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MARKET REACTION TO THE IMPLEMENTATION OF BASEL CAPITAL IN SOUTH AFRICAN BANKS: EVENT STUDY APPROACH

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ABSTRACT

This study investigated stock market reaction and the effect of the implementation of Basel II and Basel III on stock returns of South African banks. In achieving this aim, this study focused on daily and annual data of six commercial banks from 3rd January 2004 to 31st December 2022. The event study methodology was employed to identify abnormal returns around the specified event dates. The effect of the changes in Basel capital requirements on stock returns was not uniform across the four events. The market reacted favourably to the implementation of the Basel II requirements in the country. There was a significantly negative market reaction to the subsequent full implementation of Basel III official. Finally, higher Basel capital requirements (CAR) was associated with lower bank stock returns. The findings implied that bank regulators increase capital to strengthen

the banking system but constrain the maximisation of shareholders' values.

Keywords: Basel capital requirements, abnormal returns, investor's perception, market reaction, event study methodology.

JEL Classification: G14, G21, G28.

INTRODUCTION

Bank regulations may probably be perceived negatively by the stock market, which could be reflected by a drop in the share prices of the regulated banks (Šútorová & Teplý, 2014). Banks are relevant to the economy's growth, but when they fail, it affects the financial sector and the entire economy (Chia et al., 2015). Banks tend to take excessive risk recklessly when they know that others will bear the consequences, such as governments using public funds to bail out distressed banks to curb systemic risk contagion that may adversely affect the economy (Tanda, 2015). The availability of government bailouts for banks' excessive risk-taking in times of distress promotes moral hazard problems (Oino, 2018; Tanda, 2015). Since banks do not entirely bear the cost of bank failures, bank regulators from different countries seek best practices to enhance their banking sector stability (Oino, 2018). Regulating banks is a controversial issue involving a trade-off between preventing bank failures, which can cause negative disturbances in economic growth, and enhancing bank stability, which may increase the cost of bank lending to customers. This increase in costs could potentially decrease bank lending, stifle bank innovations and, consequently, harm economic growth (Naceur & Kandil, 2009; Nkopane, 2017). Nevertheless, many banks' regulatory authorities adopt the Basel Accords as they are seen as acceptable international banking regulations that ensure the stability of their banking system (Dipatane, 2012).

The Basel Committee on Banking Supervision (BCBS) introduced the Basel Accords, and four Basel Accords have been introduced (Basel I, Basel II, Basel III and Basel IV). Still, only the first three have been implemented (Oyetade et al., 2021). The 1988 Basel I Accord introduced minimum capital ratios. The purpose of capital

requirements (hereafter CAR) introduced by BCBS is to protect bank depositors' funds against the risk of losses to reduce the probability of future bank failures (Oino, 2018). Basel I and Basel II CAR require banks to use debt and equity to achieve a minimum capital ratio.

The recent 2008 financial crisis revealed that banks suffered from weak capitalisation due to excessive risk-taking (Gabriel, 2016). This outcome led to the introduction of the Basel III Accord in 2010, which increased capital ratios from a minimum of 8 percent to 10 percent. It also increased the quality of capital ratios by eliminating the use of debt in the composition of the minimum capital ratios to restore stakeholders' confidence and reduce systemic risk (BCBS, 2017). Since the Basel III CAR relies on tangible equity, the requirements to achieve the minimum Basel III CAR stipulated by the BCBS is either by raising equity from the stock market or through retained profit (BCBS, 2017). The 2008 financial crisis negatively affected investors' confidence in selecting bank stocks. As a result, banks may find it difficult to attract new investors or retain old ones (Pinheiro et al., 2015) when trying to move from Basel II CAR to Basel III CAR. Furthermore, only a profitable bank can use retained profits to achieve a higher Basel III CAR within a regulatory stipulated transition period. This study investigates whether implementing Basel II and Basel III CAR impacts the market performance of South African banks' traded stocks.

The stock market provides a platform for companies to raise long-term capital to finance their firms. Moreover, it offers investment opportunities for individual and institutional investors to invest in firms for returns (Bruno et al., 2018). Share price reaction considerably influences how investors value a bank (Abreu & Gulamhussen, 2013). Nevertheless, investors' valuation of a bank also depends strongly on the level of development in the country where the banks are located. Banks located in countries with high levels of development and strong regulations may experience lower abnormal returns (Bruno et al., 2018). Many African banks have yet to implement Basel II and Basel III regulations to stabilise their banking system. Amongst the African countries, South African banks fully implemented Basel II officially in 2008 and Basel III CAR officially in 2013 (Nkopane, 2017). The South African stock exchange market is the largest and leading in Africa (Statista, 2023). Public information on banks in South Africa is available. For these reasons, this study focuses on South African

banks. It presents the first empirical analysis of how the South African stock market responded to implementing Basel II and Basel III CAR and its effects on bank stock returns.

