

## Capital Market Imperfections and Equity Derivatives: A Case of Malaysian Non-Financial Firms

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**Abstract:** Recent global financial crunch 2007 increases the presence of equity risk exposure all over the world, especially in Asian countries, which increases the incentive of using equity derivative for managing risk. Existing literature provides enough evidence regarding the firm specific determinants of financial derivatives in both advanced and Asian countries, however no study has up till now examined the determinants of equity derivatives. Current study identifies the determinants of equity derivatives by using sample data of Malaysian non financial firms listed on Bursa Stock Exchange for the period of 2004-2010. Empirical findings report that corporations having higher informational asymmetry, agency costs of debt and financial constraints are more likely to use equity derivatives. Detailed analysis with respect to informational asymmetry reports that firms having higher informational asymmetry as compared to those having lower are using equity derivatives for reducing informational asymmetry, agency costs and financial constraints.

**Key words:** Equity Derivatives • Informational Asymmetry • Malaysian • Non-financial firms

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### INTRODUCTION

Growing trend in globalization has encouraged many corporations to involve in international equity investments in order to diversify their systematic risk or to build up reputation in international markets. Corporations, both domestic and multinationals, are facing equity risk exposure after Asian financial crises of 97/98 and global financial crunch of 2010, resulting in low equity turnover and portfolio investment during the last decade. Asian economies are facing high stock market volatility over the last decade and thus are using more equity derivatives, warrants and convertible stock, in order to increase equity investment and decrease financial distress costs and liquidity constraints. Despite of higher equity market volatility, fewer corporations are using equity linked derivatives in Asian countries in contrast to their usage by the advanced countries perhaps due to the under-developed equity and bond markets [1].

Under perfect capital market assumptions, Modigliani and Miller [2] argued that, usage of derivative instruments does not affect firm value, while contrary to

it; financial theorists argue that under certain market imperfections, usage of derivative instruments for hedging purpose can increase firm value. Existing literature had examined the effect of capital market imperfections like financial distress costs and agency cost on firm's usage of foreign currency and interest rate derivative instruments, but despite of highly volatile stock markets, for the best of author's knowledge, no study has up till now explored the determinants of equity derivatives. However, existing literature had examined convertible stock, one of the equity derivative instruments, as a substitute of derivative usage and found significant negative relationship between convertible stock and derivative usage for both developed and developing country. Current study attempts to fill this gap by identifying the determinants of equity derivative usage of Malaysian non-financial firms.

During the study period, the Kula Lumpur Composite Index (KLCI) depicted a highly volatile trend, standard deviation of almost 202.37, as the stock market was on its peak in year 2010. During 2004-2007, for one unit of return investors were assuming almost 18% volatility in expected

returns, whereas, despite of sharp upward and downward movements in stock market during 2008-2010, volatility per unit of return decreases by value of 3%, reflecting presence of equity risk in the market during this period. During the period January 2008 to September 2008, [3] stated that KLCI index depicted a decline of 45% in its value which was identified as the second biggest decrease after Asian Financial crises. However, in such a stock market crash, debt holders and shareholders demand higher financing rate as a risk premium, especially in corporation's having higher informational asymmetry and agency costs of debt. Corporations, therefore, used equity derivatives, especially warrants and convertible stocks, to attract investors at preferable lower rates as compared to straight debt and equity. Existing literature had examined the determinants of financial derivatives in Malaysian non-financial firms but to the best of author's knowledge, no study has explored factors affecting usage of equity derivative in Malaysian non-financial firms. Current study therefore contributes in existing literature by identifying the factors that may affect usage of equity derivative in Malaysian non-financial firms for the period of 2004-2010 and help policy makers in indentifying the incentive of using equity derivatives in case of higher informational asymmetry and agency cost.

