Performance Of The South African Banking Sector Since 1994

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ABSTRACT

This study investigates the impact of bank-specific variables and selected macroeconomic variables on the South African banking sector for the period 1994-2011 using the capital adequacy, asset quality, management, earnings, and liquidity (CAMEL) model of bank performance evaluation. The study employs data in annual frequency from South Africa's four largest banks, namely, ABSA, First National Bank, Nedbank, and Standard Bank. These banks account for over 70% of South Africa's banking assets. Using return on assets (ROA) and return on equity (ROE) as measures of bank performance, the study finds that all bank-specific variables are statistically significant determinants of bank performance. Specifically, the study shows that asset quality, management quality, and liquidity have a positive effect on both measures of bank performance, which is consistent with a priori theoretical expectations. Capital adequacy, however, exhibits a surprising significant negative relationship with ROA, while its relationship with ROE is significant and positive as expected. Except for interest rates (in the ROA model), unemployment rate (in the ROA model), and the rate of inflation (in the ROE model), the rest of the macroeconomic variables are statistically insignificant. The study reveals that bank performance is positively related to interest rates and negatively related to unemployment rates and interest rates.

Keywords: Bank Performance; South Africa; CAMEL

1. INTRODUCTION

In nearly all countries, banks are the largest owner of financial assets (Oladejo & Oladipupo, 2011), which in turn are an important element of firms' operations in the real sector. Accordingly, the performance of banks tends to have a direct impact on the stability of the economy (Greenberg & Simbanegavi, 2009). In South Africa, the banking sector accounts for more than 20 percent of gross domestic product (GDP), and is the third largest employer, accounting for over 10 percent of overall employment.[1] Clearly, the country's efforts to reduce unemployment and increase economic growth will be adversely affected if the banking sector performs poorly. It is evident, therefore, that there is a need to understand how the banking sector performs and the determinants of its performance in order to formulate and implement meaningful policies.

Several studies have attempted to measure banking sector performance in many countries (for example, Sangmi & Nazir, 2010; Said & Tumin, 2011). More recent studies have concentrated on Asia and Europe (for example, Clair, 2004; Heffernan & Fu, 2008; Al-Tamimi, 2010; Athanasoglou, Brissimis, & Delis, 2005). There are, nonetheless, some studies that have investigated bank performance in Africa, many of which have focussed on West Africa (Oladele & Sulaimon, 2012) and North Africa (Naceur, 2003).

The few studies that have been conducted on South Africa have focused on branch performance (for example, Okeahalam, 2006; O'Donnell & Van der Westhuizen, 2002; Ncube, 2009). Most of these studies have used the common quantitative methods for assessing relative efficiency, namely the Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA), which have been criticised for being imprecise and using subjective

[1] 2010 figures.

judgement (Yang & Chen, 2004). More recently, Kumbirai and Webb (2010) studied commercial bank performance in South Africa using simple descriptive financial ratio analysis, studying the period 2005-2009. This study contributes to the literature by investigating South Africa's banking performance using an alternative and more reliable approach - the capital adequacy, asset quality, management, earnings, and liquidity (CAMEL) model. No study that we are aware of has measured the performance of South African banks using this approach.

The rest of the paper is organised as follows. Section 2 is a brief overview of the banking industry in South Africa. A discussion of bank performance is presented in Section 3 followed by an outline of the methodology used for analysis in Section 4 and estimation results in Section 5. A summary and conclusion conclude the paper in Section 6.

2. BANKING IN SOUTH AFRICA: A BRIEF OVERVIEW

The banking sector in South Africa is oligopolistic, highly concentrated and dominated by four major banks (Coppock et al., 2008). These include Amalgamated Banks of South Africa Limited (ABSA), First National Bank (FNB), Standard Bank, and Nedbank. The sector, however, boasts well-developed administrative and credit information systems (Okeahalam, 2001). It is, on the whole, well developed, effectively regulated and backed by a sound legal system (Quiding, 2006). Since 1994, the country has opened up its finance industry, resulting in an increase in the number of banks and consequently a rise in loans and advances. A large number of the new entrants in the industry have been offering a range of new products targeting the formerly unbanked population and lower-income customers, effectively heightening the degree of competition in the sector.

