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Analysis of Hedging for Mitigating Exchange Rate Fluctuations in Indonesia, With A Logistic Regression Approach (Empirical Study of Consumer Cyclical Companies)

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Abstract

The consumer cyclical companies are affected by exchange rate fluctuations and require hedging. Hedging is an action taken to reduce potential risk by mitigating exposure to price movements of an asset. This study determined how companies use hedging products and the factors that encourage companies to hedge. The companies used as research were 24 listed at IDX with a period of 17 years (2006 to 2022), and the analysis method used in this study was a logit regression. The most common derivatives firms use are cross-currency swaps, followed by call spreads. The decision to hedge is influenced by several factors: profitability, firm size, growth, liquidity, leverage, hedging regulation, and cash flow volatility. Examination of the regulation is the first research related to hedge decisions. Profitability, firm size, and cash flow volatility are variables with significant and positive results, while the negative but significant relationships with hedging decisions are leverage, liquidity, and hedging regulation. Furthermore, firms are expected to undertake or increase hedging activities if there are more positive internal supporting factors, and the government is expected to help create sustainable and comprehensive legal tools to create a more conducive climate to increase hedging activities.

Keywords: *: Hedge, Foreign Exchange, Logit, Cyclical Company, IDX*

1. Introduction

During the period January to June 2023, the frequency of transactions of stock in the consumer cyclicals sector is quite significant in the Indonesia Stock Exchange and is the largest at 17,497 million or 12,96% of the total transactions of the capital market, the volume of stock transactions of the consumer cyclicals sector is the third larger at IDR 92,844 billion or 7,9% of total traded stock volume in the, and also the value of the stock of consumer cyclicals is the third larger at 230,512 million stock or 10,9% of the total stock of the capital market (www. IDX.co.id). This shows that the consumer cyclical sector is one of the most essential sectors in Indonesia. Consumer cyclical industries depend on business and economic cycles, including vehicles, housing, entertainment, and retail. This industry is divided into two categories, namely durable cycles (for example, vehicles) and non-durable ones (for example, food) (Hayes, 2020; Pandini et al., 2018). The development of the consumer cyclicals industry in Indonesia tends to fluctuate with economic growth (Azzahra et al., 2021) and generally faces intense competition (Imron et al., 2022). So, these companies have risks due to changes in foreign exchange rates. This is reflected, among others, in several studies, namely Tarasenko (2021), which states that fluctuations in the currency's value have a significant and positive effect on fluctuations in imports of fuel and textiles. Tang (2015) states that companies significantly affected by exchange rate changes are electronic information, machinery, tourism and hotels, traffic equipment, and vehicle industries. In addition, Bodnar (1993) states that companies significantly affected by exchange rate fluctuation are clothing/apparel and other companies. Hedging is a way to reduce potential risks by mitigating exposure to asset price movements (Ashima Goyal, 2009). Most studies show that hedging can positively, negatively, or negatively impact the firm. Hedging using foreign exchange derivative instruments is an action to minimize the risk of loss due to fluctuations in

foreign exchange rates. Derivative instruments that can be used include options, forward contracts, futures contracts, and swaps (Fadillah & Nurlita, 2023). Another concept about hedging is a policy carried out to protect against exchange rate exposure in the form of a contract to reduce the value of an asset (Madura, 2020). For companies that carry out multinational trade, hedging can be a means of insurance to protect the company from the threat of interest and exchange rate fluctuations. The export and import companies are affected, especially by fluctuating foreign exchange and floating interest rates (Rizal, 2017). Hedging tools are inseparable from derivative instruments to minimize the risk of foreign exchange fluctuations. In its implementation, hedging in Indonesia is supervised by Bank Indonesia, and Bank Indonesia also provides advice to companies conducting international transactions to conduct hedging activities (Yusuf & Musdholifah, 2018). In line with the importance of exchange rate mitigation, Bank Indonesia has issued PBI No.16/21/PBI/2014 concerning Prudential Principles in the Management of Foreign Debt of Non-Bank Corporations. Bank Indonesia requires companies that have a significant difference (more than 25%) in assets after deducting foreign currency liabilities that are still significant liabilities to be hedged. This shows that regulators strongly encourage companies to hedge. However, the provisions' effectiveness on the hedging implementation must be studied more comprehensively. Based on the things mentioned, companies in the consumer cyclical sector should consider hedging as one of the mitigations in managing foreign exchange risk. Furthermore, we need to know the factors that influence companies to hedge. This study uses the logit model to describe the application of hedges in companies and analyze the factors that influence companies to hedge.