**Literature Review:** Existing financial theorists argued that corporations under imperfect market conditions can enhance firm value by optimally defining corporation's risk management policies along with firm's other financing and investment policies. Empirical studies, done in both developed and underdeveloped countries examine the determinants of usage of derivative instruments (foreign currency, interest rate and commodity risk exposure) and found evidence in favor of value-maximization, rather than manager's wealth maximization. In addition to it, researchers identified convertible stocks and preferred stocks as a substitute of derivative instruments. A study conducted by [4] argued that despite of using off-balance sheet financial instruments, corporations can reduce the variations in its cash-flows by re-structuring the asset and liabilities side of balance sheet. In this context, usage of convertible stocks and preferred stock helps in reducing financial distress costs and agency costs by minimizing the chances of opportunistic behavior by fixed claimants. Empirical results by [4] found that, by using 169 firms for the year 1986, opposed to arguments, convertible stock and preferred stocks demonstrated insignificant positive and negative effect on firm's usage of derivative instruments.

According to a study [5] that examined the 428 U.S Fortune 500 non-financial firms for the period of 1990-1992 and documented significant negative relationship between convertible stocks and derivative usage, whereas preferred stock depicted insignificant positive effect on derivative usage. Validating the relationship between underinvestment problem and interest rate derivative usage, [6] used 325 non-financial U.S firms for the period of 1993-1995 and found that derivative users were significantly different from non-users in term of preferred stocks. Empirical findings demonstrated negative effect of both convertible stocks and preferred stocks on firm's derivative usage, though relationship is statistically insignificant. In case of extent of derivative usage, preferred stock influenced extent of derivative instruments positively, while sign remained insignificant. Horng and Wei [7] identified insignificant negative effect of convertible stocks and preferred stock on usage and extent of derivative instruments, for currency and interest rate derivative instruments, by employing 186 U.S REITs corporations for the year 1995. For Swap users, results reported significant negative relationship between preferred & convertible stocks and firm's decision to use swap derivative instruments.

Another spectrum of existing literature examines the determinants of convertible bonds as a part of financing choice and found mixed evidence for both developed and under-developed countries [8, 9 and 10]. Whereas, Suchard and Singh [11] studied the determinants of hybrid security choices of 613 Australian companies for the period of January 1980 to December 2008 and examined convertible debt and warrants as an alternate of debt and equity. Results showed that resource firms that need working capital and possess higher financial and firm risk were more likely to issue warrants. Moreover, findings reported that firms having lower level of profitability and cash flows were using more warrants in order to deal with sequential financing. By examining the Malaysian 131 non-financial companies for the period of 2001-2007, [12] by using Logit model where dummy "1" is assigned for firms having convertible debt and "0" for straight debt. Results illustrated that corporations having large size, higher debt tax shield, profitability and growth opportunities were less likely to use convertible debt while, contrary to it, corporations having higher debt were more tend towards employment of straight debt. However, for the best of author's knowledge, no study has examined the determinants of warrants as equity derivatives in emerging countries like Malaysia. Current study therefore, identifies the capital imperfections that

drive the usage of equity derivative instruments by employing sample data of Malaysian non-financial firms for the period of 2004-2010.

### MATERIALS AND METHODS

Data for the study is collected from non-financial firms listed on Bursa stock exchange for the period of 2004-2010 for examining the factors influencing the corporation's decision to use equity derivatives, warrants. Sample firms include only those corporations which remained listed on stock exchange for the whole time period and neither merged or nor acquired by any other corporation. In addition, financial firms are excluded from the sample data as their specific nature of business bring biasness, which results into unbalanced panel data of 1,635 observations per year.

Warrants one of the equity derivative instruments, gives purchaser a right to buy specific number of shares at specific price within the specific time period. Hence, due to dichotomous nature of dependent variable, Logit model is used for regression analysis. Following model examines equity derivatives as a function of tangibility, leverage, size, dividend yield, liquidity and geographical diversification.

$$EQDERIV_{it} = \alpha + \beta_1 TANG_{it} + \beta_2 LEV_{it} + \beta_3 SIZE_{it} + \beta_4 DY_{it} + \beta_5 LIQ_{it} + \beta_6 GD_{it} + \epsilon_{it}$$

where,

EQDEIV= Binary value 1 for firms that issue warrants for firm I and year t and 0 otherwise.

TANG = Tangibility measured as ratio of tangible assets to total assets for firm i and year t.

LEV = Leverage, calculated by dividing total debt to total assets for firm i and year t.

SIZE = Size measured by log of total assets for firm i and year t.

