DOES INSURANCE MATTER FOR CORPORATE FIRMS IN MALAYSIA? EVIDENCE FROM A POOLED DATA OF TAKAFUL AND CONVENTIONAL INSURANCE

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ABSTRACT

The objective of this study is to investigate the factors affecting corporate demand for property takaful and insurance using data of non-financial firms listed on the main board of Bursa Malaysia. Corporate demand for general takaful and insurance products has continuously risen, evident by the increasing value in premiums collection of general insurance and takaful. Over 50 percent of total general insurance and takaful premiums were contributed by business corporations. A pooled data on the corporate demand for takaful and conventional insurance were used in this study. Panel data regression models were employed for a five-year period from year 2002 to 2006. This study finds that leverage, expected bankruptcy costs, firm size, managerial ownership and tax consideration are the factors affecting corporate demand for insurance in Malaysia. Our conclusions are robust to alternative specifications of the model of GLS with Fixed Effects that help us to control for unobservable heterogeneity. This study gives some important implications for various groups like the insurers and takaful operators, shareholders and creditors as well as the regulators in reflecting factors that determine the corporate demand for takaful and insurance in Malaysia.

Keywords: Insurance, takaful, Corporate Demand and Panel data estimation.

Introduction

Corporate risk management has been the subject of a large body of academic literature in the last twenty years. Corporate risk management methods consist of risk controlling and risk financing in which insurance is one of the risk financing methods (Dorfman, 2003). In Malaysia, the government entrusted Bank Negara Malaysia with the regulatory and supervisory role over the conventional and Islamic insurance (which is known as takaful) industries.

Islamic and conventional insurance are two different contracts. Islamic insurance which is known as takaful is based on the concept of takaful that is developed on three principles: 1) Mutual responsibility 2) Co-operation with each other 3) Protecting one another from any kind of difficulties, disasters and other misfortune whereby the financial contribution (premium) is based on the concept of tabarru' (Jamil Osman, 2003). *Tabarru'* is derived from the Arabic noun that means donation, gift and contribution (Mohd. Ma'sum Billah, 1999).

Conventional Insurance is a contract in which one person (the insurer) undertakes in return for the agreed consideration (premium) to pay to another person (the insured), a sum of money (the indemnity) on the happening of a specified event (Dorfman, 2003). It is generally accepted by Muslim jurists that the operation of conventional insurance does not conform to the rules and requirements of the Shariah. Conventional insurance involves elements of uncertainty (*Al-gharar*) in the contract of insurance, gambling (*Al-maysir*) as the consequence of the presence of uncertainty and interest (*Al-riba*) in the investment activities of the conventional insurance companies which contravene the rules of the Shariah.

However, these two contracts have the common objective of reducing a financial burden arising from any disaster or accidental loss like fire, flood or storm. In other word, the takaful and conventional insurance contracts are the integral part of corporate risk management. Takaful and conventional insurance have more or less the same characteristics, for example, in terms of the nature of their businesses, products and services offered. The only and main difference is that takaful is based on the Shariah law, while conventional insurance is not.

The Central Bank of Malaysia reported that the insurance industry continued to register positive growth in 2005, buoyed by stronger growth in the general insurance sector. The general insurance sector expanded with strong growth in 2005 with a premium growth of 9.7% (2004) to RM9, 386.1 million (BNM,

2006). The general takaful industry in Malaysia also has recorded progressive growth, particularly over the last six years from 2000 to 2005. Public demand for general takaful products has continuously risen, as is evident from the improvement in contributions (premiums) of general takaful. For example, total net contributions for general takaful expanded by a double-digit growth rate at an average of 19.2% annually, to register RM356.6 million in 2005. The data also indicate that over 50 percent of total premiums are from business corporations for general insurance and takaful business. It is, therefore, important to highlight what are the factors affecting corporate demand for insurance and does insurance matter in corporate firms?

This research focuses on the corporate demand for property or asset-based of Islamic and conventional insurance products. The majority of empirical studies focused upon identifying the factors affecting corporate demand for property insurance. Their studies try to find the relationship of these factors with property insurance and whether they are significantly or insignificantly related with property insurance and then whether they are positively or negatively related with property insurance (Yamori, 1999; Hoyt and Khang, 2000; Zou, Adams and Buckle, 2003; Daniel and Paul, 2003; Zou and Adams, 2006). Among the factors affecting corporate insurance that have been studied are; underinvestment problem and leverage, growth opportunities, managerial ownership, expected bankruptcy costs, company size, tax consideration and regulatory environment.

