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Does internal corporate governance mechanism control firm risk? Evidence from Indonesia's three high-risk sectors

Saarce Elsye Hatane, Stellania Supangat, Josua Tarigan and Ferry Jie

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Abstract

Purpose – This study aims to examine the control of corporate governance towards firm risks for a sample of Indonesian firms in agriculture, mining and property industries. This study highlights the impact of four indicators of internal mechanism of corporate governance, i.e. board size, board independence, board gender and board ownership, on three measurements of firm risks, i.e. total risk, asset return risk and idiosyncratic risk.

Design/methodology/approach – Panel data analysis is conducted using a sample of 62 companies of agriculture, mining and property industries listed in Indonesia Stock Exchange from 2013 to 2017. Pooled ordinary least square with hetero-corrected is the statistical approach conducted to test the hypotheses.

Findings – The result indicates that board size and board gender insignificantly influence firm risks. While board independence gives varied impacts towards firm risks, it gives positive influence towards total asset return risk, insignificant towards idiosyncratic risk and negative towards total risk. Other interesting results are found in board ownership that has insignificant influence on asset return risk and negative influence on idiosyncratic and total risk.

Research limitations/implications – Firms should incorporate corporate governance, especially the impactful roles of board independence and board ownership as they serve as tools in reducing firm risk. Moreover, investors may have a better understanding of corporate governance and factors that are influencing firm risks. Therefore, this study can assist them to make the right investment decision.

Originality/value – This study is notably the first to use comprehensively three measurements of firm risks in Indonesia. Risks can come from internal and external, thus the company should understand the various types of risks facing the company. Total risk measures both the internal and external risks, while asset return risk gives another perspective using overall market perception about the equity and assets of the company. Finally, this study also measures internal risk, which is the only risk that can be controlled and minimised by the board of the company.

Keywords Corporate governance, Firm risks, Idiosyncratic risk, Asset return risk, Total risk

Paper type Research paper

1. Introduction

Looking at high-risk industries in Indonesia; mining, agriculture and property industries are included in that category. They are very susceptible towards changes in the global macroeconomic (Indonesia Investments, 2018a, 2018b). Factors such as economics, politics, regulation changes, technology, market situation and nature can interfere with the business. The mining industry has been an essential sub-sector of industry since 1970 and has gained constant attention both domestically and internationally. Indonesia has been not only the biggest producer of coal, copper, gold, tin and nickel, but also the biggest exporter of palm oil in agriculture industry (Indonesia Investments, 2018a, 2018b). Generally, larger plantations produce goods like rubber and palm oil that are mainly for export, while smaller ones focus on satisfying the food demand on the locals. In Indonesia, the property industry

has low share price due to a slow recovery from the Asian Financial Crisis in 2009 that causes the property demand less than the supply. Moreover, the purchasing power of buying a house in Indonesia is week (DBS Bank, 2016).

Risk-taking is fundamental in running business. Following the financial crisis in 2008, firms have turned attention towards risk management. It is in line with ACCA (2012) which highlighted that the board is responsible for managing the risk. Further, the board has two critical roles: as a risk-taking decider and as an internal control mechanism. As a risk-taking decider, the board must comprehend the proper level of risk exposure to the company and be willing to take to accomplish the objectives. Whereas, the internal control mechanism is a part of corporate governance to ensure the risks managed adequately. After the crisis, a large number of investors lost confidence in investing in the companies. To cope with such situation, the companies have attempted to increase the confidence of investors by developing the corporate governance appliance, which comes along with risk governance.

In terms of firm risk measurement, most of previous research studies used total risk and idiosyncratic risk (Alam and Shah, 2013; Haider and Fang, 2016; Lee et al., 2016; Lenard et al., 2014; Mathew et al., 2018; Pathan, 2009; Sila et al., 2016; Sun and Liu, 2014). Total risk is known to be a combination of systematic and idiosyncratic risks. This risk identifies the whole risk aspects from both external risk in systematic risk and inherent risk in the idiosyncratic. Meanwhile, asset return risk is another way to assess the firm risk that cover market capital ratio in the measurement. The market capital ratio is viewed as equity's market value to total assets' market value (Flanerry and Rangan, 2008). The ratio helps determine the percentage of shareholders' assets in the company and assess the ability of the company to sustain over a long period. Businesses such as agriculture, mining and property industry are better to have shareholders instead of debt holders due to uncertainties; therefore, using market value may represent the overall market perception about the equity and assets of the company. These two risks are hard to be controlled by the company; the company needs to minimise the risk from within. Idiosyncratic risk is a controllable risk and exclusive to the firm. It includes the corporate culture, operating strategy, financial policy and investment strategy. This risk is the risk that company can control.

