THE NEXUS BETWEEN CAPITAL RISK, FINANCIAL PERFORMANCE, AND BASEL II IN THE COMMON MONETARY AREA (CMA)

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Abstract: Basel II aims to ensure banks hold enough capital to absorb unexpected losses and maintain financial stability. Accordingly, all four members of the Common Monetary Area (Namibia, South Africa, Eswatini, and Lesotho) chose to implement Basel II to maximise its benefits. However, existing literature presents conflicting views on the actual benefits of such implementation. Therefore, this empirical study aimed to assess whether Basel II provides the anticipated advantages by exploring the relationship between capital risk, financial performance, and Basel II among CMA countries. The study used annual data from 2001 to 2023, with the Fixed Effect Model (FE) proving most suitable. Results showed insufficient evidence to confirm or deny the claimed benefits of Basel II implementation. Nonetheless, overhead costs demonstrated a significant positive impact on banks' financial performance; specifically, a one-unit increase in overhead costs was associated with approximately a threefold increase in financial performance. Consequently, banks should carefully manage their costs, as they directly influence financial outcomes. These findings may benefit academics and banking practitioners and help fill the existing research gap on CMA countries.

Keywords: *Capital risk, Basel II, Basel implementation, Fixed Effect & CMA*

1. INTRODUCTION

International organisations, such as the IMF (International Monetary Fund), have emphasised the importance of ensuring that banks (or other financial institutions) are operated and supervised effectively so that all persons derive maximum benefits from these institutions. Moreover, the global implementation of the Basel Accords is argued to contribute to such initiatives and ultimately contribute towards the financial stability in a country and beyond (Marina et al., 2024; Novoa, 2019). One such region that supports the recommendations from the BCBS to implement the Accords is the CMA. The CMA is a monetary arrangement in the Southern part of Africa that consists of four countries, namely South Africa, Namibia, Lesotho, and Eswatini (Shumba & Mukorera, 2023). In 2008, South Africa implemented Basel II and became the second country in Africa to do so. Two years later, Namibia also implemented the same accord and became the third country in Africa to achieve this (International Monetary Fund, 2018; South African Reserve

Bank, 2024). Currently, all CMA member countries have either implemented the latest accord or are encouraged by the World Bank/IMF to do so. It is imperative to note that, regardless of the level of implementation, supervisors as well as bank managers pay close attention to the capital risk of banks because of its relevance to bank insolvency (Fraisse et al., 2020; Liu et al., 2024; Marandu & Sibindi, 2016).

Capital risk is defined as the potential decrease in the market value of assets to or below the market value of liabilities, indicating that the economic net worth is zero or negative (Koch & MacDonald, 2015). Further, literature places emphasis on the capital level of banks, as evidenced by several researchers who used various proxies for capital, such as total risk-based capital ratio (Akbar Sarif & Rini Ariyanti, 2023; AL-Najjar & Assous, 2021; Liu et al., 2024), common equity tier 1 (Andersen & Juelsrud, 2023), and risk-based capital buffer (Anees et al., 2023; Stewart et al., 2021). For the current study, the capital adequacy ratio of banks was employed as a proxy for capital due to data availability and applicability to the study. Furthermore, the financial performance identifies how well a company generates revenue as well as manages its assets, liabilities and financial interests of its stakeholders & stockholders. Hence, this study seeks to assess the nexus between the capital risk, the financial performance of the banking sectors, and the second Basel Accord that all CMA member countries have implemented.

The BCBS, the IMF and the World Bank posit that countries should implement the Basel Accords to positively contribute towards the financial stability of such countries and beyond. More importantly, within the CMA region, Lesotho and Eswatini have implemented Bael II, while South Africa and Namibia have advanced to Bael III. However, empirical studies have indicated contradicting results on the implementation of these Accords. Hence, the assessment of the second accord, capital risk, as well as financial performance in the CMA region, to either refute or confirm the alleged benefits from implementing the accord. In addition, Nikolaidou and Vogiazas (2017 revealed that numerous studies focus on developed countries and large emerging markets, while little research output focuses on bank-based financial sectors of Sub-Saharan Africa (SSA). Thus, this study sought to test the claimed benefits and complement the identified literature gap for the implementation of Basel II in the CMA member countries, focusing on capital risk as well as financial performance.

2. OBJECTIVES OF THE STUDY

The objective of the study is to establish whether the acclaimed benefits of implementing Basel II in the CMA member countries are supported by the empirical evidence within the CMA region, placing emphasis on the financial performance and the capital risk of the banking industries.

