Journal of Economics, Business, and Accountancy Ventura Vol. 26, No. 3, December – March 2024, pages 283–293

Impact of Board Gender Diversity and Derivatives Use on Firm Risk

Dwi Dewisri Kinasih[1], Nuraini Desty Nurmasari[2]*, Joni Prayogi[3]

[1]*Universitas Muhammadiyah Riau, Pekanbaru, Riau, Indonesia*
[2]*Universitas Brawijaya, Malang, East Java, Indonesia*
[3]*Universitas Jenderal Soedirman, Purwokerto, Central Java, Indonesia*

A R T I C L E I N F O

Article history:
Received: 9 January 2023
Revised: 30 January 2024
Accepted: 31 January 2024

JEL Classification:
G32, J16, L25

DOI:
10.14414/jebav.v26i3.3569

Keywords:
Firm risk, Gender diversity, Female board directorship, Derivatives use

A B S T R A C T

In the wake of the recent global pandemic, COVID-19, companies need to maintain performance and manage firm risk. Companies should understand what can affect the firm's risk. This paper investigates the impact of board diversity and derivatives use on firm risk. The sample consists of 35 Indonesian LQ45 listed on the Indonesia Stock Exchange with an observation period of 2016–2020. The company's risk is proxied by the standard deviation of stock returns. This study uses a panel data regression model, namely fixed effect regression and random effect regression. The results of this study indicate that female board directorship is negatively associated with firm risk. It shows the significant role of female board directors in the company's board. Meanwhile, the use of derivatives has no significant effect on the firm risk. These results impact the development of literature that examines the influence of board diversity and the use of derivatives for hedging in Indonesia so that companies can determine company policies to reduce risk.

A B S T R A K

Di tengah pandemi covid-19 yang baru-baru ini terjadi secara global, perusahaan perlu mempertahankan kinerja dan mengelola risiko perusahaan. Perusahaan harus memahami apa yang dapat mempengaruhi risiko perusahaan. Penelitian ini bertujuan untuk menguji dampak keragaman dewan dan penggunaan derivatif terhadap risiko perusahaan. Sampel terdiri dari 35 LQ45 Indonesia yang terdaftar di Bursa Efek Indonesia dengan periode pengamatan di tahun 2016–2020. Risiko perusahaan diproksikan dengan standar deviasi return saham. Penelitian ini menggunakan model regresi data panel yaitu regresi fixed effect dan regresi random effect. Hasil penelitian ini menunjukkan bahwa jabatan direktur perempuan berhubungan negatif dengan risiko perusahaan. Hal ini mengindikasikan peran yang signifikan dari dewan direksi perempuan dalam dewan direksi perusahaan. Sedangkan penggunaan derivatif tidak berpengaruh signifikan terhadap risiko perusahaan. Penelitian ini berdampak pada perkembangan literatur yang meneliti pengaruh keberagaman dewan dan penggunaan derivatif untuk lindung nilai di Indonesia, sehingga perusahaan dapat menentukan kebijakan perusahaan untuk mengurangi risiko.

1. INTRODUCTION

The COVID-19 pandemic has caused losses for companies in various sectors. This is because the current pandemic is related to health and causes economic uncertainty, for example, falling export commodity prices and the rupiah weakening against the US dollar. Fluctuating exchange rates, commodity prices, and interest rates can cause losses for companies if not appropriately managed. Many risky asset classes have substantial volatility due to the pandemic's pattern of increased risk aversion and the ensuing "jumping" of liquid equities (Sebhatu et al., 2020). This shows that the company cannot be separated from the risk of its operational activities. Risks that are not appropriately managed can negatively impact the company and threaten its survival. Risk management is needed to mitigate and manage the risks the company faces so that the impact of these risks can be minimized. Risk management involves the identification and assessment of prospective losses, as well as the implementation of measures to mitigate the financial impact of these risks

* Corresponding author, email address: *nuraini.desty.n@ub.ac.id*

(Smith & Merritt, 2020). Effective risk management will directly influence the value of a company. Consistent with the findings of Ghazieh & Chebana (2021), implementing a risk management and control system in a company has a good impact on its management, leading to improved performance and value generation.

The board of directors is essential in overseeing risk management and governance of risk-related decisions (Bank for International Settlements, 2015). In Indonesia, it is mandatory for any Indonesian limited liability corporation, also known as Perseroan Terbatas or PT, to have a Direksi (Board of Directors/Board of Management) and a Dewan Komisaris (Board of Commissioners/Supervisory Board) (UU No. 40/2007). A two-tier board establishes a distinct division between the Board of Directors, which is responsible for managing the firm, and the Board of Commissioners, which is responsible for overseeing the company's management by the Board of Directors in the company's best interest. This study focuses more on female board directors because of the high correlation between their task of managing the firm and firm risk. This study investigates whether female board directors have a significant effect by giving a different perspective regarding the firm's management. To manage firm risk effectively, diversity is necessary to achieve sustainable corporate growth, and face increased uncertainty, internally and externally, from shareholders or other stakeholders. The company entails having a diverse range of perspectives and expertise among the top levels of company management. One aspect of diversity that contributes to the organization's progress is the presence of females. According to Adams & Ferreira (2009), Post & Byron (2015), and Li et al. (2022), female directors have a significant impact on improving the quality of board monitoring and influencing board decision-making in the context of agency theory and upper echelon theory.

