A Review of the Banking Sector Profit Persistence

Sanderson Abel[1]*, Khobai Hlalefang[2], Pierre Le Roux[3], Learnmore Mutandwa[4]

[1]Department of Economist, Bankers Association of Zimbabwe, 14177 Gunhill Avenue, Gunhill, Harare, Zimbabwe, [2]Nelson Mandela Metropolitan University, Port Elizabeth South Africa, [3]Department of Economics, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa, [4]Midlands State University, Gweru, Zimbabwe. *Email: abelsza.mwale@gmail.com

ABSTRACT

The study aims to investigate the profit persistence and identify the determinants of profitability in the Zimbabwean banking sector during the period 2009-2014. The study established that banks were inefficient operating under monopolistic competition. The study revealed that profitability does not persist implying banks are enjoying abnormal profits over time. The results further reveals that market power, cost efficiency, credit risk, liquidity risk and the size of the bank are significant factors influencing bank profits. The results indicate that bank profits are determined mostly by strategies adopted by bank management.

Keywords: Competition, Generalised Methods of Moment, Instrumental Variables, Persistence, Profitability
JEL Classifications: L25, G21, C33

1. INTRODUCTION

The 2008/9 global financial crisis that originated from the collapse of the market for sub-prime mortgages in the United States impacted the global banking sector. The effect of the crisis manifested through declining banking sector profitability, lower levels of credit growth and deteriorating quality of assets (Ganić, 2012). In an effort to restore stability and enhance performance, the banks adopted new methods of containing costs, deepening customer relationships and repricing their products. These methods were meant to improve the stability and profitability of the banking sector.

Bank profitability is not just a performance measure but a necessary condition for the success of banks under competitive conditions. Profit performance is important given the essential roles that banks play in an economy. Banks are important in the utilisation of resources, especially in respect of intermediating between savers and investors, which facilitates economic activity. Evaluating the profitability of banks help in gauging the efficacy of different policies implemented in the financial system. These policies include deregulation, interest rate restrictions and removal of entry barriers in stimulating industry performance (Berger and Humphrey, 1997).

The profitability of banks gives an indication of the health and stability of banking institutions. Profits add to a banks' capital base, which acts as the banks first line of defence when banking institutions start incurring losses. Profitability of the banks reinforces the capitalisation of the bank which can be a source of future profitability. Profits determine the growth of an organisation in the medium to long term. If profits are rising, the cash flow of the organisation also improves, offering greater flexibility in financing corporate investment. The easier access to finance facilitates greater investment which boosts productive capacity, competitiveness and employment (Aremu et al., 2013). The relative stability of earnings improves the business scope for expansion and growth over time.

Profit persistence is the tendency of an individual bank to maintain the same place in the industry profit performance distribution. The persistence of bank profits is a reflection of the impediments to market competition and these are a reflection of the difficulty of entry and exit into the banking sector which allows abnormal profits to persist over time. Bank profits can persist over time depending on the regulatory regimes, availability of barriers to market competition and sensitivity to macroeconomic shocks (Berger et al., 2000; Sinha and Sharma, 2014). This defines the level of competition, information asymmetry and reaction of profit to macroeconomic factors (Sinha and Sharna, 2014).

The subject of profit persistence has gained interest among scholars more so after the global financial crisis of 2007/8 (Mokni and Rachdi, 2014; Jaisinghani et al., 2015; Pervan et al., 2015; Djalilov and Piesse, 2016; Sinha and Sharma, 2014). The debate has not been conclusive with different studies either supporting profit persistence or against profit persistence. In light of this ongoing debate the study seeks to contribute to the debate using the Zimbabwean banking sector as the laboratory for the period 2009-2014. The period 2009-2014 resembles the turnaround phase in the Zimbabwe economy after a decade of economic decline and instability. The period was characterised by positive economic growth and economic stability reflected through low levels of inflation. Banks were accused of excessive profiteering through over pricing banking products (Reserve Bank, 2014) forcing the government to introduce price controls through a memorandum of understanding (MoU) between the central bank and all banks in 2013. The MoU outlined the pricing formulae for various banking products, including interest rates on loans, interest rates on deposits, bank charges and the levels of other fees charged by banks. In 2014, the central bank gave another directive on the interest rates before pegging them at 15% in 2015 before further reducing them to 12% in 2017.
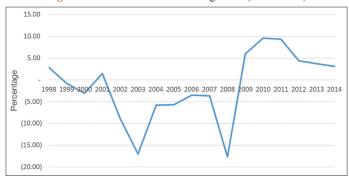
The study seeks to answer the following questions: Are bank profits a result of market power or efficiency in production? Under what market structure are banks operating? What drove bank profits of during the study period? Are bank profits persisting over time? Lastly, the study examines the determinants of banking sector profitability in Zimbabwe. The study contributes to literature by assessing the profit persistence of the banking sector and assessing the determinants of profitability. The study also examines the impact of competition on the profitability of the banking sector. Unlike previous studies which approximated competition using the structural measures such as HHI, concentration and market shares, the study employs the Lerner index to represent competition. Another new insight brought into the paper is to measure cost efficiency using the non-parametric data envelopment analysis (DEA) method. This differs from previous studies which have used measures such interest rate margin as a proxy for efficiency.

The rest of the study is organised as follows; section 2 discusses the stylized facts about the Zimbabwean banking sector. Sections 3 and 4 review the literature and study methodology respectively. Presentation of results and their interpretation is outlined in section 5. The study conclusions and recommendations are provided in section 6.

2. BACKGROUND TO THE STUDY

The Zimbabwe economy registered average growth rates of 5.38% per annum between 1980 and 1998 (World Bank, 2012). Economic condition declined dramatically during the period 2000-2008 and the economy registered average growth rate of −7.1% per annum (Figure 1). The economic decline was attributed to huge fiscal slippages which led to high inflation, high levels of monetary growth unrelated to economic activity and significantly large balance of payments deficits (IMF, 2009). The economy also suffered severe foreign currency shortages coupled

Figure 1: The Zimbabwean GDP growth (1998-2014)

Source: Government of Zimbabwe (2015)

with deterioration in balance of payments position. Industry experienced rising production costs, cash flow difficulties, foreign exchange shortage, fuel shortage, power and water shortages, and a weakening domestic demand for goods and services among others. Cumulatively, the economy declined by 40% (ZimStats, 2009) in the period 2000-2008 severely impacting the performance of the banking sector.