It is therefore, the objective of this study is to examine the above mentioned factors affecting corporate demand for insurance by companies listed on the main board of Bursa Malaysia. It is expected that, the question of whether insurance matters or not in corporate firms could be answered after examining the factors affecting the corporate demand for insurance. Since Malaysia provides two types of insurance systems this study intends to pool both conventional insurance and takaful demand data to identify an overall perspective of corporate demand factors for insurance in Malaysia. Our study will contribute to the existing literature where pooled data is used in this study to find out the overall perspective on the determinants of corporate demand for insurance in Malaysia. In contrast of all other previous studies such as Mayers and Smith (1990), Yamori (1999), Hoyt and Khang (2000), Zou, Adam and Buckle (2003), Daniel and Paul (2003) and Zou and Adam (2005 & 2006) who study the corporate demand for conventional insurance only, our study expand the focus to include takaful as well.

Literature Review

Mayers and Smith (1990) was the first to do an empirical study on the determinants of reinsurance purchasing behaviour of insurance companies. In this study they examine reinsurance purchases for a sample of United States (US) based property and casualty insurance companies because such data are systematically reported in insurers' statutory returns. The empirical model employed in their study uses the ratio of reinsurance ceded to total business premium received as the dependent variable. Company characteristics such as size, degree of concentration in insurance lines, extent of geographic concentration and best rating are used as independent variables. They find that ownership structure, size, line of business concentration, geographical location and default risk show significant effects. However, since only one industry i.e. the insurance industry is considered, it is difficult to make meaningful inferences about the insurance purchasing behaviour of other firms. In other words, their study fails to provide evidence of the insurance purchasing behaviour of non-insurance companies. The limitations described here could be mitigated with the use of data for industrial firms.

Yamori (1999) studies this area of research by focusing on the demand for corporate insurance in Japan for 504 industrial companies using 1986 data only due to the availability of published insurance premium data. His study shows that size and regulatory status appear to be important factors in the demand for corporate insurance. Some potentially important determinants of insurance purchase like growth opportunities and expected bankruptcy were absent from his study. Moreover, this study uses time specific data (1986 only) on a cross sectional analysis that might limit the empirical results to some extent. Thus, cross section and time-series data is also useful to be considered to differentiate among individuals in recognition of the fact that each individual, or cross sectional unit, may have some special characteristics of its own.

Hoyt and Khang (2000) was the first study to test a full set of determinants of the corporate demand for property insurance using insurance premium data from a questionnaire survey distributed to 251 public listed (NYSE) companies for 1989. They discover that factors such as leverage, firm size, growth opportunities and tax consideration have a significant impact the demand of corporate insurance. However, this study also only focuses on one year specific data (1989 only) that could also limit their empirical results to some extent.
Zou, Adams and Buckle (2003) analyze panel data for 235 companies in China

by using insurance premium data from a telephone survey and financial data from the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) in China. The period of data was from 1997-1999. Their study indicates that the managerial decision to purchase property insurance is positively related to company size, insolvency risks and geographical concentrations. In contrast, the amount of property insurance purchased is positively related to systematic risks but negatively related to insolvency risk and unsystematic risks company size and leverage. However, as they mentioned in their study that the interpretation of their results might be tampered by a recognition of the limitations in their study such as the short time series of data used, 3 years only (1997-1999) and potential endogeneity issue.

Daniel and Paul (2003) explore the data on property insurance in the United States (US) from 1991 through 2002.The data for insurance was from SwissRe, one of the world's largest insurance companies and the financial data collected from Compustat of the Securities and Exchange Commission (SEC). Due to insufficient quality in the data, they ignore a large part of the available contracts and perform the analysis with 180 firm-year observations. They find that expected default costs and size play an important role in determining property insurance. They argue that a major strength of their analysis compared to previous studies by Yamori (1999), Hoyt and Khang (2000) and Zou, Adams and Buckle (2003) is that they observe corporate choices for the excess value of property insurance as a proxy of demand. Yamori (1999), Hoyt and Khang (2000) and Zou, Adams and Buckle (2003) rely on the insurance premium as a proxy for demand.