The representation of females on the board has risen in ASEAN. Thailand demonstrated its superior gender diversity by having females occupy 20.4% of board seats in listed businesses, surpassing Vietnam (15.4%) and Indonesia (14.9%) (International Finance Corporation, 2019). Among the surveys of world banks in 2019, 39% lack female representation on their board, while 61% have at least one female board member. Furthermore, 16% of organizations have a board membership of more than 30% of females. Of the six ASEAN countries, namely Thailand, Vietnam, Indonesia, Malaysia, Singapore, and the Philippines, Indonesia was third with a gender-diverse board of directors of 14.9% in 2017. Indonesia also ranks first as a country with a proportion of female board seats of 11.7% (International Finance Corporation, 2019). The International Finance Corporation, with the entitled paper "Board Gender Diversity in ASEAN" in 2019, came up with the idea that females play an essential role in almost all operations, from low management positions to senior management. Senior female leaders have the same academic qualifications as men, so women's abilities are the same. The presence of women on corporate boards can drive operational excellence, bringing new insights and perspectives that enable more decisive decision-making. In their study, Muhammad et al. (2023) discovered that having female directors on a company's board brings new viewpoints and improves supervision practices.

Research conducted by Qayyum et al. (2021) concluded that firms with three or more women directors on their corporate boards exhibit greater economic relevance compared to enterprises with less than three women directors. This suggests that firms with a diverse gender face less risk of falling share prices than firms with a less diverse gender board of directors. Women can reduce unwanted news, which is the main risk of falling stock prices. Greater diversity in the gender diversity of the board reduces the risk of the organization's stock price falling. In line with research conducted by Cho et al. (2021), companies with greater gender diversity at the executive level tend to have a lower bankruptcy risk than companies with lower gender diversity. Gender diversity plays an essential role in management, and risk preferences are essential in organizations. In contrast, Farag & Mallin (2017) argued that male and female executive directors have the same risk-taking behavior. Sila et al. (2016) found that the presence of female directors did not affect the company's equity risk. This indicates that a higher proportion of female directors in firms are no more or less risk-taking when compared to more male-dominated boards. To the best of the authors' knowledge, there is still inconsistency about the result of the impact of board diversity on firm risk.

In addition to the presence of women on the company's board of directors, another risk management technique that companies can use to minimize the risks they face is to hedge by using derivative instruments. Derivatives are financial instruments in the form of contracts used as a tool for strategic risk management activities by companies and investors. Seok et al. (2020) suggested that adopting derivatives for hedging is significant and effective in risk management, although the empirical pieces of evidence are conflicting. Bahoo et al. (2019) found that well-governed enterprises that have effective risk management systems utilize derivatives to hedge against risks and enhance the value of the organization. On the contrary, research has

indicated that the utilization of derivatives may have a negative impact on the value of a company due to the increased risk associated with speculative trading (Adam et al., 2017).

Derivative instruments are classified into two main purposes: hedging and speculation (trading). Derivative products are used for hedging to mitigate the impact of fluctuations in cash flows and risk exposure. Derivative instruments, such as interest rate swaps, foreign exchange contracts, and cross-currency swaps, can be used to hedge and minimize risk. Interest rate swaps help reduce the risk associated with increasing interest rates, foreign exchange contracts help mitigate the exposure to variations in foreign exchange rates, and cross-currency swaps help reduce the risk of rising interest rates. Subsequently, to engage in speculation, the corporation is inclined to make a precarious investment to achieve a greater yield.

In Indonesia, PSAK No. 71/2020 governs the accounting treatment of derivative financial instruments employed for hedging purposes, such as fair value hedges, cash flow hedges, and hedges of net investments in overseas businesses. Firmansyah et al. (2020) found a strong correlation between corporate risk and the possession of derivative instruments by companies in developing nations. They studied the effect of derivative instruments on firm risk in Indonesia from 2012 to 2017. Based on a study conducted by Candradewi and Rahyuda (2015), only 12.44% of non-financial companies in Indonesia use derivative products (Candradewi et al., 2017). Wahyudi's research between 2014 and 2016 revealed that of the 81 data points observed, 27 samples (34.6%) used hedging plans to maintain financial risk (Wahyudi et al., 2019). This data shows that the development of derivative instruments is increasing.

