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The Relationship between Corporate Risk Management Adoption and Corporate Value in China Listed Banks

Zhenjia Liu

School of Accounting and Finance, Tan Kah Kee College, Xiamen University, Xiamen, Fujian, China

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Abstract: Existing studies have indicated that corporate risk management effect of adoption on corporate value. However, applicability of the empirical evidences has not been studied extensively in China listed banks. We examined that the relationship between corporate risk management adoption and corporate value in China listed banks. We adopt the ERM index originated from COSO framework to measure enterprise risk management and economic value added (EVA) to calculate firm performance. We used 37 China listed banks from 2013 to 2021. Regression model was used to test our hypothesis. The empirical results showed that enterprise risk management adoption has non-significantly with economic value added (i.e., corporate performance or value). On the other words, we could not find out their relation.

1. Introduction and Background

Firms should face external operations environment, such as wars, epidemic spreading, financial failure, extreme climate, fraudulent practices, external supervision etc. Current article has also indicated that the managers prefer risk-averter and risk has positive relationship with returns [1]. We will examined that how and why firms manage and control risk because risk management could be make profits for a firm. On the other hands, enterprise risk management would seek to maximize stakeholders' (i.e., managers, investors or creditors etc.) value. An empirical research show that firm risk play an important role in competitive strategy, thus a risk management process is central to determinant of which firms survive, grow or decline and die [2]. Furthermore, they also supported that enterprise risk control is a process or mechanism because it transmit a signal through operations. A research also show that risk management such as identification, assessment, or control and monitor has a significant relationship with a firm's operation to maximum opportunities, thus successful enterprises are able to conduct risk control effectively at whole process of operation[3]. A article examine Nigeria deposit money banks and defined corporate governance is also a risk management tool to analyzed operational information [4]. In addition, the empirical results showed that a governance system and the bank's operating are significantly positive. They also suggest that enterprises risk control strategies could improve quality control in financial institutions.

Empirical studies have indicated the relationship between corporate risk control and corporate value. For example, an article find out enterprise risk management and firm performance are significantly positive because taxes, costs and the probability of failure have been reduced[5].

Furthermore, the research also examine that corporate risk control is significantly positive related to corporate value [6]. On the other hands, a study indicate that corporate risk management has a significantly relationship with corporate value in the Malaysian listed enterprises [7] and show that enterprise risk management implementation is significantly positive with corporate performance such as accounting or market index originated from listed Italian non-financial listed firms because the negative consequences have been reduced and decision-making such as operational and strategic have also been improved [8]. Furthermore, another article indicate that the effectiveness of enterprise risk control and firm value are significantly positive in UK listed enterprises [9]. They focus on the effectiveness of ERM process. Besides it, Farrell and Gallagher show that maturity of corporate risk management is significantly positive related to company value such as Tobin's Q[10]. *Khan* reveal that adopt ERM process is significantly related to firm value because this process improve investor confidence[11]. Callahan and Soileau show that a high level of enterprise risk management program and operating performance is higher originated from listed U.S firms [12].

However, a study support that enterprise risk management implementation is non-significantly with company's value originated from listed Indonesia listed banks because the implementation is only compliance with the regulation[13]. Another research adopted Malaysian 174 listed firms and indicate that firm strategy has an influence on corporate risk control adoption and firm value [14]. They also showed that cost leadership strategy is positively related to conduct enterprise risk management. On the other hands, they also find out corporate risk management adoption has significantly positive with corporate value. In addition, they found that enterprise risk management performance. Overall, they emphasized corporate governance plays an importantly role in risk management.