During the period 2000-2008, banks experienced protracted liquidity and solvency challenges which incapacitated some of the banks to perform their intermediary role. The insolvency and liquidity problems were a result of high prevalence of insider loans, imprudent credit risk management frameworks, and deliberate purchases of foreign currency from the illegal parallel as well as underground foreign exchange markets. This was further compounded by central bank's weak controls, guidelines, procedures and bank-wide risk management frameworks (Reserve Bank of Zimbabwe, 2004). Bank balance sheets shrank in real terms owing to losses on an inflation adjusted basis, arising largely from highly negative real returns on government securities and high levels of statutory reserves (Chipika and Malaba, 2011). The depth of the financial intermediation in the economy declined. Inefficiencies in the national payment systems, the slowdown in the local currency denomination, loans and declining foreign currency flows into the formal banking sector, led to a significant decline in traditional bank lending. Banks shifted from their core banking business to speculative non-banking activities including investment in property development, buying and selling of commodities, trading in shares on the stock exchange, as well as dealing on the parallel foreign exchange market (Reserve Bank of Zimbabwe, 2004). The profitability of the banks declined in real terms.

To restore macroeconomic stability and put the economy back on growth trajectory, the government abandoned the local currency in 2009. The economy responded by registering positive economic growth (Figure 1). The economy grew by 5.4%, 11.4%, 11.9% in 2011, 3.4% in 2013 and 3.1% during 2009-2014 (ZimStats 2014). As the economy stabilized the banking sector experienced an increase in both deposits and loans. Total deposits which stood at US$ 382 200 in February 2009 increased to US$ 4.3 billion by August 2014. On the other hand the total amount of the loans in the banking sector increase from US$103 100 in February 2009 to US$3.7 billion in August 2014 (Reserve Bank of Zimbabwe,

2014). Corresponding to the increases in loans and deposits the loan to deposit ratio also increased. The loan - deposit ratio increased from 26.91% in February 2009, to 50% in December 2009 and further increased to 97.47% in August 2014. This means on average, banks were lending out 97.47% of every one dollar it received as deposits in August 2014. As a consequence of over lending, NPLs grew from 2% in 2009 to 20.1% in September 2014. The growth in NPLs was the biggest challenge for banks limiting their capacity to expand financial intermediation. The increase in NPLs led to the problem of disintermediation where the banks had to cut down on their lending and requested borrowers to pledge collateral even for small loans. NPLs reduced bank profits through increased provisioning as the amounts of defaults increased. This reduced the incomes of the banks as well as increasing the costs of banks as they pursued litigation to recover from defaulters. In extreme cases, NPLs led to bank insolvency and bank failures.

The banking sector was profitable during the period 2009-2014. The average return on assets (ROA) and return on equity (ROE) were 1.1% and 6.6% respectively during 2009-2014. During the period the profitability of the banks can be dissected into two distinct phases: Steady and stable growth (2009-2011) and the declining profitability (2012-2014). The banking sector profitability rose during the period 2009-2011 before declining in 2012-2013. The first phase coincided with the period of economic recovery with the economy growing by between 5.4% and 11.9%. The second phase came during the period of economic slowdown when growth rates decelerated to below 3.5%. The study therefore investigates the persistence of the banking sector and the drivers of profitability during the period 2009-2014.

3. LITERATURE REVIEW

The determinants of bank profitability have been broadly categorized as either external or internal (Sufian, 2009; Hoffman, 2011). Internal determinants are those that are within the control of bank management. These are dependent on the quality of decisions made by management (Javaid et al., 2011). These determinants can be derived from bank financial statements and are termed micro or bank-specific determinants of profitability. External determinants are independent of bank management, but reflect the economic and legal environment that affects the operation and performance of banking institutions. Industry specific factors are those determinants of profitability attributable to the market in which banks operate. A number of studies has sought to investigate the determinants of bank profitability, some of the recent studies are discussed below. Menicucci and Paolucci (2016) studies the determinants of profitability in European banking sector. The study employed regression analysis using an unbalanced panel data set of European banks over the period 2009-2013. The study established that profitability was positively determined by bank size and capital ratio while the negative determinants of profitability were higher loan loss provisions. Similarly, Petria et al. (2015) examined the factors affecting profitability in EU27 over the period 2004-2011. The study found that profitability was influenced by credit risk, liquidity risk, management efficiency, business diversification, market competition and economic growth. Samad (2015) investigated the influence of bank specific and macroeconomic

variables in influencing banks profitability in Bangladesh. The study employed panel data method and established that profitability was determined by as loan-deposit ratio, loan-loss provision to total assets, equity capital to total assets, and operating expenses to total assets. Jabbar (2014) investigated profitability determinates in Pakistan banking sector for the period 2009-2012 using the panel data estimation techniques of fixed, common, and random effect mode. The results of the study shows that profitability is positively determined by capitalisation and size; and negatively by loan loss provision and deposit growth. Boadi (2015) studied the profitability of Ghanaian banks for the period 1997-2014. The objective of the study was to determine the factors determining the commercial bank profitability in Ghana. The study employed random effects and pooled ordinary least square models. The study established that profitability was determined by bank profitability, non-interest income, capital to assets and GDP growth are statistically significant. Rahman et al. (2015) also studied the profitability of Bangladesh banking sector from 2006 to 2013. The study employed a number of measures of profitability namely ROA, net interest margin over total assets (NIM) and ROE. The results revealed that profitability was positively impacted by capital strength (both regulatory capital and equity capital) and loan intensity. The study further revealed that cost efficiency and off-balance sheet activities weighed down profitability. Sohail et al. (2013) investigated the determinants of commercial banks profitability in Pakistan over the period 2004-2010. The study employed the multiple regression analysis using cross sectional time series data. The main determinants of profitability were found to be liquidity, firm's efficiency, assets composition, deposit composition and firm size.