The derivatives market plays a crucial role in addressing the global financial crisis. The G20 addressed the problem by initiating a comprehensive restructuring of over-the-counter (OTC) derivatives markets. Indonesia's OTC derivatives market is relatively modest in size, both in its economy and worldwide. However, it has shown consistent growth over the past five years. The data demonstrates that the yearly average turnover of rupiah-denominated futures experienced a 13% growth from 2015 to 2019. In 2019, OTC foreign exchange (FX) derivatives held the highest importance in Indonesia, representing 0.06% of worldwide trading volume (Financial Stability Board, 2021). The entities responsible for the development and implementation of OTC derivatives market reforms in Indonesia include the Ministry of Finance (MOF), Bank Indonesia (BI), the central bank, the Financial Services Authority (OJK), an integrated supervisory authority established in 2011, and the Commodity Futures Trading Regulatory Agency (Bappebti). Huang et al. (2017) concluded that stock price exposure and market risk are lower for derivative users than for non-derivative users. Then, Orlando & Murwaningsari (2022) conducted research that revealed a positive correlation between derivative instruments and tax avoidance. This current study examines the utilization of derivatives and its impact on company risk in Indonesia, a developing country. Based on the literature, the prior research on the association requires further discussion and should be re-examined using the latest data. Additionally, this study also encompasses the period of the COVID-19 crisis (2019-2020) by asking, "Is there a negative correlation between the utilization of derivatives and the level of risk for firms during this crisis period?"

This research has some contributions to financial literacy. First, this study contributes to presenting empirical evidence about the impact of female representation on a firm's board of directors on corporate risk during the COVID-19 crisis by examining whether, amidst a crisis, the influence yields any disparate outcomes. This study further enhances the existing research by specifically examining female boards of directors. Second, it provides empirical evidence of the effectiveness of using derivatives for hedging among firms in Indonesia because there is still limited research that investigates the influence of gender diversity and derivatives use on firm risk. The presence of women on the board is now increasingly recognized, and derivative instruments are one way of mitigating risks faced by companies, such as exchange rate risk, interest rate risk, market risk, and others. This research also contributes to the development of literature on derivative instruments, which is still quite limited, especially in Indonesia. This research tries to make a comprehensive knowledge by investigating female board directorship and derivatives use.

This paper aims to investigate the impact of board diversity on firm risk and examine the effect of using derivatives on firm risk. The research question that will be addressed is whether the diversity of boards and the use of derivatives affect the company's risk.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Johnson & Powell (1994) stated that women have a lower tendency to take risks than men. Differences in risk preferences that tend to avoid risk will trigger a lower risk faced by the company. Abou-El-Sood (2021) stated

that banks with female directors prefer less risky asset positions in Islamic banks than conventional banks. A different finding by Farag & Mallin (2017) demonstrated that female directors on management boards are not risk-averse. Female directors' risk-taking levels may vary based on their role, and female and male executive directors may have similar risk-taking behaviors.

The finding between gender diversity and firms yields inconclusive results. Rodriguez et al. (2023) discovered that gender diversity reduced the probability of insolvency linked to gender diversity. Meanwhile, Adams and Ragunathan (2015) came up with an elevation in the risk for enterprises with a diverse gender composition. Then, Sila et al. (2016) concluded that there is no correlation between gender diversity and corporate risk. However, based on the Advocates for Human Rights (2019) report, increasing gender diversity and inclusion in the extractive industry can incur some outcomes: (1) expanding the talent base, (2) increasing team member productivity, (3) improving work safety records, (4) reducing social conflict and (5) improving the quality of life of individuals in general.

According to the Women in Business 2020 report released by Grant Thornton International, Indonesia ranks 4th with the highest percentage of women in senior management positions, 37 percent (Grant Thornton International, 2020). It is in line with Indonesia's commitment to the G20 membership on gender equality. This shows that women on the board of directors of a company play an important role and are expected to bring good performance. Lenard et al. (2014) stated that the more gender diversity on the board of directors, the more impact on the company's risk by reducing the variability of stock market returns. The higher the percentage of female board directorship, the lower the variability of company performance. Then, Li et al. (2022) found that the impact of board gender diversity on business risk is more substantial for companies that have a higher ability to attract female directors, as well as for countries with lesser power distance and a greater propensity for individualism. Last, those results were strengthened by Liu and Wu (2023), who found that female directors significantly reduce all types of risk. Based on the following explanation, this study composes the first hypothesis:

H1 There is a negative association between female board directorship and firm risk.

2.1. Derivatives Use

The research period starts from 2016 to 2020. During the research data period, some of the years were when the COVID-19 pandemic occurred around the world. The pandemic also has impacted the Indonesian economy and has even caused a financial recession (economic growth was recorded as negative for two consecutive quarters) in 2020. There was a decline in the IDX Composite or an index of all stocks that are traded on the Indonesia Stock Exchange (IDX) from 6300 areas to 3900 areas within three months, indicating that the impact of the pandemic on the economy is tremendous (Ministry of Finance, 2021). Being amid great uncertainty makes the company start thinking about strategic steps to mitigate losses that may occur. One form of risk mitigation is by using derivatives. A derivative is a contract or agreement whose value or profit opportunity is related to the performance of another asset. These other assets are referred to as underlying assets (IDX website).