Furthermore, corporate governance has a strong bond with the internal mechanism as criteria by the board of directors (Li et al., 2012). The internal mechanism is known to be limited, yet the important dimension of corporate governance (Dedu and Chitan, 2013). The corporate boards have the role in supervising and in controlling the risk faced by the company properly for the sake of both the investor and stakeholders. Some possible ways to improve the function of the boards are by gaining the independence level, enhancing the oversight roles and applying practices that are more effective. Among the internal corporate governance attributes, the board composition, i.e. board size, independence and gender, as well as the board leadership structure like the board ownership, are the most affecting factors. This internal mechanism is useful to mitigate the idiosyncratic risk. Therefore, asset return risk and total risk can be controlled as well.

Using the samples from agriculture, mining and property industries over the years 2013 to 2017, this study finds that the corporate governance components have mixed results of significant and insignificant impact toward measures of firm risk. Board size and board gender are giving insignificant influence to the firm risks. Board independence has significantly negative influence towards total risk, positive influence toward asset return risk and insignificant influence toward idiosyncratic risk. Board ownership has significant negative influence toward total risk and idiosyncratic risk, but insignificant towards asset return risk.

This study notably becomes the first to investigate impact of board size, board independence, board gender and board ownership, which are the internal mechanism of corporate governance, towards firm risks in Indonesia. The firm risks are measured using

three measurements, namely total risk, asset return risk, and idiosyncratic risk. The corporate governance used here is closer connection to internal than to external as internal is more suitable to measure the level of risk-taking.

2. Literature review and hypothesis

2.1 Corporate governance

Agency and stewardship theories used in this research are explaining the part of internal corporate governance mechanisms in controlling firm risks.

Agency Theory. Jensen and Meckling first initiated this concept in 1976. It lies in the agency connection shaped between agents and principal. The shareholders delegate agents or the directors that control and organise the firm (Nyberg *et al.*, 2010). As a reward, agents earn remuneration, bonus, and compensation, whereas principals are the owner of the company and supply the funds for the company. However, the distinction between ownership and control will possibly foster an agency issue of conflict goals between the shareholders who own the firm and the directors who run the firm (Nyberg *et al.*, 2010). Directors, as the responsible party in running the company, have a susceptibility to optimise their interests at every opportunity by misapplying the firm's resources, at the expense of shareholder or called agency costs. Directors strive to elevate profits in order to earn higher remuneration (Rajablu, 2016).

Additionally, the agency problem will create asymmetric information between the directors and shareholders (Agyei-Mensah, 2017). Directors, who do the day-to-day operations, will have better information about the company rather than shareholders as shareholders are not controlling the daily activity of the company. Therefore, asymmetric information costs the shareholder because they are not able to make significant decisions from the performance of the manager. Hence, the firm is being harmed (Siagian *et al.*, 2013). To reduce the agency problem, shareholders, throughout corporate governance mechanism, monitor the directors. They want to ascertain the directors, as the agents, are conducting the best interests for the principals and disclosing crucial information (Siagian *et al.*, 2013).

Stewardship theory. Companies have many stakeholders, and the major ones are shareholders, employees, creditors, customers and government. The genuine agency relationship describes the relationship between shareholders and managers in an incomplete contract, including every aspect of business decision due to the substantial uncertainty and information imbalance (Subramanian, 2018). Stewardship theory, introduced by Donaldson and Davis (1989), states that giving more authority and power to the board to act as responsible steward to manage the company (Haider and Fang, 2016). This theory is contradictory with agency theory as the agent puts the interests of shareholder rather than the agent's self-interests. Managers, as the agents, are highly dedicated and are more likely to serve the organisation completely (Davis *et al.*, 2007). In another word, the agent attempts to achieve the shareholder's goal to maximise the shareholder's wealth without looking at how much ownership the agent owns (Subramanian, 2018).

Board size, board independence, board gender and board ownership are four internal governance mechanisms components designed to alleviate the agency conflicts between boards and shareholders (Mathew *et al.*, 2018). Schäuble (2018) argues that board ownership, a part of internal corporate governance mechanism, can mitigate agency costs. Corporate boards hold responsibility for ensuring the information in financial reports is qualified. Consequently, they control the behaviour of senior managers to ensure their actions are according to the stakeholders' interests. Corporate governance acts as a substantial part in defining the accomplishment of a business and the company's transparency and accountability (Rajablu, 2016). Corporate governance analyses the strategy and transparency of ways the organisation manages the company's resources.

Corporate governance manages better control and direction; therefore, managers decide for the sake of the stakeholders and shareholders (Siagian et al., 2013). By applying this governance mechanism, agency problem can be mitigated.

Moreover, the purpose of agency cost is to synchronise the interests between board and shareholder. Therefore, having good corporate governance is essential. This study emphasis on examining four indicators of corporate governance internal mechanisms, namely, board size (BS), board independence (BI) and board gender (BG) and board ownership (BO).

