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EFFECT OF CAPITAL AND LIQUIDITY MANAGEMENT ON PROFITABILITY OF MAJOR SOUTH AFRICAN BANKS

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ABSTRACT

The regulatory reform for banks has been converted from post-crisis lip service into implementation actions, although the effect of the new rules on profitability is driving the financial sector to make changes to its business model. The study analysed the effect of capital and liquidity management on profitability in five leading South African banks during the period 2004 to 2014. A co-integration panel analysis was used to test for the effect of the liquidity indicators on profitability. The capital ratio and quick ratio were used as liquidity indicators, whilst return on assets (ROA) and return on equity (ROE) were used as proxies for measuring profitability. The empirical results showed that there is no long-run relationship between banks' profitability and liquidity and capital management. For the short-run, capital ratio was found to have significant positive effect on banks' profitability; whereas liquidity does not have an effect on banks' profitability. This study also revealed that the proxy used as measurements of profitability tends to affect the relationship between banks' profitability and liquidity and capital management. It was concluded that capital adequacy is considered to be the most effective tool to ensure the safety and soundness of South African financial institutions.

INTRODUCTION

Banks act as intermediaries in the economy by accepting financial deposits from individuals, businesses, financial institutions, and sovereigns with surplus savings. Banks then advance these deposits in the form of credit loans to individuals, financial institutions, investors and governments that need the capital for various investment and spending purposes. Investment activities by banks are hardly deprived of problems and risks, since banks seek to maximise expected profits on their investments, which requires optimal exploitation of resources available to banks. Since banks are required to meet the liquidity needs of their clients and depositors, they thus are expected at any moment to deliver on those obligations (Alshatti, 2015). Banks regularly keep a large amount of short-term liabilities, which can be withdrawn by the public when their confidence in the bank declines. Depositors and its clients may question the soundness and creditability of the bank, if it fails to meet their immediate liquidity needs (Kaufman, 2004).

In 1974, the central bank governors of the G10 countries established the Basel Committee on Banking Supervision (BCBS). The BCBS was established as a committee to set banking regulations and supervisory practices; this was after the mid-1974 financial turmoil (BCBS, 2010). With the attention drawn to the banking industry by the turmoil, the committee was required to provide a channel for occasional cooperation on banking supervisory and practices between its member countries (Dickason, 2014). Basel Accords are designed as rules that govern the operations of the global

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financial system, with the intention to protect banks from risky financial events. However, these rules have had some negative effect on banks' operating models and profit opportunities.

South Africa's financial services sector, backed by a sound regulatory and legal framework, is sophisticated, boasting dozens of domestic and foreign institutions providing a full range of services (SARB, 2015). The South African Reserve Bank closely monitors and considers developments on the international regulatory and supervisory fronts in an on-going effort to promote the soundness of the domestic banking industry through the effective and efficient application of international regulatory and supervisory standards (SARB, 2015). This involves following relevant resolutions such as the Basel Accords.

A changing environment in the banking industry introduced different challenges that led to the evolvement of the Basel Accords over time and the 2007/2009 financial crisis has been linked to the introduction of Basel III. The Accords introduced various requirements, which tend to have an effect on banks and the global financial system. These changes increased pro-cyclical lending through capital requirements, which actually make banks take on more risk (Claessens *et al*., 2010). Furthermore, the regulations increased the lending rates of banks, which impacts on the overall profitability of banks. Thus, there is continuous changes on the effect of the capital and liquidity on banks' profitability, especially in the South African context where Banks such as African Bank have been faced with risk of liquidation. Thus, this study aims to investigate the effect of capital and liquidity management on profitability in the South African banking industry.

LITERATURE REVIEW

Capital and liquidity management framework under Basel Accords

The banking industry is highly risky and, therefore, is regulated vastly by the government and central bank in most countries. As a result, regulatory agencies play a significant role in helping to maintain control over banks because of their performance is vital for economic functions. Banking regulators aim to generate a framework that is both appropriate and effective for banks and banks' risk management actions (Rose and Hudgins, 2008). The magnitude and amount of risk on the bank's assets are the most significant components of the banking regulation. A regulatory framework, referred to as Basel Accords, covers the foundation of the global risk-based banking regulation. These Accords are rules designed to provide banks with various means of protection against numerous risk types, such as risks associated with capital requirements and liquidity management (Rose and Hudgins, 2008).