A research adopted Nigerian listed firms and examine that corporate governance or risk management and corporate value are related. They defined board characteristics is a proxy of corporate governance and could be also an enterprise risk management tool. Their empirical results suggest that how risk control relate to company value from literature and theoretical review[15]. Another authors explore risk control activities and firm's performance are related and adopted Croatian non-financial companies. The study suggest an efficient risk management improve overall enterprise value. Overall, their empirical results suggest this relationship[16]. The related study adopt Saudi listed firms and VAR or GLM are major approaches. Furthermore, they found out agency conflicts has an influence on enterprises risk control and firm value [17]. An author find out risk management committee's and firm's market value are related and adopt Malaysia listed firms. Their empirical results showed risk management committee members are significantly negative related to firm performance, however they also showed that overall risk control committee members has significantly positive with risk management expertise and firm performance because specific risk management expertise can improve firm operating and promote risk is controlled therefore, increasing the performance of corporate[18]. Another study adopt US listed firms and examine the relationship between corporate risk control and firm's market performance. They showed that corporate risk control and firm market performance are significantly positive relationship following the announcement of ERM implementation but these firms have a lower market performance for a long time[19]. Furthermore, a study adopted Malaysia listed firms and examine that the relationship between corporate risk control and firm's economic value (i.e., Economic Value Added) is a proxy of firm's value. Furthermore, they developed regression to test the related hypothesis and revealed that corporate risk management implementation is significantly positive with operating profit or ROIC. In addition, weighted average cost of capital could be decreased with corporate risk management implementation, thus increasing a firm's economic value. Overall, firm's performance as a consequence from its ERM implementation [20].

However, the related authors also report that ERM is non-significantly positive with the value of

enterprises [21]. Besides it, the empirical results find out the quality of enterprises risk management is non-significant related to company performance such as market value particular, in the financial crisis [5,22]. Another author adopt a sample of Spanish non-financial listed firms and evaluated that the relationship between enterprise risk control and firm performance [23]. The enterprise risk management information are originated from the related reports and the data of performance could be searched by the Iberian System or databases. Overall, they showed that the adoption of enterprises risk management is non-significant related to value of Spanish firms such as ROE, ROA, and Market value due to firm's performance can be improved by CRO (i.e., chief risk officer).

An author adopt Turkish listed non-financial firms and examine that the impact of corporate risk on firm value. The quantitative and qualitative methodology could be analyzed [24]. They defined firm risk management practices such as financial and operational risks, particular in overall corporate risk control. The empirical results suggest that risk control practices has no significant relationship with corporate performance and imply managers should improve disclosures on risk control and governance mechanism in emerging markets.

Traditional accounting indices for measuring firm performance. Financial performance analysis help owners, managers or investors to measure corporate advantages and disadvantages. However, theses related ratios such as ROA, ROE, EPS should be followed by GAAP. Economic value is a specific method calculated by [25] and taken funds cost. Furthermore, it reflects the true value of a corporate through using net operating profits minus the cost of capital. Furthermore, the bank is a special operate environments with other industries. The specific regulations for banks have a direct effect on the adoption of ERM. China's banks has grown bigger. ICBC is the largest banks in the world Bank and the state-owned commercial banks in China. China banks have also the impact on world economy.

Some international investors or banks announced its expansion plan in China. Therefore, we use data from China listed banks to analyze the effect of corporate risk management on economic value added (i.e., enterprises value). We adopted [26] to measure ERM and followed [25] to measure EVA (i.e, corporate performance) with unadjusted items. It is also the first study to analysis this relation with China listed banks. This study aims to explain follow questions: (1) Do China listed banks implement enterprise risk management to improve the firm performance? (2)Do these banks improve the corporate value through EVA? (3) Do these banks improve the enterprises value through EVA, applicability of the regression model in extensively in China listed banks? We indicated that China listed banks do not focus on implementing enterprise risk management to corporate value (i.e., economic value added). This result is not supported with the existing articles due to this relationship is not significantly.