2.2 Firm risk

At the time the investor invests in companies, there must be risks that should be taken. The return is unpredictable, whether it can be higher or lower than the anticipated one. Investors cannot avoid risks, even when investing in government investment products, such as government gilts that are known to have low risk. In general, firm risk can be explained as total risk, which consists of systematic and unsystematic risk (Haider and Fang, 2016). Besides, firm risk can be explained by asset return risk and idiosyncratic risk (Pathan, 2009).

Total Risk is divided into two parts, namely, systematic and unsystematic risk. Systematic risk is also famous as market risk or inherent risk, whereas unsystematic risk is also known as firm-specific or idiosyncratic risk. There is a difference between these two risks. Idiosyncratic risk can be diversified away, while systematic risk cannot be diversified away (Mathew et al., 2018). Total risk reflects the market's perception about the risks inherent in the firm's assets and liabilities. Moreover, not only regulators but also firm executives observe this risk frequently (Pathan, 2009).

Asset return risk is employed as another alternative to find firm risks (Pathan, 2009). Asset return risk is calculated as the standard deviation of daily stock returns times the ratio of market value of equity to market value of total assets times square root of trading days in each fiscal year (Flanerry and Rangan, 2008; Pathan, 2009). By using the proportion of market value of equity divided by market value of total assets, this ratio can gauge the health of the company. The ratio helps settle the percentage of company's assets owned by shareholders and measure the capability of the company to maintain the business for a long period. Businesses such as agriculture, mining and property industry are better to have shareholders instead of debtholders due to uncertainties; therefore, using market value may represent the overall market perception about the equity and assets of the company.

Idiosyncratic risk is risk that is specific to a particular company and stock. Idiosyncratic risk is also famous as unsystematic risk or firm-specific risk. For example, when the company generates high income, the company can justify the high stock price, and vice versa. Unsystematic risk is the risk that is not related to the market and can be diversified away. From the perspective of investors, the unsystematic risk can be reduced as investors diversify the portfolios while boards that have large equity stakes are exposed to both systematic and unsystematic risk. Therefore, the boards are more likely to manage the unsystematic risk. The issue is the boards cannot increase value for shareholders, as the investor, by controlling unsystematic risk, since the investors can reduce the unsystematic risk by diversifying the portfolios (Bartram et al., 2011). Idiosyncratic risk can be calculated using standard deviation of the residuals from the market model regression (Pathan, 2009; Sila et al., 2016).

3. Hypothesis development

The board of directors in a company is in charge of appointing decisions to achieve company's goals, while some decisions contain inherent risk bearing (Zhu and Weyant,

2003; Mathew *et al.*, 2016). Wood and Zaichkowsky (2004) stated that the board's decision must reveal the needs of the shareholders as the investors in the company who have different risk appetites. Therefore, mitigating the corporate risks is not the primary purpose of risk management, but it is more on how to pick the appropriate risk along with its level (Mathew *et al.*, 2016).

3.1 Board size and firm risks

Among the corporate governance components that influence the firm risk, it seems that internal governance mechanism related to the board is more relevant. Moreover, the company that applies good corporate governance will have a better performance as the decisions made by board of commissioners give a crucial contribution to the governance. Referring to Chakraborty *et al.* (2018), the larger the number of board members, the fewer risks the firm has due to better monitoring. The larger the board, the wider the perspectives are contributed (Haider and Fang, 2016). In addition, company that applies good corporate governance is expected to have better performance. Besides, the decisions of the board of commissioners give a crucial contribution to the governance. The larger the board, the wider the perspectives are contributed (Haider and Fang, 2016). However, Sun and Liu (2014) argued that board size associates positively to firm risks because small board size will be more cooperative, efficient and decisive. The number of members on the board of directors is a network source for the company, but the size of the board cannot influence organisational behavior in risk-taking (Tsai and Luan, 2016). This network resource will show its role when supported by the company's financial performance. Therefore, the hypotheses are:

H1a. Board size has an impact on total risk.

H1b. Board size has an impact on asset return risk.

H1c. Board size has an impact on idiosyncratic risk.

3.2 Independent directors and firm risk

Independent members in the board are playing better role as the overseers for the executives because the independent directors do not have connection with the management by birth or marriage, major shareholders, employees of affiliated company and representatives of the company that have important dealings with the subject company. To be effective, it is mentioned that no less than 30 per cent of the board has been composed of independent non-executive director (Deloitte, 2014). Outsider director helps the board to do its role effectively. Therefore, board independence has a crucial role in lowering the agency cost. The presence of more outsider board of commissioner may block the action of the management in riskier projects as they care of unsteady returns. According to Alam and Shah (2013) and Chakraborty *et al.* (2018), the association of independent directors and firm risks is negative. Furthermore, Zhang *et al.* (2018) argued that board independence positively influences the asset return risk due to the ability of the independent directors in inducing the executors to initiate risky projects. While Sun and Liu (2014) and Lee *et al.* (2016) verified that board independence is insignificantly affecting firm risks, due to the small roles of the outside directors in the control mechanism. It is because independent directors are unaccustomed to intra-firm information; thus, the outside directors may not affect firm risks management (Zhang *et al.*, 2018). Therefore, the hypotheses are:

H2a. Board independence has an impact on total risk.