A series of events led to the adoption of Basel requirements in South Africa. The South African banking sector experienced the collapse of more than 12 banks between 2002 and 2003 and the de-registration of 22 more banks by the South African Reserve Bank (SARB) in the same period due to non-performing loans, unsecured lending and quality of capital (Havemann, 2019). These bank failures led to consultation for the implementation of Basel II CAR. The SARB introduced a trial run referred to as a parallel run[1] of Basel II in 2007 before officially implementing the Basel II Accord in 2008. With the Basel II Accord, South African banks experienced improved regulatory capital, supervisory measures, risk measures and corporate governance standards (Soile-Balogun, 2017). Similar to Basel II, the SARB introduced a Basel III parallel run in 2012 before the official implementation of the Basel III CAR in 2013 (SARB, 2012). South African banks were not affected by the 2008 financial crisis. They were also already capitalised above the Basel II CAR, yet they were required to implement Basel III CAR because South Africa is one of the Basel member countries (Nkopane, 2017). Although many studies have been conducted on Basel CAR, there are relatively few studies on the effects on stock performance, especially from emerging countries. Under Basel III, banks have three options: reduce risk-weighted assets, increase retained earnings or raise equity (Oino, 2018). A higher Basel CAR's effect on a bank may depend on the capital shortfall that has to be raised in the stock market. In developed countries, capital shortfall is large due to clever ways to achieve minimum CAR, such as securitisation and debt capital, which was permissible under Basel II (Oino, 2018). Consequently, moving from Basel II to Basel III CAR may negatively impact banks not adequately capitalised under Basel II CAR. Therefore, this study aims to investigate the effects of Basel II and Basel III CAR on the stock performance of banks in South Africa, which is achieved with two objectives. The first objective examines the investors' perception of the Basel implementation period in South Africa. The second objective explores the effect of the Basel II and Basel III CAR on stock returns. These objectives are to determine whether adopting Basel II and Basel III impacts South African banks' stock performance.

The stock performance is measured using abnormal returns. The significance of abnormal returns (AR), either positive or negative, on bank stocks around the Basel implementation period, measures the investors' perception. A positive market reaction indicates that investors perceive a new Basel implementation would improve the performance of banks or otherwise negative reactions. Since the Basel CAR underwent a significant change after the 2008 financial crisis, tangible equity has been required as capital. As a result, investors' perceptions may influence banks' ability to raise equity to achieve higher Basel CAR. Therefore, the contribution of this study is that while the effect of Basel CAR may not be immediate on bank profitability, it would be interesting to see the immediate effect of changes in Basel regulatory capital on bank stocks in South Africa. The study results offer key insights into bank regulators, banks and investors' decisions on the implication of higher Basel CAR on stock returns in the African context.

LITERATURE REVIEW

According to Fama (1970, p. 1), the efficient market hypothesis (EMH) is that "A market is efficient when an asset price reflects new and available information instantaneously, and all available profit opportunities are exploited" (Muzindutsi, 2018). In a perfect market, where symmetric information exists between banks and their investors (Berger, 1995), the investors' response to the implementation of Basel CAR should reflect immediately in the banks' stock prices. In an efficient market state, a bank's stock price reflects investors' perception of the new Basel regulations' impact on the current and future earnings potentials of banks. When a new Basel is implemented and perceived as a good regulation, the market reflects a positive reaction through increased stock prices. This situation signals the investors' perceptions about their confidence in the new Basel regulations for the banking industry's stability. When a market is inefficient, the implementation of Basel is not reflected quickly in the prices of bank stocks. It takes time for the market to adjust to the information.

Banks are incorporated firms, and one of the firms' strategic goals is maximising shareholders' wealth (Bourke, 1989). Therefore, profits are essential. Moving from Basel II CAR to Basel III CAR requires more equity or retained earnings. Equity capital is expensive and scarce.

Some banks may choose to achieve Basel III CAR using retained earnings to avoid the cost on banks and diluted earnings (Cohen & Scatigna, 2016; Oino, 2018). Banks may be unwilling to achieve Basel III CAR using new shares because issuing new shares may lead to share dilution. On the one hand, an investor may be unwilling to invest in bank stocks due to stricter regulation changes, which may affect investors' ability to earn returns on their investment through a dividend or profit from an increasing share price over time. On the other hand, compliance with Basel III CAR aims to reduce the risk of bankruptcy with debt elimination. Consequently, the implementation of Basel III CAR may have either a positive or a negative impact on the stock performance of banks depending on bank size and existing capital level.

A higher Basel CAR affects banks differently across jurisdictions. It may influence bank operations, such as increasing regulatory compliance costs and constraining bank lending (Nkopane, 2017). This situation may negatively impact bank profits, thus potentially decelerating stock prices and volumes (Bruno et al., 2018). Some studies, such as Gabriel (2016), Le et al. (2020) and Oino (2018) using accounting profits, found that higher Basel III CAR increased capital levels and profitability of banks. There is empirical evidence from African countries (Obamuyi, 2013) with similar positive findings. Contrarily, studies from African countries, such as Sadien (2017), used sample representative South African banks to model the impact of Basel III CAR on bank performance. Its findings indicated that a 2 percent increase in equity under Basel III CAR would decline return on equity (ROE) by 0.29 percent. Therefore, no consensus can be found in the empirical literature concerning the impact of higher CAR on the performance of banks.

