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Firm size as a moderator between corporate governance and risk-taking in Malaysian banks

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Abstract This study investigates the moderating effect of firm size in the relationship between corporate governance (board size, board independence and ownership concentration) and banks' risk-taking (insolvency risk and credit risk). Secondary data (annual reports) was collected from a sample of 21 Malaysian commercial banks covering the 2005–2014 accounting period. An empirical model using pooled ordinary least squares (OLS) and generalized method of moments (GMM) was used to analyze the data. The results indicate that board size, board independence and ownership concentration negatively associate with bank risk taking. In addition, the study shows that firm size moderates relationship between corporate governance and risk-taking.

Keyword: Corporate Governance, Firm Size, Risk Taking

1 Introduction

The emergence of financial crises across the world, including the Asian financial crisis in 1997 and the global financial crisis in 2007/2008 has different reasons [1]. The Asian crisis was attributed to inefficient and poor governance practices [2], while during global financial crisis in 2007/008, the stock price dropped and major banks entered into bankruptcy [3]. Moreover, it ignited a deep global recession with concerns about the solvency of many of the world's largest financial firms, which led to catastrophic losses as a result of the mortgage crisis [4]. Recent financial crisis along with the rising rate of globalization implies that the managing and structure of corporate governance might have more impact on performance. Clarke (2000) mentioned that failure in corporate governance practice caused the financial crisis. In addition, According to [5], the weakness and failure of corporate governance and excessive risk-taking were major factors in the financial crisis. Attention to corporate governance in developing countries like Malaysia is inadequate [6]. Therefore, this study tries to investigate the effects of corporate governance on banks' risk taking by interactions of banks' size. The current study fills the gap in the literature by using bank size as moderator on the association between corporate governance and risk taking. Reviewing the past literature

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on assessing the relationships between corporate governance and risk taking in the banking industry has shown that there is not any evidence to use the role of bank size as a moderator variable on these relationships.

2 Literature review

The link between corporate governance and risk taking can be obtained from agency theoretic model [7, 8, 9]. They discussed that managers avoid taking risks to enhance firm value. They may even spend corporate resources to diversify their companies' operation risks. It can be argued that better corporate governance mitigate the risk taking.

The relationship between corporate governance and risk taking has been widely investigated and high attention to risk management is found in recent studies [10, 11, 12]. Strong corporate governance qualities of a bank make it more willing to take risks. Li [13] mentioned that there is a close relationship between corporate governance and risk taking. He mentioned that in many countries, risk management can be as an index to measure good corporate governance. Regarding to the board duty, he indicated that boards of directors need arrangements by corporate governance to be understanding about risk appetite and strategy of their companies. Li [13] demonstrated that the board should raise significantly its oversight of assurance across the organization by risk management directors. This arrangement requires useful exposure programs which enable boards to observe their companies and respond on time in the event if needed. In addition a number of studies found a negative relationship between non-executive directors and risk taking [12, 14]. Ferrero-Ferrero [14] demonstrated that levels of debt during crisis lead to reduce the levels of corporate risk taking, and effectiveness of the board is sensitive during economic period. They concluded that good corporate governance mechanism should mitigate excessive risk taking.

Based on agency theory, the board of directors in order to protect the interest of all shareholders has to play an important role in controlling the company. Large boards accommodate more ideas and specialized knowledge to make the board more informed and capable of making complex on time business decisions. Pathan [12] and Minton *et al.* [15] investigate the relationship between board size and risk taking. They found a negative and significant relationship between them, whereby that larger board can mitigate the risk taking in a firm. Another study, which recently examines the relationship between the board size of European banks and its risk, also found a negative relationship between them [16]. According to the previous studies which commonly show a negative relationship between board size and risk taking, furthermore, as the conflict of interest among stakeholders (agency problem) will increase as in size of board increase.

Several empirical and theoretical studies have attempted to investigate the characteristic of bank risk taking. According to agency problem, interest conflicts between shareholders and managers have an impact on risk taking behaviour [17]. Theory predicts that shareholders with diversified portfolio have incentive to enhance bank risk after collecting funds of bondholders and depositors whereas managers are risk –averse in protecting their position and personal benefits [18]. However, the agency problem may be mitigated in firms with concentrated ownership structure, as controlling shareholders have strong incentives to monitor managers, and even replace them in the case of poor performance [19]. Thus, risk taking is expected to be more pronounced in firms with concentrated ownership than in firms with dispersed ownership structure.