Zou and Adams (2006) again analyze the panel data (1997-1999) for 235 public listed companies in the Peoples Republic of China without segregating the companies into systematic and unsystematic risk types of companies as in their previous study (Zou et al., 2003). They analyze all the factors suggested by Hoyt and Khang (2000) and add some additional factors like geographical location and other ownership structures (e.g. foreign ownership and state ownership). Their results suggest that the decision to use property insurance is positively related to leverage but negatively related to state ownership and tax. In contrast, the volume of property insurance purchased is positively related to managerial ownership and growth options but inversely related to size. Again, as they mentioned in their study, the interpretation of their results might be tampered by recognition of the limitations in their study such as the short time series of data used, which was 3 years only (1997-1999), and the potential endogeneity issue.

Research Design and Hypotheses Development

Data Description

The insurance and financial data are collected on an individual firm basis from public listed companies in the main board of Bursa Malaysia excluding finance sector. All finance related firms were also excluded due to differences in their regulatory requirements, financial reporting standards and compliance (Claessens et al., 2002; Renneboog & Trojanowski 2005b; Yatim et al., 2006). Besides that, if the finance industry is included, inconsistency might arise in important independent variables between industries. For example, compare the debt to equity ratio of insurance companies or banks with that of other industrial firms. The financial intermediaries usually use premiums received, loss reserves or deposits as a funding source rather than debt. Therefore, this ratio would not be meaningful.

The data covers a five-year period from year 2002 - 2006. Property conventional insurance and takaful premium were used as a proxy for demand which is as a dependent variable. The data is collected from Mayban Fortis Holdings (Mayban General Assurance Berhad and Malaysian National Insurance Berhad) and two takaful operators (Syarikat Takaful Malaysia Berhad and Takaful Nasional Sdn Bhd) in Malaysia. Previous studies like Yamori (1999); Hoyt and Khang (2000); Zou, Adams and Buckle (2003) and Zou and Adam (2005 and 2006) also used insurance premium as a proxy for the demand. The amount of insurance premium by a firm is represented by the ratio of property insurance premium to the value of insurable assets. The amount of lands is subtracted because they are not usually subject to insurance. Previous studies like Hoyt and Khang (2000), Zou, Adam and Buckle (2003) and Zou & Adam (2005 and 2006) used this kind of formula to constitute the denominator of dependent variable.

There are 112 public listed companies on the main board which have been identified to have the property takaful coverage with the Syarikat Takaful Malaysia Bhd and Takaful Nasional Sdn Bhd. Out of the 112 companies, 44 companies were excluded because of having property insurance with takaful for less than 3 years, missing information on the annual reports for more than 2 years of 5-year period of study and insufficient data on Data Stream International software. The final number of companies is 68 companies for the period of 2002 – 2006. On the other hand, there are 124 public listed companies on the main board which have been identified to have property insurance coverage

with Mayban Fortis Holdings. Out of the 124 companies, 42 companies were excluded because of having property insurance with the conventional insurer for less than 3 years, missing information on the annual reports for more than 2 years of 5-year period of study or insufficient data on Data Stream International software. The final number of companies is 82 for the period of 2002 – 2006.

Thus the total number of companies to be examined was 150 companies i.e. a pooled data of takaful and conventional insurance. We use an unbalanced firm-level panel data set of 150 public listed companies at Bursa Malaysia in which their properties were insured using Islamic and conventional insurance.

The financial data of public listed companies is considered as explanatory variables (independent variables). In sourcing for the data employed, the ownership data are obtained directly from company's annual report. Other firm's financial data on the other hand, are gathered from DataStream International, a financial database provider.

Financial Data and Hypotheses Development

Leverage: Debt / Equity ratio

A firm that has more debt in its capital structure would purchase more insurance against its firm specific risks. In other words, the purchase of property insurance could be affected by a firm's capital structure i.e. financial leverage. Debt-equity ratio is used as a proxy for leverage. Previous studies which use this ratio include Hoyt and Khang (2000), Zou et al. (2003), Daniel and Paul (2003) and Zou and Adams (2006). Therefore, the following hypothesis is proposed:

H_1: High leverage firms are likely to purchase more insurance and takaful. Therefore, leverage is expected to be positively related with insurance.

Growth Opportunities: Market to Book Value

According to Froot et al. (1993), the purchase of property insurance not only reduces the risk of financial distress, but it can also lower the incidence of cash flow shortfalls following a major accidental loss that could trigger a costly resort to the capital markets or scaling down of potentially value enhancing investment i.e. the so-called underinvestment problem. Thus, this study expects a positive relation between growth opportunities and property insurance. The market to book value ratio will be used as a proxy for growth opportunities in line with previous studies like Zou, Adams and Buckle (2003), Daniel and Paul (2003) and Zou and Adams (2005). Accordingly, this study measures the market to book value as the ratio of book value plus convertible debt and preferred stock plus the market value of equity divided by total assets. Therefore, the following hypothesis is proposed:

H_2: High growth-opportunities firms are likely to purchase more insurance and takaful. Therefore, growth opportunities are expected to be positively related with insurance and takaful.

