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The Effect of Hedging with Financial Derivatives on Firm Value at Indonesia Stock Exchange

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Abstract

This study aims to analyze the effect of hedging for the risks of foreign currency, interest rate, and commodity price on firm value as measured by Tobin's Q. The findings reveal that hedging with derivative instruments is insignificantly related to firm value but significantly varied in financial risks. Hedging for foreign currency risk has a significantly positive relation to firm value, while hedging for interest rate and commodity price risk has no relation. Furthermore, this study provides a novelty compared to previous studies in the utilization of the extent of hedging as the variable to measure the implementation of hedging.
Keywords: hedging; derivative instruments; foreign currency risk; interest rate risk; commodity price risk

JEL classifications: F3; G3

1. Introduction

The uncertainty of global economic conditions has a major impact on the economic conditions of Indonesia. The increase in international transactions has caused firms to encounter market risks, particularly those associated with fluctuating exchange rate, interest rate, and commodity price. In this environment, Indonesian companies are required to implement good risk management. One risk management strategy is to deal with market risks by hedging. According to the hypothesis proposed by Modigliani and Miller (1958) on perfectly competitive markets, hedging will not provide any benefits in the form of increased value. In perfectly competitive markets, investors create their own verifiable portfolios and have the ability to minimize their own risks. Therefore, investors will not respond positively to companies that perform risk management. However, in reality, there are no markets that meet the criteria of perfect competition; thus, the imperfections in the capital market cause the application of hedging relevant.

Derivative instruments are used as the instruments of hedging. Companies that utilize derivative instruments shall benefit from a more stable profit (Allayannis & Weston 2001). In addition, the utilization of derivative instruments assists companies in dealing with frictions in real financial markets, such as financial distress, underinvestment problems, bankruptcy costs, expensive external financing, and high tax rates (Monalusi 2015). A stable earnings shall be reflected in the increase in corporate value (Huang et al. 2009). Huffman and Makar (2004) state that the utilization of foreign exchange derivatives as a hedging instrument is able to effectively reduce exposure to foreign exchange in a period of one to three months, as well as in a period of 6 to 48 months. Unfortunately, such long-term hedging products are not offered in Indonesia yet. However, Chiang and Lin (2007) discover that for-

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eign currency hedging is effective when utilized in the period of one month, but ineffective in an extended period of time. In addition, Zhang (2009) discovers that the utilization of derivative instruments as speculative means has an impact on the volatility of profits, causing a decline in corporate value. Therefore, the actual impact of the utilization of derivative instruments on corporate value depends on the benefits provided for the company (Nguyen & Liu 2014).

Primarily, this study aims to observe the effect of the application of hedging with derivative instruments on company value. In addition, this study also investigates the influence of control variables, such as size, profitability, age, leverage, liquidity, growth, and corporate dividends on firm value. This study also aims to provide empirical evidence of the effect of the application of hedging for the risks of exchange rate, interest rate, and commodity price with derivative instruments on company value in Indonesia. The authors predict that the application of hedging with derivative instruments shall have a positive effect on company value.

2. Literature Review

Hedging is an activity that allows a company to minimize the business risks while remains earning profits in a business transaction (Repie & Sedana 2015). Hedging is one of the economic benefits of the derivative instruments; by offering the opportunity to transfer risk, hedging is able to reduce a company's losses caused by market price movements (Putro 2012).

According to Hanjani (2011), as economy moves toward an open economy, companies face greater risks. One of the main risks faced by Indonesian companies is the fluctuations of rupiah exchange rate against foreign currency. Indawan et al. (2015) state that the financial crises of 1997, 2005, and 2008 increased the potential for uncertainty resulting in the increase in fluctuations, particularly depreciation, of rupiah. PT Astra International Tbk suffered an exchange rate loss of IDR7.36 trillion in 1998, causing its stock price to plummet to IDR225 or less than one percent of the stock price in December 2011, namely IDR75,000 prior to the stock split. PT Semen Cibinong Tbk (now PT Holcim Indonesia Tbk) even booked a higher loss in the same year due to foreign exchange rate, namely over IDR10 trillion. Recently, PT PLN has experienced a difficult time as well. It reported an exchange rate loss of IDR17.3 trillion in the third quarter of 2018. Changes in foreign exchange rate may pose a risk to a company's cash flow and value (Hanjani 2011). Therefore, Shapira (1995) points to currency foreign exchange hedging as part of efforts to minimize the risk of foreign exchange exposure, neutralizing losses due to changes in foreign exchange rate. In practice, the loss or gain on the initial value of currency exposure is actually possible to be neutralized by the loss or gain of the currency exchange rate on a currency hedge.