Despite the progress recorded since 1994, there are many challenges confronting the South African banking sector. For instance, the industry's delivery of services to low-income earners or poor people has been uninspiring. According to the African Development Bank (2012), almost 37 percent of the country's 33 million adults in 2010 were not accessing bank services and a large part of the country's informal enterprises had limited access to formal business finance. The entire nature of the banking licence has also been criticised as the main reason for the failure to provide banking services to the poor masses (Maumbe, 2006; Schombree, 2000; Paulson & McAndrews, 2000).

Notwithstanding these and other problems, the South African banking industry has attracted considerable interest from foreign banks, which has resulted in a number of these foreign banks purchasing sizeable stakes in big banks and launching new branches in the country. For example, in 2005 the British Barclays Group acquired and took over ABSA and in October 2007, Standard Bank sold a 20 percent stake to Industrial and Commercial Bank of China (ICBC) in a transaction valued at US$5.5billion. This was China's largest investment in the banking sector and its biggest single investment in South Africa.

3. BANK PERFORMANCE

Many studies have shown that business cycles significantly affect bank performance (for example Al-Tamimi, 2010; Athanasoglou et al., 2005; Heffernan & Fu, 2008). Since firms' and households' ability to service their debt plays an important role in ensuring bank stability, bank performance is expected to follow a pro-cyclical pattern. Supporting this hypothesis, Naceur and Kandil (2009) maintain that factors that adversely affect bank profitability arise from the deterioration of economic activity.

Loans and advances issued by banks also explain the pro-cyclical nature of bank performance. Lending is the core business of banks, and the interest generated from loans is often the largest source of income for commercial banks. Accordingly, interest income from lending is expected to have a positive relationship with banks performance. If, however, these loans, which constitute debt on the part of the borrower, are not paid back when due or if the debts are not adequately serviced, bank performance may be adversely affected.

According to Saidov (2009), today's competitive banking environment has experienced the need for the use of various methods to evaluate risks and returns involved in banking. This is probably because it is not easy to measure efficiency as well as competitiveness of financial institutions, owing to the fact that their products and services are mostly intangible (Kosmidou & Zopounidis, 2008).

Different statistical techniques have been used in the analysis of bank performance. The traditional approach for bank performance evaluation is the financial ratios analysis. However, there is no combination of financial ratios for a complete and satisfactory evaluation of bank operations efficiency. In consequence, financial ratio analyses are complemented with different bank quality evaluations such as equity structure and management quality.

The existing literature on the determinants of bank performance has concentrated on examining either single countries or a panel of countries. Several studies have found that bank sector performance is influenced by the cost to income ratio, operating expenses, and ratio of equity to total assets (Oladele & Sulaimon, 2012; Ivey, Gropper, & Rutherford, 2005; Said & Tumin, 2011; Shipho & Olweny, 2011). Among others, these studies have observed that holding the correct quantity of liquid assets, enhancing capital bases, decreasing functional expenses, improving the quality of assets and using diversifying revenue sources increase the profitability of commercial banks.

Bordeleau and Graham (2010) found a nonlinear association between liquidity and profitability in the United States of America (USA) and Canada for the period 1997–2009. They demonstrated that certain liquid assets enhance bank profitability. They further showed that ceteris paribus, there is a certain level beyond which keeping additional liquid assets reduces profitability. The study also found evidence that the correlation between profitability and holding liquid assets hinges on the business model of the bank, economic conditions, and risks related to financing market complexities. These results are corroborated by Shahchera (2012) and Al-Khouri (2011). However, Said and Tumin (2011) found that liquidity and the magnitude of banks do not have any impact on bank performance in a study of Malaysia and China, in agreement with Shen, Kao, Chen, and Yeh (2009).

The impact of inflation on bank performance has also been studied extensively (Boyd, Levine, & Smith, 2000; Awojobi, Amel, & Norouzi, 2011; Ogege, Williams, & Emerah, 2012; Kosmidou, 2008). On the whole, these studies have found a negative relationship between the rate of inflation and bank performance.