Expected Bankruptcy: Working capital to Total Assets ratio, Long-term debt ratio and Interest Coverage ratio

As, according to Warner (1977), the amount of bankruptcy costs is not proportional to firm size, this means that the larger companies have smaller relative bankruptcy costs than smaller companies. The bankruptcy related literature (Altman, 1968 and Ohlson, 1980) suggests that a proxy that is the most appropriate for measuring the probability of bankruptcy is the ratio of working capital to total assets. This implies that a negative sign for this proxy with respect to insurance premium can be expected. Other studies like Hoyt and Khang (2000) and Daniel and Paul (2003) also use the formula to measure the probability of bankruptcy. Daniel and Paul (2003) add two more variables to address the influence of expected default costs on insurance demand. These variables are the interest coverage ratio and the long-term debt ratio. Interest coverage ratio could proxy for a firm's insolvency risk. It is believed that the higher a firm's interest coverage ratio and the lower its long-term debt ratio, the greater is the probability of default. Therefore, the following hypothesis is proposed:

(i) Working capital to Total Assets ratio

H_{3a}: High expected bankruptcy costs firms (small firms) are likely to purchase more insurance and takaful. Therefore, bankruptcy costs are expected to be negatively related with insurance and takaful.

(ii) Interest coverage ratio (Earning Before Interest & Tax / Interest), and Long-term debt ratio (Long Term Debt / Total Assets)

H_{3b}: The higher a firm's interest coverage ratio and the lower its long-term debt ratio. Therefore, there will be a positive relationship between ICVR and insurance & takaful demand and a negative relationship between LTDR and insurance & takaful demand.

Tax Considerations: Ratio of Total Depreciation to Total Fixed Assets

The insurance on depreciated property makes demand for insurance would grow because economic depreciation is greater than accounting depreciation. This means that the greater the depreciation is, the more insurance the firm has the incentive to purchase. The statement might be supported by the fact that most fixed assets of the firm are insured on replacement or reinstatement cost basis according to the revised fire tariff of the General Insurance Association of Malaysia (PIAM). This was supported by Hoyt and Khang (2000) who use the ratio of depreciation to fixed assets to show the relationship between insurance and depreciated property. They suggest that the larger the amount of depreciation of a firm's assets, the greater will be the demand for insurance. Therefore, the following hypothesis is proposed:

H_4: Firms with higher ratio of depreciated property to total fixed assets are likely to purchase more insurance and takaful. Therefore, ratio of depreciated property is expected to be positively related with insurance and takaful demand.

Managerial Ownership: The proportion of shares owned by managers

There are two competing hypotheses concerning the influence of managerial ownership on the corporate demand for insurance i.e. the managerial risk-aversion and incentive-alignment hypotheses, the influence of managerial stock holdings (managerial ownership) on the corporate insurance decision is ambiguous (Daniel and Paul, 2003). However, Smith and Stulz (1985) argue that as the ownership of managers increases, they are expected to become more risk averse because they have more financial interest in the company. As a result, managers are likely to pursue risk management activities through insurance in order to reduce the risk of bankruptcy following major accidental losses. The ratio of common stocks held by company managers to the total number of common stocks issued is used to measure the managerial ownership effect of the corporate decision on insurance (Hoyt and Khang, 2000; Zou, Adams and Buckle, 2003; Daniel and Paul, 2003 and Zou and Adams 2006). Therefore, the following hypothesis is proposed:

H_5: Firms with high levels of managerial ownership are likely to purchase more insurance and takaful. Therefore, managerial ownership is expected to be positively related with insurance and takaful demand.

Company Size and Insurer's Risk Management Services: The Natural Logarithm of Total Assets

Previous study by Hoyt and Khang (2000) supports the inverse relation between company size and the corporate decision to purchase insurance where small companies are more likely to purchase property insurance than large companies. According to Mayers and Smith (1990), smaller firms can gain more from insurers' risk management services than the larger firms. Firm size is measured by total assets which could affect the amount of insurance purchased by the firm. This study follows other studies like Hoyt and Khang (2000), Yamori (1999) Zou et al. (2003), Daniel and Paul (2003) and Zou and Adams (2006) using the natural logarithm of total asset. Therefore, the following hypothesis is proposed:

H_6: Smaller Companies are likely to purchase more insurance and takaful. Therefore, size of companies is expected to be negatively related with insurance and takaful demand.

