Enterprise Risk Management and Financial Performance of Nigerian Deposit Money Banks: The Moderating Role of Corporate Governance

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Abstract

This study attempts to estimate the strength of the effect of enterprise risk management on financial performance as well as the extent of the moderating influence of corporate governance on the empirical association between enterprise risk management and financial performance. The study constructs and enterprise risk management index which combines three financial risk measures: namely, capital risk, credit risk, and liquidity risk. Financial performance is examined from the stock market perspective using market price per share a measure. The data used comprise 144 bank-period panel observations obtained from 12 listed DMBs that are traded on the floor of the Nigerian exchange between 2010 and 2021. Consistent with the fixed effect regression assumption, we find that unobserved bank-specific factors such as management philosophy and leadership style play a highly significant role in determining financial performance of the selected listed deposit money banks (DMBs) in Nigeria. We also find evidence that market price per share significantly depends on its previous performance, hence, it is highly persistent. Our results also suggest that enterprise risk management index is highly significant and exerts a positive and sizable direct effect on financial performance. On the contrary, our empirical evidence shows that corporate governance, measured by board size, has no significant direct effect on financial performance and also does not moderate significantly the empirical association between enterprise risk management and financial performance. Hence, our results tend to support the theoretical argument that larger board size encumbers financial performance.

Key words: *Enterprise risk management, financial performance, corporate governance.*

1 Introduction

Since the global financial crisis that occurred between 2007 and 2008, corporate/bank managers have been under intense pressure to switch from the traditional risk management model, which has been described as compartmentalized or fragmented, to a more comprehensive and integrated risk management framework. The crisis, which has been described by scholars as the greatest economic and financial shocks since the Great Depression, originated in the west (United States, the UK and Europe) but has significant impact on almost every country and globally. Previous studies suggest that the financial crisis, which distorted the global financial and economic system, is rooted in several factors including deficiencies in financial regulatory and supervisory frameworks, poor assessment of systematic risks, particularly in the treatment of systemically important financial institutions, the assessments of systemic risks and vulnerabilities, and the resolution of financial institutions. Also, McShane et al. (2011) observe that while some authors have linked the crisis to the failure of the conventional risk management framework in financial institutions, others have attributed it to enterprise risk management, a new approach to corporate risk management that is increasingly displacing the traditional methods, especially in large corporations,

although, emerging financial institutions combine both conventional and enterprise risk management to better mitigate risks.

Enterprise risk management is a relatively new concept, which has been viewed or described in different ways by different authors. It is increasingly viewed as an all-encompassing approach to risk management (D'arcy & Brogan, 2001; Dickinson 2001). The emergence of enterprise risk management, which can be traced to the mid-1990s, can be explained by two main factors: (1) failure of high--profile companies and preventable large corporate losses, and (2) the role of shareholder value models (which are built mainly based on the concept of risk) in strategic planning (Dickinson, 2001). Closely related, but slightly conceptually different, concepts, which are also precursors to enterprise risk management, include business risk management, holistic risk management, corporate risk management, strategic risk management, and integrated risk management (D'arcy & Brogan, 2001).

This study investigates the strength of effect of enterprise risk management on bank financial performance as well as the extent of the moderating influence of corporate governance in the relationship between enterprise risk management and financial performance. The study focuses on listed deposit money banks and covers the period from 2010 to 2021. The study is distinct from related studies in Nigeria as it uses a dynamic panel regression framework which allows firm value to depend on its own lagged value, enterprise risk management index, board size, and the interaction between enterprise risk management index and board size. The extensive literature review shows that this modeling approach is novel in the Nigerian literature.

2 Literature Review

In Vietnam, Kommunuri et al. (2015) use the classical multiple regression model to test the extent to which ERM practices improve a firm's financial and market performance. Financial performance is examined in terms of profitability, measured by return on assets, while market performance is measured by Tobin's Q. They use a panel dataset consisting of 995 firm-period observations obtained from a sample of 199 listed firms over the period from 2009 to 2013. They find, based on a model that controls for several firm-specific variables (audit quality, inspection committee, revenue growth, financial leverage, firm size, and firm age), that ERM implementation affects firm performance significantly. However, while financial performance is affected negatively, market performance is affected positively.