H2b. Board independence has an impact on asset return risk.

H2c. Board independence has an impact on idiosyncratic risk.

3.3 Board gender diversity and firm risk

Gender composition is explained as the proportion of man and woman on the board (Mathew *et al.*, 2018). Increase in women present in the organisation is due to the scandal that occurred related to corporate governance, such as Enron, Lehman Brother and WorldCom (Sener and Karaye, 2014). There have been debates about gender composition in organisations to improve good corporate governance (Plessis *et al.*, 2012). First, they reasoned that diversity in terms of women's skills encourages a clearer understanding of the marketplace. Second, diversity enhances both novelty and creativity as attitudes and beliefs are likely to be varied with demographic variables. The last, gender diversity likely offers more effective problem solving, as decision-making process goes through more than one opinions (Lenard *et al.*, 2014). Prior studies conducted by Lenard *et al.* (2014) and Mathew *et al.* (2018) found that a negative relationship occurs between gender diversity and firm risk. As female characteristics tend to be more careful in taking decision, they tend to take a lower risk or known as risk averse. The low risk taking can be implicated as less competitive in the industry. On the other hand, Sila *et al.* (2016) stated that there is no distinctive relationship is discovered between female board members and firm risks. Thus, here are the hypotheses:

H3a. Board gender has an impact on total risk.

H3b. Board gender has an impact on asset return risk.

H3c. Board gender has an impact on idiosyncratic risk.

3.4 Board ownership and firm risk

Board ownership measured as the number of shares owned by board of commissioners on the company divided by total outstanding shares (Mathew *et al.*, 2018). Board ownership has a vital function in a firm's risk-taking. Managerial equity ownership reduces the agency problem and helps to synchronise the interests of the managers and owners (Alam and Shah, 2013; Musallam, 2015; Saravanan *et al.*, 2017). As well, Pergola and Joseph (2011) stated when the board members do not own a large number of shares in the company; the board has little power to overcome the firm's control to align the interest between principal and agent. Lesser ownership in this situation may prevent the managers to involve in risky projects. On the other hand, board members may take risky project to give stakeholders a high return. Board members are highly concerned with their careers and prevent risk-taking; even sometimes, the avoided risk highly potentially increased the value of the firm. Pathan (2009), Alam and Shah (2013) and Haider and Fang (2016) confirmed that board ownership influences firm risk positively. Moreover, Pathan (2009) also found that board ownership has positive influence toward firm risk. Hence, this study expects:

H4a. Board ownership has an impact on total risk.

H4b. Board ownership has an impact on asset return risk.

H4c. Board ownership has an impact on idiosyncratic risk.

4. Research methodology

4.1 Source of data and sample

Quantitative data are used in this research. Quantitative data incorporate numerical figures expressing certain quantity, amount or scale (Lind *et al.*, 2015).

To attain the objectives of the study, panel data regression models, that combine time series and cross section data, are examined by Gretl Statistical Software. The statistical

process is done through collecting secondary data, testing of hypothesis and identifying of causal relationship. The sample firms involve agriculture, mining and property industry in the Indonesia Stock Exchange from 2013 until 2017, as shown in Table I. The secondary data, which are gained from the information published by the company, like annual reports, Bloomberg and other reliable sources, are used in this study

As seen in Table I, total samples observed that meet the criteria in this research are 310 firm-year observations in 2013 until 2017.

4.2 Measures

The dependent variable is firm risks with three variables, namely, total risk, asset return risk and idiosyncratic risk. Corporate governance, as the independent variable, assessed by the internal governance mechanism, is described into four indicators, which are the board size, board independence, board gender and board ownership. Control variables that may affect the dependent variables are considered in the models (Lind *et al.*, 2015). The proper use of control variables is crucial because control variables can produce useful replications. On the contrary, inappropriate control variables may trigger false results (Atinc *et al.*, 2011). The summary of variable measurements is provided in Table II.

