



DO DERIVATIVE INSTRUMENTS INCREASE FIRM RISK FOR INDONESIA NON-FINANCIAL COMPANIES?

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ABSTRACT

Article History

Received: 21 November 2019

Revised: 8 January 2020

Accepted: 10 February 2020

Published: 24 March 2020

Keywords

Derivatives

Idiosyncratic

Stock return

Total risk

Unsystematic risk

Volatility.

JEL Classification:

M41.

This study aims to examine the effect of derivative instruments on firm risk. This study employs stock return volatility as total risk and idiosyncratic volatility as unsystematic risk. Derivatives are financial instruments that have a value depending on the underlying value of other variables, which can be categorized into assets and liabilities. This study employed a quantitative method using multiple linear regression. The sample is all non-financial companies listed on the Indonesia Stock Exchange from 2012 to 2017. Data used in this study are panel data sourced from www.idx.co.id and www.finance.yahoo.com. The sample selection in this study used a purposive sampling method with a total sample of 246 observations. The results of this study suggest that derivative instruments are positively associated with firm risk, both total risk and unsystematic risk. The Indonesian Investors consider that the ownership derivatives by companies lead to uncertain conditions in the future. The results of this study prove that ownership of derivative instruments by companies in developing countries is closely related to corporate risk.

Contribution/Originality: This study contributes to complete the works of literature on examining firms risk both total risk and unsystematic risk. Also, this study illustrates the ownership of derivatives by companies in one developing country.

1. INTRODUCTION

The primary purpose of investing is to get the maximum benefit possible. The investor demands a return on investment over the capital of the investor he has invested. Sources of return on investment, namely yield which is a component of return that reflects the cash flow or income periodically obtained from an investment and capital gain (loss) as the second component of returns which is an increase (decrease) in the price of a security that can provide benefits (losses) for investors. Hartono (2015) stated that there are two types of rates of return, namely realized returns and expected returns. Returns that have occurred can be used as an analysis in measuring company performance and is useful in determining expected returns and future risks. Meanwhile, the expected return is the return that is expected to be obtained by investors in the future. In investing, investors will want a specific rate of return. If the investment period has passed, investors are faced with the actual rate of return on investment received. The expected rate of return with the realized rate of return may differ. In the context of investment in the capital market, the rate of return on the stock investment is the excess selling price of shares above the purchase price. The higher the selling price of shares above the purchase price, the higher the rate of return obtained by

investors. If an investor wants a high rate of return, the investor must be willing to assume a higher risk, and vice versa.

Related to valuations of stock investments in the capital market, [Ohlson \(1995\)](#) introduced the concept of value relevance, which is a reciprocal relationship between accounting information with the rate of return on investment and the market value of equity. The value relevance model links between market prices and investment returns and measures of financial performance and position. Relevant accounting information related to profit and loss can affect investors' economic decisions in helping them to evaluate past and present company events and conditions ([Ikatan Akuntansi Indonesia, 2018](#)). The results of the evaluation can be used as a basis for investing in the future. Accounting information is considered relevant if accounting information such as profit and loss can explain changes in stock prices.

The decline in the value relevance of net income can occur due to a shift in traditionally capital-intensive companies to companies that have high technology with economical services. The change in the company, which was initially run traditionally into a high-tech company, has resulted in the relevance of financial statements. Financial statements can be considered less relevant in assessing the fundamental conditions of companies that have high technology by running a strategy of intensification of knowledge and developing companies with service-oriented ([Dontoh, Radhakrishnan, & Ronen, 2004](#)). Related to stock information in the capital market, investors can assess its volatility both in price and in its retrieval. [Sari, Achسانی, and Sartono \(2017\)](#) stated that volatility in the capital market shows fluctuations in the value of a financial instrument in the capital market for a specified period. The volatility of stock returns in the capital market can lead to more significant risks and uncertainties faced by investors so that investors' desire to invest in the capital market becomes unstable — the existence of price volatility and investment returns associated with the emergence of risk.

Volatility in the capital market that often concerns investors is stock price volatility and stock return volatility ([Sari et al., 2017](#)). The volatility of stock prices illustrates changes in closing prices of shares that occur based on observations of a specific period. Changes in closing prices can occur due to internal and external factors ([Ajireswara, 2014](#)). Internal factors related to the company for these shares; for example, there is a change in the level of profit of the company. External factors occur due to shocks in the foreign capital market, macroeconomic factors, and issues that are developing in the capital market itself. Observation of stock price volatility is fundamental for investors because the results of these observations can be the basis in calculating stock return volatility.

Furthermore, the volatility of stock returns reflects the level of uncertainty or risk for the magnitude of changes in the value of a security ([Bumi, 2013](#)). High stock return volatility suggests the value of the stock can go up or down dramatically in a relatively short period. Meanwhile, low stock return volatility indicates that the value of the stock has not changed or fluctuated drastically, so changes in the value of the stock will tend to be stable over a while. Volatility itself is a measure of how responsive a portfolio returns to changes in the return on investment in shares in the capital market as a whole ([Sharpe, 1964](#)). [Tandiontong and Rusdin \(2015\)](#) stated that stock return volatility in the capital market in Indonesia is based on two assumptions, namely systematic risk and unsystematic risk. Besides, [Tandiontong and Rusdin \(2015\)](#) proved that stock return volatility has differences between systematic risk factors that indicate that the sources of risk of stock investments have different characteristics. The findings in the test show that stock investments have unequal sources of risk, so investors need different analysis in dealing with every systematic risk in investing in company shares in the capital market.