Ping and Muthuveloo (2015) examine how enterprise risk management implementation affects the performance of listed companies in Malaysia using the Partial Least Square approach. The study, which is based on COSO (2004) integrated risk management framework, also considers the how the relationship between enterprise risk management implementation and performance is moderated by firm characteristics such as firm size, board of director's monitoring, and firm complexity. Both financial and non-financial performance are considered. Their study is also based on primary data collected via a structured questionnaire from 103 respondents who are risk committee chairman, audit committee chairman, and/or managing director of selected firms. The questionnaire is structured in Likert format. They find, among other things, that enterprise risk management implementation has a significant impact on firm performance.

Alawattegama (2018) considers the impact of enterprise risk management practices on the financial performance of banking and finance companies in Sri Lanka. Specifically, the study identifies eight enterprise risk management dimensions: namely, internal environment, objective setting, event identification, risk assessment, risk responses, control activities, information, and monitoring, and examine their individual effects on return on equity. Using a sample of 45 listed firms, and based on conventional multiple regression, they find that none of the identified enterprise risk management functions has a significant effect on financial performance.

Shad and Lai (2019) examine the relationship between enterprise risk management implementation and firm performance in the Malaysian Oil and Gas Industry using the classical OLS multiple regression method. COSO framework is adopted for measuring enterprise risk management implementation, while firm performance is proxied by return on assets. Their sample includes 11 listed oil and gas companies, while data are collected from content analysis. They find that some components of enterprise risk management (supportive internal environment, objective setting, control activities, and monitoring) exert a positive and significant effect on firm performance, while others (event identification, risk assessment, risk response, and information and communication) do not significantly affect firm performance.

Haj-Salem et al. (2020) investigate the combined effect of corporate governance and corporate risk disclosure on firm value in Tunisia using the principal component analysis (PCA) and panel regression method. They measure corporate risk disclosure, they develop an index that combines 48 items using a manual content analysis. Also, they examine corporate governance using an index that combines 12 corporate items (4 items relate to ownership concentration, 5 items relate to board composition, and 2 items relate to the size of audit committee. Their sample includes 156 firm-period observations obtained from 32 listed nonfinancial firms operating in different economic sectors over the period from 2008 to 2013. Based on a model that incorporates firm liquidity, financial leverage, dividend payment, and firm size as control factors, they find that corporate risk disclosure exerts a negative and significant effect on firm value, measured in terms of Tobin's Q.

In an empirical study focusing on Pakistani financial firms, Jawada et al. (2021) examine the enterprise risk management in relation to firm performance using the multiple OLS regression framework. They use debt-to-assets ratio to proxy firm performance, while enterprise risk management is measured using a dummy variable whose value is 1 for firms that have adopted enterprise risk management or zero otherwise. Their analysis, which covers the period from 2008 to 2016, is based on a regression model that incorporates cost to income ratio, equity to assets ratio, value to assets ratio, financial leverage, return on capital, and return on equity as control variables. They find evidence that enterprise risk management has a positive and statistically significant impact on firm performance.

Alabdullah et al. (2022) investigate the extent to which board size, CEO duality, and board independence empirically relate to financial performance using a multiple regression framework. They find that none of the three corporate governance factors exerts a significant effect on financial performance or return on assets.

Ben Fatma and Chouaibi (2023) used the fixed effect model to analyze the extent of the effect of corporate governance practices on firm value, focusing on European financial institutions. Corporate governance practices investigated are board size, board gender diversity, CEO ownership, board independence, and ownership concentration, while firm value is measured in terms of market to book value ratio. Using data collected from 111 financial institutions operating in 12 European countries from 2007 to 2019, and after controlling several firm-specific variables, they find board size and ownership concentration exert a negative effect on firm value, whereas CEP ownership and gender diversity exert a positive effect. However, the impact of board independence is not statistically significant.

