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**| RESEARCH ARTICLE**

## **Hedging Decision and Value of Public Companies Indexed at LQ45 Indonesia Stock Exchange**

**Mustaruddin Saleh**

*Faculty of Economics and Business, Universitas Tanjungpura, Pontianak, Indonesia 78124*

**Corresponding Author:** Mustaruddin Saleh, **E-mail:** [mustaruddin@ekonomi.untan.ac.id](mailto:mustaruddin@ekonomi.untan.ac.id)

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**| ABSTRACT**

This study was conducted to reveal empirical facts on the impact of hedging decisions using derivative instruments on firm value and financial performance by using a sample of public companies listed on the LQ45 Index of the Indonesia Stock Exchange. The results of hypothesis testing reveal that hedging by using derivative instruments has a significant negative effect on firm value. This finding partially supports the conclusion of research conducted by Lenee and Oki (2017). However, this contradicts the findings of Alan and Gupta (2018) and Lenee and Oki (2017), who conclude that the use of hedging can minimize the volatility of foreign transactions and has a positive effect on increasing firm value. In line with the results of a research review conducted by Geyer-Klingenberg et al. (2021), there are contradictory results due to various factors that make the research findings inconsistent. Bachillera. et al. (2020) describe controversial results due to country specificity and different hedging types.

**| KEYWORDS**

Hedging; company value; foreign exchange; derivative instruments.

**| ARTICLE INFORMATION**

**ACCEPTED:** 05 June 2023

**PUBLISHED:** 11 June 2023

**DOI:** 10.32996/jefas.2023.5.3.12

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### **1. Introduction**

The cash flows received by the company in various foreign currencies can be affected by fluctuations in each of these currencies when converted between its currency, as well as the value of the company's cash outflows which depend on the value of each currency, resulting in an increase in the value of receivables and debt after conversion. If the company has debt, of course, the appreciation of foreign currency will harm the company because the value of the debt paid increases and vice versa if the company has receivables, if the foreign currency is appreciated, it will benefit the company because the number of receivables received will increase. The effect of exchange rate fluctuations on the future value of cash is called transaction exposure. Transaction exposure can have a significant impact on company profits (Madura, 2006).

In today's modern financial transactions, which are dominated by global and multinational companies, derivative instruments are also derivative gains and losses for companies. This concerns the problem of complex financial instruments in the form of contracts, often used as a tool for strategic risk management activities by various companies and sophisticated investors (Chui, 2012). Globalization has created strong linkages in financial markets with potential risks that can spread quickly, such as the economic crisis in Asian countries in 1997-1998 and the global financial crisis in 2007-2008. It is, therefore, necessary to develop a risk management strategy that can withstand the question of time. (Lenee and Oki, 2017).

Empirical studies reveal that the use of derivative instruments has increased in recent years, making derivatives an important part of the company's overall risk management profile (Berkman and Bradbury 1996; Bodnar, Hayt, and Marston 1998). According to risk management theory, firms should hedge if some market imperfection makes volatility expensive. Through hedging, firms are able to reduce the cost of financial distress (Mayers and Smith 1982; Smith and Stulz 1985) and the amount of corporate tax paid

(Smith and Stulz 1985). Ross (1998) and Leland (1998) argue that hedging reduces the likelihood of financial distress and therefore increases debt capacity and gains in the value of the tax shield. While external financing is more expensive, hedging can also ensure that the firm has sufficient cash flow to fund its investments (Charter et al., 2006).

According to Geyer-Klingeberg et al. (2021), despite a series of empirical evidence investigating firm-level data to determine whether hedging is a firm value-enhancing strategy, most of the literature still debates this point, especially with regard to the two dimensions, i.e. empirical estimates for the impact of hedging on firm value range from large positive premiums to zero and even negative impacts. Second, an empirical study design produces varying results from the various econometric methods applied, the measurement of hedges and firm value variables, the sample time period, the country sampled, and other aspects of the data and methodologies. Companies are often faced with significant uncertainty about the timing and content of government policy changes. The uncertainty of future policy decisions can significantly increase the uncertainty associated with a company's activities and affect the company's risk perception (Nguyem and Kim, 2017). On the other hand, derivative instruments are important instruments for companies to overcome risk exposure.

The facts also reveal that firms that engage in hedging experience less volatility compared to firms that do not hedge. The use of hedging during the financial crisis has been shown to increase firm value. Alam and Gupta's research (2018) also find that some companies do not clearly disclose the notional value of their derivatives, and they state the need for clear regulations for disclosing the value of derivative transactions in annual reports. The findings of Nyunyem and Kim (2017) show that firms can influence the cost of capital in particular and capital structure in general by the use of financial derivatives, and thus corporate managers must do important things towards strategic capital planning and corporate risk management. Thus risk management can increase the value and profit of the company while reducing the volatility of returns and cash flows. (Krause and Tse, 2016). An illustration to find out how the movement of foreign currency exchange rates with local currencies is presented in Figure 1.



Figure 1. Movement of the US Dollar Exchange Rate against Rupiah

Movements in the exchange rate of the US dollar against the rupiah during the period 2003 to 2021 indicate that the trend of the dollar against the rupiah is fluctuating, with the movement of the dollar continuing to strengthen or appreciate against the value of the rupiah. The selling rate of the US dollar was in the range of Rp.5,000 to Rp.6,000 per dollar in 2003 and continued to strengthen and reached its highest peak in the range of Rp.11,000 to Rp.12,000 per dollar in 2009. From 2010 until 2013, the movement of the strengthening dollar occurred as a turning point towards a decline or depreciation against the rupiah, making the value of the rupiah move towards strengthening up to the range of Rp.8,000 until Rp. 10,000 per US dollar. However, in 2021 the position of the value of the US dollar is in the range of Rp.14,438 per US dollar.