4. METHODOLOGY

4.1 The CAMEL Model

Some of the most commonly used methods/models of bank performance measurement or evaluation include the Analytic Hierarchy Process (AHP), Data Envelopment Analysis (DEA), and the capital adequacy, asset quality, management, earnings and liquidity (CAMEL) model. This study uses the CAMEL model of bank performance measurement. The model involves the use of financial ratios in measuring bank performance. Compared to the other models, the CAMEL model is arguably the most popular framework used by regulators for bank performance evaluation (Naceur, 2003; Heffernan & Fu, 2008; Sufian & Habibullah, 2010; Al-Tamimi, 2010; Khrawish, 2011; Kouser & Saba, 2012). Apart from being the most used method for evaluating bank performance, the CAMEL is also a contemporary model of financial analysis and the most recent innovation in the financial performance evaluation of banks (Sangmi & Nazir, 2010). The model assesses bank performance based on capital adequacy, asset quality, management competency and soundness, earnings and liquidity. The likelihood of bank failure is increased if any of these factors show signs of inadequacy. Financial ratios such as return on assets (ROA), return on equity (ROE), and net interest margin (NIM) form part of the financial ratios that the CAMEL model uses.

It is important to mention that the complexity of both the AHP and DEA method of performance evaluation places the CAMEL model at the very pole position as a model of choice for evaluating bank performance. The CAMEL model derives its strength from its simplicity. Different financial ratios are selected as proxies for the five dimensions of the CAMEL.

4.1.1 Capital Adequacy

Capital adequacy, according to Sangmi and Nazir (2010), is a reflection of the inner strength of a bank. Some of the ratios that measure capital adequacy include capital adequacy ratio (CAR), leverage ratio, and net worth protection. The leverage ratio, which is also referred to as the debt to equity ratio (debt/shareholders equity), is adopted in this study.

4.1.2 Asset Quality

An important parameter that can be used to gauge the strength of a bank or its performance is the quality of the bank's assets. The main reason for measuring asset quality is to find out the component of non-performing assets as a percentage of total assets. Some of the ratios used to measure asset quality include total investments to total assets, asset to capital employed, and net non-performing assets to total assets. This study adopts asset to capital employed as a proxy for asset quality. Capital employed is the value of a company's assets that contributes to its ability to generate revenue. Thus, asset to capital employed refers to the value of all assets (fixed as well as working capital) employed in a business.

4.1.3 Management Quality or Management Capability

This parameter measures or evaluates the capability of the management of a bank to aggressively deploy its resources and utilize the facilities in the bank productively and in the process reduce costs and maximize income (Purohit & Mazumdar, 2003). Amongst the five CAMEL variables, the measurement of management quality is apparently the most subjective, particularly because it is usually appraised and allocated a score by the bank examination staff (Hays, De Lurgio, & Gilbert, 2009). In other words, management capability is a qualitative measure and can only be understood and quantified by subjective evaluation of management control mechanisms or organizational culture (Sangmi & Nazir, 2010, p. 46). Management capability can also be measured using other ratios such as earning per employee, operating profit per employee, expenditure per employee and average number of active borrowers per credit officer. This study adopts operating profit per employee as a proxy for this parameter.

4.1.4 Earnings

This is perhaps the most conventional approach for measuring financial or bank performance. Cole and Gunther (1998) argue that higher income generally reflects relatively less financial difficulties and may consequently be associated with a relatively lower likelihood of bank failure. This, however, does not hold all the time. High income may also be associated with relatively high-risk behaviour, which exposes the bank to a greater probability of failure. A case in point is the 2007/2008 financial crisis, which has been associated with high-risk behaviour reflecting moral hazard on the part of financial institutions. Earnings of a bank can be evaluated using financial ratios such as return on assets and return on equity (both being profitability ratios), net interest margin, interest income to total income, and spread ratio. This study uses return on assets (ROA) and return on equity (ROE) as measures of earnings and hence bank performance. Accordingly, we use ROA and ROE as endogenous variables regressed on vectors of bank specific factors (the remaining financial ratios of the CAMEL) and selected macroeconomic variables.

