Enterprise Risk Management and Bank Valuation in the Stock Market: Evidence from the Nigerian Banking Industry

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Abstract

This study uses a dynamic panel regression framework to analyze the strength of the effect of the financial dimension of enterprise risk management on bank valuation in the Nigerian banking industry. Three financial dimensions of ERM are examined: namely, capital risk management, liquidity risk management, and credit risk management, while bank valuation is measured in terms of market price per ordinary share. 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. The empirical analysis is based on a regression model that controls for inflation and corporate governance in terms of board size. We find that market price per share is highly persistent as it depends on its one lagged value in a way that is highly statistically significant. We also find that while both credit risk management and liquidity risk management measures are not significant explanatory factors for bank valuation, capital risk management, measured by capital adequacy ratio, exerts a significant positive effect on bank valuation. Therefore, we conclude that the effect of the financial dimension of enterprise risk management on bank valuation depends on how the former is defined or measured.

Key words: *Enterprise risk management, financial risks, bank valuation.*

1 Introduction

Enterprise risk management has been proposed as a new, comprehensive, and integrated framework for predicting the overall corporate risk and achieving both short-run and long-run corporate objectives. The increasing adoption of a more comprehensive and integrated risk management framework across the world, especially in the banking industry, is closely linked to the increased volatility in the global business environment, which has exposed the inadequacy of the conventional but fragmented risk management methods (Quon et al., 2012). Enterprise risk management provides a framework that simultaneously capture all the risk dimensions (internal and external dimensions or financial and non-financial dimensions) of a firm (Arena et al., 2011; D'arcy & Brogan, 2001; Dickinson, 2001). It is also increasingly incorporated into the regulatory and supervisory frameworks (Mikes, 2009).

There are two leading factors that motivate enterprise risk management: namely, the unending cases of financial reporting scandals, especially, in large corporations, and the increasing demand for greater surveillance and oversight of major risks by corporate stakeholders (Beasley et al., 2005; Dickinson, 2001). Although, there are divergent theoretical views regarding both the meaning of the concept and its usefulness, there is, however, growing

evidence in the empirical literature suggesting that enterprise risk management provides a much better framework for modeling the overall risk of a company in line with the expectations of corporate stakeholders (Arena et al., 2011). In terms of conceptual ambiguity, the main issue revolves around the observed systematic variations in enterprise risk management practices across firms (Arena et al., 2011; Mikes, 2009). However, in terms of usefulness, the main issue is whether enterprise risk management practices have real impact on corporate performance or not (Arena et al., 2011).

This study employs a dynamic panel regression framework to examine the financial dimensions of enterprise risk management (ERM) and their effects on bank valuation using panel data on 12 listed deposit money banks in Nigeria covering the period from 2010 to 2021. The main objectives of the study are:

1. To determine the extent of the dependence of bank valuation on capital risk management.
2. To determine the extent of the dependence of bank valuation on credit risk management.
3. To determine the extent of the dependence of bank valuation on liquidity risk management.

The study contributes to the large and growing enterprise risk management literature by controlling for inflation and corporate governance while analyzing the effects of capital risk management, credit risk management, and liquidity risk management on bank valuation within a dynamic panel regression framework. This empirical modeling, to our knowledge, is novel in the Nigerian literature as much of the previous studies use the conventional multiple regression method.

2 Literature Review

Bohnert et al. (2019) empirically examine the firm-specific determinants of enterprise risk management as well as its impact on corporate value using a sample of European insurance firms. Their analysis involves 41 insurance firms and covers the period from 2007 to 2015. Enterprise risk management is measured by a dummy variable, which is assigned 1 if the firm is classified as a high-quality risk management system, or zero if the firm is classified as a low-quality risk management system. They find a positive and significant impact of enterprise risk management and corporate value, measured by Tobin's Q. Also, their results indicate that enterprise risk management is a positive function of firm size, while it is a negative function of corporate leverage and variance of monthly market returns.