2. Materials And Methods

This study uses secondary data from annual financial reports from 24 companies in the consumer cyclical sector from 2006 to 2022 listed on the IDX. The research was conducted from July 2022 to July 2023.

Data collection is done by purposive sampling by considering companies that went public at least from 2006 and are still public companies until 2022. The sampling companies are included in the apparel, automotive component, and automotive retail sub-category. The method used is logit regression to analyze the factors that cause companies to hedge. The logit regression is a non-linear method to predict whether a company will hedge using the cumulative distribution function of the logistic distribution.

Based on the various models above, researchers will examine the best model between the logistic models of Shui (2012), Prieto et al. (2019) and Sriram (2020), with the following considerations:

The variables studied related to firm value are 6 variables: profit, leverage, firm size, capital expenditures, cash flow volatility and liquidity which are considered time variables. Researchers assume these variables are appropriate for assessing various companies with different characteristics on the Indonesia Stock Exchange.

Adding a new variable, namely regulatory. Researchers assume that this variable is appropriate to assess various companies that have different characteristics on the Indonesia Stock Exchange.

The model used in this study is as follows:

$$Y_j = \beta_0 + \sum_i \beta_i X_{ij} + \varepsilon_j, \quad j = 1,\ldots,n, \quad i = 1,\ldots,m,$$

(Equation 1)

Yj is the decision (extent) to use or not use derivatives,

β0 is the constant term,

β1…βm are the coefficients on the predictor variables,

X ij is a vector of predictor variables,

ε j is a disturbance term associated with observation *j*

Conceptual Framework

7 factors influence companies to hedge, namely: Liquidity, Leverage, Profit, Cash flow Volatility, Growth, Firm Size, and Regulation. To analyze these various factors, logistic regression is used. The diagram of the factors that influence companies to hedge is as follows:

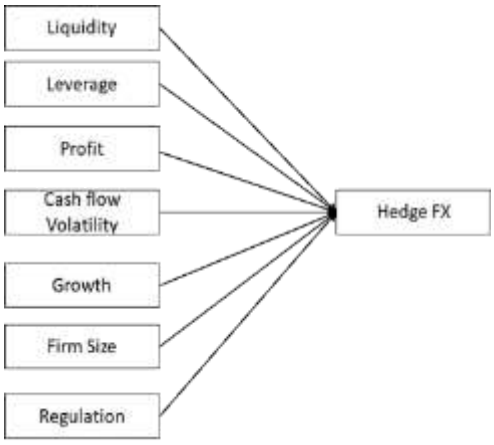

Figure 1: Conceptual Framework

Hypothesis

Factors that influence the use of hedges. The hypothesis used in this study is generally used to test the extent of the influence between the independent and dependent variables in the model in the equation. The hypothesis used is as follows:

H1: Firm size affects the use of hedging

H2: Profit affects the use of hedging

H3: Liquidity affects the use of hedging

H4: Leverage affects the use of hedging

H5: Growth affects the use of hedging

H6: Cashflow volatility affects the use of hedges

H7: Regulation affects the use of hedging

3. Results and Discussion

Implementation of Hedging in the Company

Several factors encourage companies to hedge, according to Wahyudi et al. (2019) and Lantara (2012), which include variables including firm size, profitability, liquidity, leverage, growth, and cashflow volatility. Before examining this, an overview of these variables, including hedging products, is as follows:

Firm Size

The development of firm size for 17 years based on log firm size is as follows: average of 11.739895014, where the most significant value of 11.907729261 occurred in 2022 and the smallest value of 11.502481976 occurred in 2006. The development of firm size has consistently increased since 2006 until 2022. Large companies hedge to protect themselves from increased risk due to company growth, Putro (2012). The larger the company, the greater the decision to hedge becomes more critical.