There is a theory to provide an explanation for the increase in corporate value related to hedging activities: *maximizing shareholder value*. This theory explains the success of a company measured by its achievement in increasing shareholder wealth. The implementation of hedging in a company shall assist management in increasing shareholder wealth by reducing the volatility of cash flow. Firms with stable cash flow are able to avoid conditions that decrease shareholder wealth, such as the emergence of financial distress costs, the cost of asset substitution, and underinvestment problems.

The financial distress costs are incurred when a company is experiencing financial difficulties, such as legal fees and bankruptcy costs. Stable earnings and cash flow may possibly prevent a company from experiencing bankruptcy, leading to the increase in

company value (Nguyen & Faff 2002). The cost of asset substitution represents the cost incurred by different incentives between the shareholders and the lenders. Shareholders tend to be supportive when companies invest at risk since it can generate high profits. Meanwhile, the lenders expect the companies to take action to maintain their stability. Therefore, a bank generally provides the terms of financial ratios that must be met by the debtors. In this situation, banks shall set a high interest rate for high-risk investment financing, resulting in a higher capital cost. In this regard, the company may hedge against the interest rate set by the bank.

The cost of underinvestment is a problem that arises when the high cost of external financing prevents a company from making investments in accordance with the expectations of shareholders, resulting in the dissatisfaction of the shareholders with the company's investment activity and eventually the decline in company value. By hedging, the company has more stable cash flow and is able to fulfil its investment financing needs without being overly dependent on external financing (Nguyen & Faff 2002). Hedging shall protect the company from external risks, such as fluctuations in exchange rate, interest rate, and commodity price, allowing stable cash flow and corporate profit. This condition shall be reflected in the increase in corporate value (Huang et al. 2009). However, Zhang (2009) discovers that the utilization of derivative instruments as speculative means has an impact on the volatility of profits, causing a decline in corporate value. Therefore, the actual impact of the utilization of derivative instruments on corporate value depends on the benefits provided for the company (Nguyen & Liu 2014).

In the current era of globalization, companies participating in international transactions are exposed to financial risks associated with changes in exchange rate, interest rate, and commodity price. Hedging is a strategy to reduce the risk of losses caused by market price movements (Putro 2012). Hedging includes activities utilizing derivative instruments, such as futures, forwards, options, and swaps. In this study, the operational definition of hedging with derivative instruments is the utilization of derivative instruments by a company for hedging one or all three types of risk: foreign currency, interest rate, and commodity price.

The utilization of derivative instruments in hedging is certainly able to reduce a firm's risks and provide benefits, including a more stable profit rate (Allayannis & Weston 2001). Several previous studies on hedging theories disclose that firms utilizing derivative instruments experience an increase in value in terms of profitability, proven useful in dealing with the frictions in real financial markets, such as financial distress, underinvestment problems, expensive external financing, and high tax rates. Therefore, the application of hedging with derivative instruments by a company shall result in a positive signal of more stable profit. The positive signal shall be received by investors and reflected in the stock price (Huang et al. 2009). Thus, a company that implements hedging with derivative instruments tends to have a higher corporate value than a company that does not.

2.1. Hypothesis Development

Previous studies examine the implementation of hedging with derivatives instruments on each risk separately. Allayannis and Weston (2001) prove that foreign currency hedging with derivative instruments has a positive effect on company value. Their findings indicate a hedging premium of 4.87% derived from tax deductions, financial difficulties, and underinvestment. This is in line with the study conducted by Monalusi (2015), discovering that firms that apply foreign currency hedging have a higher corporate value. Belghitar, Clark, and Mefteh

(2013), in studying non-financial companies listed in the London Stock Exchange in 1995, discover a significant effect of the implementation of interest rate hedging on firm value. The finding is supported by Bashir, Sultan, and Jghef (2013), whose finding displays a positive effect of the application of interest rate hedging on the value of non-financial companies in Pakistan. A study conducted by Carter, Rogers, and Simkins (2006) discovers that the application of commodity price hedging with specific derivative instruments has a positive effect on airlines that use gasoline as the main fuel in America. Thus, the first hypothesis in this study is as follows:

H1: The implementation of hedging for exchange rate risk with derivative instruments has a positive effect on corporate value.