4.1.5 Liquidity

The liquidity of a bank reflects the swiftness with which the bank responds to unexpected demand for cash. Therefore, for a bank to easily provide liquidity, it must have a highly liquid and readily transferable stock of financial assets. Liquidity means financial assets must be available to owners within a short space of time (Sangmi & Nazir, 2010). Liquidity ratios include current ratio (current asset/current liabilities), quick ratio (current assets-inventories/current liabilities), liquid assets to deposits, and liquid assets to total assets. The quick ratio is used as a proxy for liquidity in this study.

4.2 Macroeconomic Variables

In addition to the bank-specific variables, this study uses some macroeconomic variables to control for the impact of macroeconomic factors. The macroeconomic variables used in this study include inflation rates, real interest rates, GDP, and unemployment rates.

4.2.1 Inflation Rate

There is a substantial amount of evidence that a sustained high rate of inflation adversely influences an economy's level of real activity (Boyd et al., 2000). Some studies have found a nonlinear relationship between

inflation and financial sector performance. Azariadis and Smith (1996) and Boyd and Smith (1998), among others, have shown that it is only when inflation exceeds a certain "critical" rate (threshold) that credit market frictions become binding. Effectively, inflation may have recurrent positive and negative effects. That is, at low levels of inflation, credit market frictions may be "nonbinding" and there will be no impact on financial sector performance. However, once the rate of inflation surpasses this threshold, credit market frictions become binding, which results in intensive credit rationing ultimately leading to a decline in financial sector performance.

4.2.2 Gross Domestic Product

Demirguc-Kunt and Huizinga (1999) have shown that an increase in bank profitability in a large number of countries has been precipitated by rapid economic growth, which is measured by real GDP growth. Accordingly, business cycles are expected to have direct effects on the performance of banks. As argued by Mendes and Abreu (2003), bank performance is expected to be pro-cyclical because adverse macroeconomic conditions hurt banks by increasing the share of non-performing loans in the economy. Supporting the hypothesis, Heffernan and Fu (2008) maintain that greater demand for bank services brought about by an economic upswing is associated with a lower risk of loan defaults. Conversely, declining economic growth is likely to weaken the capacity of borrowers to service their debts, thus increasing credit risk.

4.2.3 Interest Rate

According to Mendes and Abreu (2003), real interest rates capture banks' general costs of funds. Increasing interest rates, therefore, lead to high non-performing loans and consequently poor bank performance. If the rate of GDP growth is low, high interest rates are usually associated with financial stress and a decline in bank performance. Clair (2004) states that though high real interest rates may lead to banks' increased income, they may also lead to banks' fragility and instability. Diamond (1991) explains that mostly, companies' choices between projects that are considered risky and safe are influenced by the real interest rate thereby affecting their financial performance as well as fragility. With a real interest rate that is rising, adoption of risky investment projects is predictable and this will increase the level of counterparty default, which ultimately undermines the stability of banks. Theoretically, there is a negative relationship between bank performance and interest rates.

4.2.4 Unemployment

On the whole, a positive growth in real GDP is accompanied by an increase in employment. Growing unemployment, in turn, leads to a reduction in aggregate demand, which further results in an increase in the loan default rate of borrowers, ultimately reducing bank profitability (Heffernan & Fu, 2008; Mendes & Abreu, 2003). Consequently, bank performance declines. An empirical result by Abreu and Mendes (2002) shows that the rate of unemployment is negatively related to net interest margin, return on average assets (ROAA), and return on average equity (ROAE), which are all measures of bank performance.

4.3 Data, Data Sources, and Sample

Data for financial ratios were collected from the annual financial ratios report of South Africa's four biggest banks, as recorded by McGregor BFA covering the period 1994 to 2011 in annual frequency. In South Africa, the four largest banks, ABSA, First National Bank, Nedbank, and Standard Bank, to a large extent represent the banking sector in South Africa. The four banks collectively account for an estimated 72% of South Africa's banking assets (Schoombee, 2000). Data for the macroeconomic variables or external factors (GDP, inflation rates, real interest rates, and unemployment rates) were obtained from World Development Indicators online, a World Bank database of social and economic indicators.