The persistence of bank profits is the tendency for an individual bank to maintain the same place in the banking industry profit performance distribution. Profit persistence defines the levels of competition for the banking profits, information asymmetry and reaction of bank profits to macroeconomic factors (Sinha and Sharma, 2014). The strong from of persistence of profit hypothesis is premised on two conditions; there is free entry and exit which eliminates any form of abnormal profits very fast. Profits move towards the same long run average value. An alternative to the persistence of profitability hypothesis argue that some banks enjoy the protection of the regulator or have the power to inhibit the entry of other firms into the industry which would allow abnormal profits to persist from 1 year to the other which makes convergence slow or nonexistent in the extreme case (Goddard et al., 2011). There has been of late a proliferation of studies that have looked at the persistence of banking sector profitability in literature. Mokni and Rachdi (2014) distinguishes the profitability between the banks in Middle Eastern and North Africa region and evaluates the profitability of the banking sectors. The study further distinguished between Islam and Conventional banking. The study was undertaken using the method of the generalized method of moments. The study reveals that there is profitability differences between Islamic and conventional banks. Profitability is persistent in the MENA as a result of higher degree of government intervention reflecting barriers to competition. Jaisinghani et al. (2015) investigate the incidence of profit persistence among Indian banks using the panel data of 51 banks over the period

2005-2013. The Arellano and Bond (1991) and Blundell and Bond (1998) estimation techniques were used for the study. The study found that profitability was negatively affected by government ownership, lending to sensitive sectors, and non-performing assets. Fund-based income, and tier-two capital adequacy ratio had a positive impact on profitability. Pervan et al. (2015) examined the persistence of profit in the Republic of Croatia. The persistence of profit in was estimated using the Markov Chain stochastic process. The study established that that profit persistence was less likely to occur in banks with higher profit. Djalilov and Piesse (2016) investigated the determinants and persistence of profitability in the early transition countries of Central and Eastern Europe for the period 2000-2013. The study employed the generalised method of moment's (GMM) technique. The study established that profitability persisted in the transitionary countries and the banking sector was more competitive. The study also found that credit risk had a positive impact on profitability of early transition countries whilst having positive effect in late transition countries. It was further revealed that in late transition countries government spending and monetary freedom had positive impact on profitability. In early transition countries, well capitalised banks were more profitable implying robustness of these banks. Sinha and Sharma (2014) investigated the determinants of bank profitability in India using the dynamic model framework. The study also sought to establish the persistence of bank profitability using the GMM as suggested in Arellano and Bond. The study established that product markets of Indian Banks are moderately competitive, and less opaque due to asymmetry in information. The study found that despite the competition in the banking sector, profits in the banking sector moderately persisted over time. The study also revealed that profitability was positively determined by capital to assets ratio, operating efficiency and diversification, and economic growth. Inflation negatively affected profitability in the Indian banking sector.

4. METHODOLOGY

This section discusses the methodology to be employed for the study.

4.1. Profitability Model
A GMM instrumental variable approach is used to measure the persistence of profitability following Arellano and Bond (1991). The method has been used in a number of recent studies (Mokni and Rachdim 2014; Djalilov and Piesse, 2016; Sinha and Sharma, 2014). The method of moments produces parameter estimates that are consistent under weak distributional assumptions. In standard settings, where one would typically use ordinary or two-stage least squares, or standard panel data methods such as fixed effects, GMM can be used to improve the standard estimators when auxiliary assumptions fail. For robustness check the results obtained using the GMM method will be compared with those obtained using fixed effects model. The study uses two measures of profitability (π_{it}) i.e., ROA and the ROE.

ROA shows how a bank is able to utilize its assets to generate profits. The measure excludes off balance sheet activities which may be misleading. ROE shows the return on shareholders' equity

reflecting the approximate benefit shareholders will receive from their investments in a bank and accounts for off balance sheet activities which contributes to the overall profitability of the bank.

Empirically the study serves to test the profit persistence, internal and external determinants of profitability using the model below:

$$\pi_{it} = \alpha_i + \beta_1\pi_{it-1} + \beta_2 LNSIZE_{it} + \beta_3 LIRISK_{it} + \beta_4 CAD_{it} + \beta_5 NPL_{it} + \beta_6 GDPG_{it} + \beta_7 INF_{it} + \beta_8 LI_{it} + \beta_9 EFF_{it} + \varepsilon_{it} \quad (1)$$

The determinants of profitability in equation 1 are defined and justified below:
- Bank size (LNSIZE): The natural logarithm of total assets. The size of the bank reflects either economies or diseconomies of scale hence the expected sign could be positive or negative (Jabbar, 2014);
- Liquidity risk (LIRISK): The ratio of total liquid assets to total assets. Liquidity risk measures the short term responsibilities that could be met with the amount of liquid assets (Boadi, 2015);
- Capital adequacy (CAD): Capital asset ratio. The impact of capital on profitability is ambiguous. On the one hand, the higher the ratio, the lower the profitability since higher capital ratio lowers expected ROE. On the other hand, the higher capital is expected to boost the confidence of the bank clients on the financial institution leading to a positive relationship (Jaisinghani et al., 2015);
- Credit risk (NPL): The risk of financial loss from the banks clients who fail to repay their loans and advances. It is perceived that there is a negative relationship between credit risk and bank profitability (Jabbar, 2014);
- Economic growth (GDPG): Approximates the business cycle and is expected to have a positive impact on bank's performance. It is therefore a barometer to gauge whether environment is favourably or not. It is expected to influence positively both the demand and supply of loanable funds in an economy;
- Inflation (INF): Movement in the consumer price index. The effect of inflation on bank profitability is felt through the effect on both the revenue and cost condition of the bank. The direction of the effect of inflation on profitability depends on whether inflation is anticipated or not (Pervan et al., 2015);
- Market power (LI): The inverse of competition. It is expected that there is a positive relationship between market power and profitability. Banks with more market power exploit their power to earn higher profits (Sinha and Sharma 2014); and
- Cost efficiency (EFF): Is expected to have a positive impact of profitability with banks which are more cost efficient enjoying higher profits (Rahman et al., 2015).