3 Methodology

3.1 Sample, Data and Variables

The study sample includes 12 deposit money banks that traded in the Nigeria exchange between 2010 and 2020 (see Table 1 for the sampled banks). Hence, our empirical analysis would be based on 144 bank-period panel observations. We extract the data from the annual reports and accounts of the sampled banks accessed from their official websites. Market price data are accessed from www.investing.com. EViews is used for both descriptive and empirical analyses.

The dependent variable is stock market perspective of bank financial performance, which is measured in terms of market price per share. Higher market price per share means higher stock market performance.

The explanatory variable is enterprise risk management index which is a composite function of three financial risk management dimensions: capital risk, credit risk, and liquidity risk. These variables are respectively measured by capital adequacy ratio, non-performing loan ratio, and loan to deposit ratio. The weighted sum approach is used to construct the index, with the weight attached to each financial risk dimension being the regression beta associated with the effect of that dimension on financial performance.

The moderating variable is corporate governance which is proxied by board size.

Table 1: Sampled Banks

S/n	Bank	Identifier
1	First Bank	FBNH
2	Guarantee Trust Bank	GTB
3	Wema Bank	WEMA
4	United Bank For Africa	UBA
5	Standard IBTC	SIBTC
6	Sterling Bank	STERLING
7	Access Bank	ACCESS
8	First City Monument Bank	FCMB
9	Union Bank	UBN
10	Ecobank	ECOBANK
11	Zenith Bank	ZENITH
12	Fidelity Bank	FIDELITY