The first Basel Accord, referred to as Basel I, laid forth rules for strong capital positions to be kept aside by banks in order to decrease inequality across all jurisdictions in the world and adjust rapidly to the evolvement of financial services (BCBS, 2014). This involved plans to increase capital ratios that then were seen to be extremely low. Thus, the Basel I document was developed to assist banks sustaining minimum capital requirements and reducing the credit risk, which was seen as the banking industry's primary risk (Lounsbury, 2010). However, Basel I Accord did not address challenges associated with capital structure. This led to a proposition of a new framework with a revised capital framework. This new framework is the Basel II Accord initiated to rectify deficiencies from the Basel I Accord (BCBS, 2014). It put wider focus on credit risk mitigation and highlighted the sensitivity of capital charges and operational risk to capital requirements (Bessis, 2010). A certain amount of dependence was employed on the Basel II framework to regulate the minimum amount of capital required, as established from techniques used to measure risk.

It was expected that Basel II could achieve the set objectives on liquidity and capital management in order to avoid instability in the financial sector (Rose and Hudgins, 2008). However, this was not the

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case as the 2007/2009 financial crisis showed that the banking sector had redundant leverage and insufficient liquidity buffers (BCBS, 2014; Taylor 2008). Throughout the crisis period, the market lost confidence in banking institutions' liquidity and solvency management (Claessens *et al.*, 2010). This resulted in the banking industry's weaknesses being transmitted to the entire financial system and thereafter the real economy, leading to global contraction of liquidity and availability of credit (BCBS, 2010). Thus, there was an apparent need for the fundamental strengthening of the Basel II framework in order to deal with challenges associated with liquidity and capital management.

Standards and regulations of Basel II were revised under a new framework known as Basel II.V. This revision was proposed after the 2007/2009 financial crisis to rectify the market risk exposure on the trading books of banks. Basel II.V aimed at strengthening the banks' ability to tolerate risk, through increasing their capital requirements (Perez, 2014). Various financial institutions used internal models for market risk under Basel II and Basel II.V, which led to inconsistencies as the institutions would treat the same risk in different ways (S&P, 2012). Thus, Basel III was introduced with the intention of strengthening the definition of capital requirement. This Basel III reinforces stricter and more practical capital requirements with the intention to have a safer financial system. It updated the recommendations on maturity, leverage, liquidity and capital requirements in order to reduce the incentives associated with high-risk taking (Auboin, 2010). The capital regulation, in Basel III, serves to maintain public confidence, limit the risk of failures and cap government losses ascending from deposit insurance claims (Altman, 2005). The reviews of these Basel Accords clearly emphasise the role of factors such as capital structure, leverage and liquidity management in determining banks' performance.

Empirical studies on capital and liquidity management and banks' profitability

Empirical studies on how capital and liquidity management affect banks' profitability focused on the evaluation of Basel Accords (Zicchino, 2006) or evaluated capital and liquidity management among the determinants of banks' profitability (Beltratti and Paladino, 2015; Lee and Hsieh, 2013; Mingo, 1975). Zicchino (2006) assessed the role capital-to-asset ratio, under the Basel II system, as a key contributor to pro-cyclical lending during the implementation of the regulatory reform. He proposed a model that paves the way in which banks can maximise their net worth by aligning the level of deposits, loan return, loan demand, investment in trade securities and capital structure with cash-flow constraints, financial constraints and balance-sheet identity. This is model seems to be contrary to the view by Blum (1999) that banks' riskiness is heightened by capital adequacy ratios. Blum (1999) argues that increasing equity is expensive in a temporal model where the worth of capital is higher tomorrow than today and hence; he argued that the only possible way to increase equity tomorrow is to increase risk today. This reasoning is based on the fact that, under binding regulation, tomorrow's equity is of more value to the bank than today's equity. Elliott *et al.* (2012), who analysed the effects of stricter capital requirements on lending rates and discovered that the additional costs of financing new capital requirements tend to be above the regulatory requirements, confirmed this.