Fluctuations in foreign exchange rates are one of the market risks that can be minimized by risk management through hedging activities using derivative instruments. This risk is caused by foreign business activities carried out by companies in conducting international trade for buying and selling activities of their products and services. This type of risk is included in foreign exchange exposure, namely the risk caused by how far a company is affected by changes in foreign exchange rates (Kuncoro, 2001).

To anticipate the negative impact of the risk of fluctuations in foreign exchange rates and protect the interests of shareholders, the company implements a hedging policy with derivative instruments. Hedging is a contract that aims to protect the company

from market risk (Stulz, 2004). The opinion of using hedging against fluctuations in exchange rate risk is more carried out by companies in America, Europe and Canada compared to those that do not use it (Jalilvand., et al., 2000). Hedging activities can be carried out using derivative instruments, namely options, forward contracts, futures contracts, and swaps.

Based on the background explanation above, the research was conducted to reveal empirical facts on the impact of hedging decisions using derivative instruments on firm value and financial performance. The research was conducted using research objects on public companies listed in the LQ45 Index for 2016-2020.

## **2. Literature Review**

Investment instruments in the financial market are currently growing. Various investment instruments that exist provide many choices for investors who place funds in these various financial sectors. In addition to investing by owning directly the securities traded in the capital market and money market, investors can also invest by buying derivatives or derivatives of these securities. Securities whose value is wholly or partly derived from other securities are referred to as derivative securities (Tandelilin, 2010). Among the derivative securities that have been chosen for hedging and speculative activities that have been chosen by companies and investors in the money market and in the capital market are forward contracts, futures contracts, and investment options.

### **2.1. Financial risk management theory**

The use of derivative investment instruments in an effort to hedge transaction exposure, economic exposure and translation exposure to fluctuations in foreign exchange rates can be explained by using several theories to manage the financial risks faced by companies and efforts to take advantage of profit opportunities from movements in foreign exchange rates. Financial risk management theory can explain the policy inflation taken by the company in an effort to protect the company's business activities as a result of fluctuations in exchange rates between these currencies. There are four main theories that will explain the phenomenon of exchange rate fluctuations on firm value.

#### **2.1.1. Financial Economic Theory**

This theory was proposed by Modigliani and Miller (1958), that hedging is irrelevant. The argument put forward that the capital structure of a company which consists of equity, debt and preferred stock, does not depend on the performance, especially of its underlying assets. So as long as the market is efficient, financial policies that include rules, guidelines, and strategies related to financial risk hedging are no longer needed. They argue that no matter how the company chooses to fund its operations, it will not affect the value of the company or the company's financial performance using very strong assumptions; namely, there is no government intervention, the quantity and quality of information are the same, there are no taxes, or no other fees are needed. namely the 'laissez faire' economic system.

This theory argues that investors are sophisticated shareholders and have the expertise to hedge their own investment risks at relatively the same costs that have been calculated in their investments. But the theory has been criticized with the argument that how can there be perfection in the financial markets of three imperfect humans themselves? (Leenee & Oki, 2017). Frankfurter and McGoun (2021) argue that financial and economic theory does not need to be impregnated because it is impossible to have a perfect market economy.

#### **2.1.2. Agency Cost Theory**

The theory is based on four groups of people with different interests, namely the principal-manager; current stock investors and potential stock investors; other debt holders. They state that agency will arise if there is a decrease in the value of the underlying asset compared to the value without agency conflict. This theory is an example of the inherent conflict of interest between the manager (agent) and the owner (principal) of the company, which means that the manager's decision making does not have to be primarily to maximize shareholder value, which has always been the main goal in financial management. In other words, managers are always short-term oriented in such a way that they want to achieve in the year, such as profit, which results in a bonus in their salary. Although various ways have been used to align the interests of managers with the interests of shareholders, there are still conflicts of interest (Lenee and Oki, 2017).

Agency cost theory is the direct opposite of firm economic theory and supports financial risk hedges which should be actions taken by managers to reduce costs to shareholders that have accounted for the costs of such potential conflicts of interest. The theory is in line with the opinion of Jensen and Meckling (1976).

#### **2.1.3. New institutional economics theory**

The theory combines the two schools of thought, namely neoclassical thinking and heterodox economists (Lenee and Oki, 2017). The theory is based on the paradigm that risk management is carried out based on the influence of institutional factors that have the same business and industry segments or due to general practices that have been accepted by both parties to the transaction.

One of these institutional factors is the influence of invisible interference from the government. In simple language that hedging is carried out by company managers because it is a general action that has been carried out as part of an effort to specific security measures when investing in securities or purchasing assets.

For example, debt securitization as a financial product has been tied to asset-backed securities (ABS), collateralized debt obligations (CDO), collateralized mortgage obligations (CMO), and collateralized loan obligations (CLO), collateralised bond obligations (CBO), collateralized insurance obligations (CIO), credit linked notes, credit linked notes (CLN), credit default swaps (CDS) and various other synthetic products.

#### 2.1.4. Stakeholder theory

This theory was introduced by Freeman (1984), who stated that corporate entities should be treated as the main social institutions as they grow to influence economic life on a daily basis. As a manager, he tries to manage stakeholders consisting of government agencies, political groups, associations of traders or entrepreneurs, trade unions, customers, suppliers, employees, communities and investors. In an effort to increase the value of the company, then as a manager must serve the various interests of these stakeholders.