3. METHODOLOGY

3.1.Source, Period and Type of Data

This study employed a balanced annual panel data set of 92 observations, spanning 2001-2023, which was mainly obtained from the World Bank and the International Monetary Fund (IMF). Supplementary data was also sought from the respective central banks.

3.2.Model Specification

The results from the Hausman test indicated that the data favoured the fixed effect model. This model is attributed to several researchers, with Gary Chamberlain's work being a significant contribution (Bell et al., 2019). The fixed effect model is generally specified as:

$$Yit = \beta 1X1,it + \cdot \cdot \cdot + \beta kXk,it + \alpha i + uit \qquad (4.1)$$

where i = 1, . . . , n and t = 1, . . . , T. The αi are entity-specific intercepts that capture heterogeneities across entities.

To assess the nexus between capital risk and Basel II in the CMA member countries, two models with two respective proxies of financial performance (ROE & ROA) were adopted for robustness.

Financial Performance Model with ROE as proxy:

$$ROE_{i,t} = \beta_1 Basel\ II_{i,t} + \beta_2 GFC_{i,t} + \beta_3 CAR_{i,t} + \beta_4 GDPGR_{i,t} + \beta_5 INFL_{i,t} + \beta_6 OVHCOST_{i,t} + \alpha i + \mu_{i,t} \qquad (4.2)$$

Financial Performance Model with ROA as proxy:

$$ROA_{i,t} = \beta_1 Basel\ II_{i,t} + \beta_2 GFC_{i,t} + \beta_3 CAR_{i,t} + \beta_4 GDPGR_{i,t} + \beta_5 INFL_{i,t} + \beta_6 OVHCOST_{i,t} + \alpha i + \mu_{i,t} \qquad (4.3)$$

where i = 1, . . . , 4 and t = 2001. . . ,2023. The αi are entity-specific intercepts that capture heterogeneities across CMA member countries. The rest of the variables are as explained under 4.2 and reflected in Table 1.

3.3.Variable Descriptions

Literature underscores the adequacy of capital in a banking institution or banking sector, due to its importance in the survival of banks. For the current CMA study, the capital adequacy ratio (CAR) was considered, mainly due to its popularity and availability of data. The study also considered the implementation of the second Accord (BASEL II) in the CMA region. The first country in the region to implement the latest BASEL accord was South Africa (in 2008), followed by Namibia in 2010. Lesotho and Eswatini remained on BASEL II, which they implemented in 2019 and 2018, respectively (Table 1). The factor variable of BASEL has two levels and requires two dummy variables. BASEL II is coded 1 from the period it was implemented in the respective CMA member country and zero otherwise.

Table 1: Implementation of the Accord and registered banks in CMA region

CMA Member country	Implementation date of Basel II	Current BASEL Accord	Implementation date of current Basel Accord	Nr. of registered banks – 2023
Globally	End of 2007	BASEL III	January 2022	_
South Africa	January 2008	BASEL III	March 2018	30
Namibia	February 2010	BASEL III	September 2018	9
Lesotho	June 2019	BASEL II	June 2019	4
Eswatini	April 2018	BASEL II	April 2018	4

Source: Author's compilation

This study similarly considered the effect of the global financial crisis of 2007/2008 (GFC) on capital risk by including it as a dummy variable in the models. The dummy was coded as one during the period of the GFC and zero otherwise. The researcher deemed it fit to incorporate the influence of the GFC on capital risk, as literature states it as a contributing factor towards the revision of BASEL II (Ferreira et al., 2019, 2021; Pomuti et al., 2021; Rizvi et al., 2018b). "The Committee's comprehensive reform package addresses the lessons of the financial crisis" (Bank for International Settlements, 2010, p.1). "The global financial crisis threatened to destroy the international financial system; caused the failure (or near failure) of several major investment and commercial banks…insurance companies…and precipitated the great recession (2007-09) (Duignan, 2024). Moreover, the current study includes the timeframe during which the global financial crisis was prevalent in the financial system (Liu et al., 2024; The World Bank, 2024a).. Furthermore, financial performance received much attention in the studies of risks due to their interconnectedness (Afolabi et al., 2020b; Akinbo-Balogun, 2022; Andow & Alexander, 2017b; Wachira, 2017bb). More importantly, some studies have used either Return on Assets (ROA) and/or Return on Equity (ROE) or Net Interest Income (NII) as proxies for financial performance (Anees et al., 2023; Ekinci & Poyraz, 2019; Msomi, 2022; Qazi et al., 2022; Siddique et al., 2022). Hence, this study will consider the most popular proxies of financial performance, i.e. ROA and ROE. Thus, each financial performance proxy will be considered to assess the nexus between capital risk, the Basel Accord, and the financial performance.

