

Analyzing the Impacts of Hedging on Cost of Debt a Case Study in Indonesia's Public Listed Companies in 2007-2013

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Abstract: Nowadays, the use of hedging strategy as part of its risk management strategy is becoming essential, particularly in Indonesia. This study investigate further the corporate finance theories which suggest that firms benefit from hedging due to the reduction of bankruptcy risk or financial distress and the mitigation of agency problem. It studies the impact of hedging strategy to the cost of debt in a sample of 183 Indonesian companies (1281 year observations) from 2007 to 2013. Further, this study also examines the sources of hedging benefit in reducing the cost of debt through the reduction of financial distress and agency costs.

Panel two-stage-least-square (2SLS) and diagnostic tests are conducted to ensure the validity of the model. It is proven that, throughout the whole process, there is significant negative impact of hedging to cost of debt. Empirical result shows that hedging firms is paying 141 basis point lower cost of debt than the non-hedge firms. Additionally, it is proven that hedging is more beneficial to firm with higher leverage, since the reduction of the financial distress is also greater. However, this study also gives strong evidence that hedging reduces the cost of debt by mitigating the agency problem.

Keywords: Corporate Finance, Cost of debt, Hedging, Risk Management, Agency Cost

1. Introduction

1.1. Backgrounds

Financial world has become more risky, this condition is quite challenging for developed country as well as for the developing country like Indonesia. The depreciation on the exchange rate will bring pressure in the increase of interest rate, which means also increases firm's financial risk. Rupiah is one of Asia's most volatile currencies in 2014. Even, the central bank of Indonesia (BI) changed the standard of USD/IDR exchange rate in APBN-P (Anggaran Pendapatan dan Belanja Negara-Perubahan) 2015 from IDR 11,900 to IDR 12,200. This volatility is raising the risk of firms that borrow and get their income in foreign currencies, this again will result in uncertainty of their cash flow.

In *Kajian Stabilitas Keuangan* no.22, by plotting Indonesian listed firm's using the Altman Z-score, which represented firm's risk ahead, The central bank of Indonesia (BI) pointed out that there is an increase in the number of firms entering the risky area in 2013. This phenomenon is rising due to the depreciation of USD/IDR exchange rate and the economic slowdown. In addition, BI also conducted a stress test to test the corporate ability in resistance to the depreciation of Rupiah. By using 196 listed companies, the result shows that if Rupiah depreciate to 16000/dollar, there are 9 firms that will become insolvent, the uncertainty level of those firms are increasing. This brings us to conclude that a very good risk management is extremely required in business today. One of them is by adopting hedging strategy.

These days, hedging has been a very popular issue in Indonesia. Hedging are the actions, which are taken by firm to against adverse movements in interest rates and foreign currency exchange rates (Davies et al., 2008, 517). Recently, PT. Garuda Indonesia has been very actively implementing hedging strategy and they reported they saved IDR 213.75 Billion because of Cross Currency Swap

transaction they use. The awareness of hedging has been increasing, the central Bank of Indonesia (BI) recently encourages the state-owned companies to do hedging to reduce their exposure towards foreign exchange risks and to prevent financial loss due to the sharp fluctuation of the rupiah against foreign currencies.

While, the USD/IDR exchange rate trend keeps fluctuating, as discussed before, the default risks of a firm will also increase. Unfortunately, Majority of Indonesia's companies refuse to do hedging because they assume that hedging will be additional burden in their financial report. According to Bank Indonesia statistics, the average total daily transaction in Indonesia foreign exchange rate market (on shore) in July-September 2013 reached 2.2 until 2.8 billion USD. Additionally, Bank Indonesia is also concerned that 73% of foreign exchange transaction are more active in the spot market, while 21% in swap market and 6% in forward market. This may also cause the fluctuation of IDR/USD exchange rate.

