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Zimbabwean Commercial Banks Performance under Multiple-Currency System: A Dynamic Panel Data Analysis

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ABSTRACT

This paper econometrically examines commercial bank performance during the multiple currency period from 2009-2018. A dynamic panel-data model theorized on the Structure-Conduct-Performance paradigm was estimated using the difference-generalized method-of-moments (GMM) approach. The key finding is that the multiple currency system, through growth in deposits and money supply, delivered a statistically significant but weak improvement in bank performance. Accordingly, we welcome the recent scrapping of the multiple currency system. Nonetheless, monetary authorities should focus on money supply targeting to contain inflation and preserve the value of the local currency. Furthermore, banks should employ competitive strategies and be resilient to systematic risk to enhance performance.

JEL Classification: E5, G2

1. Introduction

Globally, the banking sector, usually dominated by commercial banks, plays a central role in economic growth and development. It fulfills a crucial intermediation role, is the conduit for the contact of monetary policy (Abel, 2018), and therefore anchors economic growth (Reserve Bank of Zimbabwe [RBZ], 2017). Given this insight, examining the factors that influence the performance of commercial banks is of paramount importance for policy formulation. A horde of empirical studies on the area confirms this. Some studies (Ali *et al*, 2011; Gul *et al*, 2011; Rao & Lakew 2012; Abel and Le Roux 2016)) are country-specific while others (Staikouras and Wood, 2004; Flamini et al. 2009; Dietrich and Wanzenried 2013) are regional. Although these studies used different methodologies, they incorporated both bank-specific and external factors in their analysis. Nonetheless, the evidence continues to be contentious. One good reason for this can be evolving developments across countries and time, for which Zimbabwe is not spared. This study contributes to the existing literature in two ways.

First, the banking sector existed in a unique period of multiple currency regime, a rare framework adopted in 2009. Evidence on such monetary systems is very scant as is their occurrence. Anderson (2016) provides evidence for Equador and Quispe-Agnoli and Whisler (2006) for Ecuador and El Salvador. New studies covering the multiple currency regime in Zimbabwe (Chikoko, 2013 and Dzingirai, 2014) examined the causes of bank failures and yet the impact of the multiple currencies is implicit. As a contribution, we focus on bank performance and use growth in broad money supply as a more explicit proxy for the multiple currency regime. We hypothesize that the introduction of the multiple currency system directly influenced bank performance through growth in deposits. In Zimbabwe, deposits constituted the lion's share of the broad money supply over the study period. Given that deposits are a uniquely stable funding source for banks which impacts bank lending (Dreschler *et al*. 2017), it is expected that bank profitability should increase with deposits and money supply. However, in the Zimbabwean context, the deposit-loan –profitability channel is not straight forward.

Despite macroeconomic stability and significant growth in bank deposits during the multiple currency period, the banking sector's contribution to economic growth has been small. A study by the Zimbabwe

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Economics Policy Analysis Research Unit (ZEPARU) shows that the sector's contribution to economic growth during the multiple currency period was the least compared to the liberalization period 1990-1999 (best) and economic crisis 2000-2009 (second) (Mpofu and Matsika, 2013). This reflects a host of challenges limiting the banking sector's potential. Chief amongst them has been the absence of affordable long-term credit lines (Tsaurai, 2018) due to tightening liquidity. As a result, most loans extended were short-term at high rates. Yet, high production costs, massive de-industrialization, and low industry capacity utilization resulted in high levels of non-performing loans (Mpofu and Matsika, 2013). Also, a growing unbanked informal sector exacerbated information asymmetries between lenders and borrowers, increasing the levels of non-performing loans. This compromised the deposit-lending-profitability channel.

Second, we provide a more robust estimation. We acknowledge a related study by Abel and Le Roux (2016) which attempted to examine the determinants of banking sector profitability after the introduction of the multiple currencies. Their study is, however, based on static panel data approach employing random effects Generalised Least Squares (GLS) and fixed effects Within Group (WG) estimators. These estimators do not consider the dynamic properties of time series data. As such the authors erroneously assume that previous values of the dependent variable and explanatory variables do not affect the current behavior of the dependent variable (Bun and Sarafidis, 2013). It follows that static panel data models produce biased and inconsistent results (Tiper, 2014). Several empirical works (Arrelano and Bond, 1991; Arrelano and Bover, 1995; Blundell and Bond, 1998; Bond 2002) have registered discomfort with the efficiency of static panel data estimators and suggested dynamic panel data estimators.

Unlike the static model, the dynamic panel data model expresses a data generating process (DGP) that depends on its past values and current and past values of explanatory variables that are not strictly exogenous (Bun and Sarafidis, 2013; Tiper 2014). For more efficient and robust results, we use a dynamic panel data model which we estimate using the difference Generalized Methods of Moments (GMM) [11] estimator, originated by Hansen (1982), bettered by Holtz-Eakin et al., (1988) and further improved by Arrelano and Bover (1995) and Blundell and Bond (1998). Our choice of GMM estimator is also strengthened by our sample attributes. The GMM estimator is specifically designed and more efficient for panels with short T and large N, a case we have.

In light of the above, the main objective of the study is to examine the impact of the multiple currency system on commercial banks' performance from 2009 to 2019. Besides we seek to compare the impact of bank-specific factors and macroeconomic factors on performance. The study proceeds as follows: Section 2 gives the background to the study; in section 3 the research methodology is explained. Emphasis is on the theoretical framework of the model and estimation approach. Results are presented and discussed in section 4. Section 5 concludes the study by suggesting policy recommendations based on the findings.