4.2. Estimating Lerner Index
Competition is measured using the Lerner index which falls under the new empirical industrial organisation methods. The Lerner index is a relative mark-up of price over marginal cost. Coccorese (2014) argued that the Lerner index is a true reflection of the banks' degree of market power because it represents the behavioural departure from monopoly and perfect competition. The index also recognises the need for endogenised market

structures in testing market power (Delis et al., 2008). The market power of a firm is identified by the divergence between the firm's price and its marginal cost. The price and marginal cost should be equal in perfect competition, but will diverge in less competitive environments. A bigger difference between price and marginal cost shows that there is greater monopoly power (Fungacova et al., 2010). Studies (Coccorese, 2014; Fungacova et al., 2010; Pruteanu-Podpiera et al., 2008) that have used the Lerner index approach to measure competition. The model assumes the cost function has one output, loans (y) and 3 input prices (price of labour [w_1], price of physical capital [w_2] and price of borrowed funds [w_3]). The cost function takes the form of a translog cost function (equation 1). A trans-log cost function is computed for each year through the introduction of fixed effects for banks. The assumption of linear homogeneity in input prices is imposed by normalizing total costs (TC) and input prices by one input price. The translog cost function follows Pruteanu-Podpiera et al. (2008) and is shown below:

$$\ln\left[\frac{TC_{it}}{w_{3it}}\right] = \alpha_0 + \alpha_{01}\ln Y_{it} + \frac{1}{2}\alpha_{02}\left(\ln Y_{it}\right) + \alpha_{03}\ln\left(\frac{w_{1it}}{w_{3it}}\right)$$
$$+ \alpha_{04}\ln\left(\frac{w_{2it}}{w_{3it}}\right) + \alpha_{05}\ln\left(\frac{w_{1it}}{w_{3it}}\right)\ln\left(\frac{w_{2it}}{w_{3it}}\right)$$
$$\frac{1}{2}\alpha_{06}\left[\ln\left(\frac{w_{1it}}{w_{3it}}\right)\right]^2 + \frac{1}{2}\alpha_{07}\left[\ln\left(\frac{w_{2it}}{w_{3it}}\right)\right]^2$$
$$+ \; _{08}\ln Y_{it}\ln\left(\frac{1it}{3it}\right) + \alpha_{09}\ln yln\left(\frac{2it}{3it}\right) + \varepsilon_{it}$$

(1)

The estimated coefficients of the translog cost function (1) are then used in the calculation of the marginal cost in 2. The marginal cost is equal to the product of the derivative of the logarithm of total cost to output and total cost over output.

$$MC_{it} = \frac{TC_{it}}{Y_{it}}\left[\alpha_{01} + \alpha_{02}\ln Y_{it} + \alpha_{08}\ln\left(\frac{w_{1it}}{w_{3it}}\right) + \alpha_{09}\ln\left(\frac{w_{2it}}{w_{3it}}\right)\right]$$

(2)

Bank level marginal cost (mc_{it}) and corresponding output price, measured as total income divided by total bank assets (P_{it}) are in turn used to calculate the bank specific time varying Lerner index.

$$Lerner_{it} = \frac{\left[P_{it} - MC_{it}\right]}{P_{it}}$$

(3)

The Lerner index ranges between zero and one with higher values implying greater market power. The index can be negative which shows that there is super competition in the sector with firms engaged in cut throat pricing charging below the marginal cost as a consequence of exogenous factors such as an economic crisis.

4.3. Estimating Cost Efficiency
Banking sector efficiency has been measured by two main methods; the parametric and non-parametric methods (Stavarek and Řepkova, 2012). The parametric or econometric method

and the non-parametric or mathematical programming method differ in their underlying assumptions of the random noise and the structure of production technology. Poghosyan and Borovička (2007) argue that the main drawback of the parametric method is the imposition of functional form on the behaviour of economic variables. The non-parametric methods are based on linear programming method. The efficiency frontier is formed as a piecewise linear combination of best-practice observations. The two main nonparametric methods; DEA and free disposal hull. Sanchez et al. (2013) argue that the non-parametric approach does not require a production function in order to calculate and ascertain the determinants of efficiency of the firm. The approach is based on mathematical programming methods. DEA is used to measure the relative cost efficiency of banks in Zimbabwe over the study period. The choice of the DEA approach is motivated by the fact that DEA determines the efficient frontier of a set of decision making units (DMUs) based on the input and output variables without knowing a priori the relationship among the variables. The method does not require the specification of the functional form apriori hence removing the possibility of measurement errors. The method is able also to handle multiple inputs and outputs measured in different units (e.g. dollars, time, employees, location).

Cost efficiency measures how far a bank's cost is apart from the best practice bank's cost that produces the same output level and under the same environmental conditions(Lovell, 1993). Assuming there are n DMUs and the jth DMU, DMU$_j$, produces s outputs ($y_{ij},\dots y_{sj}$) by using m inputs ($x_{1j},\dots x_{mj}$).

The cost efficient model is summarized as follows;

$$\min \sum_{i=1}^{m} P_i^0 x_{io} \;\; s.t$$

$$CRS \quad \sum_{j=1}^{n} \lambda_j x_{ij} \le x_{io} \; i = 1,2,3,\dots,m$$

(4)

$$\sum_{j=1}^{n} \lambda_j y_{rj} \ge y_{ro} \; r = 1,2,3,\dots,s$$

$$\lambda_j, x_{io} \ge 0$$

Where P_i^0 and q_r^0 are the unit price of the input i and unit price of the output r of the DMU$_o$ respectively. These prices may be different among the DMUs. The DEA method used is an input oriented envelopment model which seeks a set of λ_j values which minimizes λ. The weakly-efficient DMUs and efficient DMUs constitute the efficient frontier. The intermediation approach is adopted for the definition of the inputs and outputs. The approach views banks as intermediaries that facilitates the transfer of funds from surplus agents to deficit agents rather than producers of loans and deposit account services. Three inputs are considered for the evaluation of the banks performance; deposits, labour and capital. The outputs considered are total loans (short-term, medium and long-term loans), and total income (sum of interest income and non-interest income).