Also, stated in *Badan Pemeriksa Keuangan* website (September 18th 2014), according to the BI governor, at least 67% of the total private sector debt remains un-hedged. This phenomenon happens because of lack of knowledge and understanding of hedging. On the other hand, it is very important for company to acknowledge hedging as a strategy to reduce their risk and to maintain outstanding financial performance. To increase the awareness of hedging benefits, for this reason, the aim of this study is to analyze the impacts of hedging on firm's cost of debts. Although there are already some study conducted about hedging in Indonesia (Utomo, 2000; Ismayanti, 2011; Putro, 2012), but the scope of their study did not emphasize on the benefit of hedging for corporation. This study fills the gap in the hedging literature by examining if and how hedging will have an impact to the firm's cost of debt.

In this study, the proxy to measure firm's cost of debt is by using the logarithm of interest spread over LIBOR (London Interbank offer rate), which is stated in company financial report. Although many researches (Klock et al., 2005; Chen and King, 2014; Anderson et al., 2002) measure the cost of debt using the bond yield spreads, but since only 10% of Indonesian public listed firms (excluding the financial industry firms) issue bonds in 2014, and that is why it's more appropriate to use logarithm of interest spread over LIBOR as the proxy of cost of debt in this study. Due to the fact, that there are still no researches done to analyze the phenomenon based on what is happening in Indonesia, thus, with all things considered, the chosen title of this research is therefore "Analyzing The Impacts of Hedging on Cost Of Debt a Case Study in Indonesia's Public Listed Companies in 2007-2013".

2. Hypothesis Development

2.1. Hedging Benefit: Reduction in the Cost of Debt

The central Bank of Indonesia (BI) recently encourages the state-owned companies to do hedging to reduce their exposure towards their foreign exchange risks and to prevent financial loss due to the sharp fluctuation of the exchange rate. This is served as an evidence of the importance of hedging strategy. However, the knowledge about the importance of hedging has not quite popular for Indonesia firm. According to the BI governor, at least 67% of the total private sector debt remains un-hedged. In contrast, theory suggests hedging gives a lot of advantages. One of the advantages is that hedging will decrease the cost of debt. Damodaran (2008) explained that a firm that effectively reduces its probability of encountering financial distress by hedging financial risk will lower its expected bankruptcy cost.

Beatty et al. (2011) find that borrowers who credibly commit to hedge using the covenants significantly reduce their interest rates. Specifically, they show that borrowers who credibly commit to hedge by accepting the interest rate protection covenants in their loan contracts enjoy significant reductions in interest rates of 63.5 basis points relative to voluntary users and reductions of 115.8 basis points relative to non-users. Chen and King (2014) find that hedging reduce the cost of debt, they point strong evidence that hedging is associated with a lower cost of debt. Hedging results in a significant drop of 40.8 bps in the cost of debt after controlling for firm-level and bond-level variables. In respect to all the theory and researches explained above, hypothesis proposed is:

H₁: There is significant relationship between hedging and cost of debt.

2.2. Reduced of bankruptcy cost

Bankruptcy cost is the cost that occurs because of the uncertainty of company's earnings and cash flows, on this context it's very clear that hedging will help to stabilize the earnings and cash flows volatility. Smith and Stulz (1985) suggest that hedging reduces a firm's cash flow volatility and consequently lowers the expected cost of financial distress. This address to further conjecture that hedging leads to a greater reduction in the cost of debt for firms with a higher bankruptcy risk. Firms with higher default risk will benefit most from hedging due to their greater bankruptcy risk that lead to higher probability and costs of financial distress.

Damodaran (2008) explain hedging will reduce the volatility of firm's cash flow and lower its bankruptcy cost. Chen and King (2014) support this theory by showing significant relationship between yield spread and variable of interaction term of hedging and bankruptcy cost proxy. They find firms with a high leverage ratio obtain a greater value from hedging than those with low leverage. In respect to all the researches explained above, hypothesis proposed is:

H₂: Hedging significantly decrease cost of debt greater to firms with higher leverage

2.3. Lower agency cost of debt

The agency problem between debt holders and shareholders exist in company and this problem will increase the cost. Myers (1977) suggests that firms with risky debt will accept positive NPV projects, but when the project turns out to be poor, the value of the project goes toward the debt holders. However, hedging alleviates the underinvestment problem by reducing the probability of the poor states occurring.