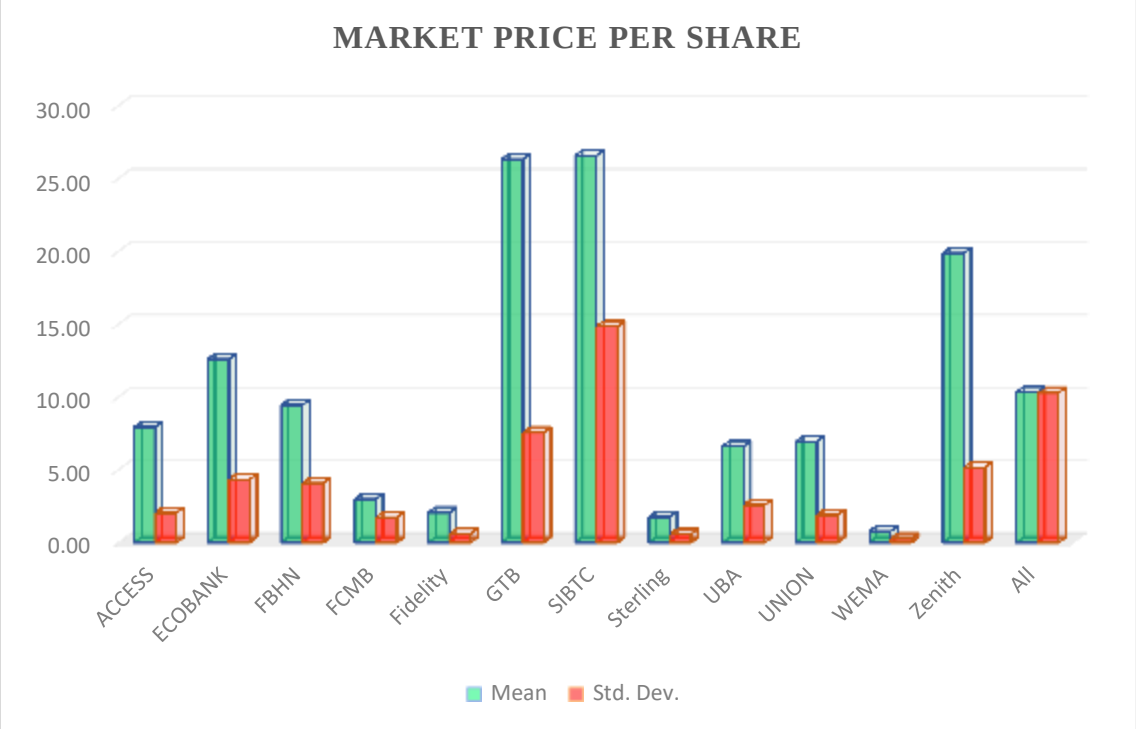

Figure 1: Mean and Standard Deviation for Market Price Per Share

3.2 Model Specification

To investigate the impact of ERM on bank financial performance and the moderating role of corporate governance, we employ a dynamic panel regression framework. More specifically, we utilize the fixed effect and the random effect methods of estimating a panel regression model. The fixed effect regression method is applicable when latent bank-specific factors (such as organizational leadership, management style, organizational culture) are an important aspect of the relationship under investigation, while the random effect method can be utilized when such latent factors are treated as errors and hence, have no relationship with the included explanatory variables. We use the

Hausman test to determine which of these two estimation approaches is consistent with our unique panel dataset and hence, produce optimal results for the empirical relationships under investigation.

We specify the functional model for the impact of enterprise risk management dimensions on return on assets as follows:

We specify the functional model for the moderating role of corporate governance in the relationship between enterprise risk management and financial performance as follows:

$$MPS = f(ERMI, BS, ERMI * BS) \quad (1)$$

Where:

MPS = Market Price Per Share

BS = Board Size (A Proxy for Corporate Governance)

ERMI = Enterprise Risk Management Index

*ERMI*BS* = Interaction between Enterprise Risk Management and Board Size

The econometric specification for the above functional model is given as follows:

$$\text{MPS}_{it} = \theta_0 + \phi_i + \theta_1 MPS_{it-1} + \theta_2 ERMI_{it} + \theta_3 BS_{it} + \theta_4 ERMI * BS_{it} + w_{it} \quad (2)$$

Where θ_0 is the model intercept representing the average value of market price per share when all other explanatory factors are zero; ϕ_i represents the unobserved bank-specific effects or heterogeneity factor; θ_1 represents the impact of lagged market price per share; θ_2 represents the impact of enterprise risk management index, and θ_3 represents the direct impact of inflation; θ_4 represents the impact of the interaction between inflation and enterprise risk management index; and w_{it} represents the regression residuals or error term. Further, the heterogeneity parameter, ϕ_i, which represents the impact of unobserved bank-specific effects such as organizational philosophy and culture, has only space index since these latent factors do not usually change with time. Hence, the significance of this coefficient, which would be tested based on Hausman test, implies that market price per share depends on both observed and unobserved firm characteristics, and the relationship between enterprise risk management, corporate governance, and market price per share is consistent with the fixed effects theory. Otherwise, the random effect framework is the appropriate.

Also, while the interaction parameter, γ_4, captures the moderating effect of corporate governance on the relationship between enterprise risk management and financial performance, we employ the residual centered approach to resolve the multicollinearity problem arising from the perfect correlation between the interaction term, $ERMI * BS$, and its constituent variables, $ERMI$ and BS.

4 Empirical Analysis

4.1 Model Estimation

Our empirical model specifies market price per share (MPS) as a function of the three main explanatory factors: namely, enterprise risk management index (ERMI), board size (LBS), and the interaction between enterprise risk management index and board size (ERMI*BS). The main objective is to test the moderating effect of corporate governance on the relationship between enterprise risk management and financial performance. However, we follow the two-stage residual centered approach to achieve orthogonality between ERMI*BS and its constituent variables: namely, ERMI and BS, since these variables are perfectly correlated and their inclusion in the same regression model would lead to multicollinearity. Specifically, we regress ERMI*BS against ERMI and INFL and save the errors. The saved errors are then used to replace ERMI*BS as the new interaction term in the second stage regression. However, our analysis would focus only on the second stage regression results, hence the first stage regression results are reported in the Appendix. Table 2 reports the Fixed Effects and Random Effects results for the second stage regression. The upper Panel contains the main panel regression results, while the diagnostic tests and goodness of fit statistics are reported in the lower Panel. Table 4 shows the estimated unobserved bank-specific effects.

Table 2: Panel Regression Results for Model 6; parenthesis contains p-values.