Ebenezer et al. (2019) investigate effects of liquidity and interest rate risks on firm profitability and firm value using the panel data regression framework. Their empirical model includes bank size (natural logarithm, of total assets) and macroeconomic variables such as GDP and inflation as control variables. Their analysis is based on 567 firm-year observations on 63 commercial banks in ASEAN 5 countries from 2009 to 2017. They find that loan to deposit ratio exerts a positive and highly significant impact on firm value and return on assets, while its impact on return on equity is negative and highly statistically significant. Their findings also show that liquid assets to total assets ratio exerts a negative and significant impact on firm value and return on equity. However, its impact on return on assets is negative but not statistically significant.

Sitompul et al. (2020) examine the impact of non-performing financing on firm value for multi-finance companies in Indonesia. Their analysis is based on a sample of 14 multi-finance companies covering the period from 2015 to 2018. They find that non-performing loan ratio has a negative but not significant relationship with firm value.

Brastama and Yadnya (2020) investigate the impact of non-performing loans on bank stock prices in Indonesia using the classical multiple regression analysis. Their sample includes four listed banks and extends over the period from 2011 to 2018. Based on a model that controls for capital adequacy ratio and bank profitability, they find, among other things, that non-performing loan ratio has a negative and significant impact on bank stock prices.

In Nigeria, Chioma et al. (2021) examine the extent of the dependence of firm value on capital risk and liquidity risk for listed deposit money banks in Nigeria. They find, using the partial least square approach to structural equation modeling, and focusing on the period from 2010 to 2019, capital adequacy risk (capital adequacy ratio) exerts a significant positive effect on firm value, while the effect of liquidity risk (loan to deposit ratio) is not statistically significant.

Anetoh et al. (2021) consider the impact of liquidity risk on the value of listed deposit money banks in Nigeria within the structural equation modeling framework using the partial least square approach. They measure liquidity risk in terms of loan to deposit ratio, while firm value is proxied by Tobin's Q and price to book value ratio. Their

empirical analysis is based on sample that includes 13 listed deposit money banks over the period from 2010 to 2013. Based on a model that incorporate capital risk or capital adequacy ratio as a control variable, they find that liquidity risk has a positive but not significant relationship with firm value.

Ricardianto et al. (2023) use the path approach to partial least square to explore the empirical nexus between ERM, business strategy, firm competitiveness, and firm performance for shipping firms listed on the Indonesian stock market. The exploration is based on panel data on 13 purposively selected firms over a period of five years from 2015 to 2019 which gives a total of 65 panel observations. The reported evidence shows that enterprise risk management has no significant explanatory power for firm performance. On the contrary, it is found that business strategy exerts a significant direct effect on both firm competitiveness and firm performance. Their evidence further shows that enterprise risk management a positive and direct explanatory factor for firm competitiveness.

3 Methodology

3.1 Sample, Data and Variables

Our sample includes 144 bank-period panel observations for 12 listed deposit money banks in Nigeria covering from 2010 to 2021 (see Table 1 for the sampled banks and Table 2 for descriptive statistics for the study variables). Data on firm-specific variables are sourced from the annual reports and accounts of the individual banks accessed from their official websites and the Nigerian stock exchange. Inflation data are sourced from the CBN database. EViews is used for both descriptive and empirical analyses.

The dependent variable is bank valuation, which is measured by market price per share. Higher market price per share implies higher bank valuation.

The explanatory variables are 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. Higher capital adequacy ratio implies lower capital risk, while higher non-performing loan ratio implies higher capital credit risks. Also, higher loan to deposit ratio implies lower liquidity level and higher liquidity risk.

The control variables are corporate governance and inflation. While corporate governance is represented by board size, inflation is measured by year on year change in consumer price index.