[Sharpe \(1964\)](#) and [Lintner \(1965\)](#) through the concept of the Capital Asset Pricing Model (CAPM), provide a theoretical framework of the pricing of risky assets. CAPM is an economic model that explains stock returns as a function of market returns. An alternative model of CAPM is the three-factor model shown by [Fama and French \(1992\)](#). In this model, the size factor and book to market are included in the market index as explanatory variables.

CAPM theory implies that idiosyncratic volatility, which is company-specific risk, is not a problem in pricing risk assets.

Meanwhile, the three-factor model theory assumes that idiosyncratic volatility can be diversified because investors hold a proportion of the market portfolio that can be well-diversified (Liu, Di Iorio, & De Silva, 2014). Furthermore, Chng, Fang, Xiang, and Zhang (2017) states that company-specific risks can be diversified but are not relevant to the expected return. In CAPM, it only explains the problem of systematic risk, while the specific risk of the company cannot be explained through cross-sectional stock returns.

Company-specific risk is usually measured by idiosyncratic volatility that is not related to market risk. The motive for carrying out a portfolio of securities is to eliminate risks that can be diversified while risks that cannot be diversified will remain inherent in each security. The law attached to security is high risk - high return. Investors get returns because investors have to bear certain risks. If portfolio efforts have been made, the return of securities should be positively correlated to this diversified risk. Idiosyncratic volatility is a specific risk for each company, so its movements are independent (not dependent) on market movements.

Regarding the shape and nature of a company's risk change, the idiosyncratic volatility of individual shares varies substantially over time, and there is a less active dominance of time-series and decreased autocorrelation (Fu, 2009). Idiosyncratic volatility that reflects specific information about the company and will fluctuate according to the information itself. Several factors can cause idiosyncratic volatility fluctuations, including announcements about company earnings, supply and demand information that is seasonal, and the dynamics of corporate competition. Therefore, this risk will naturally change over time (time-varying) depending on changes in the information.

The testing the factors on firm risk has been carried out in previous studies in Indonesia. Masdupi and Noberlin (2015) examined the effect of leverage, liquidity, and company performance on firm risk. Ningsih, Dewi, and Yuliati (2019) examined the influence of interest rates, exchange rate ratios, capital structure, and liquidity. Meanwhile, Firmansyah and Muliana (2018) examined the effect of tax avoidance and tax risk on company risk. Based on the results of tests that have been done, examining the impact of derivative instruments on company risk in Indonesia is still limited. This study aims to investigate the effect of derivative instruments on company risk. According to Sayyid (2015), derivatives are financial instruments that have a value depending on the underlying value of other variables. According to PSAK 55 (IAI, 2018), a derivative instrument is a financial instrument whose characteristics change in value as a result of changes in predetermined variables (often referred to as underlying variables), including interest rates, prices of financial instruments, commodity prices, exchange rates, price index or price index or interest rate index, credit rating or credit index, or other variables. According to the Indonesian Banking Accounting Guide (Bank Indonesia, 2008), derivative instruments can be categorized into assets and liabilities. Derivatives that are included in the category of assets for trading purposes, which are derivatives that are acquired or owned primarily to sell or repurchase shortly (typically 90 days), are part of a portfolio of specific financial instruments that are jointly managed. There is evidence of purpose in taking profits in short term profit taking or derivatives that are not financial guarantee contracts or are not used for hedging purposes that are adequately stated.

Meanwhile, derivative transactions that are included in the category of liabilities for trading purposes are derivatives that are stated as liabilities and are not reported as hedging instruments and measured at fair value, including derivatives that are not financial guarantee contracts or are not designated and effective hedging instruments. Derivative instruments can also increase profits, secure investment, and protect from price level fluctuations. When compared to other financial instruments, derivative instruments also have advantages such as lower transaction costs, more accessible and faster transaction processes, less risk, and higher liquidity (Sayyid, 2015). According to Pincus and Rajgopal (2002) and Oktavia and Martani (2013) derivative transactions are strongly related to earnings management actions by managers within the company. On the other hand, earnings management actions can increase idiosyncratic volatility as the results of tests conducted by Rajgopal and

Venkatachalam (2011); Chang, Wang, Chiu, and Huang (2015) and Zhou, Xie, and Li (2016). Zhang (2009) proved that the regulation of derivatives in financial accounting standards could reduce the practice of derivatives with speculative purposes. Barton, Hansen, and Pownall (2010) stated that managers could use derivatives to reduce earnings volatility.

Meanwhile, Huang, Zhang, Deis, and Moffitt (2009) stated that managers could use derivatives when managers want to do earnings smoothing for the benefit of long-term investors. According to Murwaningsari, Utama, and Rossieta (2015), if financial derivatives tend to be used for speculative purposes, it can result in increased volatility in profit and loss because the use of derivatives for speculative purposes provides an increase in market risk and financial distress for the company. Derivative transactions carried out by companies not used for hedging purposes allow companies to have a higher risk compared to companies that do not have derivatives of this type.