Anderson et al. (2003) investigate the impact of founding family ownership which suggests lower agency cost will decrease the cost of debt. They point out that firm with larger family ownership have fewer agency conflicts, because the founding family will conduct protection to protect their interests. This also means, the more diverse the ownership, the lower the agency cost.

Beatty (2011) finds the benefits of hedging to reduce the agency cost are only realizable when borrowers can credibly commit to maintain the hedge positions once the financing is completed. They find greater loan spread on non- derivative user firms. However, Chen and King (2014) also conduct research to find out the source of hedging benefit on decreasing agency cost, but they don't find significant result on this hypothesis across all proxies they use. Thus the hypothesis proposed is:

H₃: Hedging significantly decrease cost of debt greater to company that have higher agency problem.

3. Research Method

3.1. Regression Equation Hypothesis 1

For the first model, the main variable of this research are bond yield spread (cost of debt parameter) as the dependent variable and hedging dummy as the main independent variable. There are also additional explanatory control variables, which are the firm specific characteristic variable such as return on asset, leverage, age of the firm, current ratio, sales growth, market-to-book ratio, firm size, property, plant and equipment, interest coverage, and cash flow. The model used as follows:

$$\begin{aligned} \text{Cost of Debt} = & \alpha + \beta_1 \text{hedging} + \beta_2 \text{Cash Profitability} + \beta_3 \text{Age} + \beta_4 \text{Leverage} + \beta_5 \text{Current ratio} + \\ & \beta_6 \text{sales growth} + \beta_7 \text{Market to book} + \beta_8 \text{Size} + \beta_9 \text{Property, plant and equipment} + \\ & \beta_{10} \text{Interest coverage} + \beta_{11} \text{Cashflow} + \varepsilon \quad (1) \end{aligned}$$

However, only a single equation model to explore the relationship between interest rate (proxy of cost of debt) and hedging is not enough considering the probable two-way causal link existing in the variables as suggested by previous researcher (Gay et al. (2010); Allayannis et al. (2012); Chen and King (2014)). Instinctively, based on theory not only firm's interest rate will decrease because they apply hedging strategy, but also theory suggest firm will implement hedging strategy to protect them from high interest rate (Damodaran, 2008). When endogeneity problem is forced estimated using ordinary least squares (OLS), the estimators will be biased and also not consistent (Gujarati, 2009:273).

As a results, to address this endogeneity issue, this study follow prior researchers (Gay et al. (2010); Goss and Roberts (2011); Allayannis et al. (2012); Fields et al. (2012); Chen and King (2014)) by employing instrumental variables (IV) regression. Particularly, there may be unobservable factors that motivate a firm to hedge and also affect the cost of debt. Thus, hedging dummy should be taken as endogenous variable. In the IV regression, the first stage regression is a linear prediction model of the hedging strategy on all of other independent variables and interest rate in equation (1), and the fitted value of hedging is used as the regressor in the second stage yield spread regression, which is the equation (1) stated above (Chen and King, 2014). The first stage equation is:

$$\begin{aligned} \text{Hedging} = & \alpha + \beta_1 \text{Interest rate} + \beta_2 \text{Cash Profitability} + \beta_3 \text{Age} + \beta_4 \text{Leverage} \\ & + \beta_5 \text{Current ratio} + \beta_6 \text{sales growth} + \beta_7 \text{Market to book} + \beta_8 \text{Size} \\ & + \beta_9 \text{Property, plant, equipment} + \beta_{10} \text{Interest coverage} + \beta_{11} \text{Cashflow} \\ & + \beta_{12} \text{Proportion} + \varepsilon \end{aligned} \quad (2)$$

As seen above, variable *Proportion* is included as the instrument variables. *Proportion* is selected as the instrument variable considering both its relevance with hedging and irrelevance to the bank loan interest rate spread. Denis and Mihov (2003) show that the maturity of existing debt predicts the choice of fixed rate debt over floating rate debt, as result this will drive firm to hedge. This research following Beatty et al., (2011) by using the proportion of long term debt to total debt.