2. Background to the study

The Zimbabwean economic history is characterized by highs and lows. Following periods of prosperity during the first decade after independence (1980-1990), the economy started to show diminishing returns between 1991-1998, before dilapidating into a serious recession between 2000—2008. Zimbabwe's banking sector was not spared from the economic troubles. Some banks including Inter-market and CFX Holdings were put under curatorship, Sagit Finance and TimeBank had their licenses canceled and were placed under liquidation in 2006 (RBZ, 2014). Along the way, the country's currency continued to lose value until 2009, when the government adopted the multiple currency system. The country allowed the use of a basket of currencies including the United States Dollar, the South African Rand, and the Botswana Pula. The adoption of the multiple currency system brought some mixed effects on the economy and the banking sector in particular.

Cases of adoption of foreign currency as legal tender are not new but are rare. A case in point is the Ecuador and El Salvador experiences which compares and contrasts with the Zimbabwean model of currency reform. Distinct from what happened in Ecuador, the Zimbabwean government opted for multiple currencies instead of full dollarization. Ecuador, like Zimbabwe, after experiencing economic instability, dollarized their economy in 2000. Anderson (2016) notes that since dollarization, the Ecuador economy has recovered and macroeconomic balances, including inflation, gross domestic product, and trade have been restored. However, Ecuador's credit rating, access to credit, soundness of banks, and growth competitiveness have all fallen, and its external debt in USD figures has risen to a historical high despite the argument that dollarization adds an element of stability to the domestic economy of the adopting nation. Ecuador's external debt was at 42.7 billion in May 2018 from 32.32 billion in December 2016 (CIA World Fact-Book, 2019). The bottom line is that the adoption of other currencies may bring mixed outcomes.

[11] See section 3.2 for a detailed explanation

2.1 Pre Multiple-Currency regime

Before the adoption of the multiple currency system, Zimbabwe's banking sector has been characterized by turmoil and failures. For instance, some banks including Inter-market Holdings and CFX Holdings were placed under curatorship between 2004 and 2006, while Sagit Finance and TimeBank were liquidated in 2006 (RBZ, 2014). Major reasons for bank failures included liquidity and solvency problems, inadequate risk management systems, poor corporate governance, diversion from core business to speculative activities, rapid expansion, high levels of non-performing loans, and unsustainable earnings (RBZ, 2011). After the 2000-2008 decade of economic decline, the government of Zimbabwe adopted the use of a multiple-currency exchange rate system on 30 January 2009 (RBZ, 2009). The system was introduced after Zimbabwe had gone through a hyper-inflationary environment during which according to Hanke (2008), the Zimbabwean dollar was estimated to have lost more than 99.99 percent of its value within a space of less than two years alone between 2007 and 2008. This had negatively impacted bank profitability.

2.2 Multi-Currency System

The adoption of the multiple currency system brought hope and relief to the economy and the banking sector. Nevertheless, the multi-currency system brought mixed fortunes. On a positive note, it helped to stabilize the economy and restore price stability. Additionally, it enforced greater fiscal discipline by eliminating the government's ability to resort to budget deficit monetarization and helped revive financial intermediation (Kramarenko *et al*, 2010). After registering a 17.7 percent contraction in 2008, real GDP grew by 6 percent in 2009 and 9 percent in 2010 (World Bank, 2010).

The positive performance of the banking sector was driven mainly by growing confidence in the banking sector in the banking sector by the public since 2009. As confidence increased, there was increased use of bank accounts which led to a significant surge in deposits. The total amount of deposits in the banking sector increased from $382 million in February 2009 to $1.4 billion in December 2009 (RBZ, 2009). More deposits allowed banks to lend more allowing them to create more assets and generate revenue. Total banking sector assets increased by 28.56% from $3.6 billion as of 31 December 2010 to $4.7 billion at the end of 2011 (RBZ, 2011). The growth in assets was largely attributed to growth in loans, which in turn were funded through growth in the banking sector deposits base.

Building on this, the banking sector recorded an aggregate net profit of $52.75 million for the year ended 31 December 2014, a significant improvement from an aggregate profit of $3.39 million recorded for the same period in 2013. Out of the 19 operating banking institutions, 14 institutions reported profits for the year ended 31 December 2014 (RBZ, 2014). The losses recorded by the remaining institutions are attributed to high levels of nonperforming loans, liquidity challenges, lack of critical mass in terms of revenue to cover disproportionately high operating expenses, and deliberate strategy by some banks to clean up bad loan books through provisioning. Profitability indicators for the banking sector as measured by the average return on assets (ROA) and return on equity (ROE) improved to 2.61% and 15.50% as of 31 December 2017, respectively, from 2.26% and 10.96% as of 31 December 2016 (RBZ, 2017). As time passed, the momentum that has been obtained started to be threatened.

However, starting in 2013, the diminishing effects of the multiple currency system started to show up. The banking sector consisted of 27 institutions (RBZ, 2009) while as of December 2016 there were 19 banking institutions (RBZ, 2016). In 2013, the Registrar of Banking Institutions canceled operating licenses for two banking institutions namely, Barbican Bank Limited and Trust Banking Corporation Limited (RBZ, 2013). This was a result of new challenges that were brought by the multiple currency system. These range from a liquidity crisis, weaknesses in the country's business climate, poor financial positions of several state-owned enterprises, and weak governance at the RBZ, which have increased vulnerabilities in the banking sector. To make matters worse, the RBZ had lost its monetary policy sovereignty. According to Sunge (2018), the multiple currency system resulted in the monetary policy being endogenous. This restricted the use of conventional monetary policy instruments to fine-tune the performance of the financial sector. The RBZ was impotent in stopping the challenges that the banking sector was facing.