2. Literature Review and Hypothesis

2.1. Enterprise Risk Management and Corporate Performance

A research indicate that enterprises size and corporate value are significantly positive because larger companies have less share prices volatility [27]. It imply that risk of exposure and profitability are also significantly positive in larger stock market. Two researchers show that maintain ERM can reduce bankruptcy because the average capital cost has been reduced through conduct enterprise risk management [28,29]. Another authors also support this result because probability of bankruptcy or distress could be reduce through ERM implementation([30,31]).

Farrell and Gallagher investigate that the firm value could be improved by an risk management program. Ai examine that corporate risk control programs and enterprises performance are related in property and casualty insurers[32]. They select certain types of risks to measure corporate risk and used return of assets and Q value to reflect firm's value[33]. In addition, they found that a quality of

corporate risk control programs has a significantly positive relationship with firm value. It is likely that stakeholders in property and casualty insurers can obtain with firm risks information, therefore firm's value can be created and integrate risk management process.

Silva adopted market value such as Q value to calculate corporate value in the Brazilian listed firms. Their empirical results indicate that a positive relationship with firm risk control and enterprises performance because this mechanism provides inside or outside stakeholders with firm risks information, particular in internal and external risks etc., therefore firm can be efficiently managed to create value [34]. *Ali* adopt the Islamic bank in Pakistan and used structured questionnaires from the managers for data or non-financial indices to measure firm value. SEM model (i.e, structural equation modeling) is also conducted to test this research [35]. In addition, they examine that the firm risk control practices and firm's performance are significantly related and showed that enterprise risk management practices have a positive effect on the performance of Islamic financial firms. *Callahan, and Soileau* follow COSO enterprises risk management framework to develop corporate risk control process and find out firms with mature ERM processes can enhanced operating performance. Their empirical results showed that overall corporate risk control and the related process achieve a suitable entity objective could be assured[12].

Šofrankova examine that an enterprise performance assessment model and set up non-traditional corporate risk control models are a suitable proxy of risk control tools. They also suggest that the related risks such as internal, external systematic and non-systematic risks has a influence on the firm value in Slovakia firms [36]. A research examined that the relationship between ERM and enterprise's performance through economic value added [37]. They used a sample for cross sectional and supported enterprise risk management is a major tool to manage firm risks. In addition, they adopted structure, governance, and process to measure ERM implementation framework. Their empirical results indicated that ERM is significantly positive with economic value added.

Most of the previous studies also examine the agency theory that enterprises performance could be increased by enterprises risk management ([7,12,26]). Agency theory emphasize the managers should be seek to maximize of shareholder value. Therefore, firm risk control implementation may be a significantly relationship with corporate value due to the negative consequences of risks have been reduced (i.e., positively affect investors' perceptions), improved operational and strategic decision-making processes (i.e., enhance corporate governance). Accordingly, we proposed the hypothesis:

Hypothesis1: enterprises risk management implementation are significantly positive with corporate value

3. Methodology

We examined the effect on ERM adoption and corporate performance originated the China listed banks from 2013 to 2021. Data was used to predict by using data from the COMPUSTAT – Capital IQ database, and annual reports. The study comprised 237 samples. The related variables and statistical models are as follows.

3.1. Dependent Variables: Corporate Performance

We followed [25] to measure unadjusted economic value added in one way (see [38]).

3.2. Independent Variable (ERM Implementation)

Our study revises the ERM proxy from [26] and follow COSO framework (2004) such as strategy, operations, reporting and compliance to measures enterprise risk management. The fourth objectives

is divided into two independent measures for each objective as follows:

$$\text{ERM} = \sum_{K=1}^{2} Strategy_k + \sum_{K=1}^{2} Operations_k + \sum_{K=1}^{2} Reporting_k + \sum_{K=1}^{2} Compliance_k \quad (1)$$

Each indicator data originated from 37 banks in Eq. (1) by depending on the economic nature of the indicators.

$$Strategy_1 = (SALES_{it} - AVGSALES_{it}) / STDSALES_{it} \quad (2)$$

Where, $SALES_{it}$ = the sales for t. $AVGSALES_{it}$ = the total average sales in industry for t. $STDSALES_{it}$ = the t year the standard deviation of the revenues in banks. The variable revealed that t year sales above or below industry, thus this strategies (i.e., sales) may control or not risk.