4.3 Research model

This study intends to show whether corporate governance has an impact on firm risks. A detail examination is conducted to see the correlation between the Corporate Governance (CG) and firm risks. Regression models are formulated as follows:

Table I Summary of the sample observed

Sampling criteria	No. of observations
Total of agriculture, mining, and property companies	136
Companies listed in 2013-2017	(27)
Companies with incomplete annual report	(44)
Companies with share price 2012-2017	(3)
Total companies as the population	62
Total period (in years)	5
Total sample used in this research (62 x 5)	310

Table II Variable definitions and data source

Variable(s)	Definitions	Data source
Board size (BS)	It represents the total member of board of commissioners in the organisation	Annual report
Board independence (BI)	It represents the total number of independent commissioner over total number of board of commissioner in the organisation	Annual report
Board gender (BG)	It represents the percentage of women commissioners in board of commissioners in the organisation	Annual report
Board ownership (BOwn)	It represents the number of shares owned by board of commissioners in the organisation divided by total number of outstanding shares	Annual report
Total risk (TotR)	Standard deviation of daily stock returns (annualized)	Yahoo finance
Asset return risk (ARR)	Standard deviation of daily stock returns times the ratio of market value of equity to market value of assets multiplied by $\sqrt{250}$	Yahoo finance
Idiosyncratic risk (IdioR)	The residual from the market model regression	Yahoo finance
Leverage (Lev)	Total debt over total assets	Bloomberg
Firm size (FSize)	Market capitalization	Bloomberg
Growth	Capital expenditures over total sales	Bloomberg
Lagged performance (Perf)	The lagged return on assets for the firm	Bloomberg

$$TotR_{it} = \alpha_0 + \alpha_1 BS_{it} + \alpha_2 BI_{it} + \alpha_3 BG_{it} + \alpha_4 BOwn_{it} + \alpha_5 Lev_{it} + \alpha_6 Fsize_{it}$$
$$+ \alpha_7 Growth_{it} + \alpha_8 Perf_{it-1} + \varepsilon it \qquad (1)$$

$$ARR_{it} = \alpha_0 + \alpha_1 BS_{it} + \alpha_2 BI_{it} + \alpha_3 BG_{it} + \alpha_4 BOwn_{it} + \alpha_5 Lev_{it} + \alpha_6 Fsize_{it}$$
$$+ \alpha_7 Growth_{it} + \alpha_8 Perf_{it-1} + \varepsilon it \qquad (2)$$

$$IdioR_{it} = \alpha_0 + \alpha_1 BS_{it} + \alpha_2 BI_{it} + \alpha_3 BG_{it} + \alpha_4 BOwn_{it} + \alpha_5 Lev_{it} + \alpha_6 Fsize_{it}$$
$$+ \alpha_7 Growth_{it} + \alpha_8 Perf_{it-1} + \varepsilon it \qquad (3)$$

Where:

$TotR_{it}$ = Total risk for firm i in year t;

AR_{it} = Asset return risk for firm i in year t;

IdR_{it} = Idiosyncratic risk for firm i in year t;

BS_{it} = Board size for firm i in year t;

BI_{it} = Board independence for firm i in year t;

BG_{it} = Board gender for firm i in year t;

$BOwn_{it}$ = Board ownership for firm i in year t;

Lev_{it} = Leverage calculated as total debt divided by total assets for firm i in year t;

$FSize_{it}$ = Firm size calculated as current share price multiplied by total outstanding share for firm i in year t;

$Growth_{it}$ = Growth calculated as capital expenditures divided by total sales for firm i in year t;

Per_{it-1} = Lagged performance calculated as ROA from the previous year for firm i in year t;

ε_{it} = The residual.

i and t denote firms and periods, respectively.

5. Research results and analysis

5.1 Sample description

Table III displays the descriptive statistics of each variable, explaining further on the minimum, maximum, mean and standard deviation value of each variable.

Table III shows that the number of board members in the sample is a maximum of ten people, a minimum of two people and a median of five people. Another thing that needs to be considered is the maximum number of independent board compositions of 83.3 percent of the total number of boards. A standard deviation value less than 1 (variable BI, BG, BOwn, IdioR and Lev) indicates that the data is in the same set. It is evident that the number of board ownership in this sample is relatively small; its maximum value is only 0.67 per cent. It is pointed out in Table III that there are companies that have all members of the board with female characters. Idiosyncratic risk in this sample is a type of corporate risk that has the smallest value. Of the three risks observed in this study, asset return risk is the risk that has the highest value.

5.2 Panel data regression

Determining the estimation model is important in assessing panel data. After devising the pooled or ordinary least square (OLS) model, the pre-eminent regression model is assessed by three investigations. The F-Test is conducting to choose the best model

Table III	Descriptive statistics					
Variable	*Mean*	*Median*	*Minimum*	*Maximum*	*SD*	
Board variables						
BS	4.752	5	2	10	1.609	
BI	0.399	0.333	0.2	0.833	0.107	
BG	0.098	0.168	0	1	0.167	
BOwn	0.026	0	0	0.067	0.099	
Risk measures						
TotR	1.498	0.491	0.008	10.54	2.39	
ARR	3.932	3.456	0.046	34.97	3.108	
IdioR	0.118	0.109	0.046	0.556	0.06	
Control variables						
Lev	0.251	0.239	0	0.855	0.178	
FSize	28.794	29.076	23.747	31.717	1.623	
Growth	19.986	7.179	0.029	990.6	66.29	
Perf	4.3625	3.587	−57.361	34.44	8.133	

between pooled and fixed panel. The test result from Breusch–Pagan defines the best model between pooled and random. The Hausman test verifies whether fixed or random model is the appropriate one. With three regressions, the tests are run three times. The complete results are shown in Tables IV and V.