Regulatory environment: Dummy (1, if the firm is in a regulated industry, 0, otherwise)

This study follows regulated industry suggested by Yamori (1999) and Hoyt and Khang (2000) i.e. utility industry and oil and gas industry are also considered as highly price regulated in Malaysia. Thus, the dummy variable is 1 if a firm is classified into regulated industry and zero if classified otherwise. However, previous studies like Hoyt and Khang (2000), Zou et al. (2003) and Daniel and Paul (2003) show that financial theory does not make any clear prediction as to whether regulation has an effect on property insurance. This study has revisited the possible relationship proposed by Mayers and Smith (1990) where firms in a regulated industry would purchase more insurance than those in an unregulated industry. Therefore, the following hypothesis is proposed:

H_7: Firms in regulated industry are likely to purchase more insurance and takaful than firms in unregulated industry. Therefore, regulatory environment is expected to be positively related with insurance and takaful demand.

Methodology

This study would employ a cross-sectional and time-series regression model using panel data. The model has the following functional form:

Property Insurance Premium Ratio = f (Leverage, Growth Opportunities, Probability of Bankruptcy, Managerial Ownership, Company Size, Depreciation, Regulated Industries).

Hence, the following general model will be used to verify the factors affecting corporate risk management of insurance . The general estimation model can be specified as follows:

$$CITR_{it} = \alpha_0 + \beta_1 DER_{it} + \beta_2 MBVR_{it} + \beta_3 WCR_{it} + \beta_4 ICVR_{it} + \beta_5 LTDR_{it} + \beta_6 DEP_{it}$$

$$+ \beta_7 MOWN_{it} + \beta_8 LNTA_{it} + \beta_9 REGD_{it} + \varepsilon_{it}$$

Variable definitions:	
CITR	: The ratio of property insurance and takaful premium to the value of insurable assets.
DER	: Debt / Equity ratio
MBVR	: Market to Book Value ratio: the ratio of book value plus convertible debt and preferred stock plus the market value of equity divided by total assets.
WCR	: Working capital to Total Assets ratio
ICVR	: Interest Coverage ratio : Earning Before Interest & Tax / Interest
LTDR	: Long-term debt ratio: Long-term debt / Total Assets
DEP	: Total Accumulated Depreciation / Total Fixed Assets
MOWN	: Managerial Ownership: The proportion of shares owned by managers
LNTA	: Natural Log of total assets
REGD	: Regulated Industry (1,if the firm is in a regulated industry,0, otherwise)
ε	: Error term
i	: i th firm
t	: t th period

The general estimation models are divided into three specific models as follows:

i) **Model 1: Non Effect Model:** The non effect model assumes that the slope and intercept of firms are constant across individuals firms and time.

ii) **Model 2: Fixed Effects Model:** The fixed effect model treats omitted (unobservable) firm-specific variables as constant over period specific variables as invariant across companies. In the fixed effects model, the intercept in the regression model is allowed to differ among individuals firms in recognition of the fact that each firm, or cross sectional unit, may have some special characteristics of its own

iii) **Model 3: Random Effects Model:** The random effects model treats both firm and period specific factors as random. By following steps suggested by Gujerati (2003), instead of treating α_{0i} for model CDT as fixed, it is assumed that it is a random variable with a mean value of α_0 (no subscript i) and the intercept value for an individual firm.

However, the choice between the fixed and random effects models involves a trade-off between the degrees of freedom lost due to the dummy variable approach in the fixed effects model and the treatment of individual effects as uncorrelated with other regressors, as in the random effects formulation. Testing the orthogonality of the random effects and the regressors is thus important. The usual procedure is to use the Hausman test statistic for the difference between the fixed effects and random effects estimates, as suggested by Hsiao (2003).

Analysis Of Findings

Table 4.1 presents the descriptive statistics for the insurance premium ratio (IPR) and the firm-specific characteristics for the pooled company and year sample of 150 public listed companies of Bursa Malaysia for the period of 2002-2006. Overall, table 4.1 show that the value of mean and median for all variables are not the same while their skewness and the value of kurtosis are not equal to zero and three respectively. Meanwhile, the values of Jarque-Bera are significant at 1 percent level and hence, it rejects the hypothesis that the data are normally distributed. Thus, this indicates that the sample data are not normally distributed. This preliminary statistical analysis shows that the estimation on the determinants of corporate demand for insurance could not produce a better result using the Ordinary Least Square (OLS) estimation method. Hence, the Generalized Least Square (GLS) method is more appropriate and expected to yield a much better result.