In analysing the effect of capital management on banks' profitability, an early study by Mingo (1975) found that a decline in banks' capital portions tends to lead to increase in profitability. This was supported by recent studies (Agyei and Yeboah, 2011; Beltratti and Paladino, 2015; Yahaya and Bala, 2015; Yeboah and Yeboah, 2014), which found that capital structure and bank leverage are among the key determinants of banks' profitability. Additionally, studies by Lee and Hsieh (2013) and Saona (2016) found a significant relationship between capital ratio and banks' profitability. However, their findings showed that such relationship capital ratio and profitability tends be negative when commercial banks are considered. These findings, by Alshatti (2015); Lee and Hsieh (2013) and Saona (2016), justify the main rationale behind the framework on regulations of capital management outlined by all Basil Accords. For example, evidence of a negative relationship between capital ratio and banks' profitability may motivate banks to keep less capital (Behn *et al.*, 2014) if there were no regulations on capital management.

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For liquidity management, Adebayo *et al*. (2011) studied the effect of liquidity on banks' profitability in Nigerian commercial banks and found that there was a significant relationship between liquidity and banks' profitability. Saleem and Rehman (2011) also analysed the role of liquidity and profitability in banks performance and concluded that liquidity and profitability ratios have significant effects on the financial position of banks. These studies provided empirical evidence supporting a positive relationship between liquidity and banks' profitability. Similarly, Alshatti (2015), Maqsood, *et al.* (2016), and Yahaya and Bala (2015) found that liquidity in commercial banks is influenced by profitability and at the same time, profitability levels are influenced by the banks' liquidity. Contrarily, Olarewaju and Adeyemi (2015) found that there was no causal relationship between liquidity and profitability in most of Nigerian Deposit Money Banks. This suggests that optimal use of liquidity is required to improve banks' profitability.

In the South African context, Marozva (2015) analysed relationship between liquidity and bank performance and found a short-run relationship between liquidity and banks performance. However, Marozva (2015) did not find evidence supporting a long-run relationship between liquidity and banks' performance. Therefore, he recommended a further investigation on this topic with the consideration of capital management. Hence, this study investigated the effect of liquidity and capital management on banks' profitability in South Africa, especially when different measures of profitability are considered.

METHODOLOGY

Data and sample selection

This study applied the quantitative approach to investigate the impact of liquidity management on banks' profitability in South Africa. The sample period consists of 50 annual data from five South African banks for the period 2004-2014. This means that a total of 50 (5 x 10) observations was used. The sample period was selected because a ten-year period provides sufficient room for analysis and three Basel Accords were proposed and implemented during the period. A sample of five major banks, namely Barclays Africa, Investec, FirstRand, Nedbank and Standard Bank were used because they are the leading banks in South Africa and have significant influence on the country's financial sector. Variables used in the study include capital and quick ratios as measures of liquidity and return on assets (ROA) and return on equity (ROE) as measures of profitability. The data for all variables was obtained from McGregor INETBFA database.

Research Models

The data comprises of both time series and cross-sectional elements, which is known as a panel data (Brooks, 2014). A starting point in analysing panel data is the estimation of a panel regression. When estimating a panel regression, it is important to determine which effects apply to the panel data. It could either be a pooled regression, which would effectively assume that the intercepts are the same for each bank and for each year. Alternatively, it could be a fixed effect model (FEM) which assumes fixed effects for each bank and/or time-fixed effects and lastly, it could be a random effect model (REM), which assumes the effects are random along either the cross-sectional or the time dimensions (Brooks, 2014).

The following two models represent the research models:

$$Y_{1it} = a_0 + a_1 x_{1it} + a_2 x_{2it} + e_{1it} \quad (1)$$

$$Y_{2it} = b_0 + b_1 x_{1it} + b_2 x_{2it} + e_{2it} \quad (2)$$

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Where: Y_{1it} represents the profitability for bank i at time t, measured by ROA;
Y_{2it} represents the profitability for bank i at time t, measured by ROE;
x_{1it} is the Capital ratio $\left(\frac{\text{Capital}}{\text{Total assets}}\right)$ for bank i at time t;
x_2it is the Quick ratio $\left(\frac{\text{Current Assets}-\text{Inventory}}{\text{Current Liabilities}}\right)$ for bank i at time t;;
a_1 and a_2 represent the coefficients of the ROA equation;
b_1 and b_2 represent the coefficients in the ROE equation;
a_0 and b_0 represent the constant in ROA and RO equations, respectively; and
e_1 and e_2 are the error terms in in ROA and RO equations, respectively.