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

Table 2: Descriptive Statistics

Variable	Mean($\bar{x}$)	Std. Dev. (σ)	CV	Skew.	Kurt.	Observations.
MPS	10.33	10.29	99.67	1.55	5.09	144
CAR	19.97	4.72	23.66	0.50	3.25	143
NPLR	6.27	6.13	97.82	4.75	33.87	143
LTDR	63.22	14.12	22.33	0.27	2.82	142
BS	13.16	2.66	20.25	-0.12	2.92	144
INFL	12.35	3.19	25.83	0.35	2.12	12

3.2 Model Specification

To investigate the impact of ERM on bank valuation, we employ a dynamic panel regression framework. Two conventional approaches under the panel regression framework are employed: namely, the fixed effect and the random effect methods. The fixed effect regression method uses the OLS framework to analyze the empirical relationship of interest with the assumption that cross-sectional heterogeneity or latent bank-specific variables (such as management quality, organizational culture, and leadership style) are significant explanatory factors for bank valuation. On the other hand, the random effect method follows the generalized least square approach based on the assumption that latent bank-specific factors are generalized by an error process and are, hence, not significant determinants of bank intermediation efficiency or performance.

We specify the functional model for the impact of enterprise risk management dimensions on market price per share as follows:

$$MPS = f(CAR, LNPLR, LTDR) \quad (1)$$

Where:

MPS = Market price Per Share

CAR = Capital Adequacy Ratio

NPLR = Non-Performing Loan Ratio

LTDR = Loan to Deposit Ratio

The econometric parameterization of the above functional model is given as follows:

$$\text{MPS}_{it} = \lambda_0 + \phi_i + \lambda_1 MPS_{it-1} + \lambda_2 CAR_{it} + \lambda_3 NPLR_{it} + \lambda_4 LTDR_{it} + u_{it} \quad (3.12)$$

Where λ_0 is the model intercept representing the average value of MPS when all other explanatory factors are zero; ϕ_i represents the unobserved bank-specific effects or heterogeneity factor; λ_1 dynamic parameter capturing the effect of lagged market price per share; λ_2, λ_3, and λ_4 are the main explanatory factors respectively capturing the effects of capital adequacy ratio, non-performing loan ratio, and loan to deposit ratio; and u_{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 and market price per share is consistent with the fixed effects theory.

4 Empirical Analysis

4.1 Model Estimation

In the methodology section, we specify market price per share (MPS) to depend on the three main explanatory factors: namely, capital adequacy ratio (CAR), non-performing loan ratio (NPLR), and loan to deposit ratio (LTDR), and two control variables: namely, lagged market price per share, corporate governance, and inflation. As stated previously, all variables enter the model in their logarithmic form. In this subsection, we estimate this model using the two main conventional panel data methods: namely, Fixed Effects and Random Effects, and the regression results are presented in Table 3. 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 cross-sectional heterogeneity/bank-specific effects.

Table 3: Panel Regression Results for Model 3; parenthesis contains p-values.

Variables	**1**	**2**
	FEM	**REM**
Constant (λ_0)	1.1770 (0.2979)	-1.4318 (0.1153)
LMPS (-1) (λ_1)	0.3076*** (0.0002)	0.9025*** (0.0000)
LCAR (λ_2)	0.6371*** (0.0013)	0.6168*** (0.0001)
LNPLR (λ_3)	-0.0784 (0.2095)	0.0246 (0.6447)
LLTDR (λ_4)	-0.2504 (0.1345)	-0.0467 (0.7370)
LBS (λ_5)	-0.2920 (0.1610)	-0.2382* (0.0879)
LINFL (λ_6)	0.0259 (0.8253)	0.2174* (0.0538)
R^2	0.9284	0.8842
$\bar{R}^2$	0.9177	0.8787
F-ratio	86.964*** (0.0000)	159.19*** (0.0000)
DW	1.7448	2.0752
Likelihood Ratio (LR)	63.394*** (0.0000)	–
Hausman Test	–	68.653*** (0.0000)

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

Table 4: Estimated Unobserved Cross-Sectional/Bank-Specific Effects

S/n	**Bank**	**Cross-sectional Heterogeneity**
1	ECOBANK	0.5798
2	FBHN	0.2202

3	SIBTC	0.8980
4	Sterling	-0.7475
5	UNION	0.2490
6	WEMA	-1.3928
7	Zenith	0.6421
8	Fidelity	-0.8005
9	UBA	-0.1205
10	ACCESS	0.1544
11	FCMB	-0.6569
12	GTB	0.9746