Firmansyah et al. (2020) discovered a positive association between derivative instruments and firm risk. He was employed by companies in Indonesia from 2012 to 2017. He discovered a substantial positive correlation between derivatives use and firm risk. The reason for that relationship is that during that period, corporations were inclined to employ derivatives for speculative purposes, while they were ineffective for hedging purposes. This study examines the effects of derivatives utilized in Indonesia as a developing country during the crisis of the COVID-19 period. This study investigates whether the influence of derivatives can play a role in risk mitigation functions caused by significant exposure during COVID-19.

Previously, before the COVID-19 period, Gusti et al. (2017) concluded that derivatives negatively affect company risk. Then, during the crisis of the COVID-19 period, Cheng & Cheung (2021) found a negative relationship between derivatives and firm risk. Thus, companies that use derivatives at a higher level tend to have a lower level of risk. Based on the following explanation, this study composes the second hypothesis:

H2 There is a negative association between derivatives use and firm risk.

3. RESEARCH METHOD

The sample in this study is Indonesian LQ45-indexed companies listed on the Indonesia Stock Exchange for 2016-2020. The reason is that the LQ45 company's stock is one of the active stocks, so it is constantly subject

to price changes. The data used in this study is secondary data in the company's annual report. The samples were collected using a purposive sampling technique based on specific criteria. This study excluded financial companies and companies that did not have complete annual report data during the study period. This study's sample number was 35 companies from 2016 to 2020.

The dependent variable component consists of the company's total risk. This study's measurement of a company's total risk uses the standard deviation of return $(STD\_RET)_{i,t}$. This measurement uses an efficient capital market assumption, indicating that net exposure can be estimated empirically using the company's stock price as an aggregate measure of relevant information (Bartram et al., 2011). Furthermore, the independent variables consist of female board directorship and derivative use. The measurement of gender diversity uses FEMi,t, which denotes the proportion of women on the board and is measured by the ratio of female board directorship to the total number of directors on the board (Abou-El-Sood, 2019).

This study employs a dummy variable to quantify the use of derivatives. The references include Butt et al. (2022), Lau (2016), Panaretou (2014), Khediri (2010), and Allayannis and Weston (2001). If the corporation utilizes derivative instruments, it is coded by 1; otherwise, it is assigned by 0. Within the annual report, we input or query the term "Derivative" to ascertain the company's utilization of derivatives. The control variables used are the proportion of independent commissioners, company size, company debt, and dividend policy. The control variables consist of the proportion of independent commissioners (PIC), dividend (DIV), debt-to-equity ratio (DER), and company size (SIZE). More details, operational and measurement definitions can be seen in the Table 1.

This study used a panel data regression model, namely fixed effect regression and random effect regression. All data in this study was previously carried out by using STATA. The estimate of the models is the development of the research model carried out by Hughes et al. (2019) and Lau (2016) as follows:

$$STD\_RET_{i,t} = \beta_0 + \beta_1 FEM_{1i,t} + \beta_2 DERIV_{2i,t} + \beta_3 PIC_{3i,t} + \beta_4 DIV_{4i,t} + \beta_5 DER_{5i,t} + \beta_6 SIZE_{6i,t} + \varepsilon_{i,t}$$

Accordingly, this study expects $FEM_{1i,t}$ and $DERIV_{2i,t}$ to have a negatively significant coefficient to firm risk, as argued in H1 and H2.

Table 1. Variable measurements

Variables	Proxy	Measurement
Dependent Variable		
Firm Risk	The standard deviation of stock return (STD_RET)	Total risk is measured by calculating the standard deviation of stock return for each company (σE) ((Bartram et al., 2011).
Independent Variables		
Female board directorship	FEM	The proportion of women on the board is measured by the ratio of female directors to the total number of directors on the board (Abou-El-Sood, 2019).
Derivatives Use	DERIV	The dummy variable is given the number 1 if the company uses derivative instruments and is assigned a number 0 if the company does not use derivative instruments (Lau, 2016).
Control Variables		
Proportion of Independent Commissioners	PIC	The proportion is the number of independent commissioners compared to the total number of members of the board of commissioners (Ramadhani & Adhariani, 2017).
Dividend	DIV	The dummy variable scores 1 if the company pays dividends and 0 if the company does not pay dividends (Lau, 2016).
Debt to Equity Ratio	DER	The ratio is calculated by dividing a company's total liabilities by its shareholder equity (Lau, 2016).
Company Size	SIZE	SIZE = ln (Total Asset) (Lau, 2016).

4. DATA ANALYSIS AND DISCUSSION

This study utilized panel data regression to explain the effect of female board directorship and the use of the derivative on firm risk. The number of observations in this study was 167 observations. Descriptive statistics are shown in Table 2 (Derivative Use), Table 3 (Female Board Directorship), and Table 4 (All Samples). Table 2 in Panel A shows companies' average, minimum, maximum, and standard deviation values using derivatives. Meanwhile, Panel B is a company that does not use derivatives. Based on Table 2, companies that use derivatives have a greater risk of 12.44% when compared to companies that do not use 11.64% of derivatives. This could be because quite a few companies use derivatives in the sample of this study. Meanwhile, Table 3 in Panel A shows the average, minimum, maximum, and standard deviation values for companies with female directors on their boards. Meanwhile, panel B is a company that does not have a female director on its board of directors. According to Table 3, organizations without gender diversity have an average risk value of 12.83%, which is greater than the average risk value of companies with gender diversity, which is 10.69%.