In an open economy, most companies participate in international transactions. This has increased the volume of transactions with foreign currency (Indawan et al. 2015). In their study, Indawan et al. (2015) also argue that the amount of external debt of the non-bank private sector continues to increase from year to year. A great number of non-bank private companies borrows in foreign currency; therefore, depreciation of rupiah shall affect Indonesian companies that have to pay interest or principal in foreign currency at the time when the rupiah is weakened. Mozumder et al. (2015) discover that there is a decline in firm value of European companies during the depreciation of euro. This risk is able to be minimized through hedging for foreign currency. Companies that implement hedging can plan their foreign currency requirements to meet their obligations, thereby minimizing losses incurred during depreciation of the exchange rate. Companies that can manage the risk of losses are expected to have more stable profit, encouraging investors to provide a positive value to the company. Thus, the hypothesis regarding the application of hedging for foreign currency risk is as follows:

H2a: The implementation of hedging for foreign currency risk with derivative instruments has a positive effect on corporate value.

In general, companies tend to make long-term loans from banks, hence the considerably high risks covered by the banks. Based on the perspective of the banks, a longer loan period means a longer period of uncertain performance and economic condition of the companies. All of those uncertainties are considered as high risks for banks, since the macroeconomic performance shall affect the ability of the companies to pay their loan. Therefore, banks generally provide long-term loans with floating interest rates. In this regard, the interest to be paid shall change according to the benchmark rate. Companies with floating interest rate loans face the risk of interest rate fluctuations. The announcement of plans by the central bank of the United States (the Federal Reserve) to increase the interest rate shall cause depreciation of the rupiah–dollar exchange rate and the decline of stock indices in Indonesia. Interest rates in the US affect interest rates in other countries, including Indonesia. Companies that are aware of this can implement hedging by using interest rate swaps. A company can adjust the interest rate with the pattern of its earnings to avoid difficulties in payment; therefore, hedging shall maintain the company's stable cash flow. Companies with stable cash flow tend to have more stable profits, leading to a positive value assigned by the investors. Thus, the hypothesis regarding the application of hedging for interest rate risk is as follows:

H2b: The implementation of hedging for interest rate risk with derivative instruments has a positive effect on corporate value.

The effect of commodity price movement on firm value is determined by the company's economic activity. Generally, companies utilizing or selling global commodities face risk of commodity price fluctuations. In a study with a focus on commodity

price exposure in non-financial companies, Bartram (2005) uses a sample of 490 non-financial companies in Germany to analyze the effect of commodity price risk on company value. The study tests the effect of the risk of commodity price that has not been hedged on stock prices. Bartram (2005) reports that the percentage of firms with significant exposure to commodity price risk is in the range of 4.5%–15.9%. Fluctuations in global commodity prices, such as the increase in world oil price in the period 2005–2008 and the decline in world oil price since 2010 followed by the decline in the price of other commodities, also comprise a risk for a company. This type of risk can be minimized by implementing hedging for commodity price risk. The utilization of derivative instruments shall provide certain prices for a certain period to the consumer companies and global commodity producers, thus the profit of the companies shall not be too influenced by changes in market prices that tend to fluctuate. Companies that can manage the risk of losses are expected to have more stable profits, encouraging investors to provide a positive value to the company. Thus, the hypothesis of the implementation of hedging for commodity price risk is as follows:

H2c: The implementation of hedging for commodity price risk with derivative instruments has a positive effect on corporate value.

3. Research Methods

This study refers to the research by Allayannis and Weston (2001) and research models developed by Ahmed, Azevedo, and Guney (2013), Bashir, Sultan, and Jghef (2013), Belghitar, Clark, and Mefteh (2013), and Ayturk, Gurbuz, and Yanik (2016). This study offers several differences compared to previous studies, as follows: (1) adding the extent of hedging variable as a measurement of the application of hedging; (2) classifying the implementation of hedging into three risk groups of foreign currency rate, interest rate, and commodity price; and (3) providing several adjustments to the previous research models. In addition, this study uses a different population and sample than previous studies, namely non-financial companies listed in the Indonesia Stock Exchange during the 2012–2015 period. Time limitation and relevance to the study are the reasons for the selection of observation period. The four previous studies used a sample of non-financial companies. In this regard, the authors also select non-financial companies as research sample since financial companies have different characteristics than non-financial companies. Furthermore, there are regulations that tend to be more stringent in financial companies than those in non-financial companies. The first model shall examine the effect of the implementation of hedging with derivative instruments on company value, using a dummy variable for the measurement, as follows:

$$\begin{aligned}\mathrm{TOBINS_{it}} = {} & \beta_0 + \beta_1 \mathrm{HEDGDUM_{it}} + \beta_2 \mathrm{SIZE_{it}} \\ & + \beta_3 \mathrm{PROF_i} + \beta_4 \mathrm{AGE_{it}} \\ & + \beta_5 \mathrm{LIQ_{it}} + \beta_6 \mathrm{LEV_{it}} \\ & + \beta_7 \mathrm{Growth_{it}} + \beta_8 \mathrm{DIV_{it}} + \acute{\varepsilon}_{\mathrm{it}}\end{aligned} \tag{1}$$

in which β_0 is the intercept/coefficient of the regression; β_1 is the regression coefficient for the implementation of hedging for each risk (independent variables); $\beta_3 - \beta_8$ are the coefficients for the control variables of the company value; and $\acute{\varepsilon}$ is a random error term.

The description of the elements of the equations is presented as follows:

$\mathrm{TOBINS_{it}}$: The value of firm i as measured using Tobin's Q ratio in year t;

$\mathrm{HEDGDUM_{it}}$: The implementation of hedging with derivative instruments for foreign currency rate, interest rate, and commodity price in year

t of firm i as measured using a dummy variable of 1 should the firm applies the hedging for foreign currency rate risk and 0 should it does not apply the hedging;

$\mathrm{SIZE_{it}}$: The size of firm i as measured by the natural logarithm of total assets in year t;

$\mathrm{PROF_{it}}$: The profitability of firm i in year t as measured using ROA: the ratio between net income and total book value of the firm's assets;

$\mathrm{AGE_{it}}$: The firm age at IPO as measured by the logarithm of number of days that the company has been listed in the Indonesia Stock Exchange as of December 31 of t year;

$\mathrm{LIQ_{it}}$: The liquidity of firm i in year t as measured using the current ratio of that year;

$\mathrm{LEV_{it}}$: The leverage of firm i as measured by total book value of debt divided by total book value of assets in year t;

$\mathrm{Growth_{it}}$: The growth of the firm as proxied by the future investment opportunities, measured by the ratio of capital expenditure to total assets of firm i in year t;

$\mathrm{DIV_{it}}$: The dividend policy applied by firm i in year t to investor as measured using a dummy variable.

In the second hypothesis, the authors include an independent variable of the extent of hedging to further examine the impact of the implementation of hedging with derivative instruments on company value. The authors also observe the effect of hedging for each of the three types of risk (foreign currency rate, interest rate, and commodity price) on firm value. To accomplish this, the second model in this study is as follows:

$$\begin{aligned}\mathrm{TOBINS_{it}} = {} & \beta_0 + \beta_1 \mathrm{FXHEDGExt_{it}} \\ & + \beta_2 \mathrm{IRHEDGExt_{it}} \\ & + \beta_3 \mathrm{CMHEDGExt_{it}} \\ & + \beta_4 \mathrm{SIZE_{it}} + \beta_5 \mathrm{PROF_{it}} \\ & + \beta_6 \mathrm{AGE_{it}} + \beta_7 \mathrm{LIQ_{it}} + \beta_8 \mathrm{LEV_{it}} \\ & + \beta_9 \mathrm{Growth_{it}} + \beta_{10} \mathrm{DIV_{it}} + \acute{\varepsilon}_{\mathrm{it}}\end{aligned} \tag{2}$$

in which β_0 is the intercept/coefficient of the regression; $\beta_1 - \beta_3$ are the regression coefficients for the implementation of hedging for each risk (independent variables); $\beta_4 - \beta_{10}$ are the coefficients for the control variables of the company value; and $\acute{\varepsilon}$ is a random error term.

The description of the elements of the equations is presented as follows:

$\mathrm{TOBINS_{it}}$: The value of firm i as measured using Tobin's Q ratio in year t;

$\mathrm{HEDGDUM_{it}}$: The implementation of hedging with derivative instruments for foreign currency rate, interest rate, and commodity price in year t of firm i as measured using a dummy variable of 1 should the firm applies the hedging for foreign currency rate risk and 0 should it does not apply the hedging;

$\mathrm{FXHEDGExt_{it}}$: The implementation of hedging with derivative instruments for foreign currency rate risk in firm i as measured by the extent of hedging. The extent of hedging is measured by dividing the notional value of the derivative instruments against the book value of total assets in year t;