Regardless of the aforementioned challenges, commercial banks have been performing well. According to the RBZ (2017) banking sector report, the performance of the banking sector was satisfactory during the year ended 31 December 2017, as reflected by the improvement in the key risk and performance indicators. Total assets increased to $11.25 billion, while capitalization and profitability indicators also reflected improved performance. As of 31 December 2017, three (3) banking institutions had performed so well that they were already compliant with the 2020 minimum capital requirements of $100 million for tier 1 strategic group, while other banking

institutions remain on course with their capital plans (RBZ, 2017). It is the mismatch between improved commercial bank performance and a host of challenges that has motivated this study.

3. Research methodology

We employed a dynamic panel data set comprising of 11 commercial banks[12] in Zimbabwe over the period 2009 to 2018. The sample compromised only banks that have been in continuous existence over the period under study. We acknowledge that this might overstate our findings as it introduces survivor bias. When the multiple currency system was adopted in 2009, there were 17 commercial banks and the number decreased to 13 by end of 2018. The change was a result of bank closures, mergers, and acquisitions over the period. For instance, EcoBank was established in 2011 after Ecobank Transnational Incorporated (ETI) acquired Premier Merchant Bank in 2011. In 2012 the Royal Bank and Genesis Investment Bank surrendered their licenses. Barbican Bank and TimeBank also failed to resume operation. The Zimbabwe Allied Banking Corporation (ZABG) formed from the ailing Trust, Time, and Royal Banks collapsed in 2017. The duration covers the period after the adoption of the multiple currencies with the latest data on bank performance. We estimated the model using the difference-Generalized Methods of Moments (GMM) approach.

3.1 Theoretical framework

The model used is grounded on empirical specifications based on theoretical models of profit by Bikker and Bos (2008) and the Structure Conduct Performance Paradigm developed by Bain (1951) and improved by other authors including Molyneux and Forbes (1995). In their specification Bikker and Bos (2008), a bank (i)'s profit (Π) is defined as the difference between its output revenue (Y_i) and input cost (X_i), the output price vector as p, and the input price vector as w_i:

$$\Pi_i = \rho Y_i - w_i X_i \; subject\; to$$
$$T(X_i, Y_i) = 0$$
$$H(\rho, Y_i, w_i, Z_i) = 0 \qquad (1)$$

Where Π_i is profit for bank i, ρ is price, Y_i is the output vector, X_i refers to the input vector, w_i input price vector, T is the transformation function, pricing opportunity set, H, captures the bank's assessment of its competitive position, and Z is the level of equity.

Each bank i maximizes profit using transformation function T and pricing opportunity set H, which captures the bank's assessment of its competitive position and willingness of customers to pay the prices charged by the bank. Part of the pricing opportunity set is Z, the level of equity. All variables used are vectors, and a subscript i refers to individual banks, whereas a variable without a subscript denotes the aggregate vector for all banks in a market. For each output in the output vector Y_i, bank i faces the price p based on the inverse demand function $f(Y)$. Bank i then maximize profit using the following formula:

$$\rho = f(\textstyle\sum_{i=1}^{N} Y_i) = f(Y) \qquad (2)$$

In the model, banks are assumed to face perfectly competitive input markets but operate in output markets where price differentiation is potentially possible (Bikker and Bos, 2008). The extent to which banks can influence prices depends on output quantities, input prices, and other factors, all of which are given at the time of price setting. Taking into account the bank's market share, the market price's elasticity of demand, bank i's expectations and its interdependence with other banks, their final model for measuring bank performance by looking at its profit is, therefore:

$$\Pi_i^* = \rho^* Y_i - w_i \frac{dX_i^*}{dY_i} Y_i = MS_i \left(-\frac{1}{\eta}\right)(1 + \lambda_i)\rho^* Y_i \qquad (3)$$

This model implies that optimal profits Π_i^* go up with increased market share MS_i, with decreased price elasticity of demand η, with increased conjectural variation λi, with increased output prices p^*, and with increased demand for Y_i. In light of this insight, we use ROA/ROE as proxies of bank profitability for performance measurement. A measure of market share, we resort to bank size to represent its position in the oligopolistic market. To beef up our theoretical model, we also refer to the SCP, which allows us to introduce our variable of interest, money supply growth in a multiple currency regime.

In the specification by Bain (1951) the Structure-Conduct-Performance (SCP) model relates profit as a function of the market's structure, conduct, and performance. Since then improvement by Molyneux and Forbes (1995) in Nabieu (2013) has seen it remaining quite relevant in explaining firm behavior in several sectors of the economy. Market structure, here, is approximated by the concentration index. The model made use of the

[12] The banks are Agriculture Development Bank of Zimbabwe (Agri-Bank), Banc ABC, Barclays (Now First Capital), Commercial Bank of Zimbabwe (CBZ), First Banking Corporation (FBC), Metropolitan Bank, Ned Bank, NMB, Stanbic Bank, Standard Chartered Bank and Zimbabwe Bank (ZB).

traditional approach to establish the relationship between profitability, market concentration, and market share and other variables to have:

$$\pi = f(MC, MS) \quad (4)$$

Where π is (Performance), which can be measured as either Return on assets (ROA) or Return on Equity (ROE). MC is (index of market concentration) and MS is (market share).

Nabieu (2013) further developed the traditional SCP hypothesis by estimating the profit equation as:

$$\pi_i = f(C_m, M_i, X_i) + \varepsilon_i \quad (5)$$

Where X_i = a vector of control variables for bank i to account for firm-specific and market-specific characteristics, and ε_i is an error term for bank *i*.