The relationship of ownership structure to risk taking was examined by several studies [20, 21, 22]. Saunders et al. [23] found that owner controlled banks exhibit higher risk-taking behaviour than banks controlled by managers with small shareholdings. Laeven and Levine [24] framed their empirical analysis around three theoretical keystones. First, diversified owners (owners who do not have a large fraction of their personal wealth invested in the bank) tend to advocate for more bank risk taking than debt holders and non-shareholder managers. As in any limited liability firm, diversified owners have incentives to increase bank risk after collecting funds from bondholders and depositors [18]. Similarly, managers with bank-specific human capital skills and private benefits of control tend to advocate for less risk taking than stockholders without those skills and benefits [17, 25]. From this perspective, banks with ownership structures that empower diversified owners take more risk than banks with owners who play a more subdued governance role. Srairi [26] demonstrated that different categories of shareholders have different risk-taking behaviours, he found a negative association between ownership structure on risk taking in the banking industry. In addition, Davydov [27] and Nguyen [28] findings also show a negative relationship between ownership structure and risk taking.

3 Data collection and variables definitions

This study conducted on a panel data set of 21 published annual reports of Malaysian banks for the period of 2005 to 2014. Two methodologies, i.e. ordinary least squares and generalized method of moments have been used to analyze the data. Table 1 shows the variables and their description in this study.

Table 1 Variables and description

variables	Measurement
Dependent variables	
Insolvency risk	Return on asset + Capital asset ratio / standard deviation of return on asset
Credit Risk	Non-performing loan / total loan
Mediator variable	
SIZE	Log of total asset
Independent variables	
BIND	Board independence (percentage of independent non-executive directors in board)
BSIZE	Board size (number of directors in board
OC	Ownership concentration)
Control variables	
CLCD	Customer loans to customer deposits
LIQUID	Liquid Assets to Total Assets
LA	Loans to Assets
EA	Equity to asset

4 Methods and hypotheses testing

There are two objectives in this study, which are; (a) to assess whether there is significant relevance between board size, board independence and ownership concentration with credit and insolvency risk. (b) To investigate the role of banks' size (log of total asset) as moderate variables on the relationship between board independence, board size and ownership concentration with credit and insolvency risk by controlling liquidity, loan to asset, equity to

asset, and customer loan to customer deposits. Hypothesis and regression models tested as follows:

H_1. There is a negative and significant relationship between corporate governance (board independence, board size and ownership concentration) and risk taking (credit and insolvency risk).

H_4: Firm size moderating the relationship between corporate governance (board independence, board size and ownership concentration) and risk taking (credit and insolvency risk).

$$FP_{it} = \alpha + \beta_1 BIND_{it} + \beta_2 BSIZE_{it} + \beta_3 OC_{it} + \beta_4 LA_{it} + \beta_5 EA_{it} + \beta_6 CLCD_{it} + \beta_7 LIQUIDITY_{it} + \varepsilon_{it} \quad (1)$$

$$FP_{it} = \alpha + \beta_1 BIND_{it} + \beta_2 BSIZE_{it} + \beta_3 OC_{it} + \beta_8 SIZE_{it} + \beta_9 BIND * SIZE_{it} + \beta_{10} BSIZE * SIZE_{it} + \beta_9 OC * SIZE_{it} + \beta_4 LA_{it} + \beta_5 EA_{it} + \beta_6 CLCD_{it} + \beta_7 LIQUIDITY_{it} + \varepsilon_{it} \quad (2)$$

Where: FP: Financial performance (Return on Asset and Return on Equity), BIND: Board Independence, BSIZE: Board Size, OC: Ownership Concentration, SIZE: Log of Total Asset, LA: Loan to Asset, EA: Equity to Asset, LIQUID: Liquid Assets to Total Assets, CLCD: Customer loans to customer deposits, BIND*SIZE, BSIZE*SIZE and OC*SIZE: interaction terms.

5 Empirical results

The indication of the nature of data is described based on descriptive statistical analysis. The results are presented in Table 2.