Variables	**1** **FEM**	**2** **REM**
Constant (θ_0)	1.9876*** (0.0003)	0.8025** (0.0285)
LMPS (-1) (θ_1)	0.2986*** (0.0002)	0.9189*** (0.0000)
ERMI (θ_2)	0.9933*** (0.0000)	0.6206*** (0.0010)
LBS (θ_3)	-0.2913 (0.1504)	-0.2597* (0.0600)
ERMI*BS (θ_4)	-0.2438 (0.8311)	0.3397 (0.7122)
R^2	0.9284	0.8788
$\bar{R}^2$	0.9191	0.8750
F-ratio	100.28*** (0.0000)	230.37*** (0.0000)
DW	1.7306	2.0564
Likelihood Ratio (LR)	69.406*** (0.0000)	–
Hausman Test	–	79.275*** (0.0000)

*****indicates significance at 1% level; **indicates significance at 5% level**
***indicates significance at 10% level**

Table 3: Estimated Unobserved Cross-Sectional/Bank-Specific Effects

S/n	**Bank**	**Cross-sectional Heterogeneity**
1	ECOBANK	0.5861
2	FBHN	0.2305
3	SIBTC	0.9055
4	Sterling	-0.7626
5	UNION	0.2440
6	WEMA	-1.4112
7	Zenith	0.6493
8	Fidelity	-0.8094
9	UBA	-0.1109
10	ACCESS	0.1557
11	FCMB	-0.6596
12	GTB	0.9826

Source: EViews Result Output based on Research Data

From the upper Panel of Table 2, we can see that the signs of the fixed effects estimates are similar with those of the random effects for most of explanatory variables, specifically, LMPS(-1), ERMI, and LBS. First, the coefficient on LMPS(-1) is positive and highly significant for both fixed effects ($\theta_1 = 0.2986$, p-value = 0.0002) and random effects ($\theta_1 = 0.9189$, p-value = 0.0000) methods, thereby conforming the significant role of own effect in determining the current and future behaviour of market price per share. Second, the coefficient on ERMI ($\theta_2 > 0$) is positive and highly significant for both methods, indicating that enterprise risk management index is a significant explanatory factor for market price per share. Thirdly, while the coefficient on LBS ($\theta_3 < 0$) is negative for both methods, its significance occurs at the 10% level but only for the random effect method. However, while the coefficient on ERMI*BS is not significant for both methods, its sign varies, being positive for the random effects method ($\theta_4 = 0.3397, p$-value = 0.7122) but negative for the fixed effects method ($\theta_4 = -0.2438, p$-value = 0.8311).

In terms of the overall performance of the fitted LMPS model, the goodness of fit tests in the lower Panel of Table 2 indicate that the fixed effect method performs better than the random effects method. Although, the F-statistic (p-value = 0.0000) indicates that the results produced by the two methods are equally significant at less than 1% level, the Adjusted R-squared shows that the fixed effects model explains higher variation in market price per share than the random effect model. The fixed effects model ($\bar{R}^2$ = 0.9200) explains almost 93% of the observed variation market price per share, while the random effects model ($\bar{R}^2$ = 0.8750) accounts for approximately 88%.

Turning to the specification tests, both the Likelihood Ratio (p-value = 0.0000) and Hausman (p-value = 0.0000) test statistics are highly statistically significant, thereby strongly rejecting the random effects model assumption: namely, unobserved (latent) bank-specific effects are uncorrelated with the observed explanatory variables. Hence, our results suggest that the unobserved bank-specific effects (that is, differences in organizational culture, leadership, and management style), significantly affect the relationship between enterprise risk management, corporate governance, and bank stock market performance, measured in terms of market price per share. The implication of this finding is that our subsequent analysis of model 8 would focus only on the fixed effects results in Column 2 of Table 2.