This paper incorporated the aforementioned models (the Bikker and Bos, 2008 model and the SCP paradigm) in assessing bank performance in the unique era of the multi-currency system. Firstly money supply is being incorporated as a variable to serve as a proxy for the unique multi-currency era. This is used to gauge how banks performed in an era where the central bank had limited to no control over the supply of money in the economy and was unable to perform its lender of last resort function. Money supply is being used to represent a multi-currency regime because of the composition of M3 or broad money. Broad money supply is defined as notes and coins in the hands of the non-bank private sector and total deposits in the banking system less inter-bank and government deposit (RBZ, 2017). From 2009, when the multi-currency regime was introduced, depositors brought more money into the banking system and this was an indicator of increased public confidence in the banking sector. Therefore using money supply, which is the component held in deposits, is important in measuring commercial bank performance in Zimbabwe during the multi-currency era.

Various studies (Chinoda 2014; Flamini *et al,* 2015 and Abel and Le Roux 2016) found the following as bank-specific determinants of performance; capital adequacy, non-performing loans, and liquidity therefore this paper employed these variables to measure bank performance. The final theoretical static panel data model[13] therefore becomes:

$$lg\pi_{it} = \alpha_i + \beta_1 CONC_t + \beta_2 BS_{it} + \beta_3 MS_t + \beta_4 GDP_t + \beta_5 NPL_{it} + \varepsilon_{it} \quad (6)$$

3.2 Econometric Model and Estimation

To examine the relationships in (3.1.6), we transform it into a dynamic panel data model. We then estimate it using the differenced Generalized Methods of Moments (GMM) approach originated by Hansen (1982), bettered by Holtz-Eakin et al., (1988) and further improved by Arrelano and Bover (1995) and Blundell and Bond (1998). Our choice for dynamic panel data estimation over static panel data is not arbitrary, but based on sample size and motivated by lucrative properties embedded in the former. Unlike static models, dynamic panel data models express a data generating process (DGP) that depends on its past values and current and past values of explanatory variables that are not strictly exogenous (Bun and Sarafidis, 2013; Tiper 2014). The inability to incorporate past realizations on current values makes the static panel data model weak for inference. Also, the approach is specifically designed for panels with short T and large N, a case we have. In general, a dynamic panel data is expressed as:

$$y_{it} = \lambda y_{i,t-1} + x'_{it}\beta + \alpha_i + \upsilon_{it} \qquad i = 1, \dots, N; t = 1, \dots \dots, T \quad (7)$$

Where x'_{it} is a vector of regressors, α_i is the individual-specific effects, υ_{it} is the error term with zero mean, constant variance, and uncorrelated with time and individuals. In this specification, $y_{i,t-1}$ is correlated with α_i since the past values already depend on individual effects (Kruiniger, 2009). Expressing (3.1.6) in dynamic form gives:

$$lg\pi_{it} = \lambda lg\pi_{i,t-1} + \beta_1 CONC_t + \beta_2 BS_{it} + \beta_3 MS_t + \beta_4 GDP_t + \beta_5 NPL_{it} + \alpha_i + \upsilon_{it} \quad (8)$$

This violates the compatibility of conventional panel data estimators. As $\pi_{i,t-1}$ is correlated with both x'_{it} and υ_{it}, the random effects[14] Generalized Least Squares (GLS) and fixed effects[15] Within Group (WG) estimators are biased and inconsistent (Bond, 2002; Bun and Sarafidis, 2013) such that the model suffers from an endogeneity problem. A great deal of work has been done to provide solutions to this.

Anderson and Hsiao (1982) first attempted to address

[13] Bank Concentration, GDP, Money Supply are macroeconomic factors and are therefore individual-invariant variables. For these variables $x_{it} = x_t$ for all i.

[14] By definition, random effects assumes independence between υ_{it}

[15] WG transformations of variable deviations from mean implies that $\bar{y}_i$ is correlated with $\bar{v}_i$

Table 1: Data Description and Data Sources

Variable	Description	Source(s)
roa	Return on Assets-Calculated as Net Income over Assets	Banks' Published Financial Statements
roe	Return on Equity-Calculated as Net Income over Shareholder Equity	Banks' Published Financial Statements
conc	Bank Concentration-Top 3 Banks' Assets as a percentage of total Bank Assets	Banks' Published Financial Statements
bs	Bank Size-Measured by a Bank's Total Assets	Banks' Published Financial Statements
msg	Growth in Broad Money Supply (M3)	Reserve Bank of Zimbabwe
GDP	Growth in Gross Domestic Product	World Bank
npls	Non-Performing loans-Value of loan defaults as a percentage of total loans	Banks' Published Financial Statements

Source: Authors' Compilation

the problem by taking $\Delta y_{i,t-2}$, and $y_{i,t-2}$ as instruments of $y_{i,t-1}$, an approach supported by (Holtz-Eakin *et al*, 1988). Allerano and Bond (1991) building on work originated by Holtz-Eakin *et al*., (1988) and earlier work by Hansen (1982) developed the difference Generalized Methods of Moments (GMM) estimator. They obtained estimators by using the moment conditions generated by lagged levels of the dependent variable, $(y_{i,t-2}, y_{i,t-3}, \dots\dots)$ with υ_{it}. Arrelano and Bond (1991) demonstrated through simulation tests that the difference GMM has the smallest bias and variance compared to GLS and WG estimators. It follows that the difference GMM is more efficient (Bond and Windmeijer, 2005). Arrelano and Bover (1995) and Blundell and Bond (1998) made further improvements on the GMM estimators[16].