$\mathrm{IRHEDGExt_{it}}$: The implementation of hedging with derivative instruments for interest rate risk in firm i as measured by the extent of hedging. The extent of hedging is measured by dividing the notional value of the derivative instruments against the book value of total assets in year t;

$\mathrm{CMHEDGExt_{it}}$: The implementation of hedging with derivative instruments for commodity price risk in firm i as measured by the extent of hedging. The extent of hedging is measured by dividing the notional value of the derivative instruments against the book value of total assets in year t;

$\mathrm{SIZE_{it}}$: The size of firm i as measured by the natural logarithm of total assets in year t;

$\mathrm{PROF_{it}}$: The profitability of firm i in year t as measured using ROA: the ratio between net income

and total book value of the firm's assets;

$\mathrm{AGE_{it}}$: The firm age at IPO as measured by the logarithm of number of days that the firm has been listed in the Indonesia Stock Exchange as of December 31 of t year;

$\mathrm{LIQ_{it}}$: The liquidity of firm i in year t as measured using current ratio of that year;

$\mathrm{LEV_{it}}$: The leverage of firm i as measured by total book value of debt divided by total book value of assets in year t;

$\mathrm{Growth_{it}}$: The growth of the firm as proxied by the future investment opportunities, measured by the ratio of capital expenditure to total assets of firm i in year t;

$\mathrm{DIV_{it}}$: The dividend policy applied by firm i in year t to investor as measured using a dummy variable.

The independent variable used in this study is hedging with derivative instruments. Hedging is an activity carried out by companies in an attempt to reduce the risk of losses caused by market price movements (Putro 2012). As mentioned earlier, hedging includes activities utilizing derivative instruments, such as futures, forwards, options, and swaps, and the operational definition of hedging with derivative instruments in this study is the utilization of derivative instruments by a company for hedging one or all three types of risk: foreign currency, interest rate, and commodity price.

Thus, the first model uses a dummy variable ($\mathrm{HEDGDUM}$) as an independent variable to measure the utilization of derivative instruments. Companies that use derivative instruments shall be given a value of 1 while companies that do not shall be given a value of 0. Furthermore, the second model adds the extent of hedging ($\mathrm{HEDGExt}$) as an independent variable, obtained by dividing the notional value of the hedging instrument from the total book value of the company's assets (Ayturk, Gurbuz, & Yanik 2016, Berkman & Bradbury 1996, Gay & Nam 1998, Howton & Perfect 1998, Allayannis & Ofek 2001, Campello et al. 2011). The authors decide to use these variables to further examine the effect of the implementation of hedging on firms (Mackay & Moeller 2007). The extent of hedging is also observed in each type of risk (foreign currency, interest rate, and commodity price), represented by the variables $\mathrm{FXHEDGHExt}$, $\mathrm{IRHEDGExt}$, and $\mathrm{CMHEDGExt}$, respectively.

4. Results and Discussion

The first model in this study has company value as the dependent variable and the implementation of hedging with derivative instruments for the risks of foreign currency, interest rate, and commodity price as independent variables. The independent variables in the first model use a dummy variable as described in the previous section.

The summary of the test results is presented in Table 1. The test results of the model significance indicate that the first model has a probability value F greater than 0.00 and is significant at $\alpha < 1\%$. Thus, the independent variables in the first model are also able to explain the dependent variable, i.e., the firm value. Therefore, the first model can be used to explain the company value. The test results of the coefficient of determination, R2, in the first model displays the value of 54.56%. This indicates that 54.56% of the variation of firm value proxied with the TOBINS variable can be explained by the independent variables in the model, that is, the implementation of hedging for the risks of foreign currency, interest rate, and commodity price with derivative instruments.

The partial significance test of the first model shows that the independent variable of the implementation of hedging for the risks of foreign currency, interest rate, and commodity price with derivative instruments has no significant effect on Tobin's Q. This

Table 1: Regression Results for Model 1

$$\mathrm{TOBINS_{it}} = \beta_0 + \beta_1 \mathrm{HEDGDUM_{it}} + \beta_2 \mathrm{SIZE_{it}} + \beta_3 \mathrm{PROF_i} + \beta_4 \mathrm{AGE_{it}} + \beta_5 \mathrm{LIQ_{it}} + \beta_6 \mathrm{LEV_{it}} + \beta_7 \mathrm{Growth_{it}} + \beta_8 \mathrm{DIV_{it}} + \acute{\varepsilon}_{it}$$