In addition, inflation was also considered. The World Bank (2024b) defines inflation (INFL), as measured by the consumer price index, to reflect the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. Inflation represents how much more expensive the relevant set of goods and/or services has become over a certain period. Moreover, inflation is expected to affect the financial performance of banks since an average increase in prices is linked to both the deposit rate and the lending rate. Moreover, INFL has an influence on the likelihood of borrowers paying their debts (Mpofu & Nikolaidou, 2018). The economic theory posits that a high inflation rate is likely to reduce the consumer's purchasing power, thereby reducing the demand for goods and services,hich will cause a bank's income to decrease and reduce its ability to pay its bills (Rahmananingtyas Ayu Novarina, 2022).

Additionally, the economic growth rate (GDPGR) was considered by considering the annual percentage change in the real GDP. The GDPGR is a pivotal economic indicator since it measures the percentage change in a country's total goods and services over time. It is expected that when an economy grows, the bank customers are more likely to honour their obligations with the banks and hence, the banks are likely to record a higher financial performance. The opposite is also true. The lower economic growth may make it difficult for clients to pay their instalments, and hence, this may lower the bank's performance. The last variable to be discussed is the proxy for efficiency, measured by overhead costs to total assets (OVHCOST). This variable provides an indication of how effectively banks would manage their expenses in relation to their respective assets. A higher ratio means the banks are not operating efficiently; moreover, a lower ratio means the banks are more efficient.

3.4.Selected Variables

Table 2: Description of determinants of profitability, proxies, symbols & sample literature

Determinants	**Proxy**	**Symbol**	**Sample of the literature**
Profitability	Net income/Total Equity	ROE	(Mirović et al., 2024; Morara & Sibindi, 2021)
	Net income/Total Assets	ROA	(Isayas, 2022; Mirović et al., 2024; Morara & Sibindi, 2021; Zheng et al., 2017)
Industry-specific variables			
Capitalisation	Bank total capital to total assets ratio	CAR	(Ashraf et al., 2020; Berger & N, 1995; Iannotta et al., 2007; Lee & Hsieh, 2013; Marandu & Sibindi, 2016; Pomuti et al., 2021)
Inefficiency	Overhead costs/Total Assets	OVHCOST	(Zheng et al., 2017)
Macroeconomic variables			
Inflation rate	Annual Inflation Rate	INFL	(Isayas, 2022)
Economic growth	Annual change in real gross domestic product in percentage	GDPGR	(Isayas, 2022; Mirović et al., 2024; Zheng et al., 2017)

Dummy Variables			
Implementation of the Basel Accords	It's a dummy variable for the implementation of the Basel Accords which takes the value of 1 if Basel II was implemented else 0.	BASEL	(Ashraf et al., 2020; Ferreira et al., 2021; Van Roy, 2011; Zheng et al., 2017)
Global Financial Crisis	It's a dummy variable for the 2007/2009 global financial crisis which takes the value of one for 2008 & 2009 else 0.	GFC	(Ashraf et al., 2020; Ferreira et al., 2021; Zheng et al., 2017)

Source: Authors compilation, 2025

4. PEARSON'S CORRELATION

The Pearson correlation coefficient (between -1 and 1) is the most common method of measuring a linear correlation. More importantly, this study deemed it fit to conduct the analysis to identify and quantify the strength as well as direction of relationships between two variables, though the focus is amongst the independent variables. A high correlation (or multicollinearity) between two independent variables can be challenging because it can lead to instability in coefficient estimates, overfitting, as well as difficulty in interpreting the models' results (Daoud, 2018; Shaun Turney, 2022). The correlation results showed that Basel II was significant at 5%. The analysis further revealed that there is a significant weak negative correlation between the second accord as well as the capital risk of the CMA member countries. Most importantly, the study indicated that there was no perfect linear relationship among the regressors (Table 3).