3.2. Regression Equation Hypothesis 2

For the second and third hypotheses which are the purpose is to explore the sources of hedging benefit in reducing the cost of debt. For each proxy variable of interest, will be form an interaction term of hedging and the proxy variable, and run the interest rate regressions on this interaction term, hedging variable and control variables as specified in equation (1) (Chen and king, 2014). To test the second hypothesis, the dependent variable is cost of debt, while the interaction variable of hedging dummy and financial risk included as the main independent variable. The proxy of financial risk used is leverage. This model still includes the same additional explanatory variables in the previous model.

$$\begin{aligned} \text{Cost of Debt} = & \alpha + \beta_1 \text{hedging} + \beta_2 \text{Hedging} * \text{Leverage} + \beta_3 \text{Leverage} + \\ & \beta_4 \text{Cash Profitability} + \beta_5 \text{Age} + \beta_6 \text{Current ratio} + \beta_7 \text{sales growth} + \\ & \beta_8 \text{Market to book} + \beta_9 \text{Size} + \beta_{10} \text{Property, plant, equipment} + \\ & \beta_{11} \text{Interest coverage} + \beta_{12} \text{Cashflow} + \varepsilon \end{aligned} \quad (3)$$

The methodology used to test the second hypothesis is similar with the first hypothesis testing. The equation (2) served as the first stage regression and take out the fitted value as the regressor to estimate Equation (3). The β_2 estimator here is the focus of this hypothesis testing. β_2 will show whether the firm with higher leverage will benefit more on the reduction of their cost of debt.

3.3. Regression Equation Hypothesis 3

On the third model, the main variables are logarithm of interest spread over LIBOR as the dependent variable, hedging dummy also public ownership included as the main independent variables. To test the hypothesis 3, an interaction term between hedging and public ownership also included in the model. This model still includes the same additional explanatory variables in the previous model.

$$\begin{aligned} \text{Cost of Debt} = & \alpha + \beta_1 \text{hedging} + \beta_2 \text{Hedging} * \text{public ownership} + \beta_3 \text{public ownership} \\ & + \beta_4 \text{Cash Profitability} + \beta_5 \text{Age} + \beta_6 \text{Leverage} + \beta_7 \text{Current ratio} \\ & + \beta_8 \text{sales growth} + \beta_9 \text{Market to book} + \beta_{10} \text{Size} \\ & + \beta_{11} \text{Property, plant, equipment} + \beta_{12} \text{Interest coverage} + \beta_{13} \text{Cashflow} \\ & + \varepsilon \end{aligned} \quad (4)$$

The methodology used to test the third hypothesis is similar with the first hypothesis testing. The equation (3) served as the first stage regression and take out the fitted value as the regressor to estimate Equation (5). The β_2 estimator here is the focus of this hypothesis testing. β_2 will show whether the firm with higher public ownership will benefit more on the reduction of their cost of debt.

3.4. Research Variables

The dependent variable in this research is the cost of debt (CoD). Chen and King (2014) calculate the CoD using the yield spread of a company, while Goss and Roberts (2011); Fields et al. (2012); Beatty

(2012) measure CoD using the natural logarithm of the loan spread. The major experimental variables in this study is hedging dummy. The hedging dummy equals to '1' in a given year if a firm holds a hedging position, and '0' otherwise. Following Chen and King (2014), to determine whether a firm is involved in hedging activities by examining firms' annual report. However the keywords are: hedging, *lindung nilai*, derivatives, *derivatif*, swaps, forwards, futures, options, call, and currency contracts.

As explained before, because of endogeneity of hedging towards interest rate, instrument variable is needed as an explanation of the other firm's motivation to do hedging, but the instrument variable may not have significant impact to the cost of debt. The variable proportion is chosen, as Beatty et.al. (2012) also used this variable as their instrument variables. To test the second and third hypothesis, which aims to find whether hedging leads to a lower cost of debt through reducing the financial distress and agency cost. For each proxy variable of interest, will be formed an interaction term of hedging and the proxy variables. The proxy of financial distress is leverage. On the other hand the proxy of agency cost is the public ownership. Operationalization of each of variables is summarized in Table 1:

Table 1: Operationalization of Variables

Type	Variables	Definition
Dependent variable	Cost of debt	$\ln \text{the interest spread over LIBOR}$
Experimental variable	Hedging dummy	'1' found stated keywords criterion, '0' otherwise.
Control variables	Leverage	$\frac{\text{TOTALDEBT}}{\text{TOTALDEBT} + \text{MARKETVALUE OF EQUITY}}$ (5)
Interaction term variable	Leverage*Hedging	the interaction term of hedging and financial distress
Control variables	Public ownership	$1 - \frac{\text{stock owned by employees and affiliated directors}}{\text{total common stock}}$ (6)
Interaction term variable	Public ownership*Hedging	the interaction term of hedging and agency cost
Control variables	Cash profitability	$\frac{\text{Earning before tax depreciation amortization (EBITDA)}}{\text{TOTALASSETS}}$ (7)
	Age of the Firm	the number of years that have elapsed since they went public
	Current ratio	$\frac{\text{current asset}}{\text{current liabilities}}$ (8)
	Sales growth	$\frac{\text{sales}_t - \text{sales}_{t-1}}{\text{sales}_{t-1}}$ (9)
	Market-to-book ratio	$\frac{\text{market value of assets}}{\text{book value of assets}}$ (10)
	Firm size	$\log \text{total assets}$
	Property, plant and equipment	$\frac{\text{Property, plant, and equipments}}{\text{total assets}}$ (11)
	Interest coverage	$\frac{\text{EBITDA}}{\text{INTEREST EXPENSE}}$ (12)
	Cash flow	$\frac{\text{operating cash flow}}{\text{total assets}}$ (13)
Dummy variable	Proportion	$\frac{\text{Long term debt}}{\text{Total debt}}$ (14)

4. Result and Discussion

4.1. Data

There are 510 companies in which listed in Indonesia Stock Exchange during 2007-2013, but remaining 183 companies meet the sample criteria. Thoroughly selection process is presented in Table 2.

Table 2: Sample Selection Process

Total listed companies in Indonesia stock exchange	510 companies
Firms in financial, banking, securities industry	87 companies
Firms that don't have full published annual report from year 2007 to 2013	178 companies
Firms that don't have bank loan	52 companies
Firms that have outlier data in relation to the other data in the sample)	10 companies
Total sample firms	183 companies

Profile of research variables is shown in Table 2. Table 2 shows the result of descriptive statistics for all 183 companies sample used in this research with total 1281 observations, more specific, the observation of derivatives user is 301 observation and non-user 980 observations.

Table 3: Descriptive Statistic

VARIABLES	MEAN	STD.DEV.	MIN.	MAX.
Cost of Debt	5.856831	0.5018472	4.98	6.55
Hedging	0.2349727	0.4241473	0	1
Leverage	0.5055582	0.2421183	0.15	0.86
Cash Profitability	0.1290051	0.1291288	-0.3474	1.0685
Age	15.25137	6.487672	0	42
Current ratio	1.583841	0.8104345	0.56	3.21
Sales Growth	0.156667	0.2106205	-0.16	0.54
Market to book ratio	1.339586	0.6531025	0.71	2.73
Size	6.231195	0.7245251	4.1197	8.107
Property, plant and equipment	0.3872449	0.2592129	0.0001	2.146
Interest Coverage	1.890488	1.520354	-2.994852	9.964002
Cash Flow	0.0771276	0.1713675	-1.636229	2.04033
Proportion	0.2072573	0.320049	0	7.60628

All regressions must carry out the same diagnostic tests to ensure the problem of heteroskedasticity, autocorrelation and cross-sectional dependence are eliminated from the model. Heteroskedasticity test using Modified Wald test, due to the probability which higher than the critical value of 0.05, there is no heteroskedasticity symptoms in the first stage model for hypothesis 1 and 2. However, the first stage regression model of hypothesis 3 has Prob>Chi2 value below 0.05 indicates that the model suffering from group wise heteroskedasticity. Alike on the first stage model, the heteroskedasticity test result on the second stage model also indicating there is heteroskedasticity presence in the hypothesis 3, while in the hypothesis 1 and 2 results show no presence heteroskedasticity problem.