3.2.1 Endogeneity and Instruments Validation

A key issue in GMM estimation is the validation of instruments. We use current values and first lags of liquidity ($lgLIQ$) and capital adequacy $lg(CAR)$ as the instruments. The dependent variable and the standard variables ($lgCONC$ and $lgBS$) are used as the endogenous variables. The GMM estimated model therefore becomes:

$$lg\pi_{it} = \lambda\pi_{i,t-1} + \beta_1 lgCONC_t + \beta_2 lgBS_{it} + \beta_3 lgMS_t + \beta_4 lgGDP_{t-1} + \beta_5 lgNPL_{it} + \alpha_i + \upsilon_{it}$$
$$END(lg\pi_{it};\ lgCONC_t;\ lgBS_{it}; lag(\#\ \#))$$
$$and\ INST(lgLIQ_{it};\ lgLIQ_{i,t-1};\ lgCAR_{it}; lgCAR_{i,t-1}) \quad (9)$$

The use of lagged GDP growth follows Mileva (2007). Lags (# #) instruct the specified lags are to be used as the endogenous variables. In the presence of autocorrelation in the disturbance term, the instruments become invalid, which distorts the efficiency and reliability of estimators (Arrelano and Bond, 1991; Bond and Blundell, 2000; Bowsher, 2000). If υ_{it} are serially correlated of order 1, then $y_{i,t-2}$ is endogenous to υ_{it}. To validate the instruments, we used the Arellano and Bond test under the null hypothesis of no autocorrelation. Also, we augment instrumental validation using the Sagan (1958) test and the Hansen (1982), under the null that residuals should be uncorrelated with instruments. It is ideal not to reject the null in both tests.

ROA and ROE are separately going to be used as the performance indicators, to test the effect of bank-specific and macroeconomic variables on bank performance under the multi-currency system. The paper used both ROE and ROA because ROA on its own can be misleading as it excludes off-balance sheet activities, which contributes to the overall profitability of the bank. Whilst ROE includes off-balance sheet activities, it does not show how banks utilize their assets to generate profits. Therefore the two profitability measures are being used for comparison purposes. Secondary data was collected from the banks' annual reports and financial statements, a survey of banks' databases, and the Reserve Bank of Zimbabwe monetary policy statements. The data description and sources are shown in Table 1.

4. Results and discussion

4.1 Descriptive statistics

Summary statistics and correlation matrix are reported in Tables 2 and 3 respectively.

[16] See Roodman (2009) for further details on GMM Estimators

Table 2: Summary Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Roa	110	0.233	0.046	0.001	0.418
Roe	110	1.586	6.633	0.001	63.171
Conc	110	0.633	0.018	0.610	0.672
Bs	110	431,000,000	400,000,000	31,800,000	1,990,000,000
Ms	110	57.594	96.264	4.551	340.035
Gdp	110	0.070	0.058	0.007	0.163
Npls	110	0.097	0.150	0.000	1.068

Source: Authors' Compilation

Table 3: Correlation Matrix

	lgroa	lgroe	lgcnc	lgbs	lgmsg	lggdp	lgnpl
lgroa	1.000						
lgroe	0.1859	1.000					
lgcnc	-0.0539	-0.112	1.000				
lgbs	0.3706	0.2748	-0.3557	1.000			
lgmsg	-0.1718	0.0019	0.2946	-0.3515	1.000		
lggdp	-0.0044	-0.0882	0.519	-0.3815	0.4119	1.000	
lgnpl	-0.0156	-0.0939	-0.3022	0.268	-0.6904	-0.3533	1.000

Table 4: Difference GMM Estimation Results

	Return on Assets				Return on Equity			
Variable	**Coef.**	**Std. Err**	**t**	**P>|t|**	**Coef.**	**Std. Err**	**t**	**P>|t|**
$lgroe_{i,t-1}$	-0.008	0.030	-0.26	0.797	-0.165***	0.039	-4.28	0.001
$lgcnc_{it}$	1.375**	0.467	2.94	0.013	-1.981***	0.397	-4.99	0.000
$lgbs_{it}$	0.211***	0.057	3.72	0.003	0.582**	0.196	2.97	0.013
$lgmsg_{it}$	0.020**	0.009	2.24	0.046	0.091**	0.031	2.93	0.014
$lggdp_{i,t-1}$	0.033***	0.010	3.29	0.007	0.119***	0.027	4.37	0.001
$lgnpl_{it}$	-0.012	0.017	-0.7	0.499	-0.027	0.040	-0.67	0.518
Observations	88				88			
Instruments	64				80			
F-Statistic	6.13				236.57			
Prob (F-Statistic)	0.005				0.000			

, and *** shows level of significance at 10%, 5% and 1% respectively. Source: Authors; Compilation from STATA GMM Estimation*

Maximum values of money supply growth rate of 340.035 were recorded in 2009 when the multi-currency regime started. This is can be attributed to the restoration in confidence in the banking sector following the adoption of the multi-currency which saw an increase in deposits. The minimum money supply growth was recorded in 2013 when there was a decline in economic activity. Maximum GDP growth was recorded in 2011 and a minimum in 2014. The maximum values for ROE and ROA were recorded in 2011 at the peak of economic growth and the minimum values in 2009 when the banks were recovering from the hyperinflation environment.

There is no pair with a correlation of over 0.8. This rules out the problem of multi-collinearity. Return on equity has a positive and weak linear relationship with money supply (growth), while has a stronger but negative with money growth. This is because M3 is broad and comprises savings, demand deposits, short-term and long-

Table 5: Diagnostic Tests

	Return on Assets		Return on Equity	
Test	**z-Value**	**Probability**	**z-Value**	**Probability**
Arellano-Bond (AR1)	-1.02	0.307	-1.44	0.150
Arrelano-Bond (AR2)	0.90	0.370	-0.09	0.931
	$\chi^2(74)$	**Probability**	$\chi^2(74)$	**Probability**
Sargan Test	66.39	0.210	95.14	0.050
Hansen Test	8.73	1.00	8.5	1.00

Source: Authors Compilation from STATA GMM Estimates

term deposits which allow a bank to have more funds available for lending and loans are an asset to a bank.