The issue of corporate governance must be increasingly considered after the financial crisis; therefore, there must be a balance between satisfying the interests of stakeholders by aligning them with the direction of the business. This is due to the implicit assumption of consumer behavior that expects the same level of satisfaction at all times for certain products or services from the company. Therefore, maintaining this value is difficult and expensive and can lead to potential financial distress, which is why hedging is necessary (Lenee and Oki, 2017).

#### 2.2. Types of financial risk

Risk is a possible difference between the actual return received and the expected return. The bigger the difference, the greater the risk of the investment (Tandililing, 2010). Financial risk is broadly grouped into interest rate risk, market risk, inflation risk, business risk, financial risk, liquidity risk, exchange rate risk and others.



Figure 2. Forms of Financial Risk, adopted from Eshna, 2015, in Lenee and Oki, 2017).

Interest rate risk can affect the variability of acceptance or return of an investment; for example, changes in interest rates are inversely proportional to the company's stock price in the market. If there is an increase in interest rates, it will have a negative impact on the company's stock price, which will result in lower stock prices, ceteris paribus, because investors tend to shift their investment from the capital market to banking in the form of time deposits with a lower risk level. This type of interest rate risk is the most unavoidable financial risk for individual or institutional investors. All interest-bearing assets, such as debt instruments, are exposed to this risk. This risk arises when there is a potential change in interest rates that will affect a decrease in income and reduce the value of the company's net assets (Beets, 2004).

The need for multinational companies to transact business across national and regional borders has created the risk of foreign exchange rates fluctuating from time to time. The need to hedge currency risk is especially important if the cash inflows from business transactions are denominated in a different currency than the cash outflows; there is a time lag in receiving money from abroad by making foreign payments; the use of a certain exchange rate for product pricing to achieve consistency and anticipation of payment transactions with uncertain payments made (Lenee and Oki, 2017).

Overall, market fluctuations affect the return variability of an investment. Market fluctuations are indicated by changes in the price of a financial asset and a real asset, which poses a risk to businesses and owners of capital. Market changes are influenced by various factors, including economic recession, country or region instability, and political or policy changes, especially those related to the economy and trade (Tandililing, 2010). Inflation risk can also influence business activities carried out by companies and can also reduce the purchasing power of consumers. If there is an increase in ordinary inflation, investors or capital owners usually demand an additional premium for inflation to compensate for the decrease in purchasing power they experience.

Commodities that are commonly traded in financial markets today are numerous and broadly classified into 2 groups, namely, hard commodities and soft commodities. Hard commodities are products that are sourced from nature that are mined from the ground, while soft commodities are those that are grown and cultivated. Examples of the two groups include cotton, soybean, coal, wheat, copper, aluminium, citrus, rice, cocoa, gold, silver and steel etc. Bamed (2012) in Lenee and Oki (2017) defines commodity risk as fluctuations in the price of the commodity which can have a negative impact on the level of company income that will be received in the future and can be classified into price risk (changes in commodity prices by factors such as uncontrollable factors); quantity risk (change in commodity availability); input risk (potential increase in business costs as a result of price risk) and political risk (policy changes related to business compliance in the production and supply of commodities). The most significant risk affecting a business is, of course, price risk; this has a direct impact on the quantity produced and the cost of inputs.

### ***2.3. Risk Management by using derivative products.***

Risk management is a topic that continues to be an important part of financial managers. Currently, the scope of risk management has expanded to include something related to controlling the costs of key inputs such as fuel (petroleum) by making forward purchases and or protecting against changes in interest rates and exchange rates through transactions on interest rates or the foreign exchange market. In addition, the risk manager tries to ensure that the action he takes to hedge the risk is to ensure that it does not significantly increase the risk (Brigham and Ehrhardt, 2005).

History records that, for the first time, formally, the formation of a derivatives market was the formation of a futures market for wheat commodities. Farmers are concerned about the price of wheat they receive when sold during the harvest season, and millers are also concerned about the price of wheat they will pay. The risks faced by both parties can be reduced if the price has been agreed upon earlier, before the harvest season arrives. So the two parties made an initial agreement on the supply and price of wheat earlier so that there was certainty of supply and price of these commodities in the future so as to reduce risks for both parties.

Currently, the derivatives market has developed rapidly compared to other major markets for the reason that there is an analytical technique that has been introduced to the analysis technique of derivative products, namely the Black-Scholes Option Pricing Model, which was developed to assist in setting fair prices, good results and transparent in the pricing of hedging contracts; Second, computer and communication technology makes it easy for both parties to reach an agreement; Third, globalization has rapidly increased the importance of currency markets and the demand to reduce exchange rate risk in trading on global markets.

#### ***2.3.1. Futures Contract***

One of the most important tools in an effort to reduce interest rates, exchange rates, and commodity risk is hedging in the form of futures contracts. There are lots of financial asset and commodity transactions involving these futures contracts. Futures contracts, in other words, call (buy), is the act of buying to buy or buy to sell a certain asset at a certain time in the future, but the price has been set when the contract is executed.

