

## THE USE OF DERIVATIVES TO HEDGE RISK FOR PLANTATION AND PROPERTY COMPANIES IN MALAYSIA

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### Abstract

Global financial crisis during 2007-2009 had hit corporate sectors significantly. The corporations' liquidity and profitability were affected so badly during the crisis that forced them to come up with hedging strategy to mitigate the risk. Hence, this study attempts to investigate the determinants corporations' specific factors on the derivatives use among 71 Malaysian firms in the plantation and property sectors in hedging the risks. The study is divided into two sub-periods i.e. during financial crisis (2007-2009) and post financial crisis (2010-2012) using the public listed corporations at Bursa Malaysia and employing the Logistic Regression model. The findings revealed that growth opportunity of the corporations has significant impact on the derivatives use during the financial crisis whilst profitability and growth opportunity both contributed to the derivatives use post financial crisis. It is comfortably to say that the corporations with better growth and profitability tend to use the derivatives in hedging their risks. This is consistent with the risk management theory in order to mitigate underinvestment problem. Most importantly, this study indicates that the Malaysian firms in the two sectors are still risk averse as the derivatives use in hedging corporate risks is still at minimal level.

**Keywords:** *financial crisis; hedging; derivatives; corporate risk; logistic regression*

### 1.0 INTRODUCTION

The global financial crisis in 2007-2009, has brought significant corollaries to the world economy. It was started in the United States (US) as an asset bubble which was caused by an arrangement of financial derivatives activities that then drove the sub-prime mortgage boom, shattered into housing and banking catastrophe and tumbling effect on consumer and investment demand. The major effect on the banking crisis was from investment and merchant banks chaos which then spread into the commercial banks (Krugman, 2009). In 2008, the contracting of the US economy had waded across export-dependent Asian economies. Asian economic crisis started from Thailand and Indonesia on currency tumbles that created chaos and depreciation of currency. Even though Malaysian economy had been exposed to the situation as well, but yet it was protected from the direct effect of the financial crisis due to the new derivatives were not permissible in the country. At the same time, the previous experience of the Asian financial crisis had the Bank Negara Malaysia (BNM) to regulate the financial sectors without affecting the stock market.

From the series of financial crisis occurred in the global market, many corporations have revised their risk management practices. In the global market, it is reported that derivatives are widely used by corporations

to hedge from the crisis, for example 59 percent of the firms in Sweden (Alkeback, Hagelin & Pramborg, 2006), 78 percent in Hong Kong and Singapore combined samples (Sheedy, 2006) and 61.6 percent in Denmark, Finland, Iceland, and Sweden combined samples (Brunzell, Hansson & Liljebloom, 2009). The derivatives activity is believed to be an effective and inexpensive risk management tool. Derivatives can protect the variability of the company future cash flows and may provide adequate internal funds for unexpected fluctuations in investment spending or external financing (Froot, Scharfstein & Stein, 1993; Heaney & Winata, 2005; Nguyen & Faff, 2007). It could also maximize firm value due to its impact on after tax cash flows, agency costs, financial distress costs and underinvestment costs (Smith & Stulz, 1985; Froot, Scharfstein, & Stein, 1993).

In the Asia-Pacific region, the development of derivatives market has been growing rapidly. Survey by Futures Industry Association (FIA) in 2010 revealed that Asia-Pacific has overtaken North America as the world's biggest derivatives market, accounting for 38 percent of global total compared to 33 percent for the latter. The study also documented a surge in the trading volume of derivatives contracts in the Asia-Pacific region amounting to 4.2 billion contracts in the first half of 2010 compared to the same period previous year. This growth was driven by the upward demand for hedging among Asian corporations especially from Korea, India and China. Malaysia is also following the steps taken by those earlier countries who actively participate in the derivatives market.