From the upper Panel of Table 3, we can see that the signs of the fixed effects estimates are consistent with those of the random effects for most of the variables, except for non-performing loan ratio which has mixed signs. For ERM variables, λ_2 consistently has a positive sign and a very low p-value, while λ_4 consistently has a negative sign and a high p-value. This shows that market price per share moves in oppositive direction with loan to deposit ratio but moves in similar direction with capital adequacy ratio. On the other hand, λ_3, which captures the effect of non-performing loan ratio has mixed signs, being associated with a positive sign for the random effects method and a negative sign for the fixed effects method. However, for both methods, the p-values show that only the effect of capital adequacy ratio (p-value < 0.01) is statistically significant.

For the control variables, the results are largely similar for different methods, especially with respect to the signs of the estimated coefficients. While market price per share is a positive function of both its own lagged value and inflation, it is negatively related to board size. For lagged market price per share, the fixed effects estimate of λ_1 is 0.3076 with a p-value of 0.0002, while the random effects estimate is 0.9025 with a p-value of 0.0000. Although, these coefficients differ greatly in size, they are both significant at less than 1% level, showing that bank market prices can be largely predicted based on their immediate history. For inflation, the fixed effects estimate of λ_6 is 0.0259 with a p-value of 0.8253, while the random effects estimate is 0.2174 with a p-value of 0.0538. However, the random effects coefficient is much higher in both magnitude and level of significance than that of the fixed effects. For board size, the fixed effects coefficient is estimated at -0.2920 with a p-value of 0.1610, whereas the random effects coefficient has an estimated value of -0.2382, with a p-value of 0.0879. Although, both coefficients have similar signs, however, like inflation, the fixed random effects coefficient achieves significance at the 10% level, while the fixed effects coefficient lacks statistical significance.

In terms of the overall performance of the fitted MPS model, the goodness of fit tests in the lower Panel of Table 3 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 coefficient of determination shows that the fixed effects model explains higher variation in market price per share than the random effect model. The fixed effects model ($\bar{R}^2$ = 0.9177) explains almost 92% of the total observed variation in market price per share, while the random effects model ($\bar{R}^2$ = 0.8787) accounts for approximately 88%. However, the residual diagnostic test shows that the random effects method outperforms the fixed effects method. While the random effects Durbin Watson is 2.0752, which approximately its ideal value of 2, the fixed effects Durbin Watson is estimated at 1.7448 which is reasonably below 2.

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 rejecting the random effects model and validating the fixed effects argument that unobserved (latent) bank-specific effects are important explanatory factors for market price per share of the selected banks in our sample. Hence, like all the previous cases, our results suggest that the heterogeneity parameter (ϕ_i), which accounts for the unobserved bank-specific effects (that is, differences in organizational culture, leadership, and management style), significantly moderate the relationship between enterprise risk management and bank stock market performance measured in terms of market price per share. Again,

the implication of this finding is that our subsequent analysis of model 3 would focus only on the fixed effects results in Column 1 of Table 3.

From Table 4, 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 ($\phi = 0.9746$, SIBTC ($\phi = 0.8980$), ZENITH ($\phi = 0.6421$), ECOBANK ($\phi = 0.5798$), UNION ($\phi = 0.2490$), FBHN ($\phi = 0.2202$) and ACCESS ($\phi = 0.1544$), while banks with negative unobserved effects include WEMA ($\phi = -1.3928$), FIDELITY ($\phi = -0.8005$), STERLING ($\phi = -0.7475$), FCMB ($\phi = -0.6569$) and UBA ($\phi = -0.1205$).