Table 4 is a descriptive statistic for the entire sample in this study, which shows that the average standard deviation of stock returns is 0.1185 (11.85%), indicating that the company's average risk is still relatively small. For female directors, the average value of 0.1219 (12.19%) shows that female directors in companies in Indonesia still have a percentage below 20%, while men hold 87.88% of directors with a maximum ratio of 100%. The average value of derivatives used is 0.2575 (25.75%), and the remaining 74.24% do not use derivatives. These findings show that most of the companies whose shares are actively traded and have high stock liquidity have not used derivative instruments in their risk management. Research by Lantara (2010) shows that companies using derivatives in Indonesia are 28.8%, which indicates that the development of the derivatives market in Indonesia is still at a very early stage, where this result is much lower compared to research results in other developed countries. As for the control variable in this study, the proportion of independent commissioners has an average value of 0.4148 (41.48%), dividends have an average value of 0.8204 (82.04%), which indicates that most companies distribute dividends to shareholders, the debt to equity (DER) ratio has an average value of 1.1998. The size of the company has an average value of 24.56.

Table 2. Descriptive statistics (derivative use)

Variable	Mean	Min	Max	Std. Dev
Panel A: Derivative User				
STD_RET	0,1244	0,0095	0,296	0,0701
FEM	0,1043	0	0,6	0,1702
DERIV	1	1	1	0
PIC	0,4202	0,25	0,8333	0,1485
DIV	0,7906	0	1	0,4116
DER	1,1926	0,3332	3,8631	0,9811
SIZE (in Million)	**3.712**	**26.185**	**27.781**	**8.612**
Panel B: Not a Derivative User				
STD_RET	0,1164	0,032	0,33	0,0567
FEM	0,1279	0	0,6	0,1594
DERIV	0	0	0	0
PIC	0,4129	0,25	0,8	0,1145
DIV	0,8306	0	1	0,3765
DER	1,2023	0,0015	7,7012	1,2265
SIZE (in Million)	**25.902**	**11.586**	**246.943**	**46.179**

Table 3. Descriptive statistics (female board directorship)

Variable	Mean	Min	Max	Std. Dev
Panel A: Female Board				
STD_RET	0,1069	0,0095	0,253	0,0505
FEM	0,2643	0,0909	0,6	0,1387
DERIV	0,1818	0	1	0,3882
PIC	0,444	0,2857	0,8333	0,1552
DIV	0,7662	0	1	0,426
DER	0,9986	0,0015	3,159	0,7304
SIZE	23,85	12,731	33,14	6,3835
Panel B: Non-Female Board				
STD_RET	0,1283	0,029	0,33	0,0663
FEM	0	0	0	0
DERIV	0,3222	0	1	0,4699
PIC	0,3898	0,25	0,6667	0,0812
DIV	0,8666	0	1	0,3418
DER	1,3719	0,1762	7,7012	1,4183
SIZE	25,179	12,475	32,921	6,5726

Table 4. Descriptive statistics (all samples)

Variables	Mean	Min	Max	Std. Dev
STD_RET	0,1185	0,095	0,33	0,0603
FEM	0,1219	0	0,6	0,1621
DERIV	0,2574	0	1	0,4385
PIC	0,4148	0,25	0,833	0,1237
DIV	0,8204	0	1	0,385
DER	1,1998	0,0015	7,701	1,1652
SIZE (in Million)	20.201	26.185	246.943	42.307

Notes: SDT_RET= standard deviation of stock return; FEM = female board directorship; DERIV = derivatif; PIC = Proportion of Independent Commissioners; DIV= dividend; DER = debt to equity ratio; SIZE = company size in million rupiah

4.1. Estimation Model Testing

Before testing the hypothesis on the model, it is necessary to determine in advance which estimation model is more appropriate to use on panel data. The Table 5 is a table for testing the estimation model using 3 test models: the Chow test, Hausman test, and Lagrange Multiplier test. The best model in this research uses the random effect. Table 5 shows the test results in selecting the best estimation model. Based on Table 5, it can be seen that the Chow test results have an alpha value <0.05, which indicates that the best model is the common effect model. The Hausman test has an alpha value of 0.3291 > 0.05, which indicates that the best model is a random effect. Meanwhile, the results of the Lagrange Multiplier test have a value of 0.0007 < 0.05, which indicates that the best model is a random effect. Based on these three test results, the best estimation model in this research is to use a random effect estimation model. The random effect model can overcome the problem of heteroscedasticity and autocorrelation. However, the regression model in this study is free from the problem of classical assumptions.