Next, autocorrelation/ serial-correlation test is conducted. Based on the Wooldridge test on first stage and second stage model, both model for hypothesis 1 and 2 show no indication of autocorrelation problem. On the other hand, hypothesis 3 models' Wooldridge autocorrelation test result indicating that the last model is suffering the problem of autocorrelation.

Lastly, since all the models are using the fixed effect model, this means that cross sectional dependence test is conducted using the Pesaran CD test. All the results of Pesaran CD test show a strong significance level. All the probability value indicates that cross-sectional does exist in the model, as the value is less than 5% significance level. After confirming the existence of the obstacles, regression analysis can be performed to obtain the desired outcome that is free from biasedness and inefficiency by performing remedies regression which are: (1) the Driscoll and Kraay standard errors regression and analysis, (2) Prais Winsten Correlated Panels Corrected Standard Errors regression.

4.2. Multivariate Analysis

4.2.1. Hypothesis 1 Test Result

The result of Driscoll and Kraay regression that is displayed on Table 4 explicitly answers the research question stated earlier and successfully accept the hypothesis, which states that there is significant relationship between hedging and cost of debt. The value of R-squared signifies that 38.36% of the variations in independent variable can be explained by the variations in independent variables. This is

however can be explain that this research is missing another explanatory variables that might have relationship with cost of debt such as covenant requirements (Beatty et al., 2012;Fields et al., 2012), Maturity per loan (Beatty et al., 2012), Loan Concentration (Goss and Roberts, 2011). Those mentioned variables data is not available in Indonesian firms' annual report.

The result listed on the Table 4 explains that Hedging, Leverage, Cash Profitability, Firm's Age, Current ratio and Interest coverage are affecting the firm's cost of debt. On the other hand, Sales growth and size are excluded because they don't produce significant relationship in the model. The exclusion of those independent variables is to make the model more efficient because the more variables added to the model, the more uncertainty there is in estimating the coefficients (O' Halloran, 2005). This result is parallel with the result produced by Masri and Martani (2012), they find that size and sales growth do not have significant relationship to cost of debt.

Table 4: Driscoll and Kraay Standards Errors Hypothesis 1

Second stage			
Cost of Debt	Coefficient	Standard Error	P> t
Hedging	-1.415981	0.4158979	0.001***
Leverage	0.2001633	0.0838985	0.018**
Cash Profitability	-0.3269019	0.0780391	0.000***
Age	-0.005525	0.0258704	0.025**
Current ratio	-0.0227993	0.0114167	0.047**
Interest coverage	-0.0442229	0.016573	0.008***
_Cons	6.501718	0.11276	0.000***
	R-squared		0.3836
	F (5,182)		15.06
	Prob > F		0.0000
First stage			
	Coefficient	Standard Error	P> t
Hedging	-0.2150007	0.0383539	0.000***
Interest Rate	0.0555284	0.0204005	0.004***
Market to Book Ratio	0.4890312	0.2161766	0.025**
_Cons	1.318767	0.255142	0.000***

Below is the estimated regression model based on the result:

$$\begin{aligned}
 \text{Cost of Debt} &= 6.501718 - 1.41 \text{ hedging} - 0.3269019 \text{ Cash Profitability} - 0.005525 \text{ Age} \\
 &+ 0.2001633 \text{ Leverage} - 0.0227993 \text{ Current ratio} - 0.0442229 \text{ Interest coverage} \\
 &+ \varepsilon \quad (15)
 \end{aligned}$$

Shown at the Table 4, The p-value of hedging variable is less than 0.05 of level of significance. Hedging will reduce the bank loan spread by 141 basis points. Leverage's coefficient is 0.2001633, this means that leverage is increasing the cost of debt. Next, Interest coverage has the negative sign in the coefficient tell us that every increase in firm's interest coverage will decrease firm's cost of debt. Finally, Age has coefficient of -0.005525, meaning every increase 1 year on firm's age will decrease firm's cost of debt by 0.5 basis point. Lastly, Current ratio's coefficient is -0.0227993. This explained Firms with higher current ratios are more likely to be able to meet their obligations.

