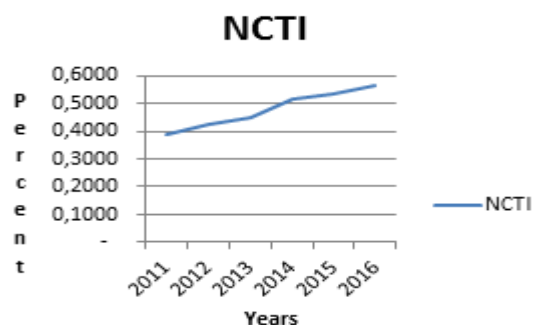
Credit risk came forth explaining about a quarter of changes in ROE with positive and statistically significant coefficient ($\beta = 24.6\%$, $p= 0.000$).The positive significant coefficient led us to reject the hypothesis that negative significant relationship exists between credit risk and bank profitability. Market profit opportunity and bank diversification came fifth and sixth respectively in explaining bank profitability. Each accounted for about 18% of variations in the model. Market profit opportunity registered a positive and statistically significant regression coefficient ($\beta = 17.5\%$, $p= 0.002$) causing us to accept the hypothesis that is a positive significant relationship between this ratio and profitability. A positive and significant regression coefficient was also observed for bank diversification and profitability ($\beta = 17.2\%$, $p= 0.000$). We therefore accepted the hypothesis that a positive significant relationship exists between bank diversification and profitability.

4.3. Trend Analysis

Figure 1 display charts that show annual average trend for the three measures of bank profitability namely ROA, ROE and NIM and for the macroeconomic variables, inflation and bank interest rate as well as for bank specific factors being bank liquidity, capital adequacy, credit risk, company size, market profit opportunity, cost efficiency and bank diversification.

Figure1. Trends of Annual Averages of Variables





From Figure 1 the profitability proxy trio (ROE, ROA and NIM) exhibits a declining trend from 2011 until 2015 and rebounding in 2016 but without getting back to 2011 levels. ROE line was above that of ROA and NIM while the former was below the other two. The fact that NIM was above ROA implies that the net interest income was bigger than the net income because of huge non-interest expenses which did not match with non-interest income. Several authors have underscored the importance of bank management controlling the non-interest expenses as they tend to erode profitability capacity of banks (see for example, Kosmidou *et al.* (2006); Guru *et al.* (2002). While ROE had a sharp fall, ROA and NIM showed a mild declining trend. This implies that while the total assets increased significantly equity did not move in the similar fashion. The implications could be that, other things being equal, the rise in deposits did not result in significant growth in interest income. Both inflation (CPI) and bank interest rates (BIR) during the period reflected a steep decline until 2015 but slightly rose in 2016. Mild fluctuations are observed in bank liquidity (LA) data. It rose in 2011 to 2013, slightly declined in 2013 to 2014, dropped again in 2015 and recovered in 2016. Overall, there was a slight upward movement in total loans and total assets. The capital adequacy (EA) improved significantly in 2011 to 2013 signifying either increase in equity capital or falling total assets. The ratio however, plummeted in 2013 to 2015 to bounce back in 2016.

The credit risk ratio (LLPTL) data exhibited a “bowel shape” indicating a slight fall in 2011 to 2013, remaining flat in 2013 and 2014 and showing mild improvements from 2014 to 2016. Total assets (SIZE) depicted a rising trajectory from 2011 to 2015. This could be attributed to diminishing bank interest rates which has the potential of luring customers to borrowing. The ratio of deposits to total assets (DEPTA) exhibited a decreasing pattern, indicating a steep decline from 2012 to 2014 and a mild fall from 2014 to 2016. The implications are that the deposits from customers could have gone down while loans and advances to borrowers were rising to signify good public attitude towards investing into emerging business opportunities. A mild rising pattern was observed in the cost efficiency ratio (NCTI). The implications are that during the period under study either costs were on the rise or net incomes were decreasing. Huge fluctuations were detected in bank diversification ratio (NIITI). However, after a significant drop from 2011 to 2012 the ratio started rising albeit in a non-linear fashion. This unstable trend means that the non-interest income sources were less guaranteed during the period under study.

5. Conclusion and recommendations

The paper presents an analysis of what could be the predictors of Botswana commercial banks' performance. The results suggest that ROE is the best proxy of the bank's profitability followed by ROA and the last measure being NIM. The combination of inflation, cost efficiency, bank liquidity, credit risk, market profit opportunity and bank diversification in that order of importance (descending order of coefficients) was the best predictor of bank profitability as represented by ROE. Overall, the period under investigation witnessed the sharp plunge (50%) in commercial banks profitability as measured by ROE although assets were rising. All of the expected signs in variables were realised except in credit risk where a positive relationship between the ratio and profitability was reported instead of a negative relationship. It is clear from this study that bank profitability is affected by numerous factors some of which are highly correlated.

Implications of these results to the banks are that they should find means to shield themselves against inflation related risks and try to match their increasing operating expenses with revenue growth. As banks chase corporate customers they should not lose sight of household customers since excessive exposure to the former may lead to high risk in case of defaults due to macroeconomic factors. Bank

liquidity should be brought under control while banks become more vigilant on assessing deserving customers for loans and advances to reduce the likelihood of defaulting. Banks should also intensify pursuit for non-interest income sources which can guarantee constant income to cover some of non-interest expenses. Overall, banks should strike a balance between asset, liquidity, and liability management in order to remain competitive and earn higher profits.

With regard to Bank of Botswana as a regulator of commercial banks, are that firstly, it has to continue monitoring the inflation rate to ensure that it is within the target range of 3-6%. This is so because higher inflation rates will lead to more bank profits but at the same time led to erosion of purchasing power and in turn curtail the ability to save. Conversely lower inflation rates might lead to poor bank performance. Secondly, the central bank should monitor the discount (bank) rate to ensure that banks offer their customers reasonable prime and lending rates. Thirdly, BOB should enforce controls on bank liquidity by monitoring deposit rates and also keeping an eye on excessive generation of non-interest income by monitoring bank charges. Lastly, minimum capital adequacy requirements should be integral part of their bank supervision role in order to ensure that banks provide best services to the public while they strive to meet shareholders' profitability and safety expectations.

6. Limitation

The approach adopted by this study of utilising secondary data from Bank of Botswana website restricted the scope of the study in terms of period that could be covered as the Bank of Botswana Reports tend to aggregate some of the past data into annual or quarterly categories as they move forward. More monthly data could have yielded better results. We, however, believe that data obtained and analysed was good enough to provide adequate insightful revelation on determinants of profitability in commercial banks in Botswana.

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