Many existing studies apply accounting-based performance measures, such as ROE and return on asset, to determine the impact of Basel CAR on the performance of banks. Conversely, accounting-based studies (Gabriel, 2016; Osborne et al., 2012) did not examine the stock market reaction to implementing new Basel requirements. The stock market reaction indicates investors' perception of the expected effect of Basel CAR on bank profitability. Investors' perception drives share prices up or down, which assists banks in raising additional shares in the stock market to achieve minimum CAR (Chia et al., 2015). Amidst the news on Basel regulations, the intentions of regulatory

authorities, and the effect of Basel regulations on macroeconomics and bank profitability, investors' perceptions are relevant to bank survival in emerging markets.

Compliance with higher Basel CAR has been known to reduce the number of banks in emerging markets, such as Brazil and Nigeria (Obamuyi, 2013; Pinheiro et al., 2015). Kenya speculates that implementing Basel III CAR may force banks to merge (Ombaka & Jagongo, 2018). Capital markets in emerging markets are probably not sufficiently liquid and deep enough to accommodate most banks to raise capital to achieve minimum CAR before the implementation dates. Nonetheless, in developed markets, banks are targets for mergers and acquisitions if they are well-capitalised (Valkanov & Kleimeier, 2007).

Market-based studies (Allen et al., 2018; Chia et al., 2015) use market data, such as market capitalisation, closing share price and price-to-book ratios. Market data will show the share returns in terms of value creation to shareholders following the implementation of the new Basel CAR, which should be reflected in banks' share prices within the observed period (Brown & Warner, 1985).

Studies in behavioural finance have shown that stocks exhibit a high response to the announcement of an initial event but later display reversals following the sequence of a news event (Subrahmanyam, 2008). The slow magnitude of response to subsequent announcements is due to the slow diffusion of news because investors do not find any evidence that the effect of the news on high-momentum stocks reverses later (Subrahmanyam, 2008). Market-based studies (Abreu & Gulamhussen, 2013; Schleicher & Walker, 1999) have shown that when earnings are anticipated, it is reflected in the share prices well before the announcement of an event, which could increase or decrease banks' share prices before the event date.

Very few studies (Chia et al., 2015; Lim & Yong, 2017; Šútorová & Teplý, 2014) have examined the effects of announcements of a new Basel CAR on banks' stock performance. The empirical evidence on the market reaction is generally mixed. Some studies (Abreu & Gulamhussen, 2013; Allen et al., 2018) did not find overwhelming market reaction to the announcement of the new Basel CAR. Others (Delaney, 2016; Schäfer et al., 2013; Šútorová & Teplý, 2014) indicate a negative and significant market reaction around the announcement

period (Bruno et al., 2018; Hoesli et al., 2020). The reason is that higher capital is perceived to reduce returns to shareholders even though it aims to reduce the probability of future bank failures (Bruno et al., 2018). Furthermore, a negative effect holds if banks have capital ratios below the minimum regulatory requirements at the event dates (Chia et al., 2015).

In a study of negative market reactions, Šútorová and Teplý (2014) examined whether the European Union (EU) market appreciated Basel III CAR from 2005 to 2011. Through a fixed effect model, their study found that a capital increase led to a negative change in the market capitalisation of banks. Similarly, Lim and Yong (2017) find a negative market reaction to the initial Basel II announcement for banks in the United States (US), EU, Australia and Canada. Schäfer et al. (2013) discovered that the market negatively reacted to the US national banking regulations reform announced following the 2008 financial crisis, which led to a significant decrease in equity prices of the country's commercial and investment banks. Knevels (2014), using a multivariate analysis, also found that Basel III announcements negatively affected the stock returns of EU banks. These negative reactions force banks to use retained earnings to achieve Basel III CAR rather than equity (Oino, 2018). According to Delaney's (2016) findings for US banks, the negative effect was due to regulatory uncertainty, especially amongst banks with low capital levels and high leverage. Delaney (2016) noticed significant negative AR using the event study approach for different sub-events preceding the Basel III regulatory capital implementation. Nevertheless, he found positive returns after the release of initial Basel III guidelines for US banks (Delaney, 2016).

In contrast, studies such as Abreu and Gulamhussen (2013) and Allen et al. (2018) observed no significant market reaction for US banks. Abreu and Gulamhussen (2013) did not find evidence of AR following the 11th November 2011 announcement of a new regulation to tackle moral hazard problems in the event of future financial crises. Their result suggested that the regulators identifying top big banks to regulate differently is not perceived in the market to solve moral hazard problems (Abreu & Gulamhussen, 2013). Similar findings by Allen et al. (2018) showed no significant market reaction to the US national banking reform to eliminate moral hazard problems. Still, they found a negative market reaction for smaller banks not subject to regulatory change (Allen et al., 2018).

Limited studies discovered a positive and significant market reaction to the Basel Accords. A positive market reaction implies that the investors perceive the introduction of Basel CAR as a strategic value addition for banks. For instance, Deschacht (2021), using the event study methodology, noticed a significantly positive AR for the final announcement of Basel III requirements for European banks. Furthermore, European banks with low capital ratios reacted positively to the announcement, as the market expected tighter regulations or a shorter transition period of the Basel III requirements (Deschacht, 2021).