Profitability

The description of the company's profitability based on ROA (Return on Assets or profit sharing on assets) during the study period is as follows: average 0.028902854 times where there are fluctuations in ROA starting in 2006 of 0.023405761 times and the lowest point position occurred in 2020 of -0.000220595 times and the highest occurred in 2012 of 0.076526624 times. In 2020, there was a covid 19 pandemic, which was the first time it appeared in the world. This substantially negatively impacted the company's operations, so its profitability decreased. Profitability, as measured by using Return on Asset (ROA), shows how companies use their asset resources to create profits that can return or exceed their original assets. It also explains that the company's higher profitability shows the company's good performance in managing company resources. So, the higher the company's profitability, the higher the company's hedging decision.

Liquidity

The development of the company's liquidity is reflected in the quick ratio (short-term liabilities divided by short-term assets), where for 17 years, the average value is 1.477791852 times where fluctuations starting in 2006 at 1.331512833 and the lowest point occurred in 2012 at 0.957695256 times. The highest point occurred in 2022 at 2.447691849 times. A significant buildup of liquidity

began in 2020, and the highest occurred in 2022. This can be understood considering companies must maintain excess liquidity during a crisis to prevent financial distress. Liquidity is a ratio used to measure a company's ability to fulfill its short-term obligations. This ratio compares current liabilities with assets available to meet these short-term obligations. If a company's current ratio value is low, its current liabilities are more significant than its current assets. This increases the risk of failure (Kasmir, 2021).

Growth

The development of corporate investment, as reflected in the value of capital expenditure divided by assets, has fluctuated since 2006 until now. In 2006, there was a growth of 0.164427343 times, the lowest point occurred in 2022 of 0.037520864 times, and the highest point occurred in 2015 of 0.187216943 and an average value of 0.139378826 times. The lowest investment growth occurred in 2022, considering there was still a pandemic where the company's utilization had stayed within its production capacity, so no significant additional investment was needed.

Leverage

The development of long-term debt divided by assets over 17 years fluctuates. In 2006, the company's leverage was 0.212471850 times with an average of 0.239507037 times. The lowest leverage occurred in 2012 at 0.177120554 times, and the highest occurred in 2022 at 0.291642528 times. The high leverage in 2022 can be understood considering the company needs to increase and maintain liquidity in times of crisis where, to increase liquidity, the company takes steps to increase loans.

Cash flow Volatility

The volatility of the company's cash flow is seen from the standard deviation of operating cash flow for the last 3 years where the average value is 176,129,940,477. This standard deviation fluctuates quite a lot in 2006 it was 51,105,577,531 and the highest occurred in 2021 at 574,961,966,555. The high standard deviation of cash flow was in 2021 considering that the company had to increase liquidity significantly at the start of the pandemic in 2020. After knowing the description of the factors that influence hedging decisions, the description of the company's hedging use looks as follows:

Use of Hedge Product

In the last 17 years, the company conducted foreign exchange hedging transactions totaling USD 4,409,829,841 where the order from the largest to the smallest is as follows: CCS (cross currency swap) of USD 2,733,077,580, Call Spread of USD 920,000,000, Forward of USD 449,961,229, Option of USD 295,400,000 and Swap of USD 11,372,870.