Furthermore, according to Lau (2016) the use of derivatives in developing countries tends to result in a decline in the value of the company. It is due to weak institutions and governance in developing countries and derivative markets in less liquid developing countries. This condition resulted in a lack of effectiveness of the derivatives used by the company. It is in line with the findings of Huang, Kabir, and Zhang (2017) that the use of derivatives by companies in developed countries can reduce the standard deviation of stock returns and systematic risk. Still, such conditions do not occur in developing countries. Huang et al. (2017) also found that developed countries use financial derivative transactions more for risk management than for trading purposes. Companies in developed countries try to reduce financial exposure, which can reduce the possibility of financial distress and mitigate the problem of under-investment. Furthermore, Cao, Chen, Goetzmann, and Liang (2018) state that derivative instruments used by companies even for hedging purposes, but in reality, companies that have derivatives with hedging purposes tend to have shares that are valued too low by investors. Therefore, derivative transactions with the purpose of hedging are closely related to the degree of error in the imposition of stock prices.

Based on the findings in the research above, the use of derivative instruments in developing countries is less effective for hedging purposes not only caused by the company itself, but the significant contribution of external factors influences the less effective use of the derivative instruments. Weak institutions and governance in developing countries and derivatives markets in less liquid developing countries are external factors that result in less effective derivative instruments if companies use them for hedging purposes. Besides, the lack of investor understanding of derivative instruments also supports information on ownership of derivative instruments by companies, which results in investment decisions that are harmful to the company. On the other hand, financial accounting standards have governed the ownership of derivative instruments that can only be used for hedging purposes. Nevertheless, in reality, not all companies in Indonesia follow the standard rules mentioned. The use of derivative transactions by companies in developing countries tends to be used as ordinary investment or tends to be used for speculative purposes even though there are derivatives applied by companies with hedging purposes. This study uses accounting information sourced from the financial statements of non-financial companies listed on the Indonesia Stock Exchange starting in 2012, which is the year from the adoption of IFRS in Indonesia until 2017. Al Nasser and Hajilee (2016) stated that markets in emerging markets are integrated with developed markets. The selection of non-financial companies has different financial statement characteristics from the financial statements of financial companies. Non-financial companies use derivatives with the purpose of hedging because of the potential for high-risk exposure associated with commodity prices, interest rates, and exchange rates (Bartram, Brown, & Conrad, 2011). Therefore, non-financial companies that use derivative instruments with the aim of hedging should have a motive in reducing firm risk. On the other hand, Lau (2016) and Huang et al. (2017) states that derivative instruments with hedging purposes are only successful in developed countries, so the use of derivative instruments in developing countries can increase risk. Testing of derivative transactions carried out by companies in reducing or increasing the risk of companies in developing countries becomes interesting to do.

This study also includes financial leverage and net income volatility as control variables. Financial leverage is closely related to the company's financial distress (Rajgopal & Venkatachalam, 2011). Rajgopal and Venkatachalam (2011) found that financial leverage influences idiosyncratic volatility because companies with high leverage will face the possibility of more considerable financial difficulties. Meanwhile, Khan. and Bradbury (2015) stated that net income volatility as accounting information uncertainty as well as leads to firm risk.

2. HYPOTHESIS DEVELOPMENT

Chng et al. (2017) concluded that companies that have derivatives with hedging purposes are not relevant to diversify portfolios if the purpose is only to reduce idiosyncratic volatility instability. It is related to the decrease in information asymmetry between agents and principals. Also, Chng et al. (2017) stated that portfolio diversification could be conducted to companies that implement hedging policies inconsistently. It also applies to companies that have derivatives for speculative purposes because they are considered to have problems with idiosyncratic volatility. Lau (2016) stated that capital markets that impose discounts on derivative users would have an impact on the decline in the company's market value. The finding implies that if the company does not apply derivative policies to hedge correctly, it will reduce the value of the company. The adoption of derivative policies with incompatible hedging purposes is the same as the ownership of derivatives with speculative purposes. These conditions can be avoided by implementing the right risk management policies and avoiding company policies that can increase company risk, especially unsystematic risk that can be reduced or eliminated.

According to Oktavia and Martani (2013) the uncertainty of derivatives in Indonesia owned by companies both used for speculative purposes and hedging purposes shows the tendency of companies in earnings management activities that can endanger the company. Guay and Kothari (2003) stated that the use of derivatives is not the only way to manage risk. There are other possible risk management tools carried out by non-financial companies. Therefore, derivatives used by companies do not always result in a decrease in company risk. Furthermore, Ayturk, Gurbuz, and Yanik (2016) state that most companies limit information on the use of derivatives. Therefore, many investors find it challenging to read risk management policies and hedging strategies from financial statements and use this information for the benefit of the investment decision process. The unclear disclosure of derivative information by users of financial statements is what results in the ownership of derivatives that can be dangerous for companies. Zhao and Paget-Brown (2013) found that in weak economic conditions, ownership of derivatives with a hedging objective had a negative effect on idiosyncratic volatility, whereas, in the right economic conditions, ownership of derivative instruments with hedging purposes could increase idiosyncratic volatility. Meanwhile, Bartram et al. (2011) concluded that the use of financial derivatives reduces both total risk and systematic risk. Tessema (2016) found evidence that the recognition and disclosure required by financial accounting standards for the ownership of derivative instruments for hedging purposes has a negative effect on the total risk of the company.