$$Strategy_2 = (\Delta\beta_{it} - \mu\Delta\beta_{it}) / \sigma\Delta\beta_{it} \quad (3)$$

$\Delta\beta_{it}$ = the change of beta value for t; $\mu\Delta\beta_{it}$ = the t year the average change of system risk in banks; $\sigma\Delta\beta_{it}$ = the t year the standard deviation of the change of system risk in banks. This variable also revealed that t year sales above or below industry, thus this strategies (i.e., sales) effective or less effective strategy reduce risk.

$$Operations_1 = (SALES_{it} / TA_{it}) \quad (4)$$

Where, $SALES_{it}$=the sales for t. TA_{it}= the total assets for t. The variable revealed that t year assets efficient or in-efficiently used.

$$Operations_2 = (SALES_{it} / EMPLOYEES_{it}) \quad (5)$$

Where, $SALES_{it}$=the sales for t.$EMPLOYEES_{it}$= the number of employees for t. The variable revealed that t year human resources efficiently or in-efficiently used.

$$Reporting_1 = (MW_{it} + AO_{it} + REST_{it}) \quad (6)$$

Where, MW_{it}= the t year material weakness of internal control disclosed; AO_{it} = the t year auditor opinions disclosed; $REST_{it}$ = the t year announce of financial statements restatements. We select samples of listed China banks may be disclosed in the financial reports or weakness of internal control or provided by the Government. This variable Material Weakness is a dummy variable and set to -1, otherwise it is set to 0. Firms with unqualified opinions in their auditor's report have the variable auditor opinion is also a dummy variable and set equal to 0, otherwise it is set to -1. On the other hands, if a firm announced a restatement in sample years, this variable restatement is set to-1, otherwise it is set to 0.

$$Reporting_2 = \frac{|NDLLP_{it}|}{(|NLLP_{it}| + |DLLP_{it}|)} \quad (7)$$

Loan portfolio plays an important role in bank operations, thus managers may manipulate earnings through loan loss provisions ([39]). We follow [40] to measure discretionary loan loss provisions ($DLLP_{it}$, see Appendix 1).

$$LLP_{it} = a_1 + a_2 NPL_{it-1} + a_3 \Delta NPL_{it-1} + a_4 \Delta TL_{it} + \varepsilon_{it} \quad (8)$$

Where LLP_{it} is the t year loan loss provisions divided by the beginning loans for t year; NPL_{it-1} is the t year non-performing loan divided by the beginning loans for t year; ΔNPL_{it-1} is the t year change of non-performing loan divided by the beginning loans for t year; ΔTL_{it} is the t year change of total loans divided by the beginning loans for t year. $DLLP_{it}$ is the t year discretionary or abnormal loan loss provisions and measured by the absolute value of ε_{it}. Thus, Non-discretionary loan loss provisions ($NLLP_{it}$) is $NDLLP_{it}$. Overall, higher levels of loan loss provisions decrease earnings.

$$Compliance_1 = AF_{it} / TA_{it} \quad (9)$$

AF_{it} is the t year auditor fees; TA_{it} is the t year total assets.

$$Compliance_2 = SNGL_{it} / TA_{it} \quad (10)$$

$SNGL_{it}$ is the t year settlement net gain or loss; TA_{it} is the t year total assets.

3.3. Control Variables

The related articles indicated that capital structure, firm size, intangible assets, market value added, earnings per share, have a significantly relationship with economic value added [41,42,43]. This article followed these variables as follow as to measure the control variables: capital structure (i.e, debt ratio) is the t year debt divided by the t year assets; firm size is the t year sales; Intangible assets ability is the t year intangible assets; market value added is the t year outstanding stocks multiplied by the t year per stock price minus the t year equity; earnings per share is the t year net income minus preferred dividends divided by the t year outstanding stocks.