Independent Variable	Exp. Sign	Model 1		
		coefficient	Prob.	
HEDGDUM	+	0.090692	0.3391	
SIZE	+	-0.034875	0.0396	**
PROF	+	9.810586	0.0000	***
AGE	+	-0.109925	0.2168	
LIQ	+	0.000163	0.0691	*
LEV	-	1.085976	0.0000	***
Growth	+	5.379029	0.0000	***
DIV	-	-0.032534	0.3690	
C				
R^2	0.5456			
Prob> F	0.0000			

Source: Processed by Authors (2016)
Note: **** significant $\alpha < 1\%$; ** significant $\alpha < 5\%$; * significant $\alpha < 10\%$

is shown from the regression result in Model 1, in which the implementation of hedging with derivative instruments has a p-value greater than $\alpha < 10\%$. Nevertheless, the independent variables in the first model continue to show a positive direction, i.e. an increase in firm value. Recalling Hypothesis 1 (H1: The implementation of hedging for the risks of foreign currency, interest rate, and commodity price with derivative instruments has a positive effect on corporate value), the regression results in the first model show that the implementation of hedging with derivative instruments has a positive but not a significant effect on firm value. The implementation of hedging for the risks of foreign currency, interest rate, and commodity price has a significance level of 0.3391 with a positive coefficient value of 0.090692. In this regard, this study cannot provide enough evidence to accept Hypothesis 1. Therefore, applying hedging with derivative instruments has no significant influence on firm value.

The preliminary hypothesis of the study suggests that firms that apply hedging for any risks shall provide a positive signal or a sense of security to their investors, allowing the investors to provide a higher value to them. Investors assess risk management to protect their wealth, thus companies that perform risk management shall have more value. However, this is not in line with the findings of this study. This study discovers that the implementation of hedging with derivative instruments has no effect on company value.

The findings of this study are in line with those of previous studies by Bashir, Sultan, and Jghef (2013), Jin and Jorion (2006), and Nguyen and Faff (2002). The study conducted by Bashir, Sultan, and Jghef (2013) reveals that the implementation of hedging for foreign currency risk has no significant influence on company value. They argue that the limitations of investor knowledge and weak investor protection do not allow for value from hedging activities in Pakistan. Marami and Dubois (2013) discover that the implementation of hedging for interest rate risk has no significant influence to company value. They discover that an increase in value is only obtained from the fulfillment of the disclosure obligations instead of the benefits. Jin and Jorion (2006) conduct a similar study that discovers no significant effect between the two. They state that risk hedging activities for oil price in America are not accepted as positive signals by investors since they can be anticipated by investors themselves. The second model utilizes firm value as a dependent variable and the implementation of hedging with derivative instruments for each risk (exchange rate,

interest rate, and commodity price) as independent variable. The independent variable in the second model adds the extent of hedging as described in research method section.

The summary of the test results of Model 2 are presented in Table 2. The test results of model significance indicate that the second model has a probability value F greater than 0.00 and is significant at $\alpha < 1\%$. Thus, the independent variables in the second model are also able to explain the dependent variable, namely, the value of the hedger firm. Therefore, the second model can be used to explain the value of the hedger firm. The test results of the coefficient of determination, R2, in the second model displays the value of 0.714. It indicates that 71.4% of the variation of hedger firm value can be explained by the independent variables in the model.

The significance test of the second model shows that the independent variable, i.e. the implementation of hedging for each of the risks (measured using the extent of hedging) has a different effect on firm performance or firm value, depending on the type of the risk. This is in contrast to the first model that does not distinguish the risks mitigated by derivative instruments. Model 2 differentiates the implementation of hedging for each risk within the sample of the companies that apply hedging. In the second model, the implementation of hedging for foreign currency risk has a positive and significant impact on company value. The effect of hedging for foreign currency risk as measured by comparing the notional value of the derivative contract with the total book value of assets has a significant influence at $\alpha < 1\%$ (p-value = 0.008). The implementation of hedging for foreign currency risk has a positive and significant impact on the company value of 2.758. This means that the hedging for foreign currency risk contracts with the notional amount of the derivative. The total assets of the company shall increase the company value by 2.758. Meanwhile, the implementation of hedging for both interest rate risk and commodity price risk has a negative and insignificant effect on company value. The implementation of hedging for interest rate risk and commodity price risk has p-values of 0.209 and 0.444, having no significant effect on company value. Therefore, only the implementation of foreign currency hedging is in line with the initial hypothesis of the study.