From Table 3, we can see that seven out of the twelve banks in our sample have positive unobserved fixed effects, while the other five banks have negative unobserved effects. Banks with positive unobserved effects include GTB ($\phi = 0.9826$), SIBTC ($\phi = 0.9055$), ZENITH ($\phi = 0.6493$), ECOBANK ($\phi = 0.5861$), UNION ($\phi = 0.2440$), FBHN ($\phi = 0.2305$), and ACCESS ($\phi = 0.1557$), while banks with negative unobserved effects include FIDELITY ($\phi = -0.8094$), STERLING ($\phi = -0.7626$), FCMB ($\phi = -0.6596$), WEMA ($\phi = -1.4112$), and UBA ($\phi = -0.1109$).

4.2 Discussion of Findings

Our main objective is to determine the extent to which corporate governance moderates the relationship between enterprise risk management and bank financial performance. We measure corporate governance in terms of board size, while enterprise risk management index and market price per share are respectively used to proxy enterprise risk management and financial performance. Also, we examine the moderating effect of corporate governance in terms of the interaction between enterprise risk management and board size. Theoretically, corporate financial risk management blended with good governance structures and practices reduces agency costs and asymmetric information between managers and outsiders (creditors and shareholders) leading to higher performance and valuation. This implies that corporate governance plays a significant moderating role in the relationship between enterprise risk management and the stock market performance of a firm. Based on this theoretical argument, we expected *apriori*, that the coefficient linking the interaction term to market price per share would be highly significant so that the null hypothesis of no significant moderating effect of corporate governance in the financial performance model would be strongly rejected.

Contrary to our expectation, *apriori*, our empirical analysis shows that corporate governance has no significant moderating effect on the relationship between enterprise risk management and bank financial performance. As evident in Column 1 of Table 2, the coefficient on LBS has an estimated value of -0.2913 with a p-value of 0.1504, showing that board size has a negative but not statistically significant direct relationship with market price per share. Also, the coefficient on ERMI*BS is estimated at -0.2438 with a p-value of 0.8311 showing that the interaction between enterprise risk management and board size has a negative but not significant effect on market price per share. Hence, our empirical evidence does not support the rejection of the hypothesis that corporate governance does not significantly moderate the relationship between enterprise risk management and financial performance. This

finding tends to agree with several previous studies including Husaini and Rafika (2014), whose finding indicate no significant relationship between corporate governance, measured by board size, and firm value. On the contrary, the current finding contradicts Almoneef and Samontaray (2019), Gerged and Agwili (2020), Harun et al (2020), and Husaini (2017). The evidence reported in these studies indicate that the linkage between board size is positive and statistically significant.

The current finding shows that corporate governance does not significantly affect firm valuation, either directly or through its interaction with enterprise risk management. However, the negative sign attached to the estimated coefficients suggests that larger board size encumbers the positive relationship between enterprise risk management and firm valuation. This is consistent with the notion that larger board size leads to poorer communication and slower management decision making, thereby impeding financial performance. Hence, for listed deposit money banks in Nigeria, effective implementation of enterprise risk management requires smaller board size.

5 Summary and Conclusion

This study applies a dynamic panel regression model to firm-level data obtained from the Nigerian industry in an attempt to determine the strength of the effect of enterprise risk management on financial performance as well as the moderating influence of corporate governance on the empirical association between enterprise risk management and financial performance. The study constructs and enterprise risk management index which combines three financial risk measures: namely, capital risk, credit risk, and liquidity risk. Financial performance is examined from the stock market perspective using market price per share a measure. The data used comprise 144 bank-period panel observations obtained from 12 listed DMBs that are traded on the Nigerian exchange between 2010 and 2021.

Consistent with the fixed effect regression assumption, we find that unobserved bank-specific factors such as management philosophy and leadership style play a highly significant role in determining financial performance of the selected listed deposit money banks (DMBs) in Nigeria. We also find evidence that market price per share significantly depends on its previous performance, hence, it is highly persistent.

Our results also suggest that enterprise risk management index is highly significant and exerts a positive and sizable direct effect on financial performance. On the contrary, our empirical evidence shows that corporate governance, measured by board size, has no significant direct effect on financial performance and does not moderate significantly the empirical association between enterprise risk management and financial performance. However, our results tend to support the theoretical view that larger board size leads to poorer communication and slower management decision making, thereby impeding financial performance.

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