3.4. Empirical Model

$$EVA_{it,n} = a_1 + a_2 ERM_{it} + a_3 DB_{it} + a_4 SIZE_{it} + a_5 IA_{it} + a_6 MVA_{it} + a_7 EPS_{it} + \varepsilon_{it} \quad (11)$$

Where ERM_{it} is the t year enterprise risk management index (i.e., ERM index); $EVA_{it,n}$ is the t year unadjusted economic value added; DB_{it} is the t year debt divided by the t year assets; $SIZE_{it}$ denotes is the t year sales; IA_{it} is the t year intangible assets. MVA_{it} is the t year market value added. EPS_{it} is the t year earnings per shares.

3.5. Robustness Test

In order to avoid extremely possible bias from abnormal values, we substitute the sample data of from the 5th percentile to the 95th percentile for full sample data to measures for the robustness test [44].

4. Empirical Results

4.1. Descriptive Statistics

Table 1: Descriptive statistics: all samples (RMB dollars).

	Max	Avg	Min	Std
EVA_{it} (tenthousands)	894000000	2720000000	259000000	428308000
ERM_{it}	24.90	-0.25	-56.00	5.14
DB_{it}(%)	0.95	0.93	0.90	0.01
$SIZE_{it}$(ten thousands)	8910000	1530000	22100	2075860
IA_{it}(ten thousands)	266000	36700	0	65153.79
MVA_{it}(ten thousands	8020000	1830000	-32700000.	5166750
EPS_{it}(per share,$)	4.61	1.22	0.33	0.74
Samples	237			

According to Table 1, it shows the mean EVA (unadjusted) is above zero in China listed banks. We showed that economic value added is increasing. On the other hands, EPS (i.e., earnings per share)

and market value added are both above zero. These empirical results reveal that financial conditions is better and conservative in China listed banks. In addition, capital structure (i.e., debt ratio) also reveal that financial conditions is conservative. (i.e., China listed banks have more bank's own capital).

Where ERM_{it} is the t year enterprise risk management index (i.e., ERM index); $EVA_{it,n}$ is the t year unadjusted economic value added; DB_{it} is the t year debt divided by the t year assets; $SIZE_{it}$ denotes is the t year sales; IA_{it} is the t year intangible assets. MVA_{it} is the t year market value added. EPS_{it} is the t year earnings per shares.

4.2. Empirical Test

Table 2 indicates that enterprise risk management is significantly positive with EVA of all listed banks in China. Therefore, enterprise risk management implementation may greatly enhance corporate performance such as economic value. In addition, enterprise risk management through managing risks reduce the consequence of uncertainties. This is consistent with the maximization of shareholder value. It also shows China listed banks whose Committee of Sponsoring Organizations corporate risk management framework is effectively, however, this relationship has also non-significantly.

It is also likely that China listed banks face more significant risks such as interest rate, political risks or stricter regulations and they may make risks control more closely dissected and monitored from board level or governments, thus hinder the effectiveness of ERM adoption. Furthermore, another possible reasons are (1) banks investors may not focus on ERM behavior or economic value added, they has only generated a favorable image of banks earnings; (2) the limitations of sample selection in the empirical studies, we only selected data after 2008 to test our hypothesis. Overall, Hypothesis 1 is not supported.

Based on control variables, we included capital structure, firm size, intangible assets, market value added, earnings per share into the model for comparative analysis. Debt ratio is non-significantly negative with economic value added; Size (sales) is significantly positive with economic value added; Intangible assets is non-significantly negative with economic value added; market value added is non-significantly negative with economic value added; Earnings per share (EPS) is significantly positive with economic value added. Size is calculated by taking the sales. We showed that sales is significantly positive related to corporate economic value because higher sales can efficiently improve performance (i.t., net income) or higher sales are more likely to have stable earnings for China listed banks.