4.4 Model and Estimation Method/Technique

Following Heffernan and Fu (2008) and Hays et al. (2009), the financial ratios that serve as proxies for the CAMEL variables together with the macroeconomic variables are used to specify a multiple regression model for analysis. The model contains the five CAMEL variables and the macroeconomic variables. Two measures of bank

performance are used in this study, namely, return on assets (ROA) and return on equity (ROE), while the independent variables are divided into two categories: the bank-specific variables and macroeconomic determinants of bank performance. The estimating equation is given by:

$$P_{it} = \delta + \sum_{\tau=0}^{n} \beta_{\tau} X_{\tau it} + \sum_{k=0}^{m} \psi_k Z_{kit} + \mu_{it} \quad (1)$$

where P is a bank performance indicator, namely, *ROA* and *ROE*; X and Z are vectors of bank-specific and macroeconomic explanatory variables, respectively, and μ is a stochastic term. According to Gujarati (2007), if T, which is the number of time series data, is large and the number of cross-sectional units is smaller, the fixed effects model is more appropriate compared to the random effects approach. Since our data are from 1994 to 2011 (18 years) and the number of banks under consideration is only 5, this study adopts the fixed effect model.

After estimation of the fixed effects model, a comparison of the ROA and ROE results is carried out. Thereafter, we attempt to ascertain whether the banks' individual specific effects have influence on their individual performances. This is carried out using the least-squares dummy variable (LSDV) approach of the fixed effects model. In this case, the intercept is permitted to vary across individual banks whereas slope coefficients remain constant. Hsiao (2003) argues that the LSDV model offers a sound way to comprehend fixed effects and it recognizes the different intercepts. Moreover, this is an additional method of computing the within estimators, particularly if the quantity of observations is not large. In the present study, the LSDV technique enables the calculation of statistically distinctive intercept values for every bank. These differences reveal the unique characteristics of the banks which differentiate each bank from other banks.

Finally, we re-estimate the model using the Generalised Method of Moments (GMM) and System-GMM as a robustness check on our results. According to Arellano and Bond (1991), fixed effects LSDV might be inefficient, which necessitates the exploitation of orthogonality conditions that exist between the lagged values of the dependent variable and the disturbance term through the use of an additional instrument in the model. In panel data analysis, it is generally accepted that the GMM is superior to the other estimation techniques outlined in the foregoing discussion. Recent studies on bank profitability have employed the GMM methods to overcome problems associated with pooled OLS techniques. The GMM approaches have no assumptions regarding data distribution compared to OLS. It has also been argued that the GMM estimator captures the endogeneity of regressors and accounts for heteroscedasticity and serial correlation in residual terms (Wintoki, Linck, & Netter, 2009).

Recent studies reveal that for first-differenced GMM provisions, lagging regressors continually over a number of times leads to weak instruments (Han & Phillips, 2010; Arellano & Honore, 2001; Moral-Benito, 2012). As a result, the GMM estimator will tend to be somewhat biased. The solution is System-GMM estimation. The System-GMM originates from estimating two simultaneous equations, one of them with a lagged first difference variable as an instrument and the other one with a lagged level as an instrument. This method is associated with efficiency gains and valid instruments. It has been argued that the GMM estimator has the ability to choose parameter estimates which will reduce the association between the instrument and the disturbance term to zero (Wooldridge, 2001; Kripfganz & Schwarz, 2012; Bontempi & Mammi, 2012).