The use of derivative instruments with hedging purposes used by companies as a tool for risk mitigation must be seen in the country where they are used because Lau (2016) found that the use of derivative instruments with hedging purposes that can improve company performance only occur in developed countries. Conversely, the use of derivative instruments in developing countries can cause a decline in the value of the company. Conditions occurring in developing countries are triggered due to weak institutions and governance in developing countries and derivative markets in less liquid developing countries. It is relevant to the results of research by Huang et al. (2017), who found that the use of derivatives used by companies in developed countries can reduce total risk and systematic risk. Ownership of derivatives in developed countries is more widely used for risk management purposes compared to trading purposes.

Meanwhile, Cao et al. (2018) found that ownership of derivative instruments with the purpose of hedging by companies tends to cause shares to be underestimated by investors. Derivative transactions for hedging purposes are closely related to the error rate for the imposition of stock prices. Furthermore, Cao et al. (2018) conclude that

derivatives with hedging purposes that can increase share prices and minimize risk are derivatives with hedging purposes that are owned by the company continuously, not temporary ones. Therefore, if ownership of a derivative instrument with a purpose of hedging by a company that is not persistent or continuous is the same as ownership of a derivative instrument for speculative purposes, the ownership of derivative instruments which tend to be speculative purposes will increase profitability volatility because it can lead to higher market risk and potential financial distress Murwaningsari et al. (2015).

The ownership of derivative instruments is best used with the purpose of hedging when used in developing countries has the same potential as the purpose for speculative, not used for risk mitigation. Although in Indonesia, the actual implementation of derivatives has been regulated in PSAK 55 (IAI, 2018) and PSAK 60 (IAI, 2018), so derivative ownership is required only for hedging purposes. Besides, derivative transactions carried out by companies are closely related to earnings management activities that can lead to company risk due to company policy choices. Furthermore, the company must bear losses from the ownership of such derivative instruments in the future. The use of derivative instruments effectively to reduce risk is mostly carried out by developed countries, while the use of derivative instruments in developing countries increases company risk. Also, in developed countries, the use of derivative instruments for effective hedging purposes as a tool to mitigate risk if owned persistently, so that ownership of derivative instruments for hedging purposes can be considered dangerous for the company. If the ownership of derivative instruments is used for hedging, which can align the interests between the agent and the principal with the hope that the company can run well in the future.

Ownership of derivative instruments is divided into two purposes, namely for hedging purposes and for speculative purposes (trading). Derivative transactions that are classified as hedges are certain (for example, if derivatives are used to hedge changes in cash flows) or are used to hedge risks from specific exposures. The use of derivative instruments with the purpose of hedging can be used by managers in the company in minimizing the risk of the company that occurs in the future. Meanwhile, companies that have derivatives with speculative purposes indicate that the company is taking a risky action to obtain a high return on its investment. The company is considered investing in trading derivatives with high risk. As a result, investors assume that companies that have derivatives of this type will result in future income, and loss becomes uncertain. It can also impact the company's uncertainty in the future. Therefore, ownership of derivatives for any purpose, if used in developing countries, can result in a less effective role of the derivatives used by companies. Hence, ownership of derivatives tends to endanger the company.

Therefore, the hypothesis in this study is:

H₁: Derivative instruments are positively associated with firm risk.

3. RESEARCH METHOD

This study employed a quantitative method. The object of this study employs companies listed on the Indonesia Stock Exchange. The population used in this study is non-financial companies listed on the Indonesia Stock Exchange. Data was collected using the documentation method through the official website of the Indonesia Stock Exchange, namely www.idx.co.id and finance.yahoo.com. Information data from the financial statements used in this study for the comprehensive income component uses quarterly financial report data, while other data use annual data. The technique in sample selection used is to use non-random sample selection techniques (purposive sampling). In this study, samples were taken with several criteria. First, companies used in the sample are non-financial companies that have registered their shares on the Indonesia Stock Exchange before January 1, 2011. Although the data used began in 2012, sample selection started in 2011 because there was a basis for calculating the portfolio in the idiosyncratic volatility variable by using The Fama-French Model uses data from the previous year. Also, company selection began on September 1, 2018. This study eliminated companies that conduct IPOs after January 1, 2011. Second, this study removed financial companies from the sample because the characteristics of

asset structure and liabilities generate high leverage. Third, this study excluded non-financial companies that have incomplete financial statements, including information on comprehensive income components and data needed in this study from the period January 1, 2012, to December 31, 2017. Fourth, non-financial companies have disclosure data of at least 1 type of derivative transaction either for hedging purposes or for speculative purposes (trading) or which have both during the period of 1 January 2012 to 31 December 2017. The reason is to capture accounting information from companies both persistent and non-persistent in using derivatives both for hedging purposes and for speculative purposes. Based on the calculation of data for each variable, this study excludes one company because it has outlier data, the 2016 TOWR for idiosyncratic volatility variables, which have exceptional value. The amount of the company that can be used in this study is 41 companies so that the sample is 246 observations (firm-year).