In emerging markets, Chia et al. (2015) examined the market reaction to a new Basel III CAR on banks' performance in Malaysia's stock market. Their study used an event study methodology and observed a negative and significant market reaction to the announcement of Basel III CAR for seven Malaysian banks. It is less clear that Basel news significantly impacts stock returns in the financial markets. The lack of consensus in the reviewed literature proves this. One possible explanation for the lack of consensus is that many sub-events lead to the introduction of new Basel regulations. Researchers have to determine the relevant event to capture the market reaction to event dates of interest. Furthermore, limited studies focus on the effect of Basel CAR on the stock performance of banks. No study in Africa has examined the effect of Basel CAR on stock performance. Therefore, this study fills a gap in the literature by investigating the effects of Basel CAR changes on South African banks' stock performance.

METHODOLOGY

Data and Sampling

The cross-sectional data of daily closing stock prices of South African banks listed on the Johannesburg Stock Exchange (JSE) from 3rd January 2004 to 31st December 2022 were used to investigate investors' perceptions as a result of Basel II and Basel III implementation. The annual stock price data were from January 2004 to December 2022 to examine the long-run effect of Basel II and Basel III CAR on the stock returns of South African banks. The sample data period covered four event dates for which data were available. The sample period was selected prior to the introduction of the Basel II Accord in South Africa.

South Africa had a parallel run for Basel II and Basel III CAR before the official implementation dates. SARB introduced a parallel run for Basel II on 1st January 2007 to prepare the banks for the official Basel II implementation. Official Basel II was implemented on 1st January 2008. Similarly, SARB also had a parallel run for Basel III CAR on 1st January 2012 for the same reasons. Subsequently, Basel III was officially implemented on 1st January 2013. The stock market may react as early as the parallel-run dates. For these reasons, four event dates (parallel and official implementation dates) were considered within the sample period to achieve the first objective of investigating investors' perceptions. Only the official Basel II and Basel III CAR were examined to achieve the second objective on the long-run effect on stock performance.

Market data on bank daily and annual stock prices for South African banks and the JSE All Share Price Index (JSE ALSI) were sourced from the McGregor database. The annual financial data were sourced from the Bloomberg online database. The banks included in the sample were Absa, First National Bank, Nedbank, Investec, Standard and Capitec bank, whose shares are publicly traded on the JSE and are operating in the Republic of South Africa before the Basel II parallel run implementation date on 1st January 2007. The sample size represented over 90 percent of the total assets in the South African banking industry.

Estimation Window for Basel II and Basel III Event Dates

This study examined the behaviour of bank stock returns as a result of implementing a new Basel CAR. Most empirical studies in the finance literature using the event study approach focus on daily stock returns around the announcement dates of specific events of interest (Chia et al., 2015; Delaney, 2016). This study focused on daily stock returns around the implementation dates of Basel II and Basel III CAR, which aligns with studies such as Allen et al. (2018) and Bhana (1995). The market reaction to the implementation of Basel II and Basel III CAR was assessed to identify the perception of the effectiveness of the Basel regulations in South Africa.

The selection of the event date and event window is the basis of the event study. Hoesli et al. (2020) suggested identifying "the

true regulatory event" and not when the Basel Accord is officially introduced. The Basel regulations are initially for the G10 countries, for the harmonisation of banking regulations amongst these countries. Basel membership was later extended to other countries. South Africa became a Basel member in 2008. Prior to that, the financial market in South Africa did not react to the news of the new Basel Accord when it was first announced. For instance, Jacobsohn (2004) recorded the Reserve Bank governor's official announcement of Basel II on 11th August 2004. The governor of the Reserve Bank had had circulars to South African banks from 1st January 2003, creating awareness about the new Basel Accord even though the country was yet a member of the Basel Committee in that period (Mboweni, 2004; South Africa Reserve Bank, 2003). Therefore, obtaining the true regulatory event date for South Africa to access market reaction may be very difficult. Bhana (1995) examined the effect of increased capital standards on market reaction to bank share prices. The study used the announcement date of the capital standard, which was gazetted as mandatory for the South African banking industry. In addition, Allen et al. (2018) applied different event dates of interest over the other dates of the Congress, leading to the passing of a Dodd-Frank Act in the United States of America. Therefore, in line with studies such as Bhana (1995), this study used the Basel II and Basel III CAR implementation dates as the event dates of interest. The daily stock returns of the banks were computed, and 247 days were the number of days in the estimation window period before the implementation date selected for the 11-day event window relative to each Basel event date. The six banks in the sample had complete information for the study. The final sample included six South African banks.

Event Study Approach

An event study allows researchers to conclude whether an event positively or negatively affects shareholder wealth (Knevels, 2014). Consistent with EMH, if an event has an impact, it will be reflected immediately on the share prices. An event study is suitable for assessing AR in the share prices for regulatory events around the relevant event date, known as the event window (Muzindutsi, 2018). Daily AR was calculated in the periods surrounding the four events. For long-run performance, AR was calculated in the periods surrounding the two official events. For instance, Basel II official was implemented on 2nd January 2008, during which AR was calculated until a year before another Basel (Basel III CAR) was implemented.

Event studies are relevant to understanding investors' perceptions and the impact of new regulatory requirement announcements on bank values (Abreu & Gulamhussen, 2013). According to Chia et al. (2015), an event study is usually more effective when the event windows are relatively short. Therefore, to capture the market reaction and investors' perceptions of the Basel implementation, the longest event window for this study was nine days T= [-3; +5] days), t = 0 being the implementation date. The study applied annual returns instead of daily returns for a long-term impact.