4.2 Discussion of Findings

4.2.1 Capital Risk Management and Banks' Market Value

Our first objective is to determine the extent to which capital risk management enhances bank valuation. Capital risk management is measured by capital adequacy ratio while banks market value is measured in terms of market price per share. According to the irrelevance theory of Modigliani and Miller (1958), the composition of a firm's capital has no explanatory power for its market value. However, both agency theory and asymmetric information or signaling theory contend that changes in capital ratios can significantly influence investors' pricing model as they provide signals regarding the quality of management and the future direction of a firm. This implies a direct relationship between capital risk management and firm value. Hence, we expected, *apriori*, that the coefficient linking capital adequacy ratio to market price per share would be highly significant so that the null hypothesis of no significant effect of capital risk management on bank market value would be strongly rejected.

Consistent with our expectation, *apriori*, our empirical analysis shows that capital risk management has a highly significant impact on bank valuation. As evident in Column 1 of Table 3, the coefficient on LCAR (λ_2) has an estimated value of 0.6371 with a p-value of 0.0013, showing that the impact of capital adequacy ratio on return on assets is positive and statistically significant at the 1% level. Hence, contrary to Modigliani and Miller (1958), our empirical evidence leads to the rejection of the hypothesis that capital risk management has no significant impact on bank market value. The positive sign attached to the LCAR coefficient shows that an increase in capital adequacy ratio is associated with an increase in market price per share. More specifically, the estimated coefficient shows that a 1% increase in capital adequacy ratio would, on average, lead to an increase in market price per share by about 0.64%, other factors remaining unchanged. Hence, the effect of capital adequacy risk management on firm value is sizable and economically significant. Our finding agrees with Bertinetti et al. (2013) and Chioma et al. (2021).

The current finding, which is consistent with both agency theory and signaling theory suggests that capital risk management is a strong determinant of the bank price movement in the Nigerian stock market. This implies that information about banks' capital risk management are significantly priced in the Nigerian stock market. This also implies that banks with higher capital ratios are more priced in the Nigerian stock market than banks with lower capital ratios. One plausible explanation of this finding is that bank managers deliberately disclose information regarding their capital risk management to reduce the information gap between them and shareholders and other stakeholders, and to influence investors' perception of their management quality. Another plausible explanation is that investors consider increase in capital adequacy ratio of a bank as a signal that the bank is immune to moral hazard and other financial risks associated with bank lending and liquidity.

4.2.2 Credit Risk Management and Banks' Market Value

Our second objective is to determine the extent of the effect of credit risk management on bank valuation. We measure credit risk management in terms of non-performing loan ratio, while bank market value is measured in terms of market price per share. Theoretically, there is a direct relationship between credit risk management and firm value. According to the asymmetric information theory, information regarding a bank's credit rating or credit risk management can provide a strong signal to investors who rely on them to determine the value of the bank in the stock market. Hence, changes in non-performing loan ratio are incorporated into the pricing model of bank investors. Based on this theoretical view, we expected, *apriori*, that the coefficient linking non-performing loan ratio to market price per share would be highly significant so that the null hypothesis of no significant effect of credit risk management on bank market value would be strongly rejected.

Contrary to our expectation, *apriori*, our empirical analysis shows that credit risk management has no significant impact on bank valuation. As evident in Column 1 of Table 3, the coefficient on LNPLR (λ_3) has an estimated value of -0.0784 with a p-value of 0.2095, showing that the impact of non-performing loan ratio on market price per share is not statistically significant. Hence, contrary to the signaling theory, our empirical evidence does not support the rejection of the hypothesis that credit risk management has no significant impact on bank market value. However, the negative sign attached to the estimated LNPLR coefficient agrees with the theoretical prediction and shows that non-performing loan ratio moves in opposite direction with market price share. More specifically, the estimated coefficient shows that *ceteris paribus*, a 1% increase in non-performing loan ratio would, on average, lead to a reduction in market price per share by about 0.08%. Hence, the effect of credit risk management on firm value is marginal and lacks economic significance. Our finding agrees with Sitompul et al. (2020). On the contrary, our finding contradicts several empirical studies including Brastama and Yadnya (2020), Ozurumba (2016), Poudel (2012), and Sugianto et al. (2020).