In this study, the dependent variable is the firm risk, which is represented by idiosyncratic volatility and stock return volatility. The proxy for idiosyncratic volatility follows Hotvedt and Tedder (1978) and Herskovic, Kelly, Lustig, and Nieuwerburgh (2014) using the Market Model, with Equation 1 is as follows:

$$R_{it} = \beta_0 + \beta_1 R_{mt} + \varepsilon_{it} \quad (1)$$

Where:

R_{it} = the company's monthly stock return i at time t .

R_{mt} = monthly stock return as used by Liu et al. (2014).

Based on the above equation, to calculate idiosyncratic volatility, the equation using monthly data based on the regression results generated monthly residuals. Annual idiosyncratic volatility results from a standard residual deviation for 12 months. According to Kaplan (2013) in calculating the standard deviation of yearly stock return volatility based on the standard deviation of monthly stock return volatility needs to be multiplied by $\sqrt{12}$ to show the standard deviation of stock returns during the current year. Also, standard deviations based on daily, weekly, monthly, or quarterly stock return data can be annualized by making a standard deviation of these data by multiplying by the root of the amount of daily, weekly, monthly and quarterly data so that they become standard deviations or annual volatility (<https://financetrain.com/calculate-annualized-standard-deviation/>). Therefore, in line with this study, to get annual idiosyncratic volatility, the standard monthly residual deviation from the above equation needs to be multiplied by $\sqrt{12}$ to get idiosyncratic volatility in one year.

The second calculation for idiosyncratic volatility employs the Fama and French (1992) Model as used by Ang, Hodrick, Xing, and Zhang (2006); Ang, Hodrick, Xing, and Zhang (2009), Liu et al. (2014). The proxy used in these studies uses the standard deviation of the residual regression of the Fama and French (1992) model. For the second sensitivity test, several steps were carried out to determine idiosyncratic volatility following the Fama-French Model. The first step is to create a company category based on market capitalization $t-1$ (size factor) for the current year, which is hereinafter called Small Minus Big (SMB). Portfolio size distribution consists of 50 percent of large companies based on market capitalization, and the remaining 50 percent is categorized as small companies (size factor). The second step and book to market equity $t-1$ (value factor) are to use a book market equity ratio (BM) consisting of 1/3 including big companies, 1/3 including medium companies and 1/3 including in the low company, hereinafter referred to as High Minus Low (HML). Every year t , companies are ranked and sorted into portfolios according to the size of their capitalization and book to market equity ratio in December of year $t-1$. Returns from the monthly size factor portfolio are calculated as monthly returns from large portfolios reduced by monthly returns from small company portfolios. The monthly return from the value factor is calculated as the monthly return of the company's large portfolio book to market equity ratio minus the company's low book to market equity ratio.

To determine the SMB portfolio, this study excludes companies that do not have complete stock price information per month as Liu et al. (2014) and companies with negative equity. In line with this, to determine the

HML portfolio, this study excludes companies that do not have stock price information per month and companies that have a negative book-to-market value. Then monthly regression is performed for Equation 2 is as follows:

$$R_t - R_{ft} = \beta_0 + \beta_1 (R_{mt} - R_{ft}) + \beta_2 \text{SMB}_t + \beta_3 \text{HML}_t + \varepsilon_t \quad (2)$$

Where:

- R_t = company's monthly stock return i
- R_{ft} = risk-free using monthly yields on 10-year government bonds as used by Naomi (2011).
- R_{mt} = monthly stock return from the Composite Stock Price Index (CSPI) as used by Liu et al. (2014).
- SMB = monthly returns of small size portfolios minus the daily returns of large size portfolios. For SMB portfolios are grouped into two by the previous year's market capitalization as Liu et al. (2014) and Kumari, Mahakud, and Hiremath (2017).
- HML = calculated by the high group portfolio minus the small group portfolio as Liu et al. (2014) and Kumari et al. (2017). The portfolio is divided into 3 with the previous year's book to market equity into three groups, namely high, medium, and low.

Idiosyncratic volatility is an annual estimate of the residual standard deviation of the regression equation results above. The equation above suggests that to calculate the standard deviation for monthly idiosyncratic volatility. Similar to the Market Model, to get annual idiosyncratic volatility using the Fama-French Model, the standard monthly residual deviation from the above equation needs to be multiplied by $\sqrt{12}$. Furthermore, stock returns volatility is proxied by the standard deviation of monthly stock returns follows Khan and Bradbury (2014); Khan. and Bradbury (2015). The annual stock returns volatility is calculated based on the standard deviation of monthly stock return volatility that needs to be done $\sqrt{12}$ to avoid bias.

This study uses derivative instruments as an independent variable. Financial derivatives variables are classified based on hedging design (for hedging purposes or not) measured based on the fair value of derivatives that are recorded as assets or liabilities (Lee, 2017). Ayturk et al. (2016) stated that according to the hedge accounting rules in IFRS, companies must recognize changes in the fair value of derivatives as assets, liabilities, or equity in each financial reporting period. PSAK 60 (IAI, 2018) requires that derivatives be recorded as assets or liabilities and reported in the statement of financial position at fair value. According to Oktavia and Martani (2013), derivative proxies, both for hedging and speculative purposes (trading), use the absolute value of the net fair value of derivative instruments. Information on derivative values both for hedging and speculative purposes (trading) that are presented at fair value is included in the notes to the company's financial statements. Thus, the proxy used for derivatives is the absolute value of the fair value of derivative assets reduced by derivative liabilities for both hedging and speculative purposes, which are described as follows:

$$\text{DERIV}_i = \frac{\text{The absolute value of the fair value of derivatives}}{\text{Total assets}_{i-1}}$$

Where:

DERIV_i = fair value of derivative assets (liabilities) for the company i year t .