In futures contracts, there are several important terminologies that must be considered, including the following:

- A commodity/asset that both parties agree to exchange is called an underlying asset.
  - The date specified for the transaction is called the settlement date or delivery date.
- The price that has been agreed upon by the two interested parties to make a transaction is called the futures price.
- The party who agrees to the contract to buy the asset that becomes the benchmark at a later date is called the owner of the futures contract or is said to have taken a long futures position or a long position.
  - The party who agrees to the contract to sell the benchmark asset at a later date is called the seller of the futures contract, also known as the short futures position or short position.

### **2.3.2. Forward Contract**

An agreement between two parties, where the first party agrees to buy the commodity at a certain price and on a certain date in the future and the other party agrees to sell the commodity at the agreed price and delivery. The agreed commodity will be delivered physically, but there is a risk if the agreed party reneges on the contract, especially if there is a large price change for the agreed commodity. This forward contract is carried out by the company in an effort to anticipate the movement of commodity prices or the receipt or payment of their foreign currency in the future. With a forward contract, the company can lock in the price movement of a commodity and or the movement of the foreign exchange price. Forward contracts and futures contracts are an attempt to hedge or reduce the risk of the company's business transactions. It is estimated that more than 95 percent of all trading transactions are designed using hedging contracts.

### **2.3.3. Swap Contract**

A swap is an agreement between two parties involved to exchange something with each other, generally carrying out mutual obligations to make a series of payments. Most swaps today involve interest rates and foreign exchange payments. An illustration of an interest rate swap contract is as follows: For example, company A issues \$100 million worth of bonds with a floating rate of 20 years. Meanwhile, company B issues bond worth \$100 million with a fixed rate of 20 years. Each company is obliged to make a series of interest payments, but one company is obliged to pay a series of fixed interest payments, and the other company makes a series of various interest payments.

### **2.3.4. Option Contract**

An option is an agreement or contract between the option seller and the option buyer in which the option seller guarantees the right (not the obligation) of the option buyer to buy or sell certain securities or commodities at a certain price and time in the future. The parties involved in options are investors with other investors and do not involve parties that issue securities that are the basis for options transactions.

There are two forms of option transactions, namely call options and put options. A call option is an option that gives the holder the right to buy a certain amount of securities at a predetermined time and price. Investors who buy call options will expect the price of the security or commodity to rise and will benefit from the price increase. While a put option is an option that gives the owner the right to sell certain securities and or commodities with a certain amount, price and time that has been agreed upon in the future. If the put option contract is exercised, the option holder will have the right to sell the security or commodity that has been determined to the seller of the option at the time, amount and price that has been determined. Investors who buy put options have expectations that are inversely proportional to investors who buy call options.

## **2.4. Previous Research and Hypothesis Statement**

Empirical studies on hedging and its effect on firm value have attracted extensive attention in the corporate finance literature (including Lenee and Oki (2017); Geyer-Klingeberg et al., (2020); Bessler et al., (2019); Panaretou (2014), and Lou and Wang (2018). A series of empirical evidence investigates firm-level data to determine whether firm hedging is a value-enhancing strategy. Most of the literature is in disagreement, mainly with regard to two matters; first, empirical estimates for the impact hedges that claim to have a positive effect have no effect to negative effect. Second, the designs used in empirical studies vary in terms of the use of the econometric model applied, the measurement of the hedge, the firm value variable, the period of time of sampling, the country being the object of the test, other aspects of data and methods Mismatch between empirical evidence and variability as in the study design makes this topic of hedging remains a challenge to be studied in order to enrich the literature review (Geyer-Klingeberg et al., 2020).

A study on the effect of corporate risk management activities on firm value using large non-financial companies in the UK revealed that most companies, namely 86.88 percent in the research sample, used derivatives to manage at least one type of price risk. The hedging variable has a statistically and economically significant effect on using foreign currency derivatives. Research also shows that there is empirical evidence that there is a weak influence between interest rate hedging on increasing firm value (Panaretou, 2014).

Bael., et al. (2018), using company data in Korea, found that companies that export more have more foreign currency debt and have higher exchange rate exposure tend to use more currency derivatives for hedging. By using 2SLS regression, it is revealed that companies that use more currency derivatives do not reduce the company's risk, but specifically for selling transactions, it results in a higher company value. Furthermore, currency derivatives used by companies with high exposure are able to produce lower corporate risk but lower firm value as well. These findings suggest that currency derivatives can function as risk hedges and hedge firms with low and manageable exposure. This is in line with the research results of Alam and Gupta (2017) that companies involved in hedging experience less volatility in their firm value compared to companies that do not hedge. The use of hedging during the financial crisis has been shown to increase the value of the hedge. The results also found that some companies did not

clearly disclose the notional value of derivatives, which prompted the need for clear regulations to disclose derivative activities in the company's annual reports.

Furthermore, Lenee and Oki (2017) examine the impact of hedging on returns on assets and capital used and reveal which financial derivatives show the highest effect in the period of their research. By using regression analysis with a panel of least squares (PLS), 100 observations revealed that regression analysis was used on a balanced panel data set of 100 observations. The results reveal the following: (1) financial companies tend to hedge more interest rate risk while non-financial companies hedge against foreign exchange risk; (2) interest rate risk hedging by both groups using a combination of forward and futures derivatives is proven to be positive and statistically significant to the rate of return on assets, thereby increasing the company's performance, but directly has the opposite effect if only swap derivatives are used.

The study of Jalilvand et al. (2000) documents important similarities and differences in the use of derivative instruments between Canadian, US, and European risk managers. They found that the use of derivative products was more widespread in Canada than in the United States and Continental Europe. Overall, most risk management programs are still in the introductory stage. Most companies have established risk management policies but do not measure their treasury performance. Also, the policies are rarely integrated with the company's strategic plans.