Performing classical assumption test in the regression model is necessary. The classical assumption tests include heteroscedasticity test and multicollinearity test. Heteroscedasticity is a condition when the variances of errors are not the same with all observations (Wooldridge, 2012). Heteroscedasticity is an issue for research. Therefore, the test need to be conducted to test the variability, whether it is equal and exists within the range of a second variable. When the p-value is less than 5 per cent, the implication is that the model contains heteroscedasticity. If there is heteroscedasticity, pooled OLS with heteroscedasticity-corrected must be conducted to overcome the heteroscedasticity problem. After passing heteroscedasticity test, reliability of variables must be examined by looking at full collinearity variance-inflation factor (VIF) values. When conducting the classical assumption test, it is notified that the model has heteroscedasticity issue. Therefore, this study uses OLS with heteroscedasticity-corrected. Table V shows the result from panel model test is random effect model for total risk and asset return risk and fixed effect model for idiosyncratic risk. However,

Table IV	Summary of ordinary least square models						
	TotR		*ARR*		*IdioR*		
Dependent variables	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Collinearity (VIF > 10,0)*
Constant	−0.604	0.819	−0.492	0.879	0.191	0.005***	
BS	0.073	0.44	−0.0163	0.888	0.006	0.018**	1.299
BI	−3.375	0.009***	3.867	0.015**	0.055	0.096*	1.082
BG	0.308	0.703	1.238	0.211	0.013	0.534	1.031
BOwn	−2.438	0.08*	0.684	0.688	−0.083	0.019**	1.061
Lev	2.588	0.002***	−7.119	0.000***	−0.014	0.491	1.17
FSize	0.089	0.369	0.157	0.195	−0.004	0.114	1.444
Growth	0.001	0.8	0.0015	0.556	−0.000	0.942	1.012
Perf	−0.018	0.319	0.014	0.551	−0.001	0.227	1.278
Adjusted R^2	0.067		0.173		0.051		
p-value (F)	0.007		1.34E-09		0.043		
Heteroskedasticity	0		0		1.23485e-252		

Notes: *$p < 0.10$ (weakly significant); **$p < 0.05$ (significant); ***$p < 0.01$ (highly significant)

Table V Summary of panel effect tests

Dependent variables	TotR p-value	ARR p-value	IdioR p-value
Fixed effect estimator	1.91919e-101	9.58068e-05	1.9539e-05
Result	Fixed	Random	Fixed
Random effect estimator			
Breush–Pagan test statistic	3.00819e-105	0.000488277	0.000219102
Result	Random	Random	Random
Hausman test statistic	0.578506	0.222627	0.0427411
Result	Random	Random	Fixed

fixed effect cannot be used, as there is heteroscedasticity issue. Besides, using fixed effect estimation may not be suitable because corporate governance variable is time-invariant which implicates that the variable would be absorbed in time demeaning process in fixed effect (Pathan, 2009; Mathew *et al.*, 2018) (Tables VI to VIII).

5.3 Hypothesis and research result

Each hypothesis is divided into three, which is a, b and c: a – represents total risk, b – represents asset return risk and c – represents idiosyncratic risk. *H1* stated that board size

Table VI Comparison of models (dependent: total risk)

Variables	Pooled OLS with hetero-corrected Coefficient	p-value	Random effect Coefficient	p-value
Constant	−0.978	0.436	1.983	0.453
BS	−0.039	0.450	0.040	0.591
BI	−2.599	0.000***	0.347	0.641
BG	0.364	0.297	−0.985	0.177
BOwn	−1.376	0.002***	0.053	0.953
Lev	0.634	0.334	0.669	0.368
FSize	0.117	0.022**	−0.029	0.745
Growth	−0.000	0.793	−0.000	0.926
Perf	−0.018	0.091*	−0.005	0.472
Adjusted R^2	0.111		0.005	
p-value (F)	0.000		0.824	

Notes: $*p < 0.10$ (weakly significant); $**p < 0.05$ (significant); $***p < 0.01$ (highly significant)

Table VII Comparison of models (dependent: asset return risk)