5.1 Descriptive statistics

Table 2 Descriptive statistics

variables	N	Minimum	Maximum	Mean	Std. Deviation
BIND	356	25.00	70.00	49.69163	9.341834
BSIZE	356	5	12	8.564607	1.498839
OC	356	16.46	56.76	31.29576	10.03663
SIZE	356	6.572	7.993	7.406303	0.241503
EA	356	0.003	0.352	0.095174	0.064024
LA	356	0.004	9.223	0.279528	1.359155
CLCD	356	0.014	43.591	1.012801	5.016688
LIQUID	356	11.629	363.291	32.80956	33.87712
CR	365	0.022	9.912	4.21733	2.628586
IR	356	.024	2.76	1.15	.571
BIND: Board Independence, BSIZE: Board Size, OC: Ownership Concentration, SIZE: Log of Total Asset, EA:Equity to Asset, LA: Loan to Asset, CLCD: Customer Loans to Customer Assets, LIQUID: Liquid Asset to Total Asset, CR:Credit Risk,IR:Insolvency Risk.					

5.2 VIF and Hettest

To test whether there is a muliticollinearity problem between predictor variables, Variable Inflation Factors (VIF) and tolerance values were checked. Table 3 shows the results of VIF and tolerance value. In addition, to test heteroscedasticity variance of dependent variable, Breusch-Pagan or Cook-Weisberg test was applied and its results are presented in Table 3.

Table 3 VIF and Hettest results

Variable	VIF	Tolerance	Hottest, Breusch-Pagan , Heteroskedasticity	
			Credit risk	Insolvency risk
BIND	1.41	0.710114	chi2(1) = 2.47 Prob > chi2 = 0.1159	chi2(1) = 16.26 Prob > chi2 = 0.341
BSIZE	1.32	0.755881		
OC	1.2	0.833211		
EA	1.18	0.848928		
LA	1.17	0.856993		
CLCD	1.16	0.864816		
LIQUIDITY	1.11	0.902709		
SIZE	1.09	0.914223		
			*The result shows that p-value of are insignificant. Therefor, the variance of these residuals is homoscedastic.	
Mean VIF	1.18			

Table 3 presents findings relevant to the VIF and tolerance value whereby to distinguish between the multicollinearity problem and independent variables. The results of VIF and tolerance values were less than 10 and more than 0.10 respectively, which shows that there is no multicolinearity problem among independent variables. However, according to the results there is no homoscedasticity problem in the model since the p-value is insignificant. Therefore, the model is regressed using the ordinary least squares (OLS) regression.

5.3 Regression results

The current study used three models or steps in order to test multiple regression. Model 1, risk taking is regressed on the independent variables (independent board, board size and ownership concentration). Model 2, risk taking is regressed on the independent variables and bank size as moderator variable. Finally, in Model 3, the banks' financial performance is regressed on independent variables, moderating variables and interaction terms (independent variables x moderating variable).

Table 4 OLS results

Variables	Applying OLS					
	Model 1		Model 2		Model 3	
	Credit risk	Insolvency risk	Credit risk	Insolvency risk	Credit risk	Insolvency risk
BIND	-0.1121*	-0.0963*	-0.032*	-0.14128	-0.090**	-0.015**
BSIZE	-0.7886*	-0.0292*	-0.034*	-0.2898*	-0.004**	-0.059**
OC	-0.0405*	-0.2380*	-0.051*	-0.1506*	-0.065**	-0.116**
EA	-0.3552*	-1.2496*	-0.117*	-0.0170*	-0.001**	-0.232*
LA	0.0176**	0.2245	-0.241*	0.1832*	-0.143*	-0.542*
CLCD	-0.2673*	-0.2673	-0.214*	-0.0383*	-0.008*	-0.555*

LIQUIDITY	0.0219*	0.0219	-0.023	0.0056*	-0.024**	-0.130*
SIZE			0.0018**	0.2375**	-0.014**	-0.030**
BIND*SIZE					-0.847**	-0.062**
BSIZE*SIZE					-0.537**	0.2713**
OC*SIZE					9.0285**	-0.314**
R-squared	0.2361	0.6541	0.09448	0.1323	0.2337	-1.856
F-Value(Sig.F)	0.0000	0.0000	0.0000	0.000	0.000	0.000
Adj R-squared	0.2095	0.1323	0.7634	0.1067	0.4346	0.2314
** significant at p < 0.01, * significant at p < 0.05						