Table 5. Estimation model testing

Uji Chow	Uji Hausman	Uji Lagrange Multiplier
0,0004	0,3291	0,0007

4.2. Pearson Correlation

The Pearson correlation measures the strength of the linear relationship among variables. Signed by and marked with an asterisk, * indicates a mutually influential relationship. Three kinds of asterisks, *, **, and ***, show a better relationship as the number of asterisks increases. While the negative sign indicates a reverse relationship and the positive sign indicates a unidirectional relationship. Table 6 presents the Pearson correlation, the negative relationship between the SD_RET variable, which is a proxy for firm risk and the female directorship (FEM_DIR) with a significance level of 5%. It indicates that companies that have a higher proportion of female directorship have a lower variability of company performance. Meanwhile, the derivatives use (DERIV), proportion of independent commissioners (PIC), and firm size (SIZE) do not show a significant relationship to firm risk (SD_RET). Furthermore, other variables such as debt to equity ratio (DER) and dividend (DIV) present a significant relationship of 1% to firm risk.

4.3. Hypothesis Testing and Discussion

In the results of the study in Table 7, it can be seen that the board diversity variable represented by the female board of directors has a significant negative coefficient value on company risk. This data shows that the more female directors in the company, the lower the company's risk level. The presence of a female board directorship is proven to reduce the company's risk. This negative relationship further confirms the results of research from Lenard et al. (2014), Abou-El-Sood (2019), Cho et al. (2021), and Qayyum et al. (2021), which state the same thing. Female board of directors are considered capable of providing a different perspective and higher prudence. A survey conducted by the International Labor Organization shows that gender diversity in the workplace helps Indonesian companies improve business outcomes, contributing to increased profitability and productivity. Around 77 percent of Indonesia's 400 companies enjoy the benefits of gender diversity in business (International Labor Organization, 2020).

Meanwhile, the variable using derivatives has a positive coefficient value but is not significant. This finding suggests that the company's use of derivatives has not been able to reduce the risk faced by the company. Based on the sample used, fewer companies use derivative instruments compared to companies that do not use derivative instruments. It could be one of the reasons why the hypothesis is not supported. The effect of derivatives does not play a significant role. The results of this study are supported by the latest report from the Financial Stability Board (2021), which shows that the Indonesian OTC derivatives market's development is still relatively small compared to an economic and global perspective. Thus, the use of derivatives does not significantly impact a reduced company's risk.

The results of this study are supported by the research of Bernile et al. (2018), which showed that diversity in the board of directors reduces stock return volatility. This diversity includes gender, age, ethnicity, educational background, financial expertise, and breadth of board experience.

Table 6. Pearson correlation test

	SD_RET	FEM_DIR	DERIV	PIC	DIV	DER	SIZE
SD_RET	1.000						
FEM_DIR	-0.164**	1.000					
	(0.035)						
DERIV	0.058	-0.064	1.000				
	(0.456)	(0.412)					
PIC	-0.022	0.265	0.026	1.000			
	(0.777)	(0.001)***	(0.741)				
DIV	-0.454	-0.125	-0.046	0.008	1.000		
	(0.000)***	(0.107)	(0.559)	(0.920)			
DER	0.262	-0.070	-0.004	0.101	-0.213***	1.000	
	(0.001)***	(0.372)	(0.963)	(0.195)	(0.006)		
SIZE	-0.001	-0.010	-0.379	0.144	0.096	0.268***	1.000
	(0.990)	(0.894)	(0.000)***	(0.063)*	(0.216)	(0.001)	

p-values in parentheses * p < 0.1, ** p < 0.05, *** p < 0.0

Table 7. Hypothesis testing

Dependent Variable: STD_RET	
FEM	(0,0794)**
DERIV	0,0037
PIC	0,0104
DIV	(0,0703)***
DER	0,0076**
SIZE	0,000072
R^2	0,2783

Table 8. Robustness testing

SDSHM	Coefficient	Robust std. err.	t	P>t
FEM_DIR	-0.0794756	0.24666	-3.22	0.002
DERIV	0.0037099	0.114944	0.32	0.747
PIC	0.0104064	0.03348	0.31	0.756
DIV	-0.070373	0.0120739	-5.83	0
DER	0.0076132	0.0052405	1.45	0.148
SIZE	0.000072	0.0007042	0.1	0.919
_cons	0.1697128	0.0194391	8.73	0

Perryman et al. (2016) concluded that firms with greater gender diversity show lower risk and deliver better performance. On average, women may be more risk averse than men, which influences decision-making and firm risk-taking. Firm risk and firm performance: The influence of increased gender diversity may indirectly result in firms having smaller returns because they take less risk while simultaneously having fewer huge losses and more stable performance increases (Perryman et al., 2016). The results are different from the findings of Panjaitan (2019), which showed that board gender diversity does not have a significant effect on company risk.

Furthermore, for the control variables in this study, the percentage of independent commissioners has a positive but not significant coefficient. The percentage of independent commissioners, 41.48%, has not been able to play a significant role in the company's risk. At the same time, the dividend variable has a negative and significant coefficient value. This shows that companies distributing dividends to shareholders tend to have a lower risk. Then, the variable debt-to-equity ratio shows a significant effect with a positive coefficient value. This shows that the more debt is used, the higher the risk faced by the company. It is aligned with the research of Nguyen & Kien (2022), which stated that leverage is positively related to the probability of default. In addition, the company's size has not been proven to have a significant effect on company risk. It indicates that the company's size is not a determining factor for the level of risk the company has. The R^2 value of 27.83% suggests that the female board directorship variable and the use of derivatives affect 27.83% of firm risk, while other variables outside this study influence the remaining 72.17%.