Table 1

Important Events for the Changes in Basel CAR in South Africa

Event date	Event	Comments
2nd January 2007	Implementation of Basel II parallel run	It allows banks to familiarise themselves with the requirements of the Basel II Accord
2nd January 2008	Implementation of Basel II CAR	Official implementation
3rd January 2012	Implementation of Basel III parallel run	It allows banks to familiarise themselves with the requirements of the Basel III Accord
2nd January 2013	Implementation of Basel III CAR	Official implementation

Estimation of Abnormal Returns

Abnormal returns (AR) represent the difference between the actual return of a security and the expected return, which is computed as:

$$AR_{it} = R_{it} - E(R_{it}) \quad (1)$$

Where AR_{it} is the AR for bank *i* on day *t*, R_{it} is the actual return of bank *i* on day *t* and $E(R_{it})$ is the expected return of bank *i* on day *t*. The expected return can be estimated using the capital asset pricing model (CAPM), the market model and the mean adjusted returns model (Muzindutsi, 2018). Amongst the three models, the market model and the CAPM are commonly used in event study literature (Deschacht, 2021; Muzindutsi, 2018). Nonetheless, the CAPM has restrictions that may influence the results (Muzindutsi, 2018). For this reason, this study chose the market model, in line with studies such as Chia et al. (2015), to estimate the expected returns as follows:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + \in_i \quad (2)$$

R_{mt} is the return on the market index proxy by the JSE ALSI, α_i and β_i are coefficients for the market model, estimated using ordinary least square (OLS) (Brown & Warner, 1985) and $\in_i$ is the error term. The market model adjusts for the risk factor to arrive at the expected return. The market model assumes a linear relationship between the returns of security *i* and the returns of a specified market portfolio. The AR for bank *i* on day *t* is calculated as:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) + \in_i \quad (3)$$

Where R_{it} is the actual share return of bank *i* on day *t*.

Following the calculation of AR, the cumulative abnormal returns (CAR) is also calculated. The CAR for bank *i* in time *t* is:

$$CAR(T_1, T_2) = \sum_{t=t_1}^{t_2} AR_{it} \quad (4)$$

The cumulative average abnormal returns (*CAARi*) is measured as the sum of the average abnormal of all banks in the sample:

$$CAAR_t = \frac{1}{N} \sum_{i=1}^{N} CAR_i \quad (5)$$

Where N is the number of observations in the event window.

The study tested the statistical significance of the hypothesis, either positive or negative, of AR, CAR and CAAR within the event window using a t-test. The significance effect signifies the magnitude of investors' perception of the different events in the short term. The t-test of AR is calculated as follows:

$$T_{AR} = \frac{AR_{it}}{SE(AR_{it})} \quad (6)$$

To conduct the t-test, researchers can choose between parametric and non-parametric test statistics, such as Patell, Generalised Rank Z and Generalised Rank T. It is important to note that Patell can be severely misspecified in the presence of event-induced volatility (Marks & Musumeci, 2017; Pacicco et al., 2018). Given the use of a small sample size comprising six South African banks in the event study regression, this study opted for a parametric test known

as the Boehmer-Musumeci-Poulsen test (BMP), introduced by Boehmer et al. (1991). According to Marks and Musumeci (2017), BMP performs well across samples of all sizes and under various conditions, accounting for event-induced volatility (Pacicco et al., 2018). The event study regression was executed using event study commands in Stata 17 software, which can estimate a sample size as low as three securities, as illustrated by Pacicco et al. (2018).

RESULTS

Descriptive Statistics of Abnormal Returns

Tables 2 and 3 present the descriptive statistics for the sample mean AR of six banks. The results in Table 2 showed that the mean AR related to the introduction of the first Basel implementation, a Basel II parallel run, was -0.017. The mean AR for Basel II official was 0.006, which was positive. The mean AR for Basel III parallel and Basel III official were -0.005 and -0.01, respectively. The descriptive statistics exhibited a consistent decline in AR as subsequent Basel CARs were implemented in the following periods after the initial Basel II parallel run.

Table 2

Descriptive Statistics of AR: T = [-10; +10] Days before and after Four Event Dates

	Mean	Std. dev.	Variance	Skewness	Kurtosis	Min	Max	Obs
Basel II parallel	-0.017	0.048	0.002	0.071	2.574	-0.116	0.097	126
Basel II official	0.006	0.049	0.002	0.422	4.128	-0.113	0.140	126
Basel III parallel	-0.005	0.034	0.001	0.216	2.895	-0.076	0.082	120
Basel III official	-0.01	0.027	0.001	0.382	2.384	-.0702	0.066	126

Note: AR = Abnormal returns. Basel II = Basel II capital regulation. Basel III = Basel III capital regulation.

Table 3 presents the descriptive statistics for the annual AR of six banks in the sample around the implementation period T = [-2years;

+2years], t=0 being the implementation date. The mean AR for Basel II official was 0.149, which was positive. Meanwhile, the mean AR for the Basel III official was -0.974, which was negative. Nevertheless, the standard deviation for Basel III official was lower, considering that the standard deviation of AR for Basel II official was high, with a positive mean AR. This finding suggested high volatility, representing regulatory uncertainty in the market when Basel II CAR was implemented.