5. ESTIMATION RESULTS

Table 1 presents the fixed-effects (within) regression estimation results for both ROA and ROE equations. The results show that all bank-specific or internal variables are statistically significant at conventional levels for both ROA and ROE equations. The results further show that asset quality (assets to capital employed ratio), management quality (operating profits per employee ratio), and liquidity (quick ratio) have a positive relationship with both measures of bank performance. This suggests that bank performance in South Africa improves whenever there is an improvement in management quality, asset quality, and liquidity level, which is consistent with a priori theoretical expectations. However, the leverage ratio, which is a measure of capital adequacy, shows a surprising significant negative relationship with ROA, whereas its relationship with ROE is significant and positive as expected. The latter result is consistent with reports which hailed the South African banking sector for remaining stable and resilient as compared to other countries, especially in the western world in the wake of the 2006/2007 global financial crisis (Marcus, 2013). The reports maintain that this is an indication that South African banks have

an enviable non-interest revenue mix and are operating at favourable efficiency ratios, with the result that they are highly profitable, well capitalised, and have good returns on equity.

With the exception of interest rates (in the ROA equation), unemployment rate (in the ROA equation), and the rate of inflation (in the ROE equation), the rest of the macroeconomic variables are statistically insignificant. The positive relationship between interest rates and bank performance is inconsistent with a priori theoretical expectations. This relationship is probably indicative of the highly concentrated banking sector in South Africa. With high interest rates, lack of competitiveness in the banking sector forces bank clients to pay disproportionately high interest rates and fees to cover for the increase in interest rates as well as any expected decline in lending that may arise due to the increase in the cost of funds. Since there is no corresponding increase in the cost of doing business (an obvious exception being an increase in the cost of mobilising deposits), bank performance tends to improve.

Table 1: Fixed-Effects (within) Regression Results for Return on Assets (ROA) and Return on Equity (ROE) Equations

Variable	ROA Equation	ROE Equation
Constant	15.48191*** (5.439034)	29.51683** (14.78054)
Assets to capital employed	0.827489** (0.3267676)	1.789814** (0.8879888)
Leverage ratio	-0.3697562*** (0.1049486)	0.5270561* (0.2851971)
Operating profit to employee ratio	0.0896558*** (0.0292188)	0.1848316** (0.0794019)
Quick ratio	0.4507847* (0.2455852)	1.444762** (0.6673762)
Interest rate	0.8755091* (0.4850992)	-0.1332961 (1.318254)
Inflation	-0.0335079 (0.1474157)	-1.224242*** (0.4006011)
GDP growth	-0.0247889 (0.1897199)	0.7465215 (0.5155626)
Unemployment rate	-0.2757392** (0.1135127)	-0.1832156 (0.3084701)

ROA Equation: $R^2 = 0.3479(\text{within})\ R^2 = 0.1547(\text{overall})\quad F(10,74) = 3.95, \text{F prob.} = 0.0002.$
ROE Equation: $R^2 = 0.3704(\text{within})\ R^2 = 0.3035(\text{overall})\quad F(10,74) = 4.35, \text{F prob.} = 0.0001.$
Note: *, **, and *** denote 1%, 5%, and 10% significance levels respectively. Standard Error in parenthesis. Source: Author's Computation

The statistically significant negative impact of the unemployment rate on the return on assets is an indication that increasing unemployment rates lead to poor bank performance (measured by ROA in this case). Unemployment is one of the major economic problems in South Africa and around the world, especially because it causes loss of production, loss of income, and loss of human capital (skill decay), which adversely affects economic growth. Since one of the primary roles of banks is financial intermediation (borrowing from surplus units and lending to deficit units), it is expected that high levels of unemployment will result in a reduction in the surplus units following the loss in employment and production, effectively hampering the intermediation role of banks.

The insignificance of inflation rate (ROA equation), interest rates (ROE equation), GDP growth (both ROA and ROE equations), and unemployment rate (ROE equation) is inconsistent with a number of studies carried out in emerging and developed economies, such as, Hong Kong, Malaysia, Singapore, and Australia, where it has been found that macroeconomic variables exert a strong influence on bank performance (Gerlach, Peng, & Shu, 2004; Ghazali, 2008; Clair, 2004; Gizycki, 2001). Our findings, nonetheless, are not uncommon. Alper and Anbar (2011) and Ayadi and Boujelbene (2012) have found similar results in studies of Turkey and Tunisia, respectively.