4.2.2. Hypothesis 2 Test Result

Table 5: Driscoll and Kraay Standards Errors Hypothesis 2

Second stage			
Interest Rate	Coefficient	Standard Error	P> t
Hedging	-2.127898	0.2265061	0.000***
Leverage	0.3010203	0.0552484	0.000***
Hedging*Leverage	-0.902062	0.3758907	0.000***
Cash Profitability	-0.8604448	0.1692782	0.000***
Age	-0.75568	0.2791635	0.007***
Current ratio	-0.0228725	0.0115687	0.048**
PPE	-0.2397904	0.0728681	0.000***
_Cons	6.182135	0.0765371	0.000***
	R-squared		0.2518
	F (6,182)		27.52
	Prob > F		0.0000
First stage			
Hedging	Coefficient	Standard Error	P> t
Interest Rate	-0.06983	0.0174465	0.000***
Market to Book Ratio	0.0371001	0.0182317	0.043**
Proportion	0.0521818	0.0502707	0.000**
_Cons	0.5375319	0.1289295	0.000***

Below is the estimated regression model based on the result:

$$\begin{aligned} \text{Cost of Debt} = & 6.182135 - 2.127898\text{hedging} - 0.902062\text{Hedging} * \text{Leverage} + 0.3010203\text{Leverage} - \\ & 0.8604448\text{CashProfitability} - 0.75568\text{Age} - 0.0228725\text{Currentratio} - \\ & 0.2397904\text{Property, plant, equipment} + \epsilon \quad (16) \end{aligned}$$

Hypothesis 1 prove that hedging reduce the cost of debt, hypothesis 2 and 3 are aimed to find out the sources of the reduction on interest rate. The focus of this section is to explain whether hedging reduce the cost of debt through reducing the financial distress by forming an interaction variable between hedging and leverage. From the Table 5 it is shown that the P-value of Hedging*Leverage variable is significant. The coefficient of the variable is -0.902062, meaning that derivative user firm with more leverage will have more reduction on cost of debt. Hedging reduces the probability of financial distress by smoothing the cash flow volatility, which resulting lower cost of debt.

4.2.3. Hypothesis 3 Test Result

Table 6: Prais Winsten Correlated Panels Corrected Standard Errors Hypothesis 3

Second stage			
Interest Rate	Coefficient	Standard Error	P> z
Hedging	-1.418506	0.2045301	0.000***
Leverage	-0.1944375	0.0562454	0.001***
Hedging*PublicOwnership	-0.037281	0.1080461	0.730
Public Ownership	-0.046802	0.0570271	0.412
Cash Profitability	-0.3105069	0.1232867	0.012**
Age	-0.630773	0.1700356	0.000***
Current ratio	-0.0771535	0.0158502	0.000***
Interest coverage	-0.0432936	0.0104858	0.000***
_Cons	6.548879	0.0830788	0.000***
	R-squared		0.3666
	Wald Chi2 (8)		551.73
	Prob > Chi2		0.000

First stage

	Coefficient	Standard Error	P> t
Hedging			
Interest Rate	-0.2007707	0.033618	0.000***
Market to Book Ratio	0.0533654	0.020409	0.009***
Proportion	0.4897945	0.1161387	0.000***
Cons	1.238154	0.1842263	0.000***

Below is the estimated regression model based on the result:

$$\begin{aligned} \text{Cost of Debt} = & 6.548879 - 1.418506\beta_1 \text{hedging} - 0.037281 \text{Hedging} * \text{publicownership} \\ & - 0.046802 \text{Publicownership} - 0.3105069 \text{CashProfitability} - 0.630773 \text{Age} \\ & - 0.1944375 \text{Leverage} - 0.0771535 \text{Current ratio} - 0.0432936 \text{Interest coverage} + \varepsilon \quad (17) \end{aligned}$$

In hypothesis 3 there are Heteroskedasticity and Autocorrelation issues, so the appropriate solution is to use Prais Winsten Correlated Panels Corrected Standard Errors regression to solve the issues. As stated before, the main focus on this section is to answer whether hedging lowering the cost of debt through the reduction of agency problem. To answer this question, the interaction variables formed are between Hedging and Public Ownership. Table 6 reported that Hedging*Public Ownership p-value is not significant, since the p-value is 0.730 higher than 0.05 significance value..