DY = Dividend yield is computed by taking ratio of dividend per share to price per share for firm i and year t.

LIQ = Liquidity calculated by dividing current assets minus inventory to current liabilities for firm i and year t.

GD = Dummy variable 1 if firms is geographically diversified and 0 otherwise.

### RESULTS AND DISCUSSION

Descriptive statistics are computed for the study to examine the mean and variations across years in dependent and independent variables as reported in Table 1. Mean statistics depict that 28% corporations are using warrants as an equity derivatives for financing purpose. Malaysian non-financial firms hold 36.75% tangible assets and have mean value of size 12.79 and 5.1918 in terms of total assets and market value of equity respectively. Liquidity depicts an average value of 2.69, indicating that on the whole Malaysian corporations have enough funds in hand for precautionary measures. Almost 59% corporations are geographically diversified, reflecting the presence of high level of informational asymmetry among Malaysian non-financial corporations. Regarding dividends, for one share corporations are giving MYR 5.86 as a dividend, however, corporations have lower dividend payout ratio, mean value of 0.36. Higher dividend yield signals firm's future growth opportunities as corporations have enough funds in hand to pay MYR 5.86 for each share. Almost 40% of corporation's assets are financed through debt but at the same time perceived as high risky as Malaysian corporations have debt to market value of equity and debt to book value of equity of about 274% and 177% respectively. On average corporations have assets having worth of MYR 1,015,821 thousand, market capitalization of MYR 740,412.1 whereas corporations have average intrinsic value of MYR 213,346.1 thus representing that overall the stocks are under-valued.

In order to examine the significant difference among firms specific factors, non-parametric univariate analysis has been done in Table 2. Results report that equity derivative users are significantly different from non-users of equity derivatives in tangibility, size, liquidity, dividend patterns, debt financing and geographical diversification. Whereas, Malaysian corporations that are using equity derivatives are significantly indifferent from non-users with respect to market capitalization.

In order to identify the multicollinearity issue, Table 3 reports correlation values among independent variables. Equity derivatives are found to be negatively correlated with tangibility, size and liquidity in accordance with the theory that the more the tangible assets and size of the firm, the lower the existence of informational asymmetry in a firm, resulting in a fewer usage of equity derivatives within a firm. Positive correlation between

Table 1: Descriptive Statistics

	Mean	Std. Deviation
Equity Derivatives	0.28	0.447
Tangibility	0.367572	0.866187
Debt to total assets	0.408887	0.241084
Debt to Market value of equity	2.749109	14.68976
Debt to book value of equity	1.778617	2.741752
Log (Book value of equity)	12.79328	1.216803
Log (Market value of Equity)	5.191804	0.634129
Dividend Yield	5.869305	10.69161
Dividend Payout	0.369128	1.486631
Liquidity	2.690793	6.963517
Geographical Diversification	0.59	0.492
Book Value of Total assets (in 000s)	1015821	2893133
Market value of equity (in 000s)	760412.1	3280030
Book value of equity (in 000s)	213346.1	372372.5

Table 2: Non-parametric Univariate Analysis

Variables	Non-Users (1169)	Users (443)	Z value (sig)
TANG	0.4037	0.2768	-5.5496
	1.0119	0.216	0.000***
Debt-Asset	0.389	0.4593	-5.7276
	0.2391	0.2351	0.000***
Debt-MV of Equity	3.0277	2.0843	-2.7048
	17.2462	3.4267	0.007**
Debt-BV of Equity	1.624	2.1615	-5.0053
	2.5865	3.0245	0.000***
SIZE (log of BV)	12.7666	12.85	-1.7478
	1.2314	1.186	0.08*
SIZE (log of MV)	5.2145	5.1275	-1.5770
	0.3431	0.2983	1.15
DY	5.3003	6.9897	-3.0526
	9.8318	11.6387	0.002**
DP	0.3942	0.3059	-4.09
	1.4917	1.5039	0.000***
LIQ	3.0662	1.7479	-6.0466
	8.0201	2.7087	0.000***
GD	0.5632	0.6449	-2.9769
	0.4962	0.4791	0.003**

\*\*\*, \*\* and \* are significant at 1%, 5% and 10% respectively

geographical diversifications and equity derivatives are consistent with the transparency hypothesis that outsiders and specialist have not enough information regarding the individual segments of diversified firm, resulting in a increase in presence of informational asymmetry. Leverage is found to be positively correlated with the equity derivatives as highly risky firms are more likely to go for the usage of equity derivatives in order to avoid higher cost of debt. Dividend yield, also served as a proxy for growth opportunities, found to be positively correlated with the equity derivatives, as firms having high growth opportunities have higher informational asymmetry, thus using more equity derivative instruments.