4.5. Study Data

The study sample was chosen based on the availability of the data. All banks whose data sets were available were included in the sample. The total number of banks during the study period declined from 28 to 21. The study sample only included 18 banking institutions comprising 13 commercial banks; 3 building societies and a savings bank. The commercial banks are involved in offering the current and deposit account facilities, and provide loans and overdrafts to needy business organizations and mortgage financing. Building societies are mainly involved in savings, fixed deposits, personal and company loans, and mortgage lending. The savings bank is involved in offering deposit accounts, savings accounts, loans and overdrafts, and mortgage financing. The distinction among the various classification of the banking sector is now non-existent since all banking institutions are operating under universal banking license. The study used quarterly data over the period 2009 to 2014. The data for the study was drawn from published financial statements, Government Budget Statements and Zimbabwe Statistic Agents (ZimStats) publications.

5. RESULTS AND INTERPRETATION

This section presents the results of the study and their interpretation. Firstly the study presents the results of the estimation of the Lerner index followed by the DEA results. The section concludes by looking at the estimation of the profitability model.

5.1. Competition Results

Competition was measured using the Lerner index approach. Regression results for the translog cost function (equation 1) are shown in Table 1. Table 1 presents results of estimating the translog cost function.

Results in Table 1 were estimated using the panel regression with fixed effects model. The Hausman specification tests for panel data ruled out the random effects model. The results suggest that the model is properly specified as depicted by the F-statistic. The results indicates that TC is well explained by the prices of the factors of production which are statistically significant in explaining the translog cost function. The results from the estimation of the translog cost function are used in estimating the marginal costs which were used to derive the Lerner index.

The overall average Lerner index for the period 2009-2014 was 0.07, depicting neither monopoly nor perfect competition. This implies the Zimbabwean banking sector operated under monopolistic competition over the period.
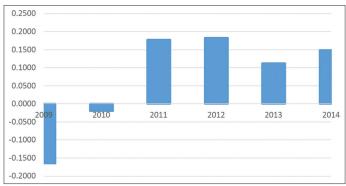
Figure 2 shows that the Lerner index was not stable over the whole period. The Lerner index took an upward trend between 2009 and 2012. An increase in Lerner index reflects an increase in market power. The period was characterised by increase in demand for banking products, increase in deposits and loans, and also increased banking sector capitalization. The Lerner index declined in 2013 which coincided with the institution of the MoU in the banking sector by government. The MoU was put in place by the government to outline the parameters for setting bank charges and interest rates. This led to the decline in the bank charges and

Table 1: Regression results for the translog cost function

Variable	Parameter	Coefficient
Intercept	α_0	5.635695*
		(0.0618)
$\ln y$	α_1	1.093367
		(0.1066)
$\frac{1}{2}(\ln y)^2$	α_2	0.011214
		(0.2366)
$\ln\left(\frac{w_1}{w_3}\right)$	α_3	0.783307***
		(0.0001)
$\ln\left(\frac{w_2}{w_3}\right)$	α_4	0.795831***
		(0.0000)
$\ln\left(\frac{w_1}{w_3}\right)\ln\left(\frac{w_2}{w_3}\right)$	α_5	−0.044725***
		(0.0000)
$\frac{1}{2}\left[\ln\left(\frac{w_1}{w_3}\right)\right]^2$	α_6	0.207064***
		(0.0000)
$\frac{1}{2}\left[\ln\left(\frac{w_2}{w_3}\right)\right]^2$	α_7	0.013519***
		(0.0000)
$\ln y \ln\left(\frac{w_1}{w_3}\right)$	α_8	−0.008965
		(0.4152)
$\ln y \ln\left(\frac{w_2}{w_3}\right)$	α_9	−0.037395***
		(0.0001)
R-squared		0.7781
F-statistic		635.01
Chi-square		24.08
Adjusted R-squared		0.7566
P (F-statistic)		0.0000
Prob (Chi-square)		0.000

Source: Own calculation

Figure 2: Evolution of Lerner index

Source: Own calculation

interest rates that banks were charging. Incomes for the banks declined significantly during 2013. With the removal of price controls in December 2013, the Lerner Index started to increase. The Lerner index was negative for the years 2009 and 2010. The negative index is a result of the marginal cost of producing bank output falling faster than the decline in prices. This reflected the effects of a country which was coming out of an economic crisis.

Simpasa (2013) also found the same negative result in Zambian market during the 2010-2011 period after the financial crisis. The figure shows that on average the banking sector was characterised by monopolistic competition throughout the period.

5.2. Cost Efficiency Results

This section presents the results of measuring the cost efficiency using the DEA method. The measurement of the cost efficiency assists in benchmarking banks against the most efficient ones. The measured average estimated cost efficiency of the banking sector for the period 2009-2014 is 64.7%. The results implies that banks could have produced the same amount of output using 64.7% of the resources used. In other words banks were operating with a 35.3% level of inefficiency. This means that banks could have produced the same level of output using 35.3% less resources if they have not been wasteful. Banks therefore had substantial room for cost savings if they had employed their inputs more efficiently.