To ascertain whether the specific effects of the banks affect their individual performances, we estimate the Least Squares Dummy Variable (LSDV) model. The objective of this approach is to examine if individual bank-specific characteristics affect the overall results. This is carried out by allowing the intercept to vary from one bank to the other. Estimation results of the LSDV model for both ROA and ROE equations are presented in Table 2.

Table 2: Fixed-Effects (LSDV) Estimation Results for ROA and ROE

Variables	ROA Equation	ROE Equation
Cons	17.0531** (6.419627)	27.85824 (17.44529)
Dum 2	-1.630369 (1.98471)	7.282122 (5.393437)
Dum 3	0.556861 (1.112911)	.4500998 (3.024329)
Dum 4	-6.288015 (4.017503)	-3.448824 (10.91754)
Dum 5	-.4977217 (1.531105)	4.321988 (4.160768)
Asset to capital employed	.827489** (.3267676)	1.789814** (.8879888)
Leverage ratio	-.3697562*** (.1049486)	.5270561* (.2851971)
Operating profit to employee ratio	.0896558*** (.0292188)	.1848316** (.0794019)
Quick ratio	.4507847* (.2455852)	1.444762** (.6673762)
Interest rate	.8755091* (.4850992)	-.1332961 (1.318254)
Inflation rate	-.0335079 (.1474157)	-1.224242*** (.400601)
GDP growth	-.0247889 (0.1897199)	.7465215 (.5155626)
Unemployment rate	-.2757392** (0.1135127)	-.1832156 (.3084701)

ROA Equation: $R^2 = 0.5059(overall)$ $F(14,74) = 5.41, F\ prob. = 0.0000$
ROE Equation: $R^2 = 0.4307(overall)$ $F(14,74) = 4.00, F\ prob. = 0.0000.$
Source: Author's Computation

Again, the bias of inconsistent estimators reduces when *T* is greater than *N* in the LSDV model. The dummies represent the individual intercepts of the four banks. The LSDV estimation results in Table 2 do not show any significant differences with the fixed effects 'within' regression results in Table 1. All parameter estimates of the explanatory variables show virtually the same relationship in terms of sign and statistical significance for both ROA and ROE equations. In the group of bank-specific variables, asset quality (assets to capital employed ratio), management quality (operating profits per employee ratio) and liquidity (quick ratio) have a positive relationship with both measures of bank performance while the leverage ratio (a measure of capital adequacy) shows a negative relationship with ROA and a positive relationship with ROE. Among the macroeconomic variables, interest rates have a positive relationship with ROA, the rate of inflation has a negative relationship with ROE, and the rate of unemployment has a negative relationship with ROA. The rest of the macroeconomic variables are statistically insignificant. Most interestingly, Table 2 shows that none of the dummy variables is statistically significant, indicating that the banks do not exhibit any significant specific effects. The implication of this finding is that the same pattern of behaviour between the explanatory variables and the dependent variable can be generalised among the four banks.

Table 3 presents GMM and SYS-GMM estimation results, which are expected to yield unbiased, efficient and consistent estimators. The two take into consideration the dynamic nature of the model, thus giving a more realistic result than the static models. The results are to a great degree consistent with the earlier findings. All bank specific variables have the same signs as in the previous results. There are, however, slight differences in the statistical significance of these variables. Except for the quick ratio (in the ROA equation) and the current asset (in the ROE equation), all bank-specific variables are statistically significant in the dynamic panel model. Among the macroeconomic variables, statistical significance is observed in the rate of unemployment (in the ROA equation, only in the GMM estimation), the rate of interest (in the ROE equation for both GMM and SYSTEM-GMM estimations), and GDP growth (in the ROE equation, only in the SYSTEM-GMM estimations).