Table 4.1: Descriptive Statistics

Variables	Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
CITR	0.0019	0.0009	0.0070	11.4977	165.1082	812054.5***
DER	0.7785	0.4415	2.5507	-7.9573	208.5421	1287421***
MBVR	0.0010	0.0001	0.0033	9.3308	104.5151	322714.3***
WCR	0.1339	0.1243	0.2098	-0.6896	7.9447	798.2702***
ICVR	97.3297	5.2426	880.3641	14.8730	245.4628	1807596***
LTDR	0.1368	0.0984	0.1379	1.2628	4.3278	246.6235***
DEP	0.0149	0.0109	2.5507	3.5170	26.7932	18647.35***
MOWN	0.1242	0.0096	0.7112	25.0067	657.0925	13035667***
TA	2507.61	676.00	6869.150	6.0469	45.8733	60110.28***
REGD	0.0523	0.0000	0.2227	4.0233	17.18673	8057.894***

*** Significant at 1%

Table 4.2 presents the Pearson's correlation coefficients among independent variables for the pooled data of corporate demand for conventional insurance and takaful. The statistically significant correlations between some of the independent variables reported in Table 4.2 raise the possibility of multicollinearity. The correlation coefficients between pairs of independent variables are generally low, suggesting that a serious collinearity problem is unlikely. However, variance inflation factors (VIF) and condition indices are also computed to test for the presence of multicollinearity. The variance decomposition proportion is considered high when the value exceeds 0.5 and the condition index is considered high when the value exceeds 30 (Belsley, Kuh and Welsch, 1980). Kennedy (1998) suggests that a VIF of more than 10 indicates harmful collinearity. However, the calculated VIF are all less than 2 and the (largest) condition indices are less than 10. Therefore, multicollinearity does not appear to be a severe problem in this study.

Table 4.2: Pearson's Correlations

	DER	MBVR	WCR	ICVR	LTDR	DEP	MOWN	TA	REGD
DER	1.00								
MBVR	0.019	1.00							
WCR	-0.050	0.012	1.00						
ICVR	-0.021	-0.019	0.062**	1.00					
LTDR	0.320***	0.148***	-0.159***	-0.028	1.00				
DEP	-0.087***	-0.016	0.163***	0.033	-0.128***	1.00			
MOWN	0.007	-0.016	-0.005	-0.014	0.063**	-0.045	1.00		
TA	0.036	-0.062**	-0.095***	0.123***	0.237***	-0.015	-0.036	1.00	
REGD	0.018	-0.059*	-0.136***	-0.029	0.083**	-0.027	-0.037	0.373***	1.00

*** Significant at 1% ** Significant at 5% *Significant at 10%

Table 4.3 reports the results of the GLS regression with non effects, fixed effects and random effects on the corporate demand insurance and takaful. The estimation using fixed effects regression that exploits time series variation, cross-sectional variation in any omitted variables in this model, is captured in firm-specific intercept terms. Thus, as suggested by Johnston and Dinardo (1997), this study omit the regulated firm dummy (REGD) from this regression because it does not vary over time. Studies by Zou et al. (2003), Daniel and Paul (2003) and Zou and Adams (2006) also omit the regulated firm dummy in their fixed effect analysis.

Table 4.3: Panel Regression results

Specification	Expected Sign	Non-Effect	Fixed Effect	Random Effect
Constant	+/-	0.00724	0.00165	0.00062
		(0.60342)	(44.99570)***	(1.87439)*
DER	+	0.00015	0.00034	0.00062
		(8.55974)***	(10.83737)***	(9.37965)***
MBVR	+	-0.00011	-0.00217	0.00944
		(-0.03608)	(-0.56453)	(0.80028)
WCR	-	-0.00069	-0.00010	-0.00116
		(-8.37159)***	(-1.33652)	(-0.83607)
ICVR	+	6.47E-08	1.14E-07	9.15E-08
		1.07442	(5.76791)***	(1.98069)**
LTDR	-	-0.00277	-0.00284	-0.00310
		(-23.40219)***	(-10.28746)***	(-4.69085)***
DEP	+	0.01102	0.04555	0.07807
		(3.32679)***	(9.197479)***	(2.81709)***
MOWN	+	1.25E-05	5.69E-05	2.97E-05
		(1.50815)	(4.63007)***	(2.78550)***
LNTA	-	4.44E-08	3.73E-08	3.13E-08
		(12.78884)***	(7.22347)***	(5.34281)***
REGD	+	-3.32E-05	-	0.00013
		(-0.35279)		(0.30794)
N		727	727	727
R^2		0.92193	0.92900	0.21300
Adj. R^2		0.92054	0.90941	0.20313
F-test		344.1916***	28.20270***	21.56218***
DW-test		2.01981	1.79560	2.10715