Table 2: Regressions of Enterprise Risk Management with economic value added.

Independent variable \ Dependent variable	EVA_{it}
intercept	1.8807E+14
ERM_{it}	8.5085E+10
DB_{it}	-2.0248E+14
$SIZE_{it}$	62.8824627***
IA_{it}	-581.144625
MVA_{it}	-4.5201E+12
EPS_{it}	45.6684449***
F-value	35.0543***
R^2	0.464043
samples	237

In addition, earnings per share (EPS) is assumed related to profitability. Profitability is a measure of business operating results, thus higher earnings per share also rapidly reflect the current of performance is significantly positive with corporate economic value based on the empirical study on China listed banks. In addition, VIF below 10 (from 1.152 to 1.348). The empirical results indicate that these regression models are reasonable and robust (i. e, variables are not high collinearity).

Where ERM_{it} is the t year enterprise risk management index (i.e., ERM index); $EVA_{it,n}$ is the t year unadjusted economic value added; DB_{it} is the t year debt divided by the t year assets; $SIZE_{it}$ denotes is the t year sales; IA_{it} is the t year intangible assets. MVA_{it} is the t year market value added. EPS_{it} is the t year earnings per shares *** represents statistic significant at 1% level; ** represents statistic significant at 5% level; * represents statistic significant at 10% level.

5. Conclusion

Existing articles have been widely discussed enterprise risk management. The purpose of this paper is to investigate that the relationship between corporate risk management adoption and corporate value. Banks under stricter regulations from governments, they may make risks control more closely dissected and monitored. Previous research has not shown that the relation between corporate risk management and corporate value in China. It is also the first study to analysis this relation with China listed banks. This study collects firm-year 237 observations (37 China listed banks) from 2013 to 2021. ERM index is measured by COSO-ERM framework [26] (i.e., the proxy of corporate risk management) and economic value added is proxy of corporate performance. The empirical results showed that effectiveness of corporate risk management adoption is non-significantly positively to economic value added in China listed banks. It shows that China listed banks face more significant risks such as interest rate, political risks and under stricter regulations, thus stakeholders may not focus on the benefits of corporate risk management adoption or only focus on others financial indices.

The results provide critical implications. Bank managers may reconsider their ERM behavior. For researchers, ERM models may be subjective, thus other models can be analyzed in the future. Investors may analyze the true value of China listed banks through enterprise risk management adoption. Regulators (e.g., governments) can establish stricter supervise or laws and the related rules for China listed banks to improve ERM behavior.

This study has several limitations and suggestions. First, we select economic value added is proxy of corporate performance and do not measure other index such as adjusted economic value added. Second, COSO-ERM framework originated from non-China data is may not analyze true situations correctly. Third, the empirical results may not be applied to non-listed banks. Fourth, we follow [40] to calculate discretionary loan loss provisions to measure manipulate earnings, however, the model may not also apply to banks among different nations. Fifth, other researchers may consider refining the measurement of the discretionary loan loss provisions model because not all of banks managers in earnings management behavior are equal, especially in loan loss or different capital markets. Sixth, future studies may also use all relevant models to measure of banks managers in earnings management behavior.

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Appendix

Appendix 1: The regressions of discretionary loan loss provisions.

Dependent variable / Independent variable	LLP_{it}
intercept	0.030646***
NPL_{it-1}	-0.36456***
ΔNPL_{it-1}	-0.49916***
ΔTL_{it}	0.071671***
F-value	37.33578***
R^2	0.315957
samples	237

where LLP_{it} is the t year loan loss provisions divided by the beginning loans for t year; NPL_{it-1} is the t year change of non-performing loan divided by the beginning loans for t year; ΔTL_{it} is the the t year change of total loan divided by the beginning loans for t year. *** represents statistic significant at 1% level; ** represents statistic significant at 5% level; * represents statistic significant at 10% level.