Table 3: Generalised Moment Method and SYS-GMM Estimation for Return on Assets and Return on Equity

Variables	ROA Equation		ROE Equation	
	GMM Estimation	SYSTEM-GMM Estimation	GMM Estimation	SYSTEM-GMM Estimation
Constant	13.97927*** (5.355876)	8.112343** (3.458814)	23.09164 (15.34904)	25.52291** (11.00532)
ROA(-1)	.3806348** (.1746709)	.4712608*** (.154786)		
ROE(-1)			.0074924 (.1052145)	-.0012189 (.0836233)
Asset to capital employed ratio	.9923976*** (.3385742)	.9895927*** (.3117071)	2.276475** (.9540662)	2.387302*** (.7234209)
Leverage factor	-.2596208** (.1222787)	-.1720316** (.0871988)	.4454534** (.3008702)	.6043338** (.2208526)
Operating profit to employee ratio	.0887476*** (.0272805)	.0561961** (.0222638)	.2001826** (.0772529)	.1688227*** (.0643063)
Quick ratio	.31186 (.2367137)	.1016377 (.197603)	1.568544** (.6408263)	1.477111** (.599755)
Interest rate	.2960944 (.5307854)	.4943803 (.4727722)	-.1244211*** (1.266219)	-.8444888*** (1.07851)
Inflation rate	-.0515282 (.1355059)	.0073025 (.1294963)	-1.284638 (.3846099)	-1.214805 (.3226497)
GDP growth	.0053493 (.1734604)	.1465187 (.1432228)	.6830466 (.5287968)	.7486893* (.4176803)
Unemployment	-.1861095* (.1112589)	-.1702735 (.1040313)	-.1202481 (.3028209)	-.1230164 (.289527)

Return on Assets Equation: $GMM\ Estimation$: $Wald\ Chi2(11) = 52.61, \quad Prob > Chi2 = 0.0000$
$SYSTEM - GMM\ Estimation$: $Wald\ Chi2(11) = 78.36, \quad Prob > Chi2 = 0.0000$
Return on Equity Equation: $GMM\ Estimation$: $Wald\ Chi2(11) = 45.07, \quad Prob > Chi2 = 0.0000$
$SYSTEM - GMM\ Estimation$: $Wald\ Chi2(11) = 67.53, \quad Prob > Chi2 = 0.0000$
Source: Author's Computation

6. SUMMARY AND CONCLUSION

Due to the intangible nature of banking products and services, it is not easy to effectively measure the efficiency of banks and their performance in general. This has, to a large extent, necessitated the use of different methods and models (statistical tools and financial ratios) in the measurement of bank performance. Amongst the most commonly used methods/models of bank performance measurement or evaluation, are the AHP and DEA. This study adopts an alternative measure of bank performance, the CAMEL model, which involves the use of financial ratios in measuring bank performance. The model combines bank-specific variables with macroeconomic (external) variables in the measurement of bank performance in South African. This is consistent with the literature that maintains that factors that influence bank performance and financial stability emanate from bank-specific factors and macro-environmental factors (Al-Tamimi, 2010; Athanasoglou et al., 2005). We carry out our estimations using four different approaches, namely, fixed effects (within) regression, LSDV model, GMM, and SYSTEM-GMM. All these approaches show consistent results.

The study finds that all bank-specific variables are statistically significant at conventional levels for both return on assets (ROA) and return on equity (ROE) equations. Specifically, the study shows that asset quality (measured by assets to capital employed ratio), management quality (measured by operating profits per employee ratio), and liquidity (measured by quick ratio) have a positive relationship with both measures of bank performance, which is consistent with a priori theoretical expectations. However, the leverage ratio, which is a measure of capital adequacy, shows a surprising significant negative relationship with ROA, whereas its relationship with ROE is significant and positive as expected. Except for interest rates (in the ROA equation), unemployment rate (in the ROA equation), and the rate of inflation (in the ROE equation), the rest of the macroeconomic variables are statistically insignificant. The study observes a positive relationship between interest rates and bank performance; and a negative relationship between bank performance, on the one hand, and the rates of unemployment and interest rates on the other. The results are consistent in all models except for the quick ratio (in the ROA equation), which is

insignificant in both the GMM and SYSTEM-GMM equations; and the rate of unemployment (which is insignificant in the ROA equation, only in the GMM estimation), interest rates (which is insignificant in the ROE equation for both GMM and SYSTEM-GMM estimations), and growth of gross domestic product (which is insignificant in the ROE equation, only in the SYSTEM-GMM estimations).

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