The participations of Malaysian corporations in the derivative market have motivated the researchers to conduct the study. To our knowledge, limited studies have been investigated on the disclosure of risk management policies in Malaysia (Ameer, 2010; Ahmad & Haris, 2012). Therefore, this study attempts to investigate the factors contributing to the derivative use among public listed corporations in Malaysia. Our study is unique from Ameer (2010) and Ahmad & Haris (2012) as their data samples were only covered for the year 2009 and before (during the financial crisis and prior to the crisis happened). But we, in this study, extend the samples or observations for the period 2010 to 2012 i.e. the period after the financial crisis. The main aim of our study is to investigate whether the corporations' specific factors that contributed to the derivatives use during the financial crisis, are still applicable or significant after the financial crisis. On top of that, we would like to examine if the corporations' specific factors change, how the derivatives use would change in terms of corporations' probability.

This paper is organised as follows; Section 2 provides a brief literature review in risk management particularly on derivative use and firm risk. This is followed by methodology in Section 3. Section 4 presents the analysis of findings and discussion based on the logit regression model. Finally, Section 5 draws some conclusions and recommendation for future research.

## 2.0 LITERATURE REVIEW

Theoretically, risk is described as unfavourable events that prevent corporations from achieving its desired objectives. Risk is a condition in which there is a possibility of adverse deviation from a desired outcome that is expected. Due to the circumstances, it is crucial for every firm to develop risk management strategy as part of corporate culture. Following to this, the Malaysian Accounting Standard Board (MASB) had introduced Financial Reporting Standard (FRS132) on Financial Instruments - Disclosure and Presentation (IAS32) beginning the year 2006 emphasizing the disclosure of risk management policies adopted by firms.

A study conducted by Kozarevic, Jukan & Civic (2014), found that the main reasons for the poor use or offer of derivatives in Bosnian and Herzegovina market are due to low demand, lack of knowledge about the benefits of derivatives and low number of business operations on the global markets by the country's non-financial firms.

The importance of accounting treatment for derivative instruments was supported by Guay (1999), who examined new derivative users and time series relation between changes in derivatives use and changes in firm risk. The results revealed that firms were using derivative instruments to hedge entity firm level risk. His findings highlighted the importance of hedge accounting rules that incorporate the impact of derivatives and hedged instruments simultaneously. In supporting the theory of risk management, Purnandam (2008) has included presence of the financial distress cost and test the prediction model. This study employed leverage, industry adjusted leverage and Altman Z score as proxies of financial distress. His finding proves that firms with higher leverage hedge more although hedging incentives disappear for firms with very high leverage. The result also indicates high concentrated industries would have higher effect of leverage on hedging.

According to Ameer (2010), firms with higher foreign sales volume and growth opportunities are active users of the derivatives. The study also confirms that factors that significantly affect hedging practice of US firms as reported by Allayannis & Ofek (2001) also seem to explain the use of derivatives by Malaysian firms. The firm specific factors such as, size of the firm seem to have stronger influence on derivatives use. In another related research by Afza & Alam (2011), their study focused on financial distress costs, tax convexity, asset growth, cash flow, profitability, managerial ownership and foreign sales, which confirmed that firms with more foreign sales use more currency derivatives. A similar finding also applied to larger firms with financial constraints and fewer managers' ownership in firms.

Clark & Mefteh (2010) studied and found that derivative use is a significant determinant of firm value particularly larger firms. Value effect of derivatives use is higher and significant for firms with larger exposure, where the firms exposed to currency depreciation had six times higher in value effect compared to firms that exposed to appreciation exposure. The study also suggests that value effect of derivatives use is not significant for firms with lower exposure and foreign currency derivatives use is more effective at value creation for depreciation exposure. According to Bezzina & Grima (2011), their results showed that education, position in firms and experience with derivatives give significant impact on risk management and proper use of derivatives, respectively.