Figure 2 shows the average annual cost efficiency scores of the banking sector over the period 2009-2014. The figure shows cost efficiency scores increased during the period 2009-2012. This implies that banks improved their efficiency in containing costs in the intermediation process.
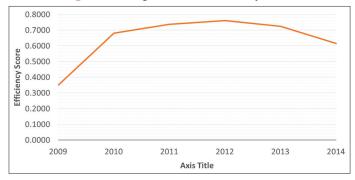
Figure 3 shows a declining trend during the period 2013-2014 period reflecting the decline in efficiency. The lowest level of cost efficiency were recorded in 2009. This was a transition year from an economic crisis to a stable environment as the country also abandoned the local currency for foreign currencies. At this transition period banks were characterised with low levels of assets, low deposit base and low levels of deposits which made cost of intermediation high. Cost efficiency started to increase after 2009, characterised by increased deposits, loans, capital base and assets, with economic growth also increasing in an environment of general price stability, which was conducive for banks to operate. The increase in economic growth enhanced the demand for bank products while at the same time increasing the amount of deposits.

5.3. Determinants of Profitability

This section presents the findings of the persistence and determinants of the profitability of the banking sector in Zimbabwe. Table 2 depicts the results for the estimation of the ROA using the GMM method for the period 2009-2014. The results show that 56.3% of the variation in profitability is explained by the dependent variables of bank size, capital adequacy, liquidity risk, levels of non-performing loans, inflation, market power and cost efficiency.

The result reveals that the lagged profitability variable is not statistically significant. This means that profitability does not persist over time, implying that profitability of the banking sector is not driven by profits from the previous periods. This also suggests that banks do not enjoy industrial protection from the regulator. The sector is also characterised by free entry into the industry which disables abnormal profits from persisting from 1 year to the other. The banking sector is open to competition which makes it impossible for banking institutions to continue enjoying abnormal profits every year.

Figure 3: Average annual cost efficiency scores

Source: Own calculation

Table 2: Estimation of the ROA using GMM method

Variable	Coefficient
C	0.1776***
	(0.0054)
ROA(−1)	0.0048
	(0.5577)
LNSIZE	−0.0207***
	(0.0039)
LIRISK	−0.0648***
	(0.0023)
CAD	−0.0045
	(0.8430)
NPL	−0.0412
	(0.1345)
GDPG	0.0002
	(0.7938)
INF	−0.6063
	(0.2279)
LI	0.1190***
	(0.0000)
CE	0.0308*
	(0.0484)
R-squared	0.563342
SE of regression	0.029335
J-statistic	5.43E-20
Adjusted R-squared	0.552663
Durbin Watson stat	1.618192

Source: Own calculation, GMM: Generalised method of moment's, ROA: Return on assets

Liquidity risk is statistically significant and negatively related to profitability. Liquidity risk depicts the relationship between the liquid funding sources (composed of deposits and other short term funding) against illiquid assets (mostly loans). Martinez and Mody (2004) explains that high liquidity ratios, either self-imposed for prudential reasons or as a result of regulation (i.e. reserve or liquidity requirements) inflict a cost on banks since it implies that banks have to give up holding higher yielding assets. In that respect banks incurs an opportunity cost of forgone income. The results makes sense in the Zimbabwean banking sector because the period of the study (2009-2012), the economy was facing liquidity challenges. A bank that was liquid had the potential to lend as the demand for loans was high hence scope for banks to increase profitability. A bank that held huge reserve of liquidity would be foregoing profits.

The size of the bank have a negative significant influence on the profitability. The result implies that smaller banks enjoyed higher profitability as compared to bigger banks. The results are supported by studies by (Staikouras and Wood, 2004; Javaid et al., 2011). These studies conclude that an increase in the size of the bank leads to diminishing marginal returns leading to reduced profits. The declining profitability can be attributable to agency costs, bureaucratic processes, and inflexibility associated with large banks. Bigger banks were associated with higher loan loss provision as compared with smaller banks hence the decline in profitability.

The Lerner index is statistically significant at one percent and positively related to the profitability of banks. This result implies that market power significantly positively influence profitability suggesting that banks with greater market power may charge a higher loan rate and offer a lower deposit rate. More market power leads to higher mark-ups resulting in an increase in profitability. The effect of the Lerner index on bank profitability is consistent with other studies (Entrop et al., 2012; Maudos and Solis, 2009; Hawtrey and Liang, 2008; Maudos and Guevara, 2004). This result implies that competition negatively influences profitability meaning that as competition increases profitability declines.

Cost efficiency is positive and significant at 5% level of significance. This is consistent with theory that the higher the costs efficiency of the banks, the higher the bank profitability. A high cost efficiency means banks are able to utilize resources including human resource and technological improvements in banking more efficiently. This then reduces the operational costs of the bank leading to increased profitability. This result is supported by a number of studies (Kosmidou et al., 2005; Alexiou and Sofoklis, 2009; Brock and Rojas-Suarez, 2000; Al-Haschimi, 2007) who found that poor expense management reduces the levels of profitability while efficient management of expenses leads to higher profits. This result is in support of the efficient structure hypothesis which argues that an efficiently managed bank will perform better. Give the competition that was experienced in the banking sector, those banks that were efficient became more profitable.

As a robustness check, the ROA model was estimated using the panel least squares regression with fixed effects. The results are presented in Table 3. The R-squared of the model is 62.6% implying that 62.6% of the changes in ROE are explained by the independent variables.

Market power, size of the bank and cost efficiency maintained the same signs and remained significant. The results reveals that unlike in the GMM model, the coefficient of credit risk is significant while the coefficient of liquidity risk ceases to be significant.

Table 4 depicts the regression results for the estimation of the ROE using the GMM method. The model retained an R-squared of 52% meaning that 52% of the variation in the ROE is explained by the dependent variables. The model confirms that profitability is significantly determined by liquidity risk, credit risk, cost efficiency and market power. The signs of the significant

Table 3: Estimation of the ROA using panel regression with fixed effects

Variable	Coefficient
C	0.2207***
	(0.0088)
ROA(−1)	0.0005
	(0.9507)
LNSIZE	−0.0242**
	(0.0261)
LIRISK	−0.0276
	(0.1496)
CAD	−0.0203
	(0.3727)
NPL	−0.0386*
	(0.0881)
GDPG	−0.0006
	(0.1122)
INF	−0.2322
	(0.1543)
LI	0.0928***
	(0.0000)
CE	0.04378***
	(0.0000)
R-squared	0.6264
SE of regression	0.0278
F-statistic	22.6385
Adjusted R-squared	0.5988
Durbin Watson stat	1.7141
Prob (F-statistic)	0.0000

Source: Own calculation, GMM: Generalised method of moment's, ROA: Return on assets

coefficient are the same as those obtained for the regression on ROA. Credit risk is negative and significant at 5% level. This highlights that non-performing loans have a negative effect on profitability. An increase in non-performing loans reduces the ROE of bank shareholders. Higher NPLs have been an albatross around the necks of banks and reached and reached highest level of 21% in 2014 negatively impacted on the profitability of banks through increased provisioning.