The current finding, which contradicts the signaling theory, suggests that credit risk management is not a significant explanatory factor for bank price movement in the Nigerian stock market. This implies that information about banks' credit risk management are not significantly priced in the Nigerian stock market. While the negative correlation between non-performing loan ratio and market price per share shows the tendency for investors in the Nigerian banking industry to penalize banks with high credit risk or poor credit risk management, the lack of significance of this correlation reflects the constant intervention by the CBN and other regulatory bodies to reduce the impact of non-performing loans in the Nigerian economy. Hence, our result is significant as it has revealed the extent of success recorded so far by the CBN relating to its prudential policies and other regulatory interventions in the banking sector.

4.2.3 Liquidity Risk Management and Banks' Market Value

Our third objective is to determine the extent to which liquidity risk management enhances bank valuation. We measure liquidity risk management in terms of loan to deposit ratio, while bank market value is measured in terms of market price per share. Theoretically, there is a direct relationship between liquidity risk management and firm value. According to the asymmetric information theory, information regarding a bank's liquidity risk can provide a strong signal to investors who rely on them to determine the value of the bank in the stock market. Hence, changes in a bank's liquidity position are typically incorporated into the pricing model of bank investors. Based on this theoretical view, we expected, *apriori*, that the coefficient linking loan to deposit ratio market price per share would be highly significant so that the null hypothesis of no significant effect of liquidity risk management on bank market value would be strongly rejected.

Contrary to our expectation, *apriori*, our empirical analysis shows that credit risk management has no significant impact on bank valuation. As evident in Column 1 of Table 4, the coefficient on LLTDR (λ_4) has an estimated value of -0.2504 with a p-value of 0.1345, showing that the impact of loan to deposit ratio on market price per share is not statistically significant. Hence, contrary to the signaling theory, our empirical evidence does not support the rejection of the hypothesis that liquidity risk management has no significant impact on bank market value. However, the negative sign attached to the estimated LLTDR coefficient agrees with the theoretical prediction and shows that loan to deposit ratio moves in opposite direction with market price share. More specifically, the estimated coefficient shows that *ceteris paribus*, a 1% increase in loan to deposit ratio would, on average, lead to a reduction in market price per share by approximately 0.25%. Hence, the effect of liquidity risk management on firm value is appreciable, though it lacks statistical significance. Our finding agrees with Anetoh et al. (2021). On the contrary, however, our finding contradicts Ebenezer et al. (2019), and Huong et al. (2021).

The current finding suggests that liquidity risk management is not a significant explanatory factor for bank price movement in the Nigerian stock market. This implies that information about banks' liquidity risk management are not significantly priced in the Nigerian stock market. However, the negative correlation between loan to deposit ratio and market price per share shows the tendency for investors in the Nigerian banking industry to penalize banks with high liquidity risk or poor liquidity risk management.

5 Summary and Conclusion

This study uses a dynamic panel regression framework to analyze the strength of the effect of the financial dimension of enterprise risk management on bank valuation in the Nigerian banking industry. Three financial dimensions of ERM are examined: namely, capital risk management, liquidity risk management, and credit risk

management, while bank valuation is measured in terms of market price per ordinary share. 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. The empirical analysis is based on a regression model that controls for inflation and corporate governance in terms of board size.

The findings indicate that the empirical association between ERM and bank valuation is governed the fixed effect theory, which implies that cross-sectional heterogeneity is an important dimension of this association. We also find that market price per share is highly persistent as it depends on its one lagged value in a way that is highly statistically significant.

Further, our results show that both credit risk management and liquidity risk management are not significant explanatory factors for bank valuation. On the contrary, capital risk management, exerts a highly significant positive effect on bank valuation. Hence, contrary to Modigliani and Miller (1958), bank capital management is important for investors in determining the market value of banks in the stock market.

Overall, our findings suggest that the effect of the financial dimension of enterprise risk management on bank valuation depends on how the former is defined or measured.

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