The findings by Alkeback et al. (2006), concluded that most firms used derivatives to hedge contractual commitment, accounting treatment, transaction cost, and liquidity risk. They further stated that increase in derivatives use is stimulated more by external factors, such as increased exposure rather than internal, such as increased knowledge. In another related study by Sivakumar & Sarkar (2008), they found that forward and options are two most preferred derivatives by the Indian firms as short term hedging instruments. Whereas, swaps instruments are preferred by the Indian firms in hedging long term exposures. Ahmad & Haris (2012) uncovered factors influence the use of derivatives; leverage, liquidity, size, and managerial ownership. Their findings show that only current ratio and market-to-book value are the main factors influencing the use of derivatives. The findings of study also support the underinvestment cost hypothesis rather than financial distress hypothesis under the risk management theory.

### **3.0 RESEARCH METHODOLOGY**

#### **3.1 Data Collection**

According to the financial data published by Bursa Malaysia, Malaysian derivative market has recorded a promising annual growth rate of 21.7 percent from the year 2001 to 2014. Specifically, the derivative total trading volume was 6 million on average during the financial crisis (2007-2009) and has grown up to 12.5 million in 2014 (Bacha, 2016). The plantation sector is found to be the main and active user of the derivatives based on the industry effect in the logistic regression model by Ahmad & Haris (2012).

Furthermore, the property sector has shown a great impact during the subprime crisis. Therefore, these motivate us to investigate the use of derivative in these two sectors.

At the time of extracting the data, there are 41 public listed corporations under the plantation sector and 94 corporations under the property sector. Out of the 135 corporations, only 71 corporations met our criteria of non-missing data on derivatives and other variables as our final sample. Our sample consists of cross section corporations during the fiscal year 2007 to 2012. The financial data are extracted from the firms' annual reports and WorldScope database.

According to Guay (1999), the definition of Users and Non Users are determined from the disclosure of derivative instruments in the annual report for previous fiscal year (t-1) and current fiscal year (t). The observation starts from year 2007 to 2012 year whereby 2007 to 2009 during the global financial crisis and 2009 onwards as post crisis. Apparently, our study defined year 2007 as current fiscal year (t) and 2006 as previous fiscal year (t-1). Consistent with Guay (1999) and Khediri (2010), corporations are classified as a 'User' in a fiscal year if their annual reports explicitly mention the use of derivative instruments in year 2006 as well as 2007. On the contrary, corporations are classified as 'Non User' if no derivative instruments are disclosed in both years.

### 3.2 Variables Specification

In examining the factors contributing to derivative use, there are four independent variables are employed in the study. As a proxy for derivative use, this study uses dummy variable that clarifies '1' for corporations that use any types of derivative instruments and '0' for non-users. The selection of four independent variables is based on risk management theory to reduce firm risk. This theory states that corporations use derivative instruments with the purpose to reduce the financial distress, underinvestment problem, growth opportunity and costly external financing.

In line with Smith (1985), Guay (1999) and Purnanandam (2008), leverage as proxy for the probability of financial distress is measured by long term debt to common equity (LTDCE) and times interest earned (TIE) ratios. They argued positive relationship between leverage and derivative use. To observe growth opportunity, this study employed price earnings (PE) and market price to book value (MPBV) as proxies. The selection of both ratios is similar to the study by Guay (1999), Purnanandam (2008) and Ameer (2010). In addition, return on asset (ROA) as proxy for profitability is important value driver mentioned by Khediri (2010) to be included in this study besides the net profit margin (NPM). Finally, the use of quick ratio (QR) as proxy for liquidity is consistent with Purnanandam (2008) and Ameer (2010).

### 3.3 Hypotheses Development

Based on the Logistic Regression model, there are four different hypotheses that could underpin the relationship between derivative use and corporate risk as stipulated by Smith & Stulz (1985), Guay (1999) and Purnanandam (2008).

*Hypothesis 1: High leverage corporations would have higher probability to use derivatives*

This hypothesis is related to the incentive of hedging firm risk (Guay, 1999). The hypothesis states that corporations use derivative to reduce the expected cost of financial distress. Consistent with Purnanandam (2008), firms with higher leverage tend to use more derivative instruments. It is argued by Smith & Stulz (1985) that hedging can increase the value of levered firm when the expected cost of financial distress is

decreasing in firm value. Under this hypothesis, we expect positive relationship between leverage and derivative use.