Despite the abundance of research on the relationship between financial hedging and firm performance, the literature so far does not provide clear findings on whether the use of derivatives results in higher firm value. Bachillera, et al. (2020) conducted a study using a meta-analysis of 51 studies; this study explains whether the lack of consensus is due to country specificity and different hedge types. The findings show that the use of foreign currency derivatives, alone or in conjunction with other types of derivatives, has positively boosted firm value. They also show that hedging presents economic benefits for all companies, especially those from common law and developed countries.

Based on the explanation above, the general hypothesis will be formulated as the following statement:

Ha: Hedging decision has a positive impact on the value of a company.

### **3. Research Method**

#### **3.1. Operational Variable and Definition**

##### **3.1.1. Dependent Variable**

To test how the decision to use derivative instruments affects firm value, this study uses 3 alternative measurements of firm value as the dependent variable, namely, Price to Book Value (PBV) and Return on Assets (ROA). The calculation of the three dependent variables is described as follows.

##### **1) Price to Book Value (PBV).**

As the dependent variable, it is measured by dividing the price per share by the total equity divided by the number of fully paid and issued shares. The PBV is calculated using the following formula:

$$PBV = \text{Stock Price} / (\text{Total Equity}/\text{number of shares outstanding})$$

##### **2) Return to Assets (ROA)**

To measure the level of profitability of the company, namely to measure the company's ability to generate net profit after tax from each of the total assets invested. The ROA variable is an important indicator for companies and investors in assessing the company's ability to survive in the long term. ROA is calculated by the following formula.

$$ROA = \frac{\text{Earnings After Tax}}{\text{Total Asset}} \times 100\%$$

##### **3.1.2. Independent Variable**

###### **1) Derivative Instruments**

To measure the use of hedging instruments for each type of risk faced by the company. This dummy variable is used to measure whether the company hedges by using derivative instruments such as forward contracts, futures contracts, options and/or swaps. Assuming that changes in the dependent variable are caused by hedging activities. To measure whether a company performs hedging or does not hedge, a dummy variable is used, which indicates the use of derivatives for risk management and a continuous variable which indicates the level of hedging (Panaretou, 2014), with the formula:

FOW: Indicates a dummy derivative representing a forward contract with a value of 1 if using a forward contract in a given year or 0 otherwise.

FUT: Use of dummy derivatives when entering into futures contracts with a value of 1 if you enter into a futures contract in a certain year or 0 otherwise.

OPT: Dummy derivative to represent an option contract with a value of 1 if the option is used in a certain year or 0 otherwise

SWP: Represents a dummy derivative for a swap contract with a value of 1 if the swap is used in a given year or 0 otherwise.

IRDEV: Marks a dummy interest rate derivative with a value of 1 if one or more of interest rate derivatives forward, futures, options and swap instruments are used in a given year to hedge interest rate risk or 0 on the contrary.

FXDEV: Dummy derivatives represent the use of foreign exchange hedges with the value of 1 if one or more foreign exchange rates are used as instruments derived from the use of forward, futures, options and swap contracts specifically to hedge foreign currency risk or 0 otherwise.

### 3.1.3. Control Variable

#### 1) Price Earning Ratio (PER)

This ratio is used to measure the company's growth opportunities, where the capital requirements needed depend on the prospects for the company's growth in the future. This variable is measured by the following formula:

$$\text{PER} = \frac{\text{Stock price per share}}{\text{Earnings per share}} = \dots\dots \text{ times}$$

#### 2) Company Size (SIZE)

Companies with large assets indicate the company has a large cash flow and is captured as a positive signal for investors (Sutanto, 2007). The way to calculate company size is by transforming the logarithm of the company's total wealth with the formula:

SIZE = Natural Logarithm of total assets

#### 3) Asset Utilization Ratio (AUR)

This variable is used to measure the efficiency level of wealth used in generating income or sales. This ratio is measured using the following formula:

$$\text{AUR} = \frac{\text{Total Sales}}{\text{Total Asset}} = \dots\dots \text{ times}$$

#### 4) Leverage (LEV).

This variable is used to control the company's funding structure in financing its assets by dividing the total debt by the company's total equity wealth. The calculation formula is as follows:

$$\text{LEV} = \frac{\text{Total Amount of debt}}{\text{Total Equity}} \times 100\%$$

#### 5) Net Profit Margin (NPM)

This variable is used to control the company's ability to generate net profit from each sale made. Measured by the following formula:

$$\text{NPM} = \frac{\text{Earnings After Tax}}{\text{Total Sales}} \times 100\%$$

### 3.2. Population and Sample

The population in this study were all companies listed on the LQ45 Index of the Indonesia Stock Exchange for the period 2014 – 2020. The research sample was taken by purposive sampling with some criteria as follows:

- Companies listed on the LQ 45 index for the period 2014-2020.
- Companies that have published financial statements for the period 2014-2020
- Companies that are always included in the LQ45 index throughout 2014-2020



time period.