Variables	Pooled OLS with hetero-corrected Coefficient	p-value	Random effect Coefficient	p-value
Constant	−1.749	0.53	−2.242	0.576
BS	0.0499	0.616	−0.036	0.795
BI	4.804	0.006***	3.72	0.039**
BG	1.094	0.125	1.614	0.191
BOwn	0.839	0.576	−0.302	0.88
Lev	−7.167	0.000***	−6.954	0.000***
FSize	0.177	0.084*	0.222	0.1337
Growth	0.002	0.035**	0.001	0.768
Perf	0.022	0.322	0.012	0.596
Adjusted R^2	0.261		0.17	
p-value (F)	0.000		0.000	

Notes: $*p < 0.10$ (weakly significant); $**p < 0.05$ (significant); $***p < 0.01$ (highly significant)

Table VIII Final panel model for idiosyncratic risk

Variables	Pooled OLS with hetero-corrected Coefficient	p-value
Constant	0.115	0.029**
BS	0.003	0.146
BI	0.037	0.264
BG	0.001	0.942
BOwn	−0.053	0.022**
Lev	−0.049	0.009***
FSize	−0.001	0.794
Growth	0.000	0.73
Perf	−0.000	0.821
Adjusted R^2	0.058	
p-value (F)	0.021	

Notes: $^*p < 0.10$ (weakly significant); $^{**}p < 0.05$ (significant); $^{***}p < 0.01$ (highly significant)

has impact on total risk, asset return risk and idiosyncratic risk. The analysis resulted that board size has insignificant influence on total risk, asset return risk and idiosyncratic risk. Hence, *H1a*, *H1b* and *H1c* are not accepted. The findings are in line with Lee *et al.* (2016) who found that board size has insignificant influence on total risk and idiosyncratic risk. This result is contradictory with Mathew *et al.* (2018) and Pathan (2009) who initiated that board size is negatively related to asset return risk.

H2 states that board independence has impact on total risk, asset return risk and idiosyncratic risk. Table IX shows that board size has negative influence on total risk, thus *H2a* is accepted. This result is consistent with some prior studies conducted by Mathew *et al.* (2018), Pathan (2009) and Haider and Fang (2016) who confirmed that board independence is negatively affected the total risk. Table IX also shows that board independence rises the asset return risk. This result is in line with Zhang *et al.* (2018) who also noticed that the outsider directors, who are unaccustomed to intra-firm information, could not limit the executives' risk-taking actions. Furthermore, the existence of independent board members is insignificant towards idiosyncratic risk. This result is consistent with Alam and Shah (2013), Sun and Liu (2014) and Lee *et al.* (2016) who found that board independence does not affect idiosyncratic risk significantly.

Table IX The final regression models of corporate governance and firm risks

	TotR				ARR				IdioR			
Variables	Coefficient	Standard error	t-ratio	p-value	Coefficient	Standard error	t-ratio	p-value	Coefficient	Standard error	t-ratio	p-value
Const	−0.978	1.254	−0.779	0.436	−1.749	2.813	−0.622	0.53	0.115	0.052	2.195	0.029**
BS	−0.039	0.051	−0.756	0.450	0.0499	0.099	0.502	0.616	0.003	0.002	1.457	0.146
BI	−2.599	0.464	−5.595	0.000***	4.804	1.735	2.769	0.006***	0.037	0.033	1.118	0.264
BG	0.364	0.349	1.043	0.297	1.094	0.711	1.54	0.125	0.001	0.019	0.072	0.942
BOwn	−1.376	0.437	−3.149	0.002***	0.839	1.498	0.56	0.576	−0.053	0.023	−2.295	0.022**
Lev	0.634	0.655	0.969	0.334	−7.167	0.839	−8.546	0.000***	−0.049	0.019	−2.597	0.009***
FSize	0.117	0.051	2.297	0.022**	0.177	0.102	1.735	0.084*	−0.001	0.002	−0.262	0.794
Growth	−0.000	0.002	−0.263	0.793	0.002	0.001	2.122	0.035**	0.000	0.000	0.345	0.73
Perf	−0.018	0.011	−1.693	0.091*	0.022	0.022	0.992	0.322	−0.000	0.001	−0.227	0.821
p-value(F)	0.000				0.000				0.021			
Adjusted R^2	0.111				0.261				0.058			

Notes: $^*p < 0.10$ (weakly significant); $^{**}p < 0.05$ (significant); $^{***}p < 0.01$ (highly significant)

H3 states that board gender has an impact on total risk, asset return risk and idiosyncratic risk. The analysis results in a fact that that board size has an insignificant impact on total risk, asset return risk and idiosyncratic risk. Hence, *H3a*, *H3b* and *H3c* are rejected. This result is consistent with Sun and Liu (2014) and Sila *et al.* (2016) who found board independence has no significant influence on total risk. However, this finding is not in line with the previous studies stating that board gender can mitigate the asset return risk (Mathew *et al.*, 2018; and Pathan, 2009). Other previous studies discovered that board gender shows negative impact to idiosyncratic risk (Mathew *et al.*, 2018; Pathan, 2009; and Lenard *et al.*, 2014), and it contradicts to the result in this study.