The fair value of derivatives = Absolute fair value of derivative assets (liabilities).

Total assets $t-1$ = total company assets i in year $t-1$.

Also, this study uses financial leverage and net income volatility as control variables. In this study, financial leverage as measured by total liabilities divided by total equity each year as used by Khan and Bradbury (2014); Khan. and Bradbury (2015).

$$\text{FINLEV} = \frac{\text{total liabilities}}{\text{total equity}}$$

Net income volatility follows the proxy used by Khan and Bradbury (2014), Khan. and Bradbury (2015) and Black (2014). To obtain net income volatility in one year, a quarterly comprehensive income, net income, and other

comprehensive income are calculated for one year divided by the market value of equity at the beginning of the period. From these calculations, the value of comprehensive income, net income, and other comprehensive income for the first three months, comprehensive income for the second three months, comprehensive income for the third three months, and comprehensive income for the third three months in the current year divided by market value of equity at the beginning of the period. The volatility of comprehensive income, net income, and other comprehensive income in one year is generated from the standard deviation of comprehensive income generated every three months divided by the market value of equity at the beginning of the period, and multiplied by $\sqrt{4}$.

Equation 3, 4, and 5 are the regression equation model, as follow:

$$IdioVolMM_{it} = \beta_0 + B1DERIV_{it} + \beta_2FINLEV_{it} + \beta_3NIVOL_{it} + \varepsilon_{it} \tag{3}$$

$$IdioVolFF_{it} = \beta_0 + B1DERIV_{it} + \beta_2FINLEV_{it} + \beta_3NIVOL_{it} + \varepsilon_{it} \tag{4}$$

$$RVOL_{it} = \beta_0 + B1DERIV_{it} + \beta_2FINLEV_{it} + \beta_3NIVOL_{it} + \varepsilon_{it} \tag{5}$$

Where:

- IdioVolMM_{it} = Idiosyncratic volatility of a company for one year using the Market Model firm i year t
- IdioVolFF_{it} = Idiosyncratic volatility of a company for one year using the Fama-French Model firm i year t
- SRVol_{it} = Stock return volatility of a company for one year firm i year t
- DERIV_{it} = The fair value of the company's derivative assets (liabilities) i year t.
- FINLEV_{it} = The company's financial leverage firm i year t.
- NIVOL_{it} = Net income volatility firm i year t.

4. RESULTS AND DISCUSSIONS

The descriptive statistical components used in this research are the mean, median, maximum value, minimum value, and standard deviation. Table 1 suggests the results of descriptive statistics summary that describe information on variable characteristics in this study.

Table-1. Descriptive statistics summary.

| | VOL ID _{MM} | VOL ID _{FF} | SRVOL | DERIV | FINLEV | NIVOL |
|-----------|----------------------|----------------------|--------|-------|--------|-------|
| Mean | 0.3341 | 0.2879 | 0.3731 | 0.006 | 1.684 | 0.033 |
| Median | 0.2895 | 0.2387 | 0.3201 | 0.004 | 1.051 | 0.018 |
| Max. | 1.8492 | 1.7865 | 1.9008 | 0.068 | 1.481 | 0.398 |
| Min. | 0.0550 | 0.0406 | 0.0698 | 0.000 | 0.187 | 0,007 |
| Std. Dev. | 0.2212 | 0.1981 | 0.2313 | 0.013 | 1.983 | 0.049 |
| Obs. | 246 | 246 | 246 | 246 | 246 | 246 |

Furthermore, Table 2 the summary of the regression test results for Equation 2 (primary model test), Equation 4 (sensitivity 1), and Equation 5 (sensitivity 2) are as follows:

Table-2. The summary of the regression test result: Equation 2, Equation 4, and Equation 5.

| Var. | MM Model | | | | FF Model | | | | SR Volatility | | | |
|---------------------|----------|---------|-------|-----|----------|---------|-------|-----|---------------|---------|-------|-----|
| | Coef. | t-Stat. | Prob. | | Coef | t-Stat. | Prob. | | Coef | t-Stat. | Prob. | |
| C | 0.294 | 11.471 | 0.000 | *** | 0.258 | 11.095 | 0.000 | *** | 0.331 | 12.502 | 0.000 | *** |
| DER | 2.578 | 1.965 | 0.025 | ** | 1.867 | 1.577 | 0.058 | * | 2.222 | 1.613 | 0.054 | * |
| FINLEV | 0.008 | 0.937 | 0.174 | | 0.009 | 1.172 | 0.121 | | 0.010 | 1.060 | 0.145 | |
| NIVOL | 0.308 | 1.078 | 0.141 | | 0.072 | 0.281 | 0.389 | | 0.366 | 1.201 | 0.115 | |
| R ² | 0.034 | | | | 0.025 | | | | 0.031 | | | |
| Adj. R ² | 0.022 | | | | 0.013 | | | | 0.019 | | | |
| F-stat. | 2.848 | | | | 2.042 | | | | 2.618 | | | |
| Prob.(F-stat.) | 0.038 | | | | 0.108 | | | | 0.051 | | | |