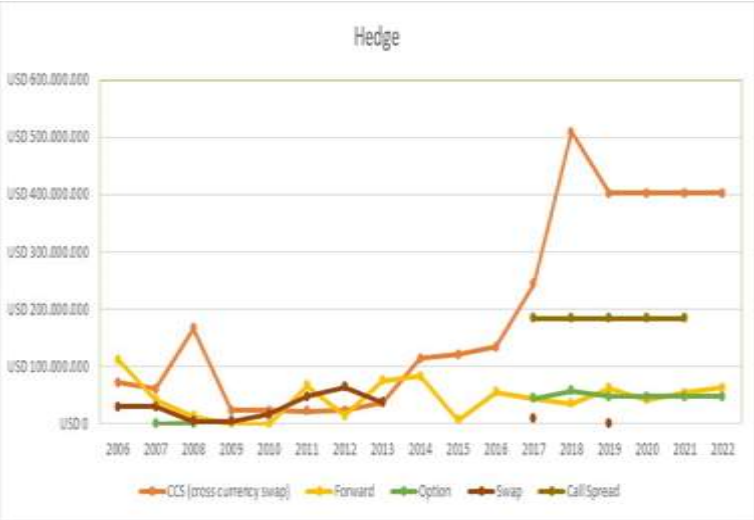

Figure 2: The use of hedge product

Source: companies financial report processed by authors

There was a spike in the use of temporary hedging in specific periods, namely 2008 and 2018. In 2008, there was a recession caused by subprime mortgages. The data shows that when there is a recession, hedging increases sharply. The same thing happened in 2018 when there was a stock market crash in the United States that worried the world. The use of hedging remained high after 2018, given the emergence of the COVID-19 pandemic worldwide, which had caused a recession. In 2008 and 2018, there was an increase in the foreign exchange rate against the rupiah, which increased sharply so that the value of the company's long-term liabilities increased sharply. This needs to be

mitigated with the right product, namely CCS, where the nature of CCS is to mitigate principal and interest payments every period. This explains why the use of CCS is the highest. Call spread transactions have been allowed since September 2016 or the enactment of Bank Indonesia Regulation Number 18/18/PBI/2016. A call spread is a transaction of 2 options (sell call and buy call) simultaneously. This transaction became the second largest hedging transaction during the observation period, considering that customers have more flexibility to execute transactions, either buy or sell, so it is attractive to them.

Forward, option, and swap transactions are plain vanilla derivatives with significant premium costs. However, the features of transaction flexibility are limited compared to structured product transactions (call spread and cross currency swap) where to make transactions on one underlying, for example, credit, many transactions must be carried out, while if done through structured product transactions can be done in one transaction. However, forward, option and swap transactions are relatively more straightforward than structured product transactions, so they remain one of the hedging transactions carried out by customers.

Determine Factors for Companies taking hedging

The results of the study to determine the factors that cause companies to hedge using the logistic regression method are as follows:

Table 1: Estimated Results of Logit Regression Parameters by including all Independent Variables

Term	Coef	SE Coef	Z-Value	P-Value	VIF	Deviance R-Sq	Deviance R-Sq(adj)
Constant	-27,04	5,50	-4,91	0,000		35,74%	33,75%
Profit	2,62	1,09	2,41	0,016	1,07		
Firm Size	2,174	0,446	4,87	0,000	1,53		
Growth	-3,91	2,05	-1,91	0,057	1,02		
Leverage	-5,35	1,87	-2,86	0,004	4,02		
Liq	-0,043	0,242	-0,18	0,861	1,75		
Hedge Reg	-1,567	0,396	-3,96	0,000	1,35		
CashFlow Volatility	0,000002	0,000001	2,81	0,005	3,40		

Based on Table 1, several things can be said including:

a. Partial tests are carried out with Wald test statistics. From the table above, it is known that the absolute value of the W test statistics on the predictor variables of profit, firm size, leverage, hedge regulation, and cashflow volatility is greater than the table value Z 0.05/2 = 1.96 or can be seen from the p-value on each predictor whose value is less thanα (0.05). So, it can be concluded that the variables significant to hedge decisions are profit, firm size, growth, leverage, hedge regulation, and cashflow volatility.

b. The R2 value is 35.74%, which means that the dependent variable in the model can be explained by 35.74% of the independent variables. This indicates that the variables of profit, firm size, growth, leverage, liquidity, hedge regulation, and cashflow volatility are good enough to explain the dependent variable (hedge decision). In contrast, the remaining 62.26% cannot explain the dependent variable.

c. For VIF values less than 10, this indicates there is no multicollinearity problem between the predictor variables.

d. The constant value (a) has a negative value of -27.04. This shows that if all independent variables, including profit, firm size, growth, leverage, liquidity, hedge regulation, and cashflow volatility, are 0 percent or do not change, then the chance of a hedge is 0.0000000000018%.

e. The regression coefficient value for the profit variable is 2.62. This value indicates a positive influence (unidirectional) between the profit and hedge variables. This means that if the profit variable increases by 1%, the chance of a hedge is predicted to be 13.8002 times.

f. The regression coefficient value for the firm size variable is 2.174. This value indicates a positive influence (unidirectional) between the firm size and hedge variables. This means that if the firm size variable increases by 1%, the chance of a hedge is predicted to be 8.7972 times.