The first equation estimates the effect liquidity and capital ratio on profitability when ROA is used as a proxy for profitability; while the second equation estimates the same effect when ROE is used as a proxy for profitability.

Panel root unit test and co-integration

In estimating the model, the following steps were taken. First, the panel unit root test was conducted to determine whether the variables are stationary or non-stationary. Non-stationary variables can result in a spurious regression (Brook, 2014). Results acquired from non-stationary data may exhibit a relationship between variables, where an actual relationship does not exist. The panel unit root tests used to determine whether data are stationary or non-stationary include Levin, Lin and Chu t*; Im, Pesaran and Shin W-stat; ADF- Fisher Chi-square and this study compared results from these tests. In case these tests reveal that variables are stationary or I(0), a normal panel regression can be estimated (Gujarati and Porter, 2008). However, if variables are found to be non-stationary or I(1), a co-integration test is conducted to see if the linear combination of these variables is stationary.

A panel co-integration model is used to determine whether the variables tested are integrated, as well as to conclude whether there are long-run or short-run effects in the model. Most of the panel co-integration work so far has relied upon a generalisation of the single equation methods of the Engle-Granger type following the pioneering work by Pedroni in 1994 and 2004 (Brooks, 2014). The Pedroni (Engle Granger) test is a less restrictive method of testing for co-integration and thus, is used in this study to conduct the panel co-integration tests. The presence of co-integration implies the long-run relationship between the variables and the error correction model is then estimated. However, if there is no co-integration between variables, then panel regressions in Equation 1 and 2 are estimated at first differences. This is done to transform non-stationary data into stationary data in order to get consistent and reliable results (Iordanova, 2015).

RESULTS AND INTERPRETATION

Results of panel unit root tests

Using the aforementioned three unit root tests the following hypotheses:

- Null hypothesis (H_0): Panel data has unit root
- Alternative hypothesis (H_1): Panel data has no unit root (stationary)

The unit root results are summarised in Table 1. The panel unit root test for ROA reveals that at level, the Levin, Lin and Chu t* method's p-value is less than 0.05, therefore, the null hypothesis is rejected. The Im, Pesaran and Shin W-stat method and ADF- Fisher Chi-square method p-values are greater than 5 percent, meaning the null hypothesis cannot be rejected. With the mixed results, it can be concluded by choosing the majority result. Therefore, the null hypothesis cannot be rejected at 0.05 significance level, implying that that ROA has a unit root at level and thus, is not stationary. Leading to further tests for stationarity at first difference, all three methods show that the null hypothesis is

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rejected and ROA is found to be stationary at first difference or I(1). ROE is not at level but it becomes stationary at first difference; meaning that it is I(1).

Unit root test for capital ratio, part B of Table 1, reveals that at level, the Levin, Lin and Chu t* method's p-value is less than 0.05 suggesting that H_0 null hypothesis for unit root is rejected. The Im, Pesaran and Shin W-stat method and ADF- Fisher chi-square method p-values are greater than 0.05, meaning the H_0 cannot be the rejected. With the mixed results, it could be concluded by choosing the majority result, which shows that capital ratio is not stationary at level. At first difference, all methods show that capital ratio is stationary; meaning that it is I(1). The results of the panel unit root test for quick ratio reveal that quick ratio is not stationary at level but becomes stationary at first difference; meaning that it is also I(1). Thus, all variables are I(1), meaning that a co-integration test is needed.

TABLE 1
PANEL UNIT ROOT TEST RESULTS

Part A	**ROA**		**ROE**	
Method	**Level** *P-value*	**1st Difference** *P-value*	**Level** *P-value*	**1st Difference** *P-value*
Levin, Lin and Chu t*	0.0007	0.0000	0.1207	0.0000
Im, Pesaran and Shin W-stat	0.0950	0.0003	0.2976	0.0032
ADF - Fisher Chi-square	0.1141	0.0004	0.3612	0.0036
Part B	**Capital ratio**		**Liquidity Ratio**	
Method	Level *P-value*	1st Difference *P-value*	Level *P-value*	1st Difference *P-value*
Levin, Lin and Chu t*	0.0039	0.0000	0.5548	0.0000
Im, Pesaran and Shin W-stat	0.1430	0.0003	0.8616	0.0003
ADF - Fisher Chi-square	0.1377	0.0004	0.6754	0.0006

Analysis of the long-run relationship

Since variable are I(1), the co-integration test was used to test for the existence of the long-run relationship. The hypothesis test for co-integration is set as follows:

- H_0: there is no co-integration between profitability and capital and liquidity ratios.
- H_1: there is co-integration between profitability and capital and liquidity ratios.