Recalling Hypothesis 2a (H2a: The implementation of hedging for foreign currency risk with derivative instruments has a positive effect on corporate value), the regression results in the second model show that the effect of hedging for foreign currency risk with derivative instruments is positive and significant, with a significance level of 0.009 and a coefficient value of 0.173. Therefore, the second model in this study provides sufficient evidence for Hypothesis 2a. Thus, the effect of the implementation of hedging for foreign currency risk, as measured using the extent of hedging variable, is positive and in line with the proposed hypothesis. This means that a company that implements hedging for foreign currency risk with derivative instruments measured by comparing the contract value of the derivative instruments (notional value) to the total assets of the company shall affect the performance improvement of the company, proxied by Tobin's Q.

The findings of this study are in line with those of Belghitar, Clark, and Mefteh (2013) and Santos (2015) of firms in the London Stock Exchange during 2005–2013, that the implementation of hedging for foreign currency risk positively affects company value. They argue that as the economy becomes more open, foreign currency transactions shall continue to rise. Therefore, a company must have good risk management related to foreign currency exchange. Thus, investors have realized the importance of hedging for foreign currency risk. This is also supported by Mozumder et al. (2015) stating that the depreciation of a country's currency that is not mitigated shall lead to the decline in the average

Table 2: Regression Results for Model 2

$$\begin{aligned}\mathrm{TOBINS_{it}} = {} & \beta_0 + \beta_1 \mathrm{FXHEDGExt_{it}} + \beta_2 \mathrm{IRHEDGExt_{it}} \\ & + \beta_3 \mathrm{CMHEDGExt_{it}} + \beta_4 \mathrm{SIZE_{it}} + \beta_5 \mathrm{PROF_{it}} + \beta_6 \mathrm{AGE_{it}} \\ & + \beta_7 \mathrm{LIQ_{it}} + \beta_8 \mathrm{LEV_{it}} + \beta_9 \mathrm{Growth_{it}} + \beta_{10} \mathrm{DIV_{it}} + \acute{\epsilon}_{\mathrm{it}}\end{aligned}$$

Lin	Exp. Sign	Model 2		
		coefficient	Prob.	
FXHEDGExt	+	2.758	0.009	***
IRHEDGExt	+	-2.244	0.209	
CMHEDGExt	+	-0.000	0.444	
SIZE	+	-0.023	0.373	
PROF	+	16.614	0	***
AGE	+	0.982	0.067	*
LIQ	+	-0.231	0.059	*
LEV	-	-0.512	0.467	
Growth	+	5.426	0.034	**
DIV	-	-0.124	0.365	
C				
R2	0.714			
Prob> F	0			

Source: Processed by Authors (2016)
Note: **** significant $\alpha < 1\%$; ** significant $\alpha < 5\%$; * significant $\alpha < 10\%$

firm value in that country. This study provides evidence that investors in Indonesia have realized the importance of this type of hedging and they ascribe more value to companies that implement hedging for foreign currency risk.

Recalling Hypothesis 2b (H2b: The implementation of hedging for interest rate risk with derivative instruments has a positive effect on corporate value), the regression results in the second model show that the effect of hedging for interest rate risk as measured by the extent of hedging variable is not significant, with a significance level of 0.208 and a coefficient value of -2.24. Therefore, the second model in this study does not provide sufficient evidence for Hypothesis 2b.

It is similar to the findings of the study by Ayturk, Gurbuz, and Yanik (2016) that there is no significant influence of the application of hedging for interest rate risk on firm value among non-financial companies listed in the Turkish Stock Exchange during 2007–2013. They argue that the unsustainable derivative markets in their country result in investors preferring that companies avoid transactions with derivative instruments. In addition, differences in banking conditions can also affect investors' assessment of the interest rate risk. In Indonesia, interest rate remains relatively stable and this is supported by the presence of strict supervision by Bank Indonesia in maintaining the stability of Indonesia's macro economy. Corporate banking in Indonesia is also unique; banks are required to customize products for certain customers, adjusting to the circumstances of the customers. Banks in Indonesia tend to supervise their customers' financial ratios, with relevant interest rates. Thus, investors in Indonesia do not consider exchange rate risk as a major risk that must be minimized for companies that take loans in Indonesia.

Recalling Hypothesis 2c (H2c: The implementation of hedging for commodity price risk with derivative instruments has a positive effect on corporate value), the regression results in the second model show that the effect of hedging for interest rate risk with derivative instruments is insignificant, with a significance level of 0.450 and a coefficient value of -0.040. Therefore, the second model in this study does not provide sufficient evidence for Hypothesis 2b.