g. The regression coefficient value for the growth variable has a negative value of -3.91. This shows that if growth increases by 1%, then on the contrary, the chance of a hedge is 0.0200 times.

h. The regression coefficient value for the leverage variable has a negative value of -5.35. This shows that if the leverage increases by 1%, the chance of a hedge is 0.0048 times.

i. The regression coefficient value for the liquidity variable has a negative value of -0.043. This shows that if liquidity increases by 1%, the chance of a hedge is 0.9584 times.

j. The regression coefficient value for the hedge regulation variable has a negative value of -1.567. This shows that if the hedge regulation increases by 1%, the chance of a hedge is 0.2087 times.

k. The regression coefficient value for cash flow volatility has a positive value of 0.000002. This shows that if cashflow volatility increases by 1%, the chance of a hedge is 1.0000 times.

Testing the Significance of the Regression Model

The significance test of the model with all independent variables included is shown in Table 2.

Table 2: Significance Test of Logit Regression Model

Test	DF	Chi-Square	P-Value
Deviance	366	225,95	1,000
Pearson	366	343,03	0,800
Hosmer-Lemeshow	8	9,97	0,267

The value of the Hosmer-Lemeshow Tests or H-L Statistic is 9.97 and Prob. Chi-Sq of 0.267 which is greater than alpha 0.05, meaning that the model is acceptable because it fits the observation data. So it can be interpreted that the model is acceptable.

Table 3: Significance Test of Logit Regression Model

	Wald Test		
Source	DF	Chi-Square	P-Value
Regression	7	58,13	0,000
Profit	1	5,83	0,016
Firm Size	1	23,74	0,000
Growth	1	3,63	0,057
Leverage	1	8,15	0,004
Liq	1	0,03	0,861
Hedge Reg.	1	15,65	0,000
Std Dev	1	7,90	0,005

The results of testing the significance of parameters simultaneously show that the resulting chi-square value is 58.13 with a p-value of 0.000 with anα used of 0.05. Because the p-value (0.000) is smaller than α (0.05), it can be concluded that in logit regression with a 95% confidence level, there is at least one significant parameter in the model.

Profit

There is a positive and significant relationship between profitability and hedge decisions. This reflects a higher reward for companies with high profits from hedge transactions. So, higher profitability will encourage companies to use more financial derivatives. These results align with research on Malaysian companies (Shaari et al., 2013). Similar results were found in a study conducted on companies in France 2004, which found that return on assets (ROA) has a significant and positive relationship (Clark & Mefteh, 2010). However, these results are inversely proportional to those conducted by Aristya and Hidajah (2020), which state that profitability does not affect hedging decisions with derivative instruments.

Firm size

The positive and significant relationship between firm size and hedge decisions is proven to occur in companies in Indonesia (Lantara, 2012). According to research in the United States using a Tobit regression model, firm size has a positive and significant correlation with the use of derivatives (Singh & Upneja, 2007). In addition, a logistic analysis of 469 firms in Australia showed that firm size is the most essential factor in using derivatives (Nguyen & Faff, 2002). This suggests that larger firms use derivatives more than smaller firms. Larger firms have the necessary resources and knowledge to implement derivatives. Serra Liu et al. (2023) state that cash hedging can increase company profits. Klingberg et al. (2018) also convey the same thing, stating that firm size is an apparent factor in determining the company's hedging decision, supporting the bankruptcy and financial distress hypothesis.

Growth

There is a negative and significant relationship between investment growth and hedge decisions. This is due to concerns that using hedges in investment activities can result in over-investment. This is in line with research by Yavas (2016), which states that companies in developing countries with more significant investments tend not to use derivatives. Farid et al. (2021) state that using hedges in investment will reduce firm value. However, this result is inversely proportional to the research conducted by several researchers. The higher the level of opportunity for the company to develop the company, the better the performance improvement, the higher the level of vigilance in managing the risks faced by the company, and the higher the opportunity to make hedging decisions. This is a good signal for investors that the company's opportunity is a favorable prospect because the investment invested is expected to provide high returns in the future (Hasim & Holiawati, 2022): (Bodroastuti et al., 2019); (Utami et al., 2018); (Saragih & Musdholifah, 2017).