**3.3. Data Analysis Method**

**3.3.1. Regression Model**

In this study, the regression model is divided into two regression models as follows:

Model 1 (PBV as dependent variable):

$$\text{Firm Value}_{i,t} = \alpha + \text{Hedge}_{i,t} + \text{Control Variables}_{i,t} + \epsilon_{i,t}$$

Model 2 (ROA as dependent variable):

$$\text{Firm Value} = \alpha + \text{Hedge}_{it} + \text{Control Variable}_{it} + \epsilon_{it}$$

**3.3.2. Model Specification**

The regression model estimation method using panel data can be done through three alternatives models as follows:

**1). Common Effect Model (CEM)**

Regression models that do not pay attention to the dimensions of time and individuals and assume that the behavior of company data is the same in various time periods are known as Common Effect estimation. This method can use the Ordinary Least Square (OLS) approach or the least squares technique to estimate the panel data model. Multiple linear regression based on the least squares method (MKT) or OLS, which is one method that is often used to estimate a regression line by minimizing the number of the square of the error of each observation on the line (Ghozali, 2013: 96). The regression model equation with Common Effect estimation can be written as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1,it} + \beta_2 X_{2,it} + e_{it}$$

Where:

$Y_{it}$  = dependent variables measured by using PBV for model 1 and ROA for model 2

$\beta_0$  = intercept

$X_1, X_2$  = independent variables

$e_{it}$  = error-term

**2). Fixed Effect Model (FEM)**

The regression model that assumes the difference in the intercept in the equation is known as the Fixed Effect regression model. To estimate panel data using the Fixed Effects model, a dummy variable technique is used to capture differences in intercepts between companies, but the intercepts are the same across time (time invariant). This model also assumes that the regression coefficient (slope) remains between companies over time. This model is often also called the Least Squares Dummy Variable (LSDV) technique with the following equation:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 D_{1i} + \beta_4 D_{2i} + \beta_5 D_{3i} + e_{it}$$

Where:  $D_{1i}$ ,  $D_{2i}$  and  $D_{3i}$  are dummy variables for objects 1,2,3 and 0 for other objects.

**3). Random Effect Model (REM)**

The use of dummy variables in the Fixed Effect model aims to represent ignorance about the real model. This reduces the degree of freedom, which in turn reduces the efficiency of the parameter. This problem can be overcome by the Random Effect model, which uses error terms, by estimating the panel data where the disturbance variables may be interrelated between individuals and over time. This model is also called the Error Component Model (ECM) or the Generalized Least Square (GLS) technique with the following equation:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + v_{it}$$

Note: 0 is the unknown parameter which indicates the mean of the population intercept, and  $v_{it}$  is the disturbance variable. In determining the estimation of the most appropriate panel regression model to be used, the Chow Test, Hausman Test and LM Test are carried out.

## 4. Results and Discussion

### 4.1. Descriptive Statistical Analysis

Descriptive statistics describe the distribution of data from the variables used in this research model in the form of average, maximum and minimum values. Furthermore, the slope of a curve can be seen from the difference in the location of the mean, median and mode. If the three measures of data centering are at the same point, then it is said to be symmetrical, or the data is normally distributed. Meanwhile, it does not mean the data is not symmetrical or not normally distributed. Kurtosis or sharpness is the level of peak of a distribution which is usually taken relative to a normal distribution.

This study uses 8 research variables, consisting of 2 dependent variables, namely PBV and ROA variables and 6 independent variables, consisting of HEDGE, PER, DER, NPM, AUR and LSIZE variables. The mean value for the PBV variable is 4.758 times. While the maximum value of the variable is 66.40 times at PT. Unilever Indonesia in 2017 and a minimum value of 0.36 times at PT. Adaro Energy in 2015. The mean value for the ROA variable is 7.38 percent and with a maximum value of 48.69 percent at PT. Unilever Indonesia in 2018; Furthermore, for a minimum value of 0.700 percent at PT. PP (Persero) in 2020. Then the HEDGE variable is a dummy variable with a minimum value of 0 and a maximum value of 1, and a mean value of 0.33. The mean value of PER variable is 22.61 times and with a minimum value of 3.65 times at PT. Sri Rezeki in 2020. For a maximum value of 329.00 times on PP (Persero) Tbk in 2020.

The mean value for the DER variable is 2.28 times, meaning that the average number of public companies listed on the LQ45 index is 2.28 times greater than the amount of their own capital. The minimum DER ratio is 0.13 times at PT. Indo Semen Tuunggal Perkasa, Tbk, in 2014, then the maximum DER value was 13,580 times at PT. Tower Bersama Infrastruktur, Tbk in 2018. The mean value of the NPM variable is 18.84 percent, with a minimum value of 0.35 percent and a maximum value of 85.18 percent at PT. Bumi Serpong Damai, Tbk in 2016. Next, for the AUR variable with an average value or mean of 56.71 percent and companies with a minimum value of 4.96 percent at PT. State Savings Bank, Tbk in 2020 and a maximum value of 239.19 percent at PT. Uniliver Indonesia in 2017. Finally, the mean value of the LSIZE variable is 4,793, with a minimum value of 6,160 at PT. Surya Citra Media, Tbk in 2016 and a maximum LSIZE value of 6,160 at PT. Bank Mandiri Tbk in 2020.

Tabel 4.1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
PBV	196	0.360	66.400	4.758	9.6344
ROA	196	0.700	48.690	7.3822	7.5523
HEDGE	196	0.000	1.000	0.331	0.4720
PER	196	3.650	329.000	22.610	30.3555
DER	196	0.1300	13.580	2.288	3.0173
NPM	196	0.3500	85.180	18.8403	13.5100
AUR	196	4.960	239.19	56.782	44.6750
LSIZE	196	3.6500	6.160	4.793	0.6143
Valid N (listwise)	196				

### 4.2. Estimation Model Selection Test

The first step is the selection between CEM and FEM by conducting the Cho test for Model 1, where PBV is the dependent variable and in Model 2, ROA is the dependent variable as follows.