4.2 Estimation Results

This section presents and discusses the estimated results, starting with difference-GMM estimates and then related diagnostic tests.

4.2.1 Difference GMM Estimation Results

A generalized method of moments estimation was done and the results are shown in Table 4.

Estimations on the standard SCP variables reflect the controversy that has characterized the paradigm. Bank size is found to have a positive, reasonably large, and statistically significant impact on both ROA and ROE. Elasticities of 0.211 and 0.582 indicate that a 1% increase in bank size corresponds to a 0.211%and 0.582% increase in the two measures respectively. This may be attributed to the economies of scale argument where bigger banks are more stable. The financial muscle invites confidence which attracts more customers, deposits, and lending activities. Our finding is in tandem with a horde of studies (including Flamini *et al*, 2009; Alper and Anbar (2011) Ali *et al,* 2011) finding a positive relationship. However, studies in antagonism do exist. For example, Sufian and Habiballah (2009) and Aladwan (2015) found a negative relationship between a bank's size and profitability. They argue that small banks perform better than bigger banks. Whilst controversy exists on the impact of bank size, evidence on concentration is more contentious, and our findings confirm this.

Coefficients of concentration show opposing effects on bank performance. The impact is positive on ROA (1.375) and negative on ROE (-1.981). Both are statistically significant at 5% and 1% respectively. This is to say less competition on average improved ROA by 1.375% yet it reduces ROE by 1.981%. These contrasting results may be explained by the developments in the banking sector since 2009. The number of banks has been falling, making the sector more oligopolistic. With less competition, the resulting monopoly allowed banks to control the market and therefore enjoyed the benefits of less competition. Banks were able to generate more from their assets in the process. Yet the negative return on equity may reflect dwindling returns from earnings as the economy started to shrink. ROA findings concur with Jeon and Miller (2002), Tregena (2006). However, Algoz *et al.,* (2016) show that the impact may vary depending on the economic environment. They reveal that in Turkey bank concentration positively affected performance after the 2008 crisis, but negatively before. Evidence of negative effect has also been suggested by

The key finding is that money supply growth has a positive and statistically significant but weak impact on bank performance. ROA and ROE coefficients of 0.020 and 0.09 which are statistically significant at 5% imply that a 1% increase in money supply growth increased ROA and ROE by 0.02% and 0.09%. The positive impact suggests that the adoption of the multiple currency system contributed to improved commercial bank performance, albeit weakly. This concurs well with the composition and trend in money supply growth. The adoption of the multiple currency system saw an increase in confidence in the banking sector. As such deposits, which constitute over 80% of the money supply over the period, increased significantly (RBZ, 2017). This provided banks with funds for lending. Owing to an increase in money supply growth between 2009 and 2011, total lending to the private sector in 2011 amounted to USD 2.3 billion, with loans and advances to the private sector accounting for a lucrative 78.8% (RBZ, 2011).

The weak impact can be attributed to diminishing returns of the multiple currency system as the economy started to nosedive post-2013. For instance, there was a slowdown in the growth of deposits, which resulted in a contraction in growth in lending to private sector lending from 28.77% in February to 1,5% by year-end (RBZ, 2013). Thereafter, the economy endured persistent liquidity challenges coupled with an increase in non-performing loans as the economy shrunk. This reduced the

bank's earnings from financial intermediation, hence the weak impact. Our findings are in tandem with the majority of studies including Akomolafe et al, (2015).

The results show that non-performing loans (npls) have the expected negative, but weak and statistically insignificant impact on both measures performance. Elasticities of -0.012 and -0.027 entail that a 1% increase in NPLS was responsible for the deterioration in ROA and ROE by 0.012% and 0.027% respectively. Additionally, banks lend from deposits and most deposits are demand deposits, if the loans are issued become non-performing loans, the bank's assets are affected hence the negative impact on return on assets. An increase in the number of toxic assets has been decreasing the amount of profitability of the banking institutions. This agrees with Akter and Roy (2016), Abel and Le Roux (2016), and Kingu *et al.,* (2018) who found a negative relationship between non-performing loans and the profitability of a bank.

The impact of economic growth on bank performance is in line with theoretical expectations and empirical findings elsewhere. Our estimates join a host of studies (including Calderon and Liu, 2003; Bangake and Eggoh, 2011; Candida, 2013) in documenting that banks thrive as the economy grows. In our case the impact, though weak, is statistically significant on both measures of performance. A 1% increase in economic growth accounted for 0.03% and 0.11% betterment in ROA and ROE respectively. This also means that a contraction in growth has a similar, but negative impact on bank performance. It is important to highlight that the impact of macroeconomic factors, GDP growth, and money supply growth, are significantly inferior to firm-specific variables discussed above. This finding is similar to Shaher *et al.,* (2011) for commercial banks in the Middle East region. It follows that individual bank's responses to systematic risk and competitive strategies are more important to profitability and survival. This could explain why some banks had to close during the same period when others were actually thriving.

4.2.2 Diagnostic Tests

The tests show that for both ROA and ROE, both AR(1) and AR(2) the null hypothesis for autocorrelation cannot be rejected since all p values are well above the conventional 0.05%. The Sargan and Hansen tests for over-identification for ROA clearly validate the instruments as indicated by high p values of 0.210 and 1 respectively. For ROE, the Sargan test, with a p-value of 0.05 is not convincingly validating the instruments, unlike the Hansen test which strongly supports that the instruments are valid. The weak Sargan tests result is not worrying as Roodman (2009) noted that the test should not be relied upon too devotedly, as it is prone to flaws. Overall, the instruments are determined to be ok.