Leverage

There is a negative and significant relationship between leverage and hedge decisions. This is because the more significant the debt, the greater the additional costs required to hedge where the IDR against USA currency hedge premium is greater than the EUR against USD. This is in line with research (Shaari, Hasan, Palanimally, Kumar, & Haji, 2013) which states that leverage is significantly and negatively related to the use of derivatives where companies that have high debt will avoid using derivative instruments due to insufficient budget). Hernadianto and Sari's (2023) leverage does not affect hedging decisions because the assets and liabilities of company transactions in foreign currencies are still within the normal limits determined by management policy. Ahmad and Haris, 2012) state that leverage is not significant in using derivatives and is not one of the factors driving the probability of using derivatives in Malaysian companies.

Liquidity

There is a negative but insignificant relationship between liquidity and hedge decisions. If the company's cash and time ratio is high, investors will feel less confident because this will indicate idle cash, reducing the company's profitability level (Priharyanto, 2009). This will impact the company's short-term cash flow if the payment transaction is carried out with a foreign exchange denomination. The value will be more excellent if the risk increases because the foreign currency appreciates against the domestic currency. This result is to the results of research by Bonita (2019) and Bodroastuti et al. (2019), which state that liquidity does not affect hedging decisions if high liquidity indicates that the company is not experiencing financial difficulties because the company has more assets than debt. However, this result is inversely proportional to the research of Klingeberg et al. (2018), which states that liquidity is an apparent factor in determining the company's hedging decision, which supports the bankruptcy and financial distress hypothesis.

Hedge Regulation

The relationship between hedge regulation and hedging decisions is negative. Only one Bank Indonesia regulation requires firms to hedge but only requires reporting to the regulator and the company's stock exchange if they do so. This indicates that the existing regulations must be completed and consistent, thus hurting hedge decisions. This is in line with research conducted by Thinh, Anh, and Dung (2020), which states that the legal framework in Vietnam affects the growth of the derivatives market. Strict regulations have hindered this financial market. Some consistent and complete regulations also affect the development of the derivatives market.

Cashflow Volatility

A positive and significant relationship exists between cash flow volatility and hedge decisions. Using hedges will reduce cash flow volatility so companies can more easily manage their finances. This is what encourages companies to hedge. Wai Lee (2019) states that the use of derivatives can reduce variations in cash flow realization in the future, thereby allowing high-growth companies to maintain sufficient internal funds to finance profitable projects in the future. Cao and Colon (2023) state that implementing a hedging strategy will help hedgers stabilize cash flow volatility. The higher the cash flow volatility affects the company in carrying out hedging activities because the high volatility of the company's cash flow will result in financial risks such as bankruptcy costs, hence the need for hedging activities to minimize these risks (Esma et al., 2021). Companies with high cash flow volatility will increase the possibility of derivative hedging policies (Wahyudi et al., 2019); (Hasim & Holiawati, 2022).

3. Conclusion

The results of the analyses carried out in this study can be concluded: Companies in the consumer cyclical sector are among the companies affected by exchange rate fluctuations. To mitigate it, a hedge is done. The hedge decision considers various variables: profitability, firm size, leverage, liquidity, growth, cash flow volatility, and hedge regulation. The hedge products used by the company are cross currency swaps, the most widely used products, then call spreads, and then plain vanilla derivative transactions. To examine the reasons why companies hedge, a logistic regression analysis was conducted, which produced the same analysis results, namely caused by profitability, firm size, and cash flow volatility (significant and positive relationships) as well as growth, leverage, and hedge regulation (significant and negative relationships).

Suggestion

Based on the findings of this study, several things can be suggested including:

a. For the Company, hedging can be a mitigation in the face of exchange rate fluctuations.

b. Companies need to do things, among others:

   1) Understand the products, mechanisms, and risks of derivative transactions.

   2) Improve the ability of human resources to carry out hedge activities.

   3) Assess the incentives for management in encouraging the use of hedges in managing company finances.

c. The government needs to create an environment that supports the increase in hedge activities by doing things, among others:

   1) Review the effectiveness of old provisions related to hedging.

Make various new provisions that are consistent and comprehensive to encourage the application of hedges.

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