Table 3

Descriptive Statistics of AR around the Implementation Period

	Mean	Std. dev.	Variance	Skewness	Kurtosis	Obs
Basel II	0.1493	1.811	3.278	0.0433	1.5301	18
Basel III	-0.974	0.237	0.056	0.431	1.913	18

Note: AR = Abnormal returns. Basel II = Basel II capital regulation. Basel III = Basel III capital regulation.

Results of Market Reaction to Basel Implementation

Multiple empirical tests were carried out to assess the robustness of the study. Tables 4 and 5 present the results to achieve the first objective of determining investors' perception of the effect of Basel regulations. A parametric Boehmer test was performed to test for any significant differences in the cumulative abnormal returns before and after the event. Table 4 depicts the results on the cumulative abnormal returns for four different event windows for each Basel implementation period. The null hypothesis is that there is no difference in the CAAR before and after the Basel implementation date. The result showed that the effect of Basel regulations was inconsistent across the observed four events. For event windows of (-3, 5; -3, 2; -3, 0) days, the CAAR was insignificant across the Basel events. Based on an inefficient market state, this finding indicates that the information took time to reflect in the stock prices. Thus, the finding failed to reject the null hypothesis due to the high *p*-value for the event windows of (-3, 5; -3, 2; -3, 0) days.

At a shorter event window of (-1, 0) days, the CAAR was positive and significant for Basel II official but negative and significant for Basel III official. Therefore, the significant evidence at 5 percent and

Table 4

Daily CAAR for Basel Implementation Dates - BMP Test

Daily	BII parallel		BII official		BIII parallel		BIII official	
	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
CAAR[-3, 5]	5.60%	(0.327)	1.07%	(0.853)	-0.38%	(0.938)	1.13%	(0.783)
CAAR[-3, 2]	5.52%	(0.235)	-4.57%	(0.331)	-0.25%	(0.95)	-4.43%	(0.184)
CAAR[-3, 0]	-0.16%	(0.967)	3.37%	(0.38)	-0.48%	(0.883)	-4.30%	(0.115)
CAAR[-1, 0]	-0.96%	(0.719)	6.04%**	(0.026)	-0.49%	(0.832)	-3.23%*	(0.093)

*** *p*-value < 0.01, ** *p*-value <0.05, * *p*-value <0.1.

Note: *p*-values in parentheses. CAAR = Cumulative average abnormal returns

10 percent significance levels suggested enough evidence to reject the null hypothesis that there was no significant difference in the CAAR before and after the Basel II and Basel III official implementation dates for event windows of (-1, 0) days. The significant result reported at the specified event windows of (-1, 0) days implied that some type of news concerning the Basel regulations might have been released to have significantly impacted these banks' stock performance. The negative CAAR for Basel III official indicated the investors' perceptions and the market position that implementing Basel III capital requirements would reduce profit. For the parallel run for Basel II and Basel III, the CAAR was negative and insignificant for (-1, 0) days. Therefore, the market reaction was neutral or less pronounced in the event windows observed.

Short-run Performances of Stocks as a Result of Basel Implementation

Table 5 presents the impact of changes in Basel CAR on stock performances using regression analysis for robustness checks. The result did not separate the days before and after the implementation of Basel. This outcome enabled the study to measure the impact of Basel regulations on banks' stock returns within a short-term window. All the Basel events had negative and significant CAAR, except for Basel II official with a positive and significant CAAR.

Table 5

Regression of CAAR at Event Day 0 (Daily Data)

	Basel II parallel	Basel II official	Basel III parallel	Basel III official
Coef	-0.314***	0.107***	-0.084 ***	-0.1736***
R. std error	(0.053)	(0.022)	(0.0197)	(0.032)
N	6	6	6	6
R-square	0.000	0.000	0.000	0.000

*** *p*-value <0 .01, ** *p*-value <0.05, * *p*-value <0.1

Note: Standard error in parentheses. CAAR = Cumulative average abnormal returns. Coef = Coefficient

The positive and significant AR for the Basel II official implementation illustrated investors' confidence in the Basel II requirements to improve

bank performance and add value to their investments. The significant evidence, at the 1% significance level, suggested enough evidence to reject the null hypothesis that Basel II or Basel III regulation had no significant effect on the stock performance of South African banks around the event dates.

Table 6

Pre- and Post-Basel Implementation Periods with Six Event Windows - BMP Test

	Basel II official		Basel III official	
SECURITY	Coefficient	*p*-values	Coefficient	*p*-values
CAAR[-3, -1]	76.35%**	(0.039)	115.99%***	(0.001)
CAAR[-2, -1]	17.11%	(0.56)	42.84%	(0.132)
CAAR[-1, 0]	-10.92%	(0.701)	-9.63%	(0.73)
CAAR[0, 1]	51.38%*	(0.08)	-14.27%	(0.61)
CAAR[0, 2]	124.31%***	(0.0007)	59.53%*	(0.09)
CAAR[0, 3]	159.55%***	(0.0002)	83.32%**	(0.04)

*** *p*-value < 0.01, ** *p*-value <0.05, * *p*-value <0.1. *p*-value in parentheses.

Note: CAAR = cumulative average abnormal returns

Table 7

Regression of CAAR for Basel II-2008 and Basel III-2013

	Basel II	Basel III
Coef	2.299***	-3.889***
Std error	(0.251)	(0.176)
N	6	6
R-square	0.000	0.000

*** *p*-value < 0.01, ** *p*-value <0.05, * *p*-value <0.1

Note: Standard error in parentheses. CAAR = Cumulative average abnormal returns. Coef = Coefficient

Tables 6 and 7 present the results using annual returns for long-run performances of stocks as a result of Basel implementation. Table 6 exhibits the parametric Boehmer test performed to test for any significant differences in cumulative abnormal returns before and after

the event. There was no market reaction following the implementation of Basel II up to one year later. In contrast, no market reaction was observed up to two years after Basel III official.