Figures in the parentheses for directional prediction are t-statistics.
*** Significant at 1% ** Significant at 5% *Significant at 10%

Table 4.4 shows the results of the Chow test and the Hausman test. The table exhibits the result of the Chow test for a non-effect model versus a fixed-effects model, F = 16.77, as significant at 1% level (one-tailed), suggesting that the heterogeneous fixed effects model is superior to the non-effect model. Meanwhile, the Hausman test for random-effects versus the fixed-effects model, $\chi 2 = 183.14$, is significant at 1% level (one-tailed), indicating that the unobservable company specific effects are correlated with the explanatory variables. Thus a fixed effects model is better than a random effects model. As such, the fixed effects model also is better in the estimation process than the other two models (non effects and random effects) in this study.

Table 4.4: Panel Specifications Tests

Test	Statistics	Statistics Value	p-value
Chow test for a Non-Effects Model versus Fixed-Effects Model	F	16.7653	0.0000
Hausman test for a Random Effects versus Fixed-Effects Model	χ^2	183.1433	0.0000

Therefore, the discussions of corporate demand for insurance and takaful are based on the results of the GLS with fixed effects model.

The coefficient for leverage is found to be positive and statistically significant at 1 percent level. The t-statistics of the measure, DER indicates that the ratio of total debt to equity is significant and positively related to property insurance and takaful premiums paid per unit value of insurable assets. It shows that an increase of one percent in DER has led to an increase in insurance premium by 0.034 percent. That is, higher debt-financing leads to more insurance purchases. This supports the hypothesis H_1, that firms with a high leverage are more likely to use property conventional insurance and takaful than companies with less debt in their capital structure in order to mitigate the agency conflicts between shareholder and debt holder. This result is also in line with Hoyt and Khang (2000) who claim that property insurance is found to be used to reduce the underinvestment problem and agency costs.

Consistent with hypothesis H_{3b}, two of the measures for expected bankruptcy costs (ICVR and LTDR) are significant at 1 percent level. These measures are proxies for the borrowing capacity of a firm that should be included in the study suggested by Daniel and Paul (2003).

The positive and statistically significant at 1 percent level for ICVR and the negative and statistically significant at 1 percent level for LTDR is consistent with the theory and parallel with the findings in Daniel and Paul (2003) who argue that firms have high borrowing capacity and no underinvestment problem exists between the firms and debtholders. However, it shows that an increase of one percent in ICVR, there would be in a very low percentage in the increase of insurance and takaful premium. On the other hand, an increase of one percent in LTDR shows

that the demand for insurance and takaful is decreased by 0.217 percent. It means that, the higher the ICVR, the higher the insurance and takaful premium and the higher the LTDR, the lower the insurance and takaful demand. However, one of the measures for expected bankruptcy costs i.e. WCR is not statistically significant as predicted in hypothesis H_{3a} and the possible rationale behind this finding is related to the finding of firms' size factor which will be explained below.

On the other hand, the ratio of depreciated property to total fixed assets hypothesis (H_4) is strongly supported by the empirical evidence which is significant at 1 percent level and positively related to demand for property insurance and takaful. This finding is supported by Hoyt and Khang (2000) who claim that the greater the amount of cumulative depreciation, the more insurance is purchased. This factor is found to be the most important determinant of corporate demand for conventional insurance and takaful where an increase in one percent of cumulative depreciation, there would be an increase by 1.555 percent in insurance and takaful premium. Arguably, in order to increase the positive tax effects, the firm buys insurance to the extent that tax deduction is allowable. This is true where most of the physical assets of corporations are insured based on the 'Replacement Cost Basis' with the indemnification of payment in the event of loss or disaster without taking into consideration the depreciation value. That is the reason why, the higher the accumulated depreciation is the lower the tax payment, and the higher the payment of insurance and takaful premium.