*Hypothesis 2: High growth opportunity corporations would have higher probability to use derivatives*

Under this hypothesis, corporations with high growth opportunities may have incentive to use derivative. The use of derivative is to reduce underinvestment problem hence increase function of the proportion of growth options in the investment opportunity set (Guay, 1999). Given that larger investment opportunity would push firm value, so corporations would use derivative for hedging purposes. Hence, a positive relationship between growth opportunity and use of derivative as expected in this study.

*Hypothesis 3: High profitability corporations would have higher probability to use derivatives*

This hypothesis states the profitability as important value driver for derivative use (Khediri, 2010). Corporations with high profitability are more likely to use derivative. Thus, we expect positive relationship between profitability and derivative use.

*Hypothesis 4: High liquidity corporations would have lower probability to use derivatives*

For this hypothesis, the underinvestment problem can be reduced by keeping more liquid assets (Purnanandam, 2008). High liquidity corporations as measured are more likely to reduce costly external financing complement hedging policies. A negative relationship between liquidity and derivative use is expected.

### 3.4 Model Specification

This study uses logit regression with pooled sample of Users and Non Users to identify factors that explain decision to use derivative instruments. Similar tests are found in Quay (1999) and Purnanandam (2008) that illustrate the importance of derivative use for risk management decision. Noting that the dependent variable (DV) is binary with a value of '1' or '0', Logistic Regression model is suitable to meet objectives of this study. The Logistic Regression model, which is also known as Logit model, estimates the probability of using derivative for risk management purpose. The Logit model is presented as below:

$$\Pr (Y=1| X_1, X_2, \dots, X_k) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3)$$

The  $\Pr (Y=1)$  implies the probability of derivative use with explanatory variables in the Logit estimation. This study has four explanatory variables as mentioned in Section 3.2. To explain the change in the variables associated with the change in use of derivative, the Logit model is based on the odds ratios that use the Exponentials of Beta Coefficients [Exp (B)] as the proxy. The Exp (B) is the interpretation of the probability or chances of occurrence between the two binary outcomes (DV). The odds ratios could be classified into three i.e. more than 1 ( $>1$ ), less than 1 ( $<1$ ) or equal to 1 ( $=1$ ).

The predicted value, which is measured by pseudo R-squared, should be more than 75 percent in reflecting good prediction by the explanatory variables on the DV in the Logit model. The Pearson Correlation and Spearman Rho are also used to examine the relationship between the derivative use and the four explanatory variables.

## 4.0 RESULT AND DISCUSSION

Conceptually, risk management would minimise firms risk through the use of derivatives. In relation to this, this study attempts to investigate the factor that contributing to use of derivative for two sectors namely the Plantation and Property sectors. This section starts with the statistics of firms using derivatives, correlation analysis and empirical results from the Logistic Regression.

### 4.1 Statistics for Derivatives Use

Table 1 summarizes the percentage of firms using derivatives for the two sectors. It shows that 34.28 percent of Plantation corporations had used derivatives and only 8.33 percent from Property corporations. Out of 15 users, 60 percent use Forward Foreign Currency followed by 20 percent use Interest Rate Swap and the remaining use other instruments such as Commodity Futures. Among the number of users, some are known as derivative users but the notional amount of derivatives is not available or disclosed in the annual reports.

**Table 1 Statistics for derivative use**

Types of Derivative	Sector	User	%	Non User	%
Currency Forward, Interest Rate Swap & Others	Plantation	12	34.28	23	65.72
	Property	3	8.33	33	91.67

Prior to conducting Logistic regression, it is essential to examine any significant relationship between the four explanatory variables and use of derivative using Pearson Correlation test.