This research also carried out a robustness test, which can be seen in Table 8. This table shows that the regression coefficient value for each variable has not changed compared to the results of the multiple linear regression test.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

This study hypothesizes that female board directorship and derivatives have a negatively significant effect on firm risk. When other control variables were considered (after controlling for the proportion of independent commissioners, dividend, debt-to-equity ratio, and company size), female board directorship proved to be associated with lower firm risk. Consistent with the predictions, this study finds that the higher the proportion of female board directorships, the lower the extent of firm risk. Otherwise, the use of the derivatives was shown to have an insignificant impact on firm risk. Based on the sample used, fewer

companies use derivative instruments compared to companies that do not use derivative instruments. It could be one of the reasons why the hypothesis is not supported.

Implications for the corporate governance literature. First, this paper impacts the literature investigating the impact of gender diversity on corporate outcomes, especially the emphasis on firm risk. It would be worth a firm's efforts to mitigate the risk intentionally. Companies can increase the percentage of female board directorship attendance as a best practice in managing company risk. Second, the results of this research also show that although Indonesia does not enforce Mandatory Minimum Regulations for Women on Boards, their presence has a negative impact on corporate risk. This research adds to the literature review about the importance of the presence of women on the board, especially in Indonesia as a developing country. Despite the importance of the results of this study, it has limitations. Future research is expected to be able to use different risk proxies such as standard deviation ROA and ROE. In addition, further research should examine the influence of other types of board diversity concerning sustainability performance, for example, board age and ethnic diversity. Finally, further research can expand the population by including all companies that have been listed on the Indonesia Stock Exchange for a broader period.

REFERENCES

Abou-El-Sood, H. (2019). Corporate governance and risk taking: the role of board gender diversity. *Pacific Accounting Review*, *31*(1), 19–42. https://doi.org/10.1108/PAR-03-2017-0021

Allayannis, G. and Weston, J.P. (2001), "The use of foreign currency derivatives and firm market value", The Review of Financial Studies, Vol. 14 No. 1, pp. 243-276, doi: 10.1093/rfs/14.1.243.

Bank for International Settlements. (2015). *Corporate governance principles for banks*.

Bartram, S. M., Brown, G. W., & Conrad, J. (2011). The Effects of Derivatives on Firm Risk and Value. *Journal of Financial and Quantitative Analysis*, *46*(4), 967–999. https://doi.org/10.1017/S0022109011000275

Abou-El-Sood, H. (2021). Board gender diversity, power, and bank risk taking. *International Review of Financial Analysis*, *75*(January 2020), 101733. https://doi.org/10.1016/j.irfa.2021.101733

Adam, T. R., Fernando, C. S., & Salas, J. M. (2017). Why do firms engage in selective hedging? Evidence from the gold mining industry. *Journal of Banking & Finance*, *77*(C), 269–282. https://econpapers.repec.org/RePEc:eee:jbfina:v:77:y:2017:i:c:p:269-282

Adams, R., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, *94*(2), 291–309. https://econpapers.repec.org/RePEc:eee:jfinec:v:94:y:2009:i:2:p:291-309

Bahoo, S., Ahmed, F., Shoukat, A., & Ahmad, M. (2019). Impact of Corporate Governance on American Corporates' Financial Performance: The Mediating Role of Derivatives. *JISR Management and Social Sciences & Economics*, *17*(1), 125–148. https://doi.org/10.31384/jisrmsse/2019.17.1.8

Bartram, S. M., Brown, G. W., & Conrad, J. (2011). The effects of derivatives on firm risk and value. *Journal of Financial and Quantitative Analysis*, *46*(4), 967–999. https://doi.org/10.1017/S0022109011000275

Bernile, G., Bhagwat, V., & Yonker, S. (2018). Board diversity, firm risk, and corporate policies. *Journal of Financial Economics*, *127*(3), 588–612. https://doi.org/10.1016/j.jfineco.2017.12.009

Candradewi, M. R., Wiksuana, I. G. B., Purbawangsa, I. B. A., & Sedana, I. B. P. (2017). Determinants of Derivatives Usage and Its Effect on Firm Risk : Evidence from Indonesian Non-Financial Firms. *European Journal of Business and Management*, *9*(15), 186–205.