**Table 2. Cho-test results**

Redundant Eixed Effect Tests	Model 1 (PBV)			Model 2 (ROA)		
	Statistic	d.f	Prob	Statistic	d.f	Prob
Test cross-section fixed effects						
Cross-section F	1.764	(27,162)	0.00167	3.070	(27,162)	0.0000
Cross-section Cji-square	50.536	27	0.0039	81.006	27	0.0000

From the results of the cho test above, it shows that in model 1, the F test value is 1.764 with a probability value of 0.00167 < 0.05, and in model 2, the F test value is 3.070 with a probability value of 0.0000 < 0.05, it can be concluded that FEM is more appropriate used to estimate the model in this study. The next step is to compare FEM with REM by testing the Hausman test.

**Table 3. Hausman-test results**

Correlated Random Effects-Hausman Test	Model 1 (PBV)			Model 2 (ROA)		
	Chi-Sq. Statistic	Chi-Sq d.f	Prob	Chi-Sq Statistic	Chi-Sq d.f	Prob
Equation: Untitled						
Test cross-section random effects						
Cross-section random	26.781	6	0.0002	42.581	6	0.0000

From the results of the Hausman test, in model 1, the chi-square statistical value is 26,781 with a probability of 0.0002 < 0.05, and in model 2, the chi-square statistical value is 42,581 with a probability of 0.0000 < 0.05, indicating that Ho is rejected and the alternative Ha is accepted; then the appropriate model for estimating the model in this study is FEM. The next step after obtaining the right estimation model to estimate the model in this study is to use FEM.

**4.3. Hypothesis Test Results**

Testing the research hypothesis using the t statistic test to test the regression coefficients individually. The results of the t test are shown in Table 4 for model 1 and Table 5 for model 2. The results showed that of the 6 (six) independent variables used in this study, 5 (five) variables had a significant effect on the dependent variable.

Table 4. Estimated Results of Testing the Fixed Effect Model:  
PBV as dependent variable (model 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.211.213	5.639.323	-3.921.061	0.0001
HEDGE	-2.695.834	7.953.230	-3.389.609	0.0009
PER	0.049443	0.015340	3.223.191	0.0015
DER	1.051.499	0.177805	5.913.771	0.0000
NPM	0.308464	0.035220	8.758.327	0.0000
AUR	0.204593	0.013293	1.539.065	0.0000
LSIZE	1.449.922	1.065.203	1.361.170	0.1754
R-squared	0.695988	Mean dependent var		4.815.459
Adjusted R-squared	0.634060	S.D. dependent var		9.646.619
S.E. of regression	5.835.529	Akaike info criterion		1.573.257
Sum squared resid	55166514	Schwarz criterion		1.630.122
Log likelihood	-1.507.792	Hannan-Quinn criter.		1.596.279
F-statistic	1.123.860	Durbin-Watson stat		2.306.452
Prob(F-statistic)	0.000000			

The constant value ( $\alpha$ ) is -2.2110 for model 1 and = 6.3320 for model 2, meaning that if  $X_1=X_2=X_3=X_4=X_5 = X_6 = 0$ , then the value of the dependent variable (Y) for model 1 is -2.2110 and 6.3320 for model 2. Based on the t statistic test, in model 1, the regression coefficient of the HEDGE variable is -2.695 and with a statistical probability value of t count,  $p= 0.000 < = 0.05$ , it means that every increase in one unit of hedging activity results in a decrease in value company amounted to 2,695 units. For the PER variable with a regression coefficient of 0.0494 with a statistical probability value of t count,  $p = 0.0009 < = 0.05$ , thus every 1 unit increase in the PER variable will increase the firm value by 0.0495 units. The coefficient value of the DER variable is 1.051 with a statistical probability value t of,  $p= 0.000 < = 0.05$ , meaning that every one unit increase in the DER variable will increase the firm value by 1.051 units. Furthermore, the coefficient value of the NPM variable is 0.3084, and the statistical probability value t is  $p = 0.00000 < = 0.05$ , meaning that every 1 percent increase in the NPM value will increase the firm value by 0.30 percent. Finally, the coefficient value of the AUR variable is 0.2045 with a statistical probability t of  $p= 0.000 < = 0.05$ , indicating that every 1 percent increase in the asset utilization ratio will increase the firm value by 0.20 percent.

Table 5. Estimated Results of Fixed Effect Model Testing:  
ROA as dependent variable (model 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.332.601	3.728.406	1.698.474	0.0913
HEDGE	-1.404.262	5.447.205	-2.577.950	0.0108
PER	-0.028186	0.010376	-2.716.465	0.0073
DER	-0.442923	0.129027	-3.432.799	0.0008
AUR	0.050486	0.011070	4.560.659	0.0000
LSIZE	-0.364613	0.717404	-0.508240	0.6120
PBV	0.434120	0.043664	9.942.358	0.0000
R-squared	0.774272	Mean dependent var		7.382.245
Adjusted R-squared	0.728291	S.D. dependent var		7.552.359
S.E. of regression	3.936.723	Akaike info criterion		1.494.534
Sum squared resid	25106417	Schwarz criterion		1.551.399
Log likelihood	-1.430.643	Hannan-Quinn criter.		1.517.555
F-statistic	1.683.875	Durbin-Watson stat		2.352.154
Prob(F-statistic)	0.000000			