The examining hypothesis suggests that derivative transactions have a positive effect on company risk, both by using idiosyncratic risk with the market model and Fama-french model as well as stock return volatility. The results of this study differ from the findings of Bartram et al. (2011) who found evidence that non-financial companies usually implement derivative policies with motives to reduce risk. Companies commonly use the use of derivatives with higher exposure to interest rate risk, exchange rate risk, and commodity prices (Bartram et al., 2011). However, companies with lower total risk are closely related to ownership of derivatives for hedging, not for speculation. Therefore, non-financial companies that use derivatives should have a motive in reducing company risk, rather than resulting in an increase in unsystematic risk that can be captured through high profit and loss volatility.

Meanwhile, in terms of investors, derivative transactions tend to be used by companies for investment purposes that are speculative because investors in Indonesia are less familiar with the use of instruments by companies. In Indonesia, derivative instruments lack a transparent market coupled with asymmetric information between agents and principals, resulting in a lack of information about the ownership of derivatives by companies. Besides, investors are less able to distinguish between derivatives for hedging and speculative purposes. Still, investors consider that the ownership of derivative instruments/ transactions with any purpose has potential that is dangerous for the company. Therefore, investors respond to investor information as harmful information related to investment in the capital market.

According to Lau (2016) the use of derivatives when used with the purpose of hedging can improve company performance and can reduce risks caused by the company's operational performance. Companies that use derivative instruments are more able to generate sales from any given level of assets compared to companies that do not use derivative instruments for hedging purposes. However, according to Lau (2016) the use of these derivatives is less effective if conducted in developing countries. The existence of weak institutions and governance in developing countries and derivative markets in less liquid developing countries results in a less effective role of the derivatives used by companies. In developed countries, derivatives used by companies can reduce the standard deviation of stock returns and systematic risk because companies in developed countries use financial derivatives for risk management compared to trading purposes (Huang et al., 2017). Also, companies that employ financial derivatives to reduce financial exposure significantly can reduce the possibility of financial distress and mitigate under-investment problems (Huang et al., 2017). Although the company implements a derivative transaction policy with the purpose of hedging, the policy is closely related to the error rate of the imposition of stock prices (Cao et al., 2018). It is supported by the fact that there are still not many companies in Indonesia that have derivatives with the aim of hedging in the long term to be able to correct mistakes in the imposition of share prices in a non-instant process. In line with this, compulsory recognition and disclosure of derivative instruments for hedging purposes can reduce the company's total risk exposure (Tessema, 2016).

Under conditions for companies in Indonesia, derivative arrangements for hedging purposes are regulated in PSAK 55 (IAI, 2018) and PSAK 60 (IAI, 2018). After implementing the recognition and disclosure of derivative instruments and the hedging activities required by financial accounting standards, the company can be prudent in reducing policies that result in increased volatility in profit or loss. Ideally, the application of standards governing the recognition and disclosure of derivative instruments for hedging purposes can force companies that enter the competitive industry to be more careful in taking significant risks. The behavior of companies that have derivative transactions is considered as users of financial statements that are dangerous for the company in the future.

There are relatively few companies that have derivative transactions/instruments in Indonesia. On the other hand, the knowledge of users of financial statements, especially investors, are still limited to the ownership of derivatives because derivative instruments are not the primary investment owned by the company. From the investor's side, accounting information in the form of disclosure of derivative transactions in the notes to the financial statements for whatever purpose their use is considered as derivatives whose nature tends to be the same as derivatives for speculative purposes. Therefore, investors in Indonesia are suspected of only knowing derivative

transactions, not as a tool for risk management in reducing the uncertainty of the company in the future. Still, derivative transactions are considered to endanger the company's condition.

The use of derivatives by companies in Indonesia is in line with [Lau \(2016\)](#), which stated that the use of derivative instruments in developing countries tends to cause a decline in the value of the company. Weak institutions and governance in developing countries and derivative markets in less liquid developing countries are triggers for the ineffective use of derivatives. This condition results in the lack of effectiveness of the derivatives used by companies and different functions when used by companies in developed countries. The use of derivatives used by companies in developed countries can reduce company risk because companies in developed countries use financial derivatives more for risk management compared to trading purposes ([Huang et al., 2017](#)). Also, the use of derivative instruments in developed countries aims to reduce financial exposure significantly to reduce the possibility of financial distress and mitigate the problem of under-investment ([Huang et al., 2017](#)).