H4 finds that board ownership has a negative impact on total risk and idiosyncratic risk (*H4a* and *H4c* are accepted) and insignificant impact on asset return risk (*H4b* is rejected). These results are inconsistent with the prior studies that found that board ownership has positive impact on total risk (Mathew *et al.*, 2018; Pathan, 2009; Haider and Fang, 2016; and Sun and Liu, 2014) and idiosyncratic risk (Mathew *et al.*, 2018; Pathan, 2009; Alam and Shah, 2013; Sun and Liu, 2014). The result from this study is also contrast to that of Mathew *et al.* (2018) and Pathan's (2009) who found that board ownership has a positive influence on asset return risk.

6. Conclusion, suggestion and limitation

It is found that corporate governance has mixed results on firm risk. Board independence has a significant negative influence on total risk, positive effect on asset return risk and insignificant impact on idiosyncratic risk. Meanwhile, board ownership can force the mitigation of total risk and idiosyncratic risk, but it cannot control the asset return risk. Next, board size has an insignificant control towards the three types of firm risks. Although board size is perceived to be one of the considerations in determining good corporate governance practice, board size cannot indicate the significant influence in this study because personal quality is the key to determine board's corporate success and improve the firm risk-taking decision. These findings promote the study of Sambasivan *et al.* (2009) that explained that risk-taking attitude of board members related to personal quality. Board gender has insignificant control towards total risk, asset return risk, and idiosyncratic risk. These results might happen because Indonesia's regulator has not set the minimum number of gender diversity on the board. Overall, the average number of female on board is very small, as much as 7.9 per cent (Deloitte, 2017). According to the data obtained, the mean of board gender in this study is only 2.6 per cent. Of data observed, the small number of female on board may indicate a symbolic meaning only to get attention from the stakeholders (Wang and Clift, 2009). Moreover, there is no minimum figure of women directors in Financial Services Authority's report (2014).

Independent board of commissioners can mitigate total risk. This implies that board independence is able to reduce both external and internal risks. However, board independence increases asset return risk. Independent board members' decisions depend on the quality and completeness of information. As the independent board obtains poor information, accurate decision regarding risk-taking may not be achieved. Hence, uncertainty becomes higher. Risk-seeker investors demand uncertainty, therefore, companies prefer to obtain funding from shareholders rather debtholders. While, from the business risk perspective, it shows that number of independent directors is not affecting the risk because every director has different enthusiasm in taking risk. Although bigger independent board of commissioners has a good monitoring of the company, but smaller board does not indicates the board has less effective monitoring.

The results for board ownership are inconsistent with agency theory and past studies; instead, the negative impacts of board ownership towards total risk and idiosyncratic risk are in line with the stewardship theory. Board ownership in organisations encourages boards to control their opportunistic attitudes. The insignificant impact of board ownership on asset return risk may occur due to the small number of shares owned by the directors in the companies. The mean of board ownership in this study is only 2.6 per cent. Besides, there is no regulation

about the minimum number of shares owned by the board. Risk-seeking investors tend to the high risk-taking, whereas risk-averse investors consider the low risk-taking.

In conclusion, firms should be aware of the result that shows the negative influence of corporate governance on firm risk. Corporate governance is the system of how a company is managed; management discloses these governance activities in the annual report, so that it can communicate to all shareholders that the company has fulfilled the interests of stakeholders. In addition to achieving financial performance, the company's ability to meet corporate governance standards is a form of promotion that can increase public trust. Adequate governance performance is a form of company compliance to regulators in an effort to achieve company goals. However, of the four components in the internal mechanism of corporate governance used in this study, only board independence and board ownerships that have a significant role in controlling the firm risks. Board size and board gender are unable to influence the firm risks. It is essential for the company to pay more attention to the effectiveness of the number of members on the board, as well as the composition of female members on the board. It is not about the numbers, but it is more about the productive roles of all the members on the board in controlling the firm risks.

This study is subjected to certain limitations. The values of adjusted R^2 for each research model examined in this study are relatively low. It indicates that there are several factors, other than independent variables observed in this study, which can also affect the firm risks. This study focussed on the use of internal mechanism to explain corporate governance as the independent variable, especially limited to board size, board independence, board gender and board ownership. Along with the increasingly dynamic business development, further research studies may use other indicators to explain corporate governance related to corporate risk management and other measurements of firm risks. Aside from that, the observations in this study are limited to the agricultural, mining and property industries listed on the Indonesia Stock Exchange in the period 2013-2015. Future studies can try to investigate the impact of corporate governance on firm risk in different industries and update the observed periods to provide new evidences.

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