TABLE 2
PEDRONI CO-INTEGRATION RESULTS OF ROA EQUATION

Method	**No deterministic trend**	**With intercept and trend**	**Without intercept and trend**
	P-value	*P-value*	*P-value*
Panel v-statistic	0.8266	0.8950	0.6840
Panel rho-statistic	0.9297	0.9945	0.9015
Panel ADF-statistic	0.7334	0.5225	0.8155
Panel PP-statistic	0.7395	0.5200	0.8295

The results in Table 2 of the Pedroni co-integration test, for ROA equation, show that there is no co-integration among the variables. With p-values of panel v-statistic, panel rho-statistic, panel ADF-statistic and panel PP-statistic methods all greater than 0.05, the H_0 for no co-integration cannot be rejected. Therefore, it is concluded that there is no long-run relationship between profitability, capital ratio and quick ratio. When the ROE was used as a measure of profitability, the results did not change; there was still no co-integrating relationship. This means that there may exist only short-run relationships between these ratios and profitability and it can be captured as a panel regression of first

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differenced series. This finding is similar to that of Marozva (2015) that there is long-run relationship between liquidity and profitability in the South African banking sector.

Analysis of short-run relationships

The absence of a co-integrating relationship implies that panel regressions can be used to estimate the short-run effect of liquidity and capital ratio on profitability. Panel regressions involve three different models, namely pooled regression, fixed effects and random effects, known as the error components model (ECM). Results of these three models are in Table 3 and further tests were conducted to identify the best model that fit the data. First, a redundant fixed effects test was run to determine whether fixed regression is appropriate over the pooled regression. The results, for both cross section and time effects, supported the fixed effects model. This called for a second stage of using the Hausman test to determine whether the fixed effects model will be appropriate over the random effects model. Results for the Hausman test (not reported here) showed, in ROA equation, that the random effects model is appropriate over fixed effects model.

The result of the random effects model (ECM) were tested for autocorrelation and multicollinearity[1] and interpreted thereafter. The results in Table 3 reveal that the coefficient of capital ratio and quick ratio at first difference is not statistically significant on ROA at the 0.05 significance level and this can be seen from their respective p-values. Capital ratio at first difference affects the banks' profitability positively but the effect is not significant, while quick ratio depicts a non-significant negative relationship on their profitability. Thus, liquidity and capital ratios have no significant effect on profitability when return on asset is used as a proxy for profitability.

TABLE 3
PANEL REGRESSION ANALYSIS FOR ROA

Variables	**Pooled regression**		**Fixed effect**		**Random effect**	
	Coefficients	*P-value*	*Coefficients*	*P-value*	*Coefficients*	*P-value*
C	-9.58E-05	0.9001	-9.53E-05	0.8774	-9.96E-05	0.9385
D (Capital ratio)	0.001021	0.1024	0.000553	0.3331	0.000709	0.1810
D (Quick ratio)	-0.002256	0.5427	-0.004569	0.2162	-0.003303	0.3196

Table 4 presents the three panel regressions for ROE equation. As done with the ROA equation, redundant fixed effects and Hausman tests were used to determine the appropriate model. Redundant fixed effects test, for both cross section and time effects, supported the fixed effects model over a polled regression. The Hausman test supported the random effects model over the fixed effects model. Thus, the results of the random effects model were further analysed after testing for autocorrelation and multicollinearity[2]. Table 4, shows that the coefficient of capital ratio is statistically significant at the 0.01 significance level (p-value < 0.01); capital ratio has a significant effect on banks' profitability. The coefficient of quick ratio is positive but it is not statistically significant; liquidity does not affect the banks' profitability. Thus, when ROE is used a proxy for profitability the capital ratio becomes a significant determinant of banks' profitability.

[1]Variance inflation factor (VIF) and autocorrelation test showed that there was no presence of multicollinearity and serial correlation in the random effects model in Table 4.
[2]Variance inflation factor (VIF) and autocorrelation test showed that there was no presence of multicollinearity and serial correlation in the random effects model in Table 5.