Therefore, the significant market reaction after the implementation of Basel II parallel implied that investors were not optimistic that Basel II and Basel III would improve the performance of South African banks in an efficient market. For each year up to three years before Basel II official implementation (-3, -1; -2, -1), investors enjoyed positive CAAR, except for one year before and the event year. Nevertheless, one year after the Basel II implementation, investors consistently earned positive cumulative abnormal returns over three years. The consistent presence of positive CAAR in one year, two years and three years after the event period suggested that investors were rewarded due to the Basel II regulations. The parametric Boehmer test also confirmed that the CAAR was different from zero for the event windows of (0, 1), (0, 2) and (0, 3) days. No significant evidence was observed to show that Basel II and Basel III CAR affected AR surrounding the Basel II and Basel III implementation periods. Conversely, there was enough evidence to prove positive AR for investors in the long run following Basel II and Basel III CAR as the *p*-value was low at the 1 percent, 5 percent and 10 percent significance levels for the event windows of (0, 1), (0, 2) and (0, 3) days.

It was observed that the significance level for Basel III official dropped to 10 percent and 5 percent levels in the event windows of (0, 2 and 0, 3) days compared to Basel II official at the 1 percent level. This result implied that investors' behaviour towards the higher Basel regulation was averse. For instance, in the second year following the Basel III implementation, there was still negative AR compared to positive AR for Basel II official. The result also indicated that the investors did not see Basel III CAR as good news compared to Basel II official. This outcome is further confirmed in Table 7, where Basel II CAR had a positive and significant AR compared to Basel III CAR, with a negative and significant AR.

DISCUSSIONS

According to Schleicher and Walker (1999), a market reaction will occur days before the event if the stock market anticipates an increase in future earnings. The findings showed that the South African market

did not anticipate that Basel II and Basel III CAR implementation would increase future earnings on their investments in bank stocks. Therefore, no statistically significant market reaction was observed days before Basel II and Basel III implementation.

For Basel II parallel and Basel III parallel, there was no significant market reaction in the pre- and post-implementation periods. Therefore, the finding failed to reject the null hypothesis that there was no difference in the AR before and after the event. For Basel II and Basel III official for the shorter event windows of (-1; 0) days, a significant market reaction was noticed one day before and on Basel II and Basel III official implementation dates. The result indicated sufficient evidence to conclude that there was no difference in the CAAR before and after Basel implementation due to a statistically significant CAAR at the event windows of (-1, 0) days.

The positive and significant short-term market reaction around the Basel II official implementation period compared to Basel II parallel suggested that investors were optimistic that Basel II would improve the performance of South African banks in an efficient market. From an efficient market hypothesis, the consistent negative AR under Basel III days before and after the event date implied negative investors' perception and regulatory uncertainty about the Basel III regulations. From an inefficient market perspective, the negative market reaction may be an under-reaction, and with time, the market will correct itself. The result is generally consistent with studies with a negative view, such as Knevels (2014), Lim and Yong (2017) and Schäfer et al. (2013). Furthermore, the findings of Basel III official's negative impact are consistent with studies such as Delaney (2016) and Knevels (2014). Knevels (2014) found that Basel III negatively affected banks' stock returns in EU markets.

The result generally showed a weak market reaction to Basel II and Basel III regulations as there were no significant market reactions up to one day before the Basel II and Basel III official event dates. This outcome indicated a slow market response to the Basel regulations in South Africa. Where Basel III CAR is concerned, a significant market reaction, either positive or negative for banks across different jurisdictions, may depend on the extent of the banks' reliance on non-common equity capital before the introduction of Basel III CAR (Chia et al., 2015). In South Africa, Basel III implementation may

not affect stock performance for two possible reasons. Firstly, South African banks are large and may use retained earnings to achieve higher CAR to avoid the cost of issuing equity, as many European banks do, according to Oino (2018). Conversely, South African banks may not be pressured to raise new equity for Basel III minimum CAR compliance.

Secondly, South African banks were already adequately capitalised above the Basel II CAR before implementing Basel III CAR (Oyetade et al., 2021). The market might perceive that Basel II was adequate to protect the South African banks. Therefore, investors might not react indifferently to subsequent regulations aimed at strengthening the South African banks against future financial crises as they are no longer relevant. Nevertheless, the findings suggested otherwise. Although it was slow, there was a significant and negative market reaction to Basel III implementation. Despite being adequately capitalised under Basel II regulations, the significant impact of Basel III regulations exhibited the relevance of Basel regulations in South Africa.