Table 3: Pearson's correlation

	ROE	**ROA**	**BASEL_C2**	**GFC**	**CAR**	**GDPGR**	**INFL**	**OVHCOST**
ROE	1	N/A						
ROA	N/A	1						
BASEL 2	-0.37*	-0.32*	1					
GFC	0.10	0.05	-0.12	1				
CAR	0.04	0.34*	-0.23*	-0.04	1			
GDPGR	0.17	0.13*	-0.26*	-0.13	-0.07	1		
INFL	-0.10	-0.05	-0.10	0.05	0.12	0.05	1	
OVHCOST	0.35*	0.62*	-0.48*	-0.04	0.68*	0.10	0.12	1

Source: Authors' computation

5. CROSS-SECTIONAL DEPENDENCE (CD) TEST

Before conducting the unit root test, the CD test needs to be conducted to determine the type of panel unit root tests that need to be applied to the data. Moreover, the CD test is imperative to confirm the presence or absence of cross-sectional dependence amongst the variables (Atemnkeng & Tingum, 2024; Tugcu, 2018). Two tests were conducted in this regard: Pesaran's CD test and Frees' test.

The Pesaran test employs a null hypothesis that there is cross-sectional independence, while the alternative states that the null is not true. When conducting the test, the p-value was found to be 0.107 and 0.275 for ROE and ROA, respectively. Notably, since the p-values are greater than 0.05, the decision was to accept the null and conclude that there is cross-sectional independence amongst the CMA variables. In addition, the Frees was considered to determine whether there is a statistically significant difference between the means of the CMA countries. The null hypothesis for the Frees' test is that there is no cross-sectional dependence that exists in the four CMA member countries, while the alternative is that the null is not true. The p-value was found to be 0.147 when using both the ROE and ROA as proxies for financial performance. Since the two p-values are above 0.05, the decision was to accept the null and conclude that there is no CD amongst the CMA member countries. Hence, both Pesaran's CD test and Frees' test confirmed the absence of CD in the CMA data (Tables 4 and 5).

Table 4: Breusch-Pagan LM test

Tests	**Stat**	**P-value**
Pesaran's test – ROE	-1.610	0.107
Pesaran's test – ROA	1.092	0.275

Source: Authors' computation

Table 3: Frees' test statistic

Tests	**Stat**	**P-value**
Frees' test – ROE	-0.092	0.147
Frees' test - ROA	-0.056	0.147

Source: Authors' computation

6. TEST FOR STATIONARITY

Since the above CD tests confirmed that there was cross-sectional independence, it was then necessary to proceed to use the first-generation unit root tests to analyse the stationarity characteristics of the variables. Moreover, the LLC test indicated that all variables are stationary at levels, while the Breitung test confirmed that the chosen variables are stationary at mixed levels.

Table 5: Stationarity test

CMA Member Countries (Panel Data)						
Variables	**LLC (p-values)**			**Breitung (p-values)**		
	Level	1st difference	Decision / Order of integration	Level	1st difference	Decision/Order of integration
GFC	0.00		I(0)	0.00		I(0)
GDPGR	0.03		I(0)	0.00		I(0)
INFL	0.00		I(0)	0.00		I(0)
CAR	0.02		I(0)	0.10	0.00	I(1)
OVHCOST	0.01		I(0)	0.01		I(0)
ROA	0.01		I(0)	0.02		I(0)
ROE	0.00		I(0)	0.03		I(0)

Source: Authors' computation

7. COINTEGRATION TEST

The Cointegration test is conducted to confirm whether there is a long-run relationship between the variables. The study considered Pedroni and the Westerlund test and found that there is no cointegration amongst the financial performance variables in the CMA member countries

8. THE DURBIN-WU-HAUSMAN TEST (DWH)

The Hausman test was employed to determine whether the random or fixed effect model should be selected as a better fit for our panel data (Msomi, 2022; Thanh Cuong et al., 2012). The results of the chi-square were 16.22, with a p-value of 0.0010. Thus, the null hypothesis was rejected and the study concluded that the fixed effect model was more appropriate. For robustness, the finding remained consistent even when ROA was adopted as the measurement of financial performance (Figures 1 and 2).

Figure 1: Hausman test for the ROE model

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        b = consistent under Ho and Ha;                    obtained from xtreg
B =     inconsistent under Ha, efficient under Ho;         obtained from xtreg
Test:   Ho: difference in coefficients not systematic
              chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      = 16.32
            Prob>chi2 =      0.0010
          (V_b-V_B is not positive definite)
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Source: Authors' Computation

Figure 2: Hausman Test for the ROA Model of four CMA member countries – Capital risk

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b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test:  Ho:  difference in coefficients not systematic
        chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                =       26.43
      Prob>chi2 =      0.0000
          (V_b-V_B is not positive definite)
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Source: Authors Computation

9. FINDINGS

The analysis revealed that Basel II and the level of capital did not have a significant impact on the financial performance of the CMA region between 2001 and 2023. However, bank inefficiency was found to have a significant positive relationship on the financial performance in the CMA region. Moreover, if the bank inefficiency in the CMA region increases by a single unit, the average financial performance in the CMA member countries will also increase three times.