5. Conclusion

This paper provides new econometric based evidence on commercial banks' performance following the introduction of the multi-currency system using annual data for the period 2009 to 2019. We make two contributions. Firstly, we provide new evidence on the determinants of bank performance in a rare monetary regime, the multiple currency system. We do this by using growth in broad money supply as a more explicit proxy for the multiple currency regime. Secondly, unlike related studies that relied on conclusions on static panel data estimations, we base our analysis on dynamic panel data model estimation. A dynamic panel data model, derived from the Structure-Conduct-Performance paradigm and the Bikker and Bos (2008) profit maximization model was estimated using the difference generalized method of moments (GMM) approach. The differenced GMM approach, originated by Hansen (1982), bettered by Holtz-Eakin et al., (1988), and further improved by Arrelano and Bover (1995) and Blundell and Bond (1998) was chosen ahead of static panel data estimators (GLS and WG). We used growth in broad money supply (M3) as a more approximate proxy for the multi-currency system and return on assets (ROA) and return on equity (ROE) as measures of bank performance. Other explanatory variables used are bank concentration ratio, bank size, which together with performance measures were treated as endogenous variables. To correct for endogeneity, the current and lagged variables of liquidity and capital adequacy ratios were used as instruments.

The key finding is that multiple currencies delivered a statistically significant but very weak improvement in bank performance. A 1% increase in money supply was responsible for 0.02 and 0.09 % improvement in ROA and ROE respectively. This suggests diminishing returns of the multiple currency system. Also, bank size has been found to enhance performance for both measures. Interestingly, the impact of bank concentration varied with the measures used. The impact is positive for ROA and negative for ROE and statistically significant for both. We document that bank-related factors, concentration, and size have a superior impact than macroeconomic factors. For both measures, the lag of economic growth was found to have a positive, statistically, and yet weak impact. More so, elasticities on NPLs are negative but statistically insignificant. We draw important policy recommendations based on our findings.

Firstly, given the insight of diminishing returns from the multiple currency system, we welcome the recent scrapping of the multiple currency system. However, the process was hurried since some macroeconomic fundamentals are still outstanding. Nonetheless, the restoration of monetary policy sovereignty is a positive move. Our advice is that the Reserve Bank of Zimbabwe (RBZ) monetary policy should focus on money supply targeting to contain inflation and preserve the value of the local currency. Secondly, owing to the understanding that bank-specific factors are more important in determining performance than external factors, we commend them to concentrate more on micro-prudential prudent responses to systematic risk and competitive strategies to enhance their performance.

References

Abel. S, and Le Roux (2016). Determinants of Banking Sector Profitability in Zimbabwe. *International Journal of Economics and Financial Issues*, 6(3), 845-854.

Akomolafe K. J, Danladi J. D, Babalola. O, and Abah. A. G. (2018). Monetary Policy and Commercial Banks' Performance in Nigeria. *Public Policy and Administration Research*, 5(9).

Akter. R and Roy J.K. (2016). An Empirical Study on Banking Sector of Dhaka Stock Exchange Study on Banking Sector of Dhaka Stock Exchange. *International Journal of Economics and Finance*, 9(3).

Aladwan. M. (2015). The Impact of Bank Size on Profitability: An Empirical Study on Listed Jordanian Commercial Banks. *European Scientific Journal*, 11(34):217-236

Alagöz. M, Akalın. U.S, and Ceylan O. (2016). The Relationship between Concentration and Profitability in the Turkish Banking Sector. *Journal of Emerging Economies and Policy*.

Ali K., Akhtar M.F., Ahmed H.Z. (2011) Bank-specific and macroeconomic indicators of profitability-empirical evidence from the commercial banks of Pakistan. *International Journal of Business and Social Science*, 2 (6), 235-242.

Alper, D., and Anbar, A. (2011). "Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: Empirical Evidence from Turkey", *Business and Economics Research Journal*, 2(2), 139-152.

Anderson, T. W., and C. Hsiao. (1982). Formulation and estimation of dynamic models using panel data. *Journal of Econometrics,* 18: 47–82.

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

Arellano, M., and Bover. O. (1995). Another look at the instrumental variable estimation of error components models. *Journal of Econometrics,* 68: 29–51.

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

Bangake, C. and J. Eggoh (2011). Further evidence on finance-growth causality: A panel data analysis, *Economic Systems*, 35, 176-188.

Bikker, J. A. & Bos, J.W.B. (2008). *Bank Performance: A Theoretical and Empirical Framework for the Analysis of Profitability, Competition, and Efficiency*. Routledge International Studies in Money and Banking.

Blundell, R., and Bond, S. (2007). GMM Estimation with Persistent Panel Data: An Application to Production Functions. *Journal Econometric Reviews, 19(3).*

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

Bond, S. (2002). Dynamic panel data models: A guide to microdata methods and practice. Working Paper CWP09/02, *Cemmap, Institute for Fiscal Studies*.

Bond, S., and F. Windmeijer (2005). Reliable inference for GMM estimators? Finite sample properties of alternative test procedures in linear panel data models. *Econometric Reviews* 24, 1-37.

Bowsher, C. G. (2002). On testing overidentifying restrictions in dynamic panel data models. *Applied Economics Letters* 77: 211–220.

Calderon, C., and L. Liu (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, 72, 321–334.

Cândida Ferreira (2013). Bank performance and economic growth: Evidence from Granger panel causality estimations. *Working Papers Department of Economics ISEG - Lisbon School of Economics and Management, Department of Economics, Universidade de Lisboa*

Central Intelligence Agency (CIA). (2019). World Fact Book https://www.cia.gov/library/publications/the-world-factbook/accessed 26/02/2019.