Equation 1 is estimated by using Logit regression technique and results are reported in Table 4. Aligned with the informational asymmetry hypothesis, that corporations under higher informational asymmetry are more likely to issue equity derivatives in order to give credible signal to the market [13, 14, 15]. Empirical findings illustrate that corporations having lower tangible assets have higher informational asymmetry and thus are more likely to use equity derivatives to reduce existence of informational asymmetry. Large size firms have lower informational asymmetry problem due to its better access to capital market, in contrast to small sized corporations, [16], therefore they are less likely to use equity derivatives. Corporations having more financial constraints in terms of lower liquid funds in hand and higher dividends are more likely to use equity derivatives as issuing straight debt and equity at that time increases financing costs and creates underinvestment problem [13]. Therefore, in order to avoid such events, corporations make equity derivatives as part of their financing package in order to avoid adverse selection problem.

Consistent with the transparency hypothesis, geographically diversified corporations are less transparent therefore they are more likely to use equity derivatives in order to signal valuable growth opportunities to the market. Positive relationship is estimated between leverage and equity derivatives as highly leveraged firms are perceived to be more at risk, thus more likely to be involved in underinvestment problem, therefore in order to reduce the level of leverage and economizes the issuance cost, corporations are more likely to use equity derivatives [16].

Study further sub divided the sample data into firms having higher informational asymmetry or lower, measured with respect to market capitalization. It is hypothesized that firms having higher market capitalization have lower informational asymmetry [17] and thus less likely to use equity derivatives as compared to firms having lower market capitalization. Table 5 reports the empirical results for both small and large sized firms. Corporations having market capitalization less than or equal to percentile (50%) is characterized as small sized corporations and firms having percentile value of 60% greater than market capitalization are considered under the head of large sized corporations. Segregation of sample data according to the market capitalization is due to couple of reasons: at first, warrants are substitutes of equity [11] therefore examining the determinants of equity derivatives for small size and large sized corporations help

Table 3: Correlation Matrix

	EQDERIV	TANG	LEV	SIZE	LIQ	DY	GD
EQDERIV	1						
TANG	-0.065***	1					
LEV	0.131***	0.0153	1				
SIZE	-0.061**	-0.018	-0.047	1			
LIQ	-0.084***	-0.002	-0.216***	-0.002	1		
DY	0.073***	-0.02	0.0902***	-0.1892***	-0.049	1	
GD	0.074***	-0.0735***	0.0248	0.0595**	-0.007	0.0052	1

\*\*\*, \*\* and \* are significant at 1%, 5% and 10% respectively

Table 4: Logit Model

Coef.	Exp Sign	B	Sig.
CONST		-0.12918	0.807
TANG	-	-1.43282	0.000***
LEV	+	0.784527	0.002**
SIZE	-	-0.15625	0.096*
LIQ	-	-0.07936	0.001**
DY	+	0.011467	0.030**
GD	+	0.287098	0.018**

\*\*\*, \*\* and \* are significant at 1%, 5% and 10% respectively

Table 5: Logit Regression with respect to Size

EQDERIV	For Small Sized Corporations Less than and equal to 50%		For Large Sized Corporations Greater than 60%	
	B	Sig.	B	Sig.
CONST	-2.052	0.120	3.409	0.166
TANG	-0.892	0.022**	-2.218	0.000***
LEV	1.065	0.003**	0.651	0.137
SIZE	0.217	0.419	-0.759	0.001**
LIQ	-0.148	0.004**	-0.077	0.024**
DY	0.015	0.018**	0.001	0.933
GD	0.132	0.430	0.771	0.000***

\*\*\*, \*\* and \* are significant at 1%, 5% and 10% respectively

in identifying the factors that lead to usage of equity derivatives of corporations having higher informational asymmetry due to fewer market capitalization as compared to firms having higher market capitalization i.e; lower informational asymmetry. At second, it is hypothesized that corporations having higher market capitalization have fewer financial risk and thus are less likely to use equity derivatives as value maximization purpose. Therefore, detailed analysis has been done for examining whether the significant difference exists among the determinants of equity derivative users or not.