In model 2, by using ROA as the dependent variable as a measure of company value, 5 out of 6 independent variables are able to explain the value of the company. The value of the HEDGE variable is -0.404 with a statistical probability t of,  $p = 0.0108 < = 0.05$ , meaning that every increase in one unit of hedging results in a decrease in firm value of -1.404 units. Then the coefficient value of the PER variable is -0.0281 with a statistical probability t of  $p= 0.0073 < = 0.05$ , indicating that for every 1 unit increase in the PER variable, the firm value decreases by -0.0282 units. Meanwhile, the coefficient value of the DER variable is -0.4429, and the statistical probability value t is  $p=0.0000 < = 0.05$ . This indicates that every 1 percent increase in the DER ratio results in a -0.44 percent decrease in firm value. Furthermore, the coefficient value of the AUR variable is 0.0504, with a statistical probability value of t equal to  $p = 0.0000 < 0.05$ . This indicates that every 1 unit increase will increase by 0.05 units of firm value. Then the coefficient value of the PBV variable is 0.4341 with a statistical probability value of t of  $p = 0.0000 < 0.05$ . Thus, each increase of 1 unit of PBV variable will increase the value of the company by 0.43 units.

The results of the F-statistical test, to test whether all of the independent variables included in the model have a joint influence on the dependent variable, are shown from the results of the simultaneous test (F test) with calculated F values of 11.2386 each with a probability result of,  $p = 0.000 < = 0.05$ , and 16.8387 with a probability of,  $p = 0.000 < = 0.05$ , thus simultaneously the independent variables used in the two models are able to explain the firm value in both models. In Table 4 for Model 1 and Table 5 for Model 2 above, the adjusted termination coefficient values(Adj R2) are 63.40 percent and 72.82 percent, respectively. Thus, the ability of independent variables to explain firm value is quite large in both models, while the rest is influenced by other factors outside the variables used in this study.

#### **4.4. Discussion**

The results of statistical analysis of panel data using the FEM estimation method in the two regression models used in this study are the dependent variable PBV as a fraction of firm value in model 1 and the dependent variable ROA in model 2. Companies that are fractionated with the HEDGE variable have a significant negative impact on firm value in both models. Furthermore, four (4) of the five control variables used showed a significant effect on firm value, namely the PER, DER, NPM and AUR variables for model 1 and the PER, DER, AUR and PBV variables for model 2.

The results of the study provide valuable information that the hedging actions taken by the company have a negative effect on the value of the company. Hedging action seems negative on firm value, among others, because of the 28 public companies selected as samples in the LQ45 index, only 12 companies or 42.86 percent, use hedging instruments, so the use of the dummy variable for measuring the HEDGE variable is mostly zero. Most companies, or as many as 16 companies (57.14 percent), do not use hedging derivative instruments, and most of these companies use conventional instruments to anticipate the risk of fluctuations in foreign exchange rates on their company's business activities. Of the 12 companies that use hedging instruments, most only use two hedging instruments, namely forward contracts and swap contracts.

The results of this study contradict previous research (Alan and Gupta, 2018; and Lenee and Oki, 2017), which concluded that the use of hedging could minimize the volatility of foreign exchange transactions and have a positive effect on increasing firm value, but line with what is concluded in Geyer- Klingenberg et al., (2021), who reviewed the same study found contradictory results, namely some positive effects, no effects and even negative effects on firm value. This is due to various factors that made the findings of previous studies not consistent in the results. This research supports some of the conclusions of research conducted by Lenee and Oki (2017) that hedging using swap contracts against foreign exchange has a negative impact on firm value. Bachillera., et al. (2020) explain the lack of consensus on outcomes due to country specificity and different hedging types. The findings show that the use of foreign currency derivatives, alone or in conjunction with other types of derivatives, has positively boosted firm value.

#### **5. Conclusion and Suggestion**

Based on the results of data analysis and discussion in the previous chapter using a panel data approach on 45 public companies listed on the LQ45 index, 28 companies were consistently included in the index for 7 years in the research period from 2014 to 2020, so that a total of 196 observations were collected. The right estimation model for explaining the effect of hedging or hedging variables together with control variables on firm value is by using the Fixed Effect Model (FEM) estimation method. The following are some conclusions from the findings of this study. The results of the partial test using the t statistic test showed that the HEDGE variable to measure hedging measures has a significant negative effect on firm value. Four of the five control variables, namely PER, DER, AUR and LSIZE, have a significant positive effect on firm value in model 1 and the variables PER, DER, AUR, LSIZE and PBV in model 2. The ability to explain the variables used in both panel data regression models using the Adjusted R2 test are respectively 63.40 percent in model 1 and 60.72 percent in model 2, while the rest is explained from other variables not used in this study.

It is suggested to the company that in determining the selection of hedging instruments, the benefits to be obtained and the costs incurred in the several derivative instruments used should be considered. The capital market authorities should always monitor the development of the use of public company debt, especially those sourced from the use of foreign debt (offshore loans) because if it is not managed properly using the right hedging instrument, it will result in an increase in the amount of debt if under certain conditions the foreign exchange rate is experiencing a rapid increase, it should always promote and socialize the need to anticipate foreign exchange fluctuations with various formal or conventional derivative instruments. Finally, investors are advised to be more careful in choosing shares of companies that show trends in the use of foreign debt without being equipped with adequate hedging measures. This study only used a limited number of samples, so in order to generalize the research findings, further research is advised to use a larger number of samples in order to obtain more convincing results.

**Funding:** This research received no external funding.

**Conflicts of Interest:** The authors declare no conflict of interest.

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