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TABLE 4
PANEL REGRESSION ANALYSIS FOR ROE

Variables	Pooled regression		Fixed effect		Random effect	
	Coefficients	*P-value*	*Coefficients*	*P-value*	*Coefficients*	*P-value*
C	-0.002253	0.7392	-0.002442	0.6846	-0.002385	0.7953
Capital ratio	0.019025	0.0010	0.014401	0.0128	0.016546	0.0020
Quick ratio	0.015930	0.6277	0.016129	0.6503	0.019710	0.5327

DISCUSSION OF RESULTS

The role of liquid and capital management has been at the centre of the development of Basal Accords frameworks developed to minimise risks associated bank leverage and capital structure. The study analysed the effects of capital and liquidity management on the profitability of five South African banks for the period 2004 to 2014. The debate about the appropriate measure of profitability led to the use of ROA and ROE as the two common measures profitability. Findings show that these two measures of profitability have a significant effect on the results, where the use of ROE as proxy for profitability seems to produce significant results. This study found no evidence supporting a long-run relationship between bank profitability and the liquidity and capital ratios. This confirms Marozva's (2015) findings that liquidity has no long-run effect on banks' performance in South Africa. However, this funding is contrary to studies by Adebayo *et al*. (2011), and Beltratti and Paladino (2015) which found that liquidity and capital management have a long-run relationship effect on banks' profitability.

Short-run results show that the proxy used measure of profitability has an effect on results as the capital ratio became significant when ROE is used as a proxy for profitability. This is in line with other studies (Agyei and Yeboah, 2011; Beltratti and Paladino, 2015; Yahaya and Bala, 2015; Yeboah and Yeboah, 2014) which found that capital structure and bank leverage are among the key determinants of banks' profitability. This points to the importance of the role of equity in balancing the source and the use of funds in order to maximise banks' profitability. Thus, these results emphasise the importance of separating how the change in a bank's loan demand from the change in loan supply affect banks' profitability. Banks that are capital constrained are normally unwilling or incapable to obtain new equity in unfavourable times and are forced to deleverage by reducing lending, hence exacerbating the initial downturn (Behn *et al*., 2014).

Furthermore, this study found that an increase in capital ratio led to a rise in profitability when ROE is used to measure profitability; while it tends to decrease profitability when ROA is used to measure profitability. However, on both occasions, the coefficient for liquidity ratio was not significant, meaning that this study found no empirical evidence supporting the role of liquidity in promoting banks' performance in South Africa. This is in line with the study by Olarewaju and Adeyemi (2015) who found that there was no short-run relationship between liquidity and profitability in most of Nigerian Deposit Money Banks. However, this finding is contrary to many studies (Adebayo *et al*., 2011; Alshatti 2015, Maqsood, *et al.*, 2016; Yahaya and Bala, 2015), which found that in commercial banks profitability levels are influenced by the banks' liquidity. This suggests that optimal use of liquidity is required to improve banks' profitability.

CONCLUSIONS

The regulatory reform for banks has been converted from proposals into implementation actions, although the effect of the new regulations on profitability is driving the financial sector to make the necessary changes to its business model. South Africa is not exempt from the global movement and there is pressure on domestic banks, leading to the banks reconsidering expansions into the rest of Africa. The regulation reforms have made it difficult for numerous banks to make satisfactory profits.

South Africa, as a participant in the Basel III global reforms to reinforce banking regulation and supervision, is one of the many nations implementing the new stricter capital and liquidity requirements. Banks in South Africa are known to be capitalised well and are capable to meet Basel's capital requirements. However, the new requirements imply that banks seeking to expand into other countries will be required to hold adequate funds for every country in which they operate.

The study analysed the effect of liquidity and capital management on bank profitability during the period of implementation of three different Basel Accords. Findings showed that capital management is a key determinant of banks' performance in South Africa. This means that capital adequacy is considered to be the most effective tool to ensure the safety and soundness of South African financial institutions. The empirical findings also showed that there is no significant relationship between liquidity indicators and profitability in the leading South African banks. This suggests that South African banks should revisit their liquidity management in order to establish the optimal liquidity required to improve profitability. These findings concur with on-going results that the proxy used to measure profitability affects the results. This means that future studies may explore the relevance of the models used in this topic and possibly consider the use of more value creation measures and inclusion of other macroeconomic control variables to test the effect of liquidity management on profitability in the South African context.

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