### 4.2 Pearson Correlation Analysis

Table 2 shows the Pearson's correlation between the variables used in the Logistic Regression analysis. Based on the table, MPBV is the mostly correlated with the DV. The other explanatory variables are not strongly correlated with the DV where  $r < 0.200$ . The results suggest that the multicollinearity is within the acceptable range, Ameer (2010). Hence, all variables remain in the further analysis.

**Table 2 Pearson's correlation test result**

Variables	Derivatives	QR	LTDCE	TIE	ROA	NPM	PE	MPBV
Derivatives	1							
QR	-.088	1						
LTDCE	-.023	-.131**	1					
TIE	.157**	.086	-.092	1				
ROA	.190**	-.061	-.079	.217**	1			
NPM	.049	-.003	-.091	.005	.297**	1		
PE	.001	.019	-.013	.007	.070	-.002	1	
MPBV	.273**	-.059	.076	.139**	.399**	.016	.062	1

\*\*Correlation is significant at the 0.01 level (2-tailed).

### 4.3 Logistic Regression Analysis

Table 3 presents the result of Logit Regression for Plantation sector over the period 2007 to 2012. The result shows that only the liquidity (QR) is significantly associated with the use of derivatives at 95% confidence level. Referring to the table, the odds ratio for QR is 0.893 indicating that liquidity factor has the biggest impact as and when it increases by 1 unit, the probability of derivatives use will decrease by 10.7%;  $(=0.893*100 - 100)$ . Another significant factor is profitability as measured by ROA with the odds ratio of 1.072 at 90% confidence level. This explains that when ROA increases by 1 unit, the probability of derivatives use increases by 1.072 times or 7.2%. However, profitability factor has lesser effect on the use of derivatives compared to liquidity.

Based on the odds ratios, MPBV has the biggest effect on the increase in probability of use of derivative by 1.28 times. The TIE and NPM have no impact on the derivatives use as their odds ratios are equal to 1. This explains that when TIE and NPM change by 1 unit, there is 0% percentage change in the probability of derivatives use. In conclusion, liquidity is the most significant factor on the use of derivative. This finding supports the study by Ahmad & Haris (2012) and Allyannis & Ofek (2001). The profitability has minor impact on the probability of the use of derivatives. This is consistent with the findings of Ameer (2010) and Khediri (2010).

**Table 3 Logit regression result for plantation sector (2007-2012)**

Variables	Beta Coefficient (B)	Sig.	Exp(B)
QR	-.113	.035	.893
LTDCE	.016	.112	1.016
TIE	.000	.109	1.000
ROA	.070	.079	1.072
NPM	.001	.785	1.001
PE	-.003	.545	.997
MPBV	.247	.247	1.280
Constant	-1.477	.001	.228

Table 4 illustrates the results of Logit Regression for both Plantation and Property sectors during the financial crisis period. It shows QR (liquidity) and LTDCE (leverage) have odds ratios of 0.901 and 0.994, respectively. This means that the corporations' probability to use derivatives will decrease by 9.9% when their liquidity increases. The higher QR manifests higher liquidity of the corporations or lower liquidity risk. So, the result shows that the corporations will not use derivatives when there is higher liquidity or low liquidity risk. Likewise happens to the leverage; when their leverage increases, the corporations will tend not to use the derivatives. However the probability of decrease in derivatives use is not so significant or very minimal at 0.6%.

TIE, ROA and NPM have odds ratios of 1 or equivalent to 1, which explain that the probability (increase or decrease) of the corporations to use derivatives is equivalent with the probability of increase (or decrease) in the corporations' TIE, ROA and NPM. In addition, all those variables are not significant predictors for the use of derivatives as the p-values are more than 5% confidence interval (CI). The results tell that the return or profitability factors have little impacts on the decision of corporations to use derivatives. It is contrast to Khediri's findings (2010) that profitability is positively significant related to Tobin's Q.