Determinants of equity derivatives in small sized corporations in column 3 of Table 5 are almost similar to factors affecting usage of derivatives in all firms, except size. Results report insignificant positive impact of size on firm's usage of equity derivatives which implies that in small sized corporation's decision to use equity derivatives are influenced by factors other than the size. Despite the fact that small sized firms have higher

informational asymmetry due to lower market capitalization, variations among size in lower market capitalization firms does not influence the usage of equity derivative instruments. Moreover, due to higher issuance costs of equity derivatives, value relevance benefits of equity derivative usage are limited for small sized firms. Relationship between geographical diversification and equity derivatives turned to be insignificant positive and this might be due to the low geographical diversifications done by small sized corporations. In summary, small sized corporations having higher agency costs of debt, informational asymmetry and financial constraints, in terms of lower tangible assets and liquid assets and higher leverage and dividend yield are more likely to use equity derivatives for hedging purpose.

Column 5 documents empirical results regarding the determinants of equity derivatives for large sized corporations and provide robustness to earlier findings reported in Table 4. Tangibility, size and liquidity impact

usage of equity derivatives significantly and negatively whereas leverage, geographical diversification and dividend yield influence the usage of equity derivatives positively, though relationship is significant only for geographical diversification. Consistent with the informational asymmetry hypothesis, size documents significant negative effect on firm's usage of equity derivative, suggesting the larger firms have fewer informational asymmetries which minimizes their incentive of using equity derivatives. Insignificant positive relationship between leverage and equity derivative usage is perhaps due to the greater capital market access by large sized corporations which limits the value relevance effect of leverage on equity derivatives for large sized firms thus implying that firms having higher leverage are less tend towards equity derivative usage.

Consistent with the previous findings, corporations having higher dividend yield have more financial constraints, thus are more likely to use equity derivatives, however presence of fewer informational asymmetry minimizes the likelihood of using equity derivatives in large sized corporation's which weakens the positive influence of dividend yield on equity derivative usage. Summing up, large sized corporations having higher informational asymmetry and financial constraints are more tend towards usage of equity derivatives.

### **CONCLUSION**

Over the last few decades, usage of equity derivative has been increased due to higher equity risk exposure faced by corporations in terms of stock price volatility. Corporations therefore, in order to reduce financing costs, issue equity derivatives along with the equity and straight debt in case of capital market imperfections like informational asymmetry, agency cost and underinvestment problem. Current study, therefore attempts to identify the firm specific factors that may influence the corporation 'decision to use equity derivatives. By estimating regression analysis, study revealed that corporations are using equity derivatives, warrants, to reduce informational asymmetry and agency cost.

Empirical findings imply that corporation in case of higher informational asymmetry can convey signal to market by using equity derivatives that corporations have valuable growth opportunities in hand. In addition, by considering equity derivatives as a part of financing package, corporations can decrease the agency costs of

debt and reduces the chances of underinvestment problem. Moreover, empirical results for sub categorization of firms on the basis of presence of informational asymmetry, measured by market capitalization, imply that small size corporations can enhance firm value by using equity derivatives in case of higher agency costs of debt, informational asymmetry and liquidity constraints. Whereas, on the other hand, existence of informational asymmetry and financial constraints can provide large size Malaysian non-financial firms an incentive to use equity derivatives. Current study helps policy makers in identifying the incentives for using equity derivatives so that they can improve equity derivative market. Malaysian stock exchange should develop other derivative products along with warrants, so that corporations, both large and small sized, can use them in welfare of shareholders. Future research could be possible by identifying the value relevance of using equity derivatives and impact of derivatives on firm's equity risk exposure.

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