For long-run stock performance, the findings of this study indicated negative and significant abnormal returns with higher Basel CAR. The decline in AR suggested that higher Basel CAR negatively affected the market performance of South African banks' traded stocks around the Basel implementation dates. This result is consistent with Sadien's (2017) findings. His study documented a decline in ROE with higher Basel CAR for South African banks. Nevertheless, the magnitude of the decline in ROE due to higher Basel CAR in Sadien's (2017) study is marginal compared to the decline in stock returns with changes in Basel CAR in the current study. This outcome suggested that a higher Basel CAR's effect is more pronounced in the stock market than in bank profitability. Furthermore, according to Pinheiro et al. (2015), banks might find it challenging to attract new investors or retain old ones with stricter regulations (Pinheiro et al., 2015). The significantly negative cumulative abnormal returns for Basel III indicated significant value losses to shareholders around the Basel III official implementation period.

From the preceding, the findings of a negative market reaction for Basel III official implied that South African investors did not behave differently from those in developed countries when major regulatory requirements were introduced. This result is consistent with Lim and

Yong (2017), who observed negative AR upon the announcement of Basel II CAR for EU, US, Australian and Canadian banks. Stocks may positively respond to an initial event but later exhibit reversals upon subsequent events (Subrahmanyam, 2008). This outcome may be one of many possible reasons for different market reactions for Basel II official and Basel III official for South African banks.

This study observed that the market accepted Basel II official in the short and long runs compared to Basel III official. There was a slow magnitude of response and insignificance for Basel III official. In behavioural finance, the slow market reaction to the subsequent announcement is tagged as being due to the slow diffusion of news (Subrahmanyam, 2008). Investors could be confused, which showed in the pattern of their response to Basel III official. The negative and significant market reaction to Basel III regulations indicated that investors did not appreciate bank regulation too much. They perceived that bank regulation reduces returns to shareholders even though higher capital reduces the risk of bankruptcy (Bruno et al., 2018).

The findings of this study contributed to the existing literature on the effect of Basel implementation on stock performances. After the 2008 financial crisis, bank regulators viewed Basel III capital regulation as significant for the banking sector's stability. Bank stock prices can reflect market expectations regarding the possible effects of the changes in Basel CAR on banks' profitability and value.

The findings suggested that a higher Basel CAR may not facilitate investors' preference to invest in bank stocks even though Basel CAR is an important regulatory tool for banking supervision. This situation forces banks to work harder to increase bank value to maximise shareholders' wealth strategically. In this context, banks may decide to reduce lending to decrease risk-weighted assets or increase the cost of lending. Both actions have a negative effect on economic growth. Banks should show reliability in the composition of capital ratios, risk measurement methods, risk management and information disclosures to promote investors' preference for bank stocks in the long term.

In summary, the findings showed a consistent decline in AR of South African banks as subsequent higher Basel capital requirements were implemented. The implication of higher Basel regulations reduces AR to shareholders in the South African context. The findings of this

study contributed to the finance literature and offered key insights to policymakers and bank regulators on the implication of higher Basel capital on the stock performances of South African banks. Although an increased capital level improves the banking sector's stability, it declines return to investors. The adverse effect may constrain bank access to liquidity from the stock market and constrain lending, which may lower bank performance. Overall, this study concluded by supporting quality regulatory policies for a resilient banking sector, but it must not be a one-size-fits-all. The establishment of the new regulations should be tailored to the characteristics of the South African banks and the JSE stock market.

CONCLUSION

The objective of this paper was to examine the effect of Basel II and Basel III implementation on the stock performance of South African banks using the event study methodology. Usually, a year before the official implementation of the Basel II and Basel III Accords, the SARB introduces a parallel run to prepare South African banks ahead of the official implementation period. The study employed event dates for the parallel and official implementations of Basel II and Basel III in South Africa to determine the AR. The four events applied had mixed effects on the stock performance of the South African banks. Initially, Basel II was received as good news; thus, the market reacted positively around the implementation period. Conversely, by the time of the Basel III official implementation, investors had taken positions and viewed Basel III as strict and might not add value to their investments. Furthermore, there was a slow market reaction to the official implementation of Basel III.

The study showed that stringent bank regulations targeted at increasing bank stability declined stock returns of South African banks. Therefore, investors are more likely to shift investment decisions to firms in other industries with stronger asset returns than the banking industry. There is no one-size-fits-all concept. The regulatory authority has to find a balance between successfully regulating the banking industry and the banks' competitive ability to maximise shareholders' wealth. The latter is needed for banks to continue business as ongoing concerns to maximise shareholders' wealth. Investors require higher returns on equity; therefore, bank regulators should ensure that the banks' stock performance is sustained when introducing higher Basel regulations.

Policymakers can engage with stakeholders and market participants to provide reasons for introducing new regulations and emphasise confidence in the new regulations for a safer banking system and the reinforcement of supervisory functions. The engagement with stakeholders can send good signals to the market and may stimulate investment decisions to trade in bank shares when introducing new Basel regulations. Future studies can consider the impact of Basel regulations on the volume and volatility of stocks traded around the Basel implementation dates and whether South African banks can achieve and sustain positive AR beyond the Basel implementation period dates.

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ENDNOTES

1. From the beginning of Basel adoption in South Africa, SARB introduces a parallel test run to prepare the South African banks for new Basel requirements. The parallel run period gives the banks time to test their systems, validation, reporting and submission of their trial regulatory requirements compliance (SARB, 2012).

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