Apparently, only MPBV (growth opportunity) is the most significant predictor for the probability of using derivatives. With the odds ratio of 2.014, the result indicates that the growth opportunity factor has the

highest influence on the rise of probability of derivatives use by 101.4%. Importantly, our study found that the higher growth opportunity that the corporations have, the higher tendency of corporations to use derivatives in hedging their risk. In summary, growth opportunity has positive significant impact on the use of derivatives. High growth corporations have incentive to use more derivatives. This results support the findings of Guay (1999), Ameer (2010) and Ahmad & Haris (2012).

**Table 4 Logistic regression result for both plantation & property sectors (2007-2009)**

Variables	Beta Coefficient (B)	Sig.	Exp(B)
QR	-.105	.568	.901
LTDCE	-.006	.402	.994
TIE	.000	.144	1.000
ROA	.003	.938	1.003
NPM	.001	.713	1.001
PE	.013	.346	1.013
MPBV	.700	.007	2.014
Constant	-1.876	.000	.153

From the results in Table 5 for the post crisis period, it shows that three ratios have odds ratios less than 1 which are QR, LTDCE and PE with value of 0.985, 0.997 and 0.995 respectively. The results are consistent with the during-crisis period for both QR and LTDCE. However, the percentage falls have improved in the post-crisis period for the liquidity and leverage factors, which had little impact on the corporations' decision to use derivatives. The odds ratio for PE post-crisis explains that the probability to use derivatives has fallen by 0.5% when the PE rises by 1 unit. This result contradicts the during-crisis findings where increase in the PE has also increased the probability to use derivatives. The TIE and NPM have odds ratios equal to 1 post crisis. The results are consistent with during-crisis. This indicates that the capability of corporations to service the debt obligations and ability to generate profit have very minimal impact on the corporations' decision to use derivatives.

Meanwhile, ROA and MPBV have odds ratios more than 1 with value of 1.099 and 2.011, respectively. Consistent with the results during the financial crisis, MPBV has also recorded the highest effect on the probability of derivatives use; increase by 101.1% post-crisis. And, the increase in ROA by 1 unit has caused the probability to use derivatives increases by 9.9%. Both MPBV and ROA are the significant predictors for the use of derivatives as their p-value is at or less than 5% confidence interval.

The researchers could conclude that the two main factors i.e. growth opportunity and profitability, influence the corporations to use derivatives in hedging the risk. The higher growth and profit gained by the corporations, the more susceptible the corporations to the risk or adverse exposures. So, there is a real need for the corporations to hedge particularly with the derivatives in the event of unfavourable events occur in future.

**Table 5 Logistic regression result for both plantation & property sectors (2010-2012)**

Variables	Beta Coefficient (B)	Sig.	Exp(B)
QR	-.015	.783	.985
LTDCE	-.003	.671	.997
TIE	.000	.543	1.000
ROA	.094	.056	1.099
NPM	.001	.862	1.001
PE	-.005	.584	.995
MPBV	.699	.010	2.011
Constant	-2.393	.000	.091



## 5.0 CONCLUSION

Since 2006, the MASB has started the disclosure of risk management policy particularly on the market risk faced by public listed corporations. In relation to this, this study aims to investigate the firms' specific factors that lead to the use of derivatives. The main finding of this study is strong relationship and influence between corporations' growth opportunity and probability of the derivative use in Malaysia. Our results also suggest that corporations with high growth opportunity are the main users of derivatives during and post financial crisis. Besides, the profitability is also the main driver for the use of derivatives, but only after the financial crisis. Our results indicate that profitability and liquidity are the two significant predictors for the use of derivatives in the Plantation sector. In summary, growth opportunity has positive significant impact on the use of derivatives. High growth corporations have incentive to use more derivatives. These results support the findings by Guay (1999), Ameer (2010) and Ahmad & Haris (2012), Afza & Alam (2011). The findings are also consistent with the risk management theory, which states that corporations use derivative instruments with the purpose of reducing the underinvestment problem. Last but not least, our study just focused on four variables; liquidity, leverage, profitability and growth. Therefore, it is recommended to use other variables involving different sectors and also utilize other testing model such as Probit Regression in order to enhance the results for future research.

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