The results shown in Table 4 reveal that bank profits do not persist over time. This implies that the profitability of the bank in the current period is not dependent on the profits from the previous period. The results also show that cost efficiency and market power positively influence profitability. The result means that competition in the banking sector negatively influences profitability, with an increase in competition reducing the levels of abnormal profits. Liquidity risk and credit risk are negatively related to ROE suggesting that the liquidity levels of the banks have a negative relationship with ROE. Those banks holding huge reserves of liquid assets are less profitable. The results are the same as those obtained for estimating the ROA. An increase in the levels of non-performing loans leads to a reduction in profitability.

6. CONCLUSIONS AND RECOMMENDATIONS

The average Lerner index for the period 2009-2014 was 0.07, depicting neither monopoly nor perfect competition. The result

Table 4: Estimation of the ROE using GMM method

Variable	Coefficient
C	−0.1852
	(0.5517)
ROE(−1)	0.0290
	(0.1862)
LNSIZE	0.0523
	(0.1428)
LIRISK	−0.2232**
	(0.0347)
CAD	0.0423
	(0.7027)
NPL	−0.3035**
	(0.0243)
GDPG	−0.0048
	(0.2168)
INF	−1.5482
	(0.5442)
LI	0.4619***
	(0.0000)
CE	0.2144***
	(0.0059)
R-squared	0.5283
SE of regression	0.1442
J-statistic	2.47E-20
Adjusted R-squared	0.5168
Durbin Watson stat	1.3810

Source: Own calculation, ROE: Return on equity, GMM: Generalised method of moment's

implies the Zimbabwean banks operated under monopolistic competition. The estimated cost efficiency of the banking sector for the period 2009-2014 is 64.7%. The result means that banks were operating with a 35.3% level of inefficiency implying that banks had substantial room for significant cost savings if they had employed their inputs more efficiently.

The study has shown that profitability does not persist in the banking sector. This implies that the profitability of the banking is not driven by past profits. The results shows that there is competition in the banking sector which inhibited banks from continuously enjoying abnormal profits from 1 year to the other.

The study revealed that market power is a significant explanatory variable in the determination of profitability. More market power leads to higher mark-ups resulting in an increase in profitability. This implies that competition in the banking sector reduces the level of profitability. The central bank should put in place procompetitive measures to enhance competition in the banking sector.

Cost efficiency was also found to have a positive and significant influence on profitability. This means banks that are cost efficient enjoy higher profitability. As argued above procompetitive policies are important as they will force the banks to be efficient.

The study has shown that bank specific variable of credit risk, liquidity risk, bank size are important determinants of profitability. The result implies that strategies by bank management are important in determining profitability of the sector. Bank managers

are supposed to improve on their credit risk management to reduce the amount of toxic assets. Banks should also ensure that they manage the tradeoff between liquidity and profitability by avoiding holding unnecessarily high levels of liquidity.

It is recommended to increase the time periods of the study in order to eliminate the effect of the crisis in future studies. Studies should also include external shocks and specific business environment factors which were not taken into account in the current study.

REFERENCES

Alexious, C., Sofoklis, V. (2009), Determinants of bank profitability: Evidence from the Greek banking sector. Economic Annals, LIV(182), 93-118.

Al-Haschimi, A. (2007), Determinants of Bank Spreads in Sub-Saharan Africa. IMF Draft. Working Paper No. 05/06.

Arellano, M., Bond, S. (1991), Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies 58, 277-297.

Aremu, M.A., Ekpo, I.C., Mustapha, A.M. (2013), Determinants of capital structure in the Nigerian banking sector. International Journal of Academic Research in Economics and Management Sciences, 2(4), 27-43.

Berger, A., DeYoung, R., Genay, H., Udell, G. (2000), Globalisation of financial institutions: Evidence from cross-border banking performance. Brookings-Wharton Papers on Financial Service, 3, 23-120.

Berger, A.N., Humphrey, D.B. (1997), Efficiency of financial institutions: International survey and directions for further research. European Journal of Operational Research, 98, 175-212.

Blundell, R., Bond, S. (1998), Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87(1), 115-143.

Boadi, I. (2015), Profitability determinants of the Ghanaian banking sector in ongoing wave of consolidation. International Journal of Business and Management, 10(12), 1-11.

Brock, P., Rojas-Suarez, L. (2000), Understanding the behavior of bank spreads in Latin America. Journal of Development Economics, 63(1), 113-34.

Chipika, J.T., Malaba, J. (2011), Indigenisation and Economic Empowerment Study. Harare, Zimbabwe: Business Council of Zimbabwe.

Coccorese, P. (2014), Estimating the Lerner index for the banking industry: A stochastic frontier approach. Applied Financial Economics, 2014, 1-38.

Delis, M.D., Staikouras, K.C., Varlagas, P.T. (2008), On the measurement of market power in the banking industry. Journal of Business Finance and Accounting, (35), 1023-1047.

Djalilov, K., Piesse, J. (2016), Determinants of bank profitability in transition countries: What matters most? Research in International Business and Finance, 38(C), 69-82.

Entrop, O., Memmel, C., Ruprecht, B., Wilkens, M. (2012), Determinants of Bank Interest Margins: Impact of Maturity Transformation. Bundesbank Discussion Paper, Series 2: Banking and Financial Studies, No. 17/2012.

Fungacova, Z., Solanko, L., Weill, L. (2010), Market power in the Russian banking industry. Bank of Finland (BOFIT), Discussion Paper, No. 3/2010.