Table 5 GMM results

Variables	Applying GMM					
	Model 1		Model 2		Model 3	
	Credit risk	Insolvency risk	Credit risk	Insolvency risk	Credit risk	Insolvency risk
BIND	-0.121*	0.063**	-0.325*	0.1412	-0.090	-0.015
BSIZE	-0.786*	-0.022**	-0.034*	0.2898	-0.041	-0.059
OC	-0.045*	0.238**	-0.051*	0.1506	-0.004	-0.006
EA	-0.352*	-1.249*	-0.875*	0.0170	-0.065	-0.002
LA	0.076*	0.076*	-0.563*	0.1832	-0.001	-0.002
CLCD	-0.273*	0.273*	-0.245*	0.0383	-0.143	-0.015
LIQUIDITY	-0.019*	0.019*	-0.546*	0.0056	-0.008	-0.010
SIZE			0.018*	0.2375	-0.024	-0.030
BIND*SIZE					-0.014	-0.002
BSIZE*SIZE					-0.847	0.2713
OC*SIZE					-0.537	-0.314
R-squared	0.2251	0.2251	0.09448	0.1323	9.0285	-1.856
F-Value(Sig.F)	0.0000	0.0000	0.1323	0.000	0.1067	0.1067
Adj R-squared	0.2095	0.2095	0.000	0.1067	0.1067	0.1067
AR(1)	-2.44(0.04)	-2.44(0.04)	-2.44(0.04)	-2.44(0.04)	-2.44(0.04)	-2.44(0.04)
AR(2)	0.86 (0.386)	0.86 (0.386)	0.86 (0.386)	0.86 (0.386)	0.86 (0.386)	0.86 (0.386)
Sargan test.	24.668	24.668	24.668	24.668	24.668	24.668
chi2	0.903	0.903	0.903	0.903	0.903	0.903
Prob > chi2						
** significant at p < 0.01, * significant at p < 0.05						

Findings in Tables 4, and 5, based on OLS and GMM respectively present that based on Model 1 board independence, board size and ownership concentration are negatively and significantly influence risk taking (credit risk and insolvency risk). In addition, bank size as an interaction variable positively influences the association between corporate governance and risk taking. Moreover, as shown in the tables, according to Model 3, the OLS and GMM results on the interaction effects of banks'size on the association between independent variables and banks financial performance indicated that banks size positively affect banks' performance. Therefore, the Hypotheses H1 and H2 are supported. However, Table 5 shows that the instruments used in investigating the panel dynamic data are appropriate, due to serial correlation test in the first differenced residuals, which indicated that the AR1 p-value is significant, AR2 is insignificant and Sargan test is more than 0.2.

6 Discussion and conclusion

With regard to the effect of board independence on risk taking, it seems that the presence of independent non-executive directors of a board potentially can influence their risk taking. It may be because the independent directors are more sensitive to the regulatory compliance and they have more conservative and prudent action to avoid any default. Increasing the number of independent non-executive directors leads to the large size of a board, and larger board can mitigate the risk taking in a firm.

The results of this study consistent with findings of Pathan [12] and Minton *et al.* [15] who investigated the relationship between board size and risk taking. They found a negative and significant relationship between them, whereby the larger board can mitigate risk taking in a firm. The other study examining the relationship between the board size of European banks and its risk taking has also found that there is a negative relationship between these two variables [16].

The significant relationship between board size and firm risk taking supports the agency theory. According to agency theory, in order to protect the interest of all shareholders, board of directors has to play an important role in controlling the company. Large boards accommodate more ideas and specialized knowledge to make the board more informed and capable of making on time complex business decisions. The larger boards of the company might have well rounded experience to exercise their independent judgment in delivering positive financial results. The findings imply that bank board independence is an important determinant of bank risk taking. Given that board independence is instrumental to bank risk taking, regulators should monitor more intensely those banks where both shareholders and managers' interests are aligned (such as banks with smaller and less restrictive boards), which is intended to prevent them from excessive risk taking.

The negative results between ownership concentration and risk taking suggest that banks with concentrated ownership are taking a lower risk than banks in diffuse ownership. This result is in line with the findings of Iannotta *et al.* [29] and García-Marco and Robles-Fernández [30], but contrary to the agency theory. Based on agency theory the interest conflicts between shareholders and managers have an impact on risk taking behaviour [17]. This theory predicts that shareholders with diversified portfolio have incentive to enhance bank risk after collecting funds of bondholders and depositors, whereas managers are risk–averse in protecting their position and personal benefits [18]. However, the agency problem may be mitigated in firms with concentrated ownership structure. This is because the controlling shareholders have strong incentives to monitor managers, and even replace them in the case of poor performance [19]. Thus, risk taking is expected to be more obvious in firms with dispersed ownership than in firms with concentrated ownership structure. As conclusion, this study found that there is negative and significant relationship between board size, board independence and ownership concentration with banks risk taking. In addition the relationship between corporate governance and risk taking positively affected by banks' size.

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