Consistent with the hypothesis H_5, the coefficient for MOWN is positive and statistically significant at 1 percent level on the corporate demand for conventional insurance. The t-statistics shows that an increase of one percent in managerial ownership, has led an increase by a very low percentage in insurance premium. This finding suggests that managers with relatively high levels of share ownership are more likely to purchase insurance and takaful in managing assets risk since they have an interest in the firms compared with relatively low levels of share ownership. This result is consistent with the empirical evidence of Zou and Adams (2006) but contrary to the evidence documented in Hoyt and Khang (2000).

Contrary to hypothesis H_6, the coefficient for size of firm measured by the natural log of total assets (TA) is positive and statistically significant at 1 percent level. This finding indicates that firm size is associated with corporate incentive to purchase insurance and takaful through the risk management services of insurers and takaful operators. The significant positive sign strongly suggests that large corporations in Malaysia benefit more from the risk management services of insurers and takaful operators which contradicts the hypothesis. However, the t-statistics shows that its magnitude of the coefficient is very low. This is mainly due to the large amount of total assets of the corporations as compared to the insurance premium. This runs contrary to the evidence documented in most of previous studies like Yamori (1999), Hoyt and Khang (2000), Zou et al (2002), Daniel and Paul (2003) and Zou and Adams (2006) whey they find that size is negatively related with the insurance and takaful decision making. A possible interpretation of the contrary result in this study is that the risk management program by Malaysian corporations are still at the development stage of risk management as compared to other countries like the United States, the United Kingdom, China and Japan. However, firm size is associated with an incentive to purchase insurance and takaful through the risk management services of insurers and takaful operators and also expected bankruptcy costs of the firms. Therefore, one cannot precisely evaluate the practical validity of the expected bankruptcy costs argument with this evidence only, until observing the effects of both elements at the same time. The t-statistics of the measure, the ratio of working capital to total assets (WCR) of hypothesis 3a, indicates that WCR is not related to the dependent variable. This finding shows probability of bankruptcy are not related to size in managing risks via insurance and takaful. This implies that even large firms can be expected to have smaller relative bankruptcy costs, large corporations are more likely to purchase insurance to reduce the probability of incurring these costs. The finding is consistent with previous research like Zou and Adams (2006).

Besides that, MBVR which is a proxy of measurement for growth opportunity is not found to be an important determinant of corporate demand for conventional insurance parallel with the findings in Daniel

and Paul (2003). In addition, this study did not make any clear prediction as to whether regulation has an effect on the corporate demand for insurance and takaful in Malaysia but leaves it as an issue for empirical investigation. This is in line with the previous studies such as Zou et al. (2003), Daniel and Paul (2003) and Zou and Adams (2006) who argue financial theory does not make any clear prediction as to whether regulation has an effect on property insurance.

Conclusion

This paper investigates the determinants of corporate demand for insurance and takaful in Malaysia by utilizing a panel data analysis of public listed companies at Bursa Malaysia. The findings indicate that insurance matters for corporate firms. A major strength of our analysis is that, we extend to study on the corporate demand for insurance using a pooled data of takaful and conventional insurance in Malaysia. In contrast of all other previous studies like Mayers and Smith (1990), Yamori (1999), Hoyt and Khang (2000), Zou, Adam and Buckle (2003), Daniel and Paul (2003) and Zou and Adam (2005 & 2006) were study the corporate demand for conventional insurance only. We find that corporate finance factors of leverage, expected bankruptcy costs, firm size and managerial ownership as well as tax consideration play an important role in determining the insurance and takaful demand in Malaysia. This is an interesting results where corporate demand for insurance in Malaysia are also similar with the theory of finance which has been proved in conventional insurance studies of other countries like US, UK, China and Japan.

Our conclusions are robust to alternative specifications of the model i.e. GLS with Fixed Effects model that help us to control for unobservable heterogeneity. However, there are several implications on important parties like regulator, shareholders and creditors as well as the insurance companies and takaful operators where they should take necessary action and attention from the findings of this study despite some important factor like growth opportunities and regulated industries show insignificant factors. For instance, insignificant results in the growth opportunities and the corporate decision on property insurance and takaful put a sign that insurance companies and takaful operators may wish to make better

reflect of risk management needs of enterprises in their product innovation and market strategies. However, further study should be conducted by segregating the corporate demand for conventional insurance and demand for takaful in Malaysia for comparative analysis.

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