Chigumira J. K. G. and Chipumho, E. (2013). A Review of Zimbabwe's Optimum Future Currency Regime", Zimbabwe Economic Policy Analysis and Research Unit (*ZEPARU)*

Chikoko. L. (2013). Zimbabwean Commercial Banks Liquidity Risk Determinants after Dollarisation. *Journal of Applied Finance & Banking*, 3(6), 97-114.

Chirwa, E.W. (2003). Determinants of commercial banks' profitability in Malawi: A cointegration approach, *Applied Financial Economics*, 13, pp.565-77.

Dietrich, A., and Wanzenried, G. (2013). What Determines the Profitability of Commercial Banks? New Evidence from Switzerland. *12th Conference of the Swiss Society for Financial Market Researches, Geneva*.

Drechsler I, Savov A, and Schnabl P (2017). The Deposits Channel of Monetary Policy. *The Quarterly Journal of Economics, Volume 132, Issue 4, November 2017*

Dzingirai C and Katuka B (2014). Determinants of Bank Failures in Multiple-Currency Regime in Zimbabwe

(2009–2012). *International Journal of Economics and Finance*, 6(8).

Flamini V, McDonald C, and Schumacher L (2015). The Determinants of Commercial Bank Profitability in Sub-Saharan Africa. *IMF Working Paper WP/09/15*

Flamini, V., Calvin, M., & Liliana, S. (2009): The Determinants of Commercial Bank Profitability in Sub-Saharan Africa. *International Monetary Fund*.

Hanke, S.H., Kwok, A.K.F. (2009). On the measurement of Zimbabwe's hyperinflation. *Cato Journal*, 29(2), 353-364.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica* 50: 1029–1054.

Holtz-Eakin, D., W. Newey, and H. S. Rosen. (1988). Estimating vector autoregressions with panel data. *Econometrica*, 56: 1371–1395.

Jeon Y. and Miller S.M (2002). Bank Concentration and Performance. *Economics Working Papers, Working Paper* 2002-25

Kingu. P. S, Macha Sa, and Gwahula R. (2018). Impact of Non-Performing Loans on Bank's Profitability: Empirical Evidence from Commercial Banks in Tanzania. *International Journal of Scientific Research and Management*, 6(1), 71-79.

Kramarenko, V., Engstrom, L., Verdier, G., Fernandez G., Oppers S.E., Hughes R., McHugh J., and Coats W. (2010). Zimbabwe: Challenges and Policy Options after Hyperinflation. *IMF Paper AFR003*

Kruiniger, H. (2009). GMM estimation and inference in dynamic panel data models with persistent data. *Econometric Theory*, 25, 1348-1391.

Mileva. E. (2007). Using Arellano – Bond Dynamic Panel GMM Estimators in Stata Tutorial with Examples using Stata 9.0 (xtabond and xtabond2).

Molyneux, P., and Thornton, J. (1992). Determinants of European Bank Profitability: A Note. *Journal of Banking and Finance*, 16, 1173–1178.

Mpofu, S and Matsika, W. (2013). Contributions and Challenges Facing the Financial Sector in Zimbabwe. Zimbabwe Economic Policy Analysis Research Unit (ZEPARU) Working Paper Series

Nabieu. G A. A. (2013). The Structure, Conduct, and Performance of Commercial Banks in Ghana. *European Journal of Business and Innovation Research*, 1(4), 34-47.

Piper. A. T (2014). The Benefits, Challenges, and Insights of a Dynamic Panel assessment of Life Satisfaction, *Munich Personal RePEc Archive Europa-Universit¨at Flensbur*

Quispe-Agnoli, M. and Whisler, E. (2006): Official Dollarization and the Banking System in Ecuador and El Salvador. *Economic Review Third Quarter*, Federal Reserve Bank of Atlanta.

Reserve Bank of Zimbabwe (2005): Monetary policy statement. *The Fourth Quarter to 31 December 2004*

Reserve Bank of Zimbabwe (2006): Bank Licensing, Supervision & Surveillance Annual Report

Reserve Bank of Zimbabwe (2009): Monetary Policy Statement: Turning Our Difficulties into Opportunities

Reserve Bank of Zimbabwe (2011): Troubled and insolvent banks policy.

Reserve Bank of Zimbabwe (2017): December Monthly Economic Review

Reserve Bank of Zimbabwe, (2013): Monetary Policy Statement. January 2013 pp. 25–35.

Roodman, D. M. (2009). A note on the theme of too many instruments. *Oxford Bulletin of Economics and Statistics*, 71, 135–158.

Shaher, T., Kasawneh, O., and Salem, R. (2011). The Major Factors that affect Banks Performance in Middle Eastern Countries. *Journal of Money Banking and Investment*, 20:101 109.

Staikouras, C.H., and Wood, G. (2003). The Determinants of Bank Profitability in Europe. *Paper Presented at the European Applied Business Research Conference*, *Venice, Italy*.

Sufian, F., and Habiballah, M. S. (2009).Determinants of Bank Profitability in a Developing Economy: Evidence from Bangladesh. *Journal of Business Economics and Management*, 10(3), 91-112.

Sunge, R. (2018). Money Supply Exogeneity and Endogeneity under Zimbabwe's Multiple Currency Regime, 2009 to 2017. *Journal of Economics and Sustainable Development*, 9(2).

Tregenna. F. (2006). An empirical investigation of the effects of concentration on profitability among US banks. *Munich Personal RePEc Archive, No 13731*.

Tsaurai, K. (2018). The Dynamics, Challenges, and Transition of Banking Sector Development in Zimbabwe. *The Journal of Developing Areas*, 52(3), pp. 85-96:10.1353/jda.2018.0038

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126: 25–51.

World Bank (2010). World Bank Development Indicators. Zimbabwe Data. https://www.worldbank.org/en/country/zimbabwe accessed 03/03/2019