Interestingly, this result is similar with Chen and King (2014), which conducted the research in the United States. Even though this research is conducted in Indonesia, the effect of hedging on agency cost is also undefined. Additionally, the term of agency problem mostly connected with shareholders and firms management (Faisal (2005); Prabowo (2014); Hastori et al. (2015)) and to capture the significant connection of agency problem and debt holder's interest will be very difficult. Thus, by this research we can conclude that hedging cannot reduce cost of debt by mitigating agency conflict.

5. Conclusion and Recommendation

This study was set out to find out whether implementation of hedging strategy in Indonesian company will give an impact to its cost of debt or not. This study was conducted by using sample of 183 Indonesian firms from 2007 to 2013. Hedging is proven to have a significant impact on firm's cost of debt. This result is supporting the first hypothesis which the cost of debt is significantly lower for those firms that hedge than those that do not hedge. This phenomenon happened because the reduction of bankruptcy risk and earnings volatility. Moreover, this study is providing deeper investigation to find out the sources of hedging benefits in reducing cost of debt. It is proven statistically that hedging reduces the cost of debt mainly through the lessening of financial risk. Hedging benefits is stronger for firms with higher financial risk than those with lower financial risk. Chen and King (2014) explain that hedging reduces the probability of financial distress, resulting in lower cost of debt. However, this study could not find proof that hedging reduces the cost of debt through decreasing the interest conflicts between the debt holders, shareholders and management.

The limitation of this research is triggered by a quite small number of observations. It is expected that after all the data is available to use, more companies and longer time span may be used to get more valid and complete confirmation of the initial hypothesis. Additionally, it is suggested in the future study to include more variables that may have relationship with cost of debt to increase the fitness of the model. Future research may use different proxies of cost of debt such as the yield spread of bonds or interest expenses.

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Appendix 1: Diagnostic Test Results

Cross sectional dependence test

Hypothesis 1

First stage model	
Pesaran's test of cross sectional independence =	36.214, Pr = 0.0000
Average absolute value of the off-diagonal elements =	0.585
Second stage model	
Pesaran's test of cross sectional independence =	27.598, Pr = 0.0000
Average absolute value of the off-diagonal elements =	0.446

Hypothesis 2

First stage model	
Pesaran's test of cross sectional independence =	30.700, Pr = 0.0000
Average absolute value of the off-diagonal elements =	0.496
Second stage model	
Pesaran's test of cross sectional independence =	29.990, Pr = 0.0000
Average absolute value of the off-diagonal elements =	0.484

Hypothesis 3

First stage model	
Pesaran's test of cross sectional independence =	12.377, Pr = 0.0000
Average absolute value of the off-diagonal elements =	0.497
Second stage model	
Pesaran's test of cross sectional independence =	25.207, Pr = 0.0000
Average absolute value of the off-diagonal elements =	0.387

Modified Wald Heteroskedasticity test

Hypothesis 1

First stage model	Second stage model
chi2 (7) = 8.23	chi2 (7) = 6.79
Prob>chi2 = 0.3129	Prob>chi2 = 0.4512

Hypothesis 2

First stage model	Second stage model
chi2 (7) = 3.82	chi2 (7) = 3.88
Prob>chi2 = 0.8007	Prob>chi2 = 0.7936

Hypothesis 3

First stage model	Second stage model
chi2 (183) = 2.4e+06	chi2 (183) = 1.6e+05
Prob>chi2 = 0.0000	Prob>chi2 = 0.0000

Wooldridge Autocorrelation test

Hypothesis 1

First stage model	Second stage model
F(1, 6) = 1.085	F(1, 6) = 0.108
Prob > F = 0.3378	Prob > F = 0.7541

Hypothesis 2

First stage model			
F(1,	6)	=	0.410
Prob > F		=	0.5457

Second stage model			
F(1,	6)	=	0.024
Prob > F		=	0.8808

Hypothesis 3

First stage model			
F(1,	182)	=	30.243
Prob > F		=	0.0000

Second stage model			
F(1,	182)	=	33.975
Prob > F		=	0.0000