Cho, E., Okafor, C., Ujah, N., & Zhang, L. (2021). Executives' gender-diversity, education, and firm's bankruptcy risk: Evidence from China. *Journal of Behavioral and Experimental Finance*, *30*, 100500. https://doi.org/10.1016/j.jbef.2021.100500

Farag, H., & Mallin, C. (2017). Board diversity and financial fragility: Evidence from European banks. *International Review of Financial Analysis*, *49*(January), 98–112. https://doi.org/10.1016/j.irfa.2016.12.002

Firmansyah, A., Utami, W., Umar, H., & Mulyani, S. D. (2020). Do Derivative Instruments Increase Firm Risk for Indonesia Non-Financial Companies? *International Journal of Business, Economics and Management*, *7*(2), 81–95. https://doi.org/10.18488/journal.62.2020.72.81.95

Ghazieh, L., & Chebana, N. (2021). The effectiveness of risk management system and firm performance in the European context. *Journal of Economics, Finance and Administrative Science*, *26*(52), 182–196. https://doi.org/10.1108/JEFAS-07-2019-0118

Huang, P., Kabir, M. H., & Zhang, Y. (2017). Does Corporate Derivative Use Reduce Stock Price Exposure? Evidence From UK Firms. *Quarterly Review of Economics and Finance*, *65*, 128–136.

https://doi.org/10.1016/j.qref.2017.02.004

Lantara, I. W. N. (2010). Survey on the Use of Derivatives in Indonesia. *Gadjah Mada International Journal of Business*, *12*(3), 295. https://doi.org/10.22146/gamaijb.5504

Lau, C. K. (2016). How corporate derivatives use impact firm performance? *Pacific Basin Finance Journal*, *40*, 102–114. https://doi.org/10.1016/j.pacfin.2016.10.001

Li, Z., Jia, J., & Chapple, L. (2022). Board gender diversity and firm risk: international evidence. *Managerial Auditing Journal*, *37*(4), 438–463. https://doi.org/10.1108/MAJ-05-2021-3157

Muhammad, H., Migliori, S., & Mohsni, S. (2023). Corporate governance and firm risk-taking: the moderating role of board gender diversity. *Meditari Accountancy Research*, *31*(3), 706–728. https://doi.org/10.1108/MEDAR-07-2020-0949

Orlando, S., & Murwaningsari, E. (2022). Pengaruh Instrumen Derivatif Dan Corporate Social Responsibility Terhadap Penghindaran Pajak Dengan Peran Tata Kelola Perusahaan Sebagai Pemoderasi. *Jurnal Magister Akuntansi Trisakti*, *9*(2), 189–212. https://e-journal.trisakti.ac.id/index.php/jmat/article/view/13928

Panjaitan, Y. (2019). Board Gender Diversity and Its Impact on Firm Value and Financial Risk. *Mix Jurnal Ilmiah Manajemen*, *9*(3), 407. https://doi.org/10.22441/mix.2019.v9i3.002

Perryman, A. A., Fernando, G. D., & Tripathy, A. (2016). Do gender differences persist? An examination of gender diversity on firm performance, risk, and executive compensation. *Journal of Business Research*, *69*(2), 579–586. https://doi.org/10.1016/j.jbusres.2015.05.013

Poletti-Hughes, J., & Briano-Turrent, G. C. (2019). Gender diversity on the board of directors and corporate risk: A behavioural agency theory perspective. *International Review of Financial Analysis*, *62*, 80–90. https://doi.org/10.1016/j.irfa.2019.02.004

Post, C., & Byron, K. (2015). Women On Boards And Firm Financial Performance: A Meta-Analysis. *The Academy of Management Journal*, *58*(5), 1546–1571. http://www.jstor.org/stable/24758233

Qayyum, A., Rehman, I. U., Shahzad, F., Khan, N., Nawaz, F., Kokkalis, P., & Sergi, B. S. (2021). Board gender diversity and stock price crash risk: Going beyond tokenism. *Borsa Istanbul Review*, *21*(3), 269–280. https://doi.org/10.1016/j.bir.2020.10.010

Rodriguez, J., Dandapani, K., & Lawrence, E. R. (2023). Does board gender diversity affect firms' expected risk? *Studies in Economics and Finance*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/SEF-05-2023-0245

Sebhatu, A., Wennberg, K., Arora-Jonsson, S., & Lindberg, S. I. (2020). Explaining the homogeneous diffusion of COVID-19 nonpharmaceutical interventions across heterogeneous countries. *Proceedings of the National Academy of Sciences*, *117*(35), 21201–21208. https://doi.org/10.1073/pnas.2010625117

Seok, S. I., Kim, T. H., Cho, H., & Kim, T. J. (2020). Determinants of hedging and their impact on firm value and risk: After controlling for endogeneity using a two-stage analysis. *Journal of Korea Trade*, *24*(1), 1–34. https://doi.org/10.35611/jkt.2020.24.1.1

Sila, V., Gonzalez, A., & Hagendorff, J. (2016). Women on board: Does boardroom gender diversity affect firm risk? *Journal of Corporate Finance*, *36*, 26–53. https://doi.org/10.1016/j.jcorpfin.2015.10.003

Wahyudi, S., Goklas, F., Rita, M. R., Hersugondo, H., & Laksana, R. D. (2019). The determinants of corporate hedging policy: A case study from Indonesia. *International Journal of Economics and Business Administration*, *7*(1), 113–129. https://doi.org/10.35808/ijeba/199