Ganić, M., (2012), The impact of the global financial crisis on the banking sector of Western Balkans: Cross-country comparison analysis. Journal of Economic and Social Studies, 2(2), 177-196.

Goddard, J., Liu, H., Molyneux, P., Wilson, O.S.J. (2011), The persistence

of bank profit. Journal of Banking and Finance, 35, 2881-2890.

Government of Zimbabwe. (2015), National Budget statement. Harare, Zimbabwe: Government of Zimbabwe.

Hawtrey, K., Liang, H. (2008), Bank interest margins in OECD countries. The North American Journal of Economics and Finance, 19(3), 249-260.

Hoffman, P.S. (2011), Determinants of the profitability of the US banking industry. International Journal of Business and Social Science, 2(22), 255-269.

IMF. (2009), Zimbabwe: Selected Issues and Statistical Appendix. IMF Country Report.

Jabbar, H. (2014), Determinants of banks profitability. IOSR Journal of Business and Management, 16(1), 109-113.

Jaisinghani, D., Tandon, D., Batra, D.K. (2015), Profit persistence in emerging markets: Empirical evidence from Indian banking sector. International Journal of Business Competition and Growth, 4(1), 79-97.

Javaid, S., Anwar, J., Zaman, K., Ghafoor, A. (2011), Determinants of bank profitability in Pakistan: Internal factor analysis. Journal of Yasar University, 23(6), 3794-3804.

Kosmidou, K., Pasiouras, F., Tsaklagkanos, A. (2005), Factors influencing the profits and size of Greek banks operating abroad: A pooled time-series study. Applied Financial Economics, 15, 731-738.

Lovell, K.C.A. (1993), Production frontiers and productive efficiency. In: Fried, H.O., Knox, C.A., Schmidt, S.S., editors. The Measurement of Productive Efficiency: Techniques and Applications. UK, Oxford: Oxford University Press.

Martinez, P.M.S., Mody, A. (2004), How foreign participation and market concentration impact bank spreads: Evidence from Latin America. Journal of Money, Credit, and Banking, 36(3), 511-537.

Maudos, J., de Guevara, J.F. (2004), Factors explaining the interest margin in the banking sectors of the European Union. Journal of Banking and Finance, 28, 2259-2281.

Maudos, J., Solís, L. (2009), The determinants of net interest income in the Mexican banking system: An integrated model. Journal of Banking and Finance, 33, 1920-1931.

Menicucci, E., Paolucci, G. (2016), The determinants of bank profitability: Empirical evidence from European banking sector. Journal of Financial Reporting and Accounting, 14(1), 86-115.

Mokni, R.B.S., Rachdi, H. (2014), Assessing the bank profitability in the MENA region: A comparative analysis between conventional and Islamic bank. International Journal of Islamic and Middle Eastern Finance and Management, 7(3), 305-332.

Pervan, M., Pelivan, I., Arnerić, J. (2015), Profit persistence and determinants of bank profitability in Croatia. Economic Research-Ekonomska Istraživanja, 28(1), 284-298.

Petria, N., Capraru, B., Ihnatov, I. (2013), Determinants of Banks' Profitability: Evidence from EU 27 Banking Systems. 7th International

Conference on Globalization and Higher Education in Economics and Business Administration, GEBA; 2013.

Poghosyan, T., Borovicka, J. (2007), Banking Efficiency in Emerging Economies: The Impact of Ownership Endogeneity and EU Accession. CERGE-EI Discussion Paper, No. 189.

Pruteanu-Podpiera, A.M., Schobert, F., Weill, L. (2008), Banking competition and cost efficiency: A micro-data analysis on the Czech banking industry. Comparative Economic Studies, 50(2), 253-273.

Rahman, M.M., Hamid, K., Khan, A.M. (2015), Determinants of bank profitability: Empirical evidence from Bangladesh. International Journal of Business and Management, 10(8), 135-150.

Reserve Bank of Zimbabwe. (2004), Bank Annual Report. Harare, Zimbabwe: Reserve Bank of Zimbabwe.

Reserve Bank of Zimbabwe. (2014), Bank Annual Report. Harare, Zimbabwe: Reserve Bank of Zimbabwe.

Samad, A. (2015), Determinants bank profitability: Empirical evidence from Bangladesh commercial banks. International Journal of Financial Research, 6(3), 173-179.

Sanchez, B., Hassan, K.M., Bartkus, J.R. (2013), Efficiency determinants and dynamic efficiency changes in Latin American banking industries. The Business and Economics Research Journal, 6(1), 27-52.

Simpasa, A.M. (2013), Competition and Market Structure in the Zambian Banking Sector. African Development Bank Group. Working Paper Series No. 168.

Sinha, P., Sharma, S. (2014), Determinants of Bank Profits and its Persistence in Indian Banks: A study in a Dynamic Panel Data Framework. Germany: University Library of Munich. MPRA Paper No. 61379.

Sohail, N., Iqbal, J., Tariq, H., Mumtaz, R. (2013), Determinants of commercial banks profitability: Panel data evidence from Pakistan. Research Journal of Finance and Accounting, 4(10), 67-76.

Staikouras, C., Wood, G. (2004), The determinants of European bank profitability. International Business and Economics Research Journal, 3(6), 57-68.

Stavarek, D., Repkova, I. (2012), Efficiency in the Czech banking industry: A non-parametric approach. Acta Universitatis Agriculturae Et Silviculturae Mendelianae Brunensis, 60(2), 357-366.

Sufian, F. (2009), Factors influencing bank profitability in developing economy: Empirical evidence from Malaysia. Global Business Review, 10(2), 225-241.

World Bank. (2012), Zimbabwean Growth Recovery, Note 1 Overview. Zimbabwe: The World Bank.

Zimstats. (2009), Zimbabwe National Statistics, Monthly Economic Review. January. Harare: Zimstats.

Zimstats. (2014), Zimbabwe National Statistics Annual Economic Review. Harare: Zimstats.