The findings of this study are also in line with those of Ayturk, Gurbuz, and Yanik (2016) that implement-

ing hedging for commodity price has an insignificant effect on firm value. They argue that the market for derivative instruments in developing countries is still not conducive to value, particularly in commodity-related instruments. Therefore, the number of firms that hedge commodity price risk is significantly small compared to other two risks. Thus, investors in Indonesia have not ascribed value to companies that implement hedging for commodity price risk.

In addition, most previous studies (such as Carter, Rogers, & Simkins 2006, Jin & Jorion 2006) are related to the implementation of hedging for commodity price risk in companies that trade or utilize major commodities in the world, such as mining companies and airlines. In contrast, the companies in this study are all companies that implement hedging, without special consideration for certain industries.

As a result, the utilization of the extent of hedging in this study does not provide an insight into the benefits of the implementation of hedging with derivative instruments in terms of all risks. The utilization of a variable to capture the extent of hedging in a company only proves that there is a positive effect on firm value when hedging is applied to exchange rate risk. This study does not, however, find that the implementation of hedging to reduce the risk of interest rate and commodity price fluctuations has a significant effect on company value. Therefore, this study has not been able to provide sufficient evidence for the effect of the implementation of hedging with derivative instruments. This is in contrast to the initial hypothesis of the study. There are several reasons to explain this result, as follows: (1) the condition of the derivative instrument market is still not favorable in Indonesia; this can be a strong reason why investors do not perceive hedging activities with derivative instruments as an additional value to a company; (2) the investor knowledge in Indonesia regarding the implementation of hedging with derivative instruments remains low; and (3) the regulation of investor protection is low, thus investors assess that there are high risks in investing in Indonesia, even when a company has implemented risk management.

5. Conclusions and Recommendations

The implementation of hedging with derivatives instruments for each of the risks provides a different impact on company value. Only the implementation of hedging with derivative instruments for foreign currency risk is proven to have a positive and significant impact on company value. In this regard, an investor perceives the implementation of hedging for foreign currency risk by a company as a positive signal. It is possible since a great number of companies in Indonesia transacts using foreign currency, and Indonesia's economy in recent decades indicates a weakening of the rupiah–dollar exchange rate. Therefore, investors consider the risk of rupiah exchange rate as an issue that must be managed through techniques such as hedging.

The implementation of hedging with derivative instruments for interest rate risk and commodity price has a negative and insignificant effect on company value. These results contradict the results of previous studies conducted with a sample of companies in America. There are three reasons that may explain the differences in outcomes between the previous studies and this study in Indonesia. First, Indonesia is a developing country, where investor protection regulation remains low. Therefore, investors do not simply believe in the risk management actions of a company, thus assessing the use of derivative instruments is not beneficial to the company. Second, the market for derivative instruments in Indonesia is still not well-developed. However, there has been an increase in transac-

tions in derivative instruments from year to year. Nevertheless, unfavorable regulation on the market of derivative instruments causes many investors to doubt the derivative transactions. Third, there is a lack of understanding by investors in Indonesia regarding the benefits of hedging.

The utilization of the variable to measure the extent of hedging in this study fails to provide any further insight on the implementation of hedging. It is obvious from the regression results of the second model revealing that only hedging for foreign currency risk has a significant effect on firm value. Therefore, the extent of hedging variable is not suitable to describe the effect of the implementation of hedging for interest rate and commodity price with derivative instruments.

This study has limitations in its implementation and offers suggestions for further studies. The study period is merely four years, namely from 2012 to 2014. The next studies may extend the study period to offer additional insight. This study uses the implementation of hedging with derivative instruments for each risk (foreign currency rate, interest rate, and commodity price), as measured by the dummy variable and the extent of hedging variable. However, the extent of hedging variable does not provide significant evidence of the effect of hedging on corporate value. Therefore, it is recommended for further studies to utilize other variables to describe the effectiveness of the implementation of hedging with derivative instruments to offer more illustration regarding the influence of hedging on company value. Particularly for hedging for commodity price, it would be better to focus on an industry that actively trades commodity with a market price, thus its notional value can be compared with its market price. Thus, it is hoped that further studies are able to discover sufficient evidence of the positive effect of hedging with derivative instruments. Furthermore, further studies can include financial companies and observes the possible benefits obtained by a financial firm through hedging.

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