According to [Cao et al. \(2018\)](#), derivative transactions owned by companies when used with the purpose of hedging tend to result in shares that are valued too low by investors, so ownership of derivative transactions is closely related to the level of error in the imposition of stock prices. However, ownership of derivative transactions, in the long run, can increase and correct mistakes in the imposition of stock prices in a process that is not instant. Derivatives to hedge to boost share prices and minimize risks must be owned by the company continuously, not temporary ones ([Cao et al., 2018](#)). Associated with the inconsistency of companies in holding derivatives for hedging purposes, based on data on disclosure of derivative information in the notes to the financial statements, companies in Indonesia in this study sample that have derivatives with hedging purposes consistently from 2012 to 2017 only by 21.9 percent. Therefore, ownership of derivatives with the intention of hedging by companies in Indonesia is ineffective, and even tends to be the same as ownership of derivatives with speculative purposes. Under PSAK 55 (IAI, 2018) and PSAK 60 (IAI, 2018), derivative arrangements for companies in Indonesia are only carried out for hedging purposes. Recognition and disclosure that is mandatory for ownership of derivatives with the aim of hedging can reduce the company's risk exposure ([Tessema, 2016](#)). After implementing the recognition and disclosure of derivative instruments and hedging activities required by financial accounting standards, there is an incentive for companies to reduce policies that result in increased idiosyncratic volatility. The existence of standards that regulate the recognition and disclosure of derivative instruments intending to hedge deliberately forcing companies that enter the competitive industry to be more careful in taking significant risks ([Tessema, 2016](#)). However, based on the results of tests in this study prove that the ownership of derivatives triggers an increase in the instability of profit and loss on risk is not systematic.

According to [Chng et al. \(2017\)](#), the concept of high returns and idiosyncratic volatility is real for companies that do not implement hedging strategies or implement inconsistent hedging strategies. However, when a company has derivative transactions/instruments with the objective of hedging consistently, then the level of firm risk can be suppressed so that idiosyncratic volatility is not an issue. It is different from the results of testing in this study using data from companies in Indonesia that have applied IFRS-based financial accounting standards. Financial accounting standards for derivatives are regulated in PSAK 55 (IAI, 2018) and PSAK 60 (IAI, 2018), which can only be used for hedging purposes. Thus, the results of testing in this study prove that investors do not use the usefulness of accounting information in the form of quarterly profit and loss in financial statements in the current year in assessing the condition of the company. Still, the disclosure of accounting information in the form of derivative transactions in the notes to the financial statements as stipulated in PSAK 60 (IAI, 2018) resulted in a negative response from investors in assessing the condition of the company's current year as well as stock information on the capital market, especially unsystematic risk. Investors in Indonesia are less able to differentiate between derivatives for hedging and speculative purposes, so ownership of derivatives for hedging purposes is also considered investors can endanger the company's condition in the future as a result of potential losses that must be borne by the company in meeting its obligations. The use of derivative instruments for any purpose in developing

countries tends to cause a decline in the value of the company (Lau, 2016). It is due to weak institutions and governance in developing countries and derivative markets in less liquid developing countries. Therefore, the effectiveness of derivatives plays a less role in mitigating risk, and derivative ownership tends to be harmful to the company. The opposite condition occurs when the use of derivatives in developed countries, the use of derivative ownership, can reduce the standard deviation of stock returns and systematic risk because companies in developed countries' financial derivatives are more aimed at risk management compared to trading objectives (Huang et al., 2017).

5. CONCLUSIONS

Derivative transactions have a positive effect on company risk. The test results in this study prove that investors are concerned about company ownership information on derivative instruments that tend to be used for speculative purposes. There is a potential for companies to bear losses on derivative ownership with the purpose of hedging that is not effective even tends to be used for speculative purposes. Therefore, management's decision to use derivative instruments disclosed in the notes to the financial statements may increase specific/unsystematic risk for the company. Also, the lack of investor understanding of IFRS-based financial accounting standards related to the use of derivative instruments disclosed in notes to financial statements is thought to be one of the investors' concerns.

This research also contributes to Agency Theory, which is the unsystematic risk, which is reflected in idiosyncratic volatility, cannot always be reduced through diversification of stock portfolios. Unsystematic risk occurs because of asymmetric information when management within a company has specific policies. It is proven by the company's policy in the ownership of derivative transactions. This research also contributes to the development of idiosyncratic volatility proxies and stock return volatility by using monthly baseline data by multiplying by $\sqrt{12}$ to show idiosyncratic volatility and annual idiosyncratic volatility, which in previous studies were not used. For idiosyncratic volatility utilizing the basis of daily data, multiplied by the root of the stock trading day.

This study has limitations because it uses data and information only limited to the condition of companies in Indonesia from 2012 to 2017. Data and information in this study only use financial statements and other information from companies listed on the Indonesia Stock Exchange (IDX), so the results obtained in this study cannot generalize the results for other developing and developed country data. The low ownership of derivatives in Indonesia both for hedging purposes and speculative purposes by non-financial companies. It might be due to the lack of a formal derivatives market in Indonesia or the lack of liquid derivatives markets in Indonesia. This research can be developed using data from other developing country companies - ASEAN countries, and also developed countries to compare the results of their tests against the results of this study. Future studies can use a longer time horizon than this study.

Based on the results of this study, the Indonesian Institute of Accountants (IAI) is expected to need to improve the quality of financial accounting standards so that information in financial statements can be better understood and more useful for investors. Also, IAI needs to improve access to the availability of financial accounting standards for users of financial statements for both existing investors and potential investors, given the changes in IFRS-based financial accounting standards are quite dynamic so that investors can use accounting information in making investment decisions on the capital market. Furthermore, IAI needs to coordinate with the Financial Services Authority (OJK) related to the ownership of derivative instruments by companies listed on the IDX so that their use follows the provisions in the actual financial accounting standards that are used for hedging rather than being used for speculative.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Acknowledgement: All authors contributed equally to the conception and design of the study.

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