10. CONCLUSIONS

The study did not find sufficient evidence to either support or refute the implementation of Basel II in the CMA member countries. It also could not confirm the absence or presence of the impact of capital on the financial performance of the CMA banks. However, it cautioned CMA banks to balance between financial performance as well as the inefficiency in the banking industry. This suggest that banks in the CMA region should be diligent in their management of overhead costs to improve the financial performances of their respective banking industries. Hence, effective cost management is crucial for achieving supervisor financial results.

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Appendix 1: Descriptive statistics for CMA Member Countries - 2003 - 2024

Variable	Mean	Std. Dev.	Min	Max
year			2001	2023
country			1.00	4.00
NPL	0.04	0.02	0.01	0.11
EQTY	0.10	0.03	0.06	0.18
NIM	0.06	0.02	0.00	0.10
SIZE	21.97	6.72	0.17	29.61
SIZSQR	527.11	239.14	0.03	876.75
ROE	0.20	0.08	0.03	0.42
ROA	0.02	0.01	0.00	0.04
REER	68.38	45.29	-5.10	130.40
INTR	0.11	0.02	0.07	0.17
INFL	0.05	0.05	-0.17	0.34
GDPGR	0.03	0.03	-0.08	0.12
UNEMPLT	0.22	0.04	0.17	0.30
OVHCOST	0.05	0.01	0.02	0.09
CIR	0.55	0.16	0.00	0.78
NII	0.44	0.06	0.30	0.69
CAR	0.10	0.03	0.06	0.18
LIQATD	0.32	0.24	0.00	0.97
CRTD	0.83	0.34	0.00	1.43
Basel 2	Dummy for Basel II implementation. 1 if true and 0 otherwise		0.00	1.00
GFC	Dummy for global financial crisis. 1 if true and 0 otherwise		0.00	1.00
Observations	92			

Source: Authors' computation

Appendix 2: CMA Results: capital & Basel II on Financial Performance - ROE

Fixed-effects (within) regression			Number of obs		=	92
Group variable: CMA member countries			Number of groups		=	4
R-sq:			Obs per group:			
within = 0.21			Min		=	23
between = 0.36			Avg		=	23
overall = 0.25			Max		=	23
			F (6,82)		=	3.71
corr(u_i, Xb) = -0.13			Prob > F		=	0.003
ROE	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
BASEL 2	-0.02	0.02	-1.33	0.19	-0.06	0.01
GFC	0.03	0.03	1.34	0.18	-0.02	0.08
CAR	-0.51	0.39	-1.31	0.19	-1.27	0.26
GDPGR	0.37	0.25	1.44	0.15	-0.14	0.87
INFL	-0.27	0.15	-1.79	0.08	-0.57	0.03
OVHCOST	2.74	1.05	2.60	0.01	0.64	4.84
_cons	0.13	0.07	1.93	0.06	0.00	0.26
sigma_u	0.04					
sigma_e	0.07					
Rho	0.25	(fraction of variance due to u_i)				
F test that all u_i=0: F (3, 82) = 6.49				Prob > F = 0.00		

Source: Authors' computation

Appendix 3: CMA Results: capital & Basel II on Financial Performance - ROA

Fixed-effects (within) regression				Number of obs	=	92
Group variable: country1				Number of groups	=	4
R-sq:				Obs per group:		
within = 0.214				Min	=	23
between = 0.360				Avg	=	23
overall = 0.246				**Max**	**=**	**23**
				F(6,82)	=	3.71
Corr (u_i, Xb) = -0.55				Prob > F	=	0.003
ROE	**Coef.**	**Std. Err.**	**t**	**P>t**	**[95% Conf. Interval]**	
BASEL 2	-0.022	0.017	-1.330	0.189	-0.056	0.011
GFC	0.034	0.025	1.340	0.183	-0.016	0.084
CAR	-0.506	0.386	-1.310	0.193	-1.275	0.262
GDPGR	0.366	0.254	1.440	0.154	-0.140	0.871
INFL	-0.269	0.150	-1.790	0.077	-0.568	0.030
OVHCOST	2.740	1.054	2.600	0.011	0.643	4.836
_cons	0.127	0.066	1.930	0.056	-0.004	0.258
sigma_u 0.037 ; sigma_e 0.065 rho 0.245 (fraction of variance due to u_i)						
F test that all u_i=0: F(3,82) = 6.49				Prob > F = 0.001		

Source: Authors' computation