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Risk Management of Corporate Firms Using Islamic and Conventional Insurance Demand in Malaysia

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Abstract: The general takaful industry in Malaysia has recorded progressive growth, particularly over the last six years. Demand for general takaful products has continuously risen, as reflected in the improvement in contributions (premiums) of general takaful. Besides that, the conventional insurance industry also continued to register positive growth, buoyed by stronger growth in the general insurance sector. In addition, over 50 percent of total premiums were from the business corporation for takaful and conventional insurance in Malaysia. Factors like underinvestment and leverage, growth opportunities, expected bankruptcy costs, tax considerations, managerial ownership, company size and regulatory environment have been examined in this study to identify the determinants of corporate demand for Islamic and conventional insurance of Public Listed Companies in Malaysia. The data covers a five-year period from year 2002-2006. Three models of panel data estimation were employed, namely GLS with non-effects, GLS with fixed effects and GLS with random effects. The findings are robust to alternative specifications of the model i.e. GLS with the fixed effects model that help us to control for unobservable heterogeneity. The findings show that leverage, expected bankruptcy costs, tax considerations, company size and managerial ownership play an important role in determining the corporate demand for conventional insurance and takaful in Malaysia.

Key words: Risk Management · Corporate · Insurance · Islamic

INTRODUCTION

Corporate risk management has been the subject of alarge 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. In Malaysia, the government entrusted Bank Negara Malaysia with the regulatory and supervisory role over the conventional and Islamic insurance (takaful) industries.[1] 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 words, takaful and the conventional insurance contract is an 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 difference is that takaful is based on the Shariah law, while conventional insurance is not.

This research focuses on property or asset-based Islamic and conventional insurance.[2] The majority of empirical studies focused upon identifying the factors

[1]The Central Bank and the Financial System in Malaysia - A Decade of Change (1989-1999), p. 256

[2]There are two types of takaful and conventional insurance business i.e. i) General takaful and general insurance which consists of property and liability takaful & property and liability insurance. ii) Family takaful and life insurance. As in prior studies (e.g., Hoyt and Khang, 2000; and Zou et al., 2003), only property insurance is covered in this study, whilst liability insurance is excluded for two reasons. First, third party liability insurance/takaful is compulsory and the corporate demand for other liability insurance/takaful is still very minor (less than 5 percent of total general insurance/takaful premium, BNM 2005). Second, Hoyt and Khang (2000) report that the levels of liability-based premiums are unlikely to correspond closely with current measurable firm-specific factors (e.g., size).

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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 [1-5]. Among the factors affecting corporate insurance that has been studied are; Underinvestment problem and leverage, Growth opportunities, Managerial Ownership, Tax consideration, Expected bankruptcy costs and Company size. It is therefore, this study would like to examine the above mentioned factors affecting corporate demand for insurance by public listed companies of main board at Bursa Malaysia.

The general takaful industry in Malaysia has recorded progressive growth, particularly over the last six years. 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 Central Bank of Malaysia also reported that the conventional 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. The data also indicate that over 50 percent of total premiums are from business corporations for general insurance business. It is, therefore, important to highlight the factors affecting corporate demand for Islamic and conventional insurance.

This study contributes to the existing literature where it extends to study on the corporate demand for takaful. In contrast of all other previous studies like Mayers and Smith, Yamori, Hoyt and Khang, Zou, Adam and Buckle, Daniel and Paul, Zou and Adam [6-11] were study the corporate demand for insurance (conventional) only. Takaful and conventional insurance provide similar characteristics of the product, underwriting and claims consideration except for shariah principles. OBJECTIVES

Literature Reviews: Mayers and Smith [12] conducted the first empirical study of 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, due to data limitations, many factors like growth opportunities and tax are absent from their analysis and some variables specific to the insurance industry. 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. In addition, as described by Mayers and Smith [13] reinsurance purchases from another member of the same group are not distinguished from external purchases. That is, the actual retention is included in reinsurance purchases. The limitations described here could be mitigated with the use of data for industrial firms.

Yamori [14] 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. The OLS methods of cross sectional estimation methods assume that all firms have the same behaviour in making decisions to protect their property against insurable risks. These assumptions of uniform behaviour deny any form of heterogeneity, which is, in practice, very likely to prevail. 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 [15] conducted the first study to test a full set of determinants of the corporate demand for property insurance by using insurance premium data from a questionnaire survey distributed to 251 public listed (NYSE) companies for 1989. They discover that leverage, firm size, growth opportunities and tax consideration have a significant impact on the factors for 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.

Main discusses corporate demand for insurance by offering a review of the theoretical work in this area and presenting the results of a survey of large companies in Great Britain regarding their insurance purchase decisions. He finds evidence that institutional and regulatory considerations are the important factors in the company's insurance purchase decision. However, Main uses only questionnaire survey analysis to conclude the corporate demand for insurance without analyzing financial data analysis that is the main focus of this research to fill the gap between the irrelevance of results derived from the benchmark of perfect capital markets and the practical importance of risk management decisions on insurance in modern corporations.

Zou, *et al.* [16] 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. The companies were divided into systematic and unsystematic risks based on the performance of the stocks of the companies. They employ a two-stage analytical approach to address the question of the determinants of the participation and volume insurance purchasing decisions. 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 tempered 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 [17] 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 was 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 use excess value as a proxy for corporate insurance demand. 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, *et al.* [18-20] is that they observe corporate choices for the excess value of property insurance as a proxy of demand. Yamori, *et al*, Adams and Buckle [21-23] rely on the insurance premium as a proxy for demand. Under an excess, the insurer does not participate in the loss until the actual loss exceeds a certain amount. This means that excess is a first amount of loss that should be borne by the insured in the event of loss. Some property insurance policies impose voluntarily excess and some property insurance policies impose compulsory excess. Thus, it is believed that an accurate proxy to measure property insurance demand is premium that is calculated depending on the nature and types of risk which is based on underwriting principles of insurance. Therefore, Daniel and Paul [24] who use excess value as a proxy for insurance demand is not accurate to justify the corporate behaviour of property insurance.

Zou and Adams [25] use insurance data sets for 698 Chinese publicly listed companies for the period 1997-2003 where the study tests the simultaneous linkage among debt capacity, cost of debt and corporate property insurance. Their results suggest that debt capacity, cost of debt and corporate insurance appear to be simultaneously related. This study is a follow-up and extension of research by Zou *et al.* [26] using the Simultaneous Equation Method (SEM) of analysis.

Zou and Adams [27] again analyze the panel data (1997-1999) for 235 publicly 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 [28]. They analyze all the factors suggested by Hoyt and Khang [29] 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 tempered 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. Moreover, unlike the managerial ownership factor, some additional factors that have been included in the study like foreign and state ownership were actually not strongly developed in the financial theory to relate and fill the gap between the irrelevance of

results derived from the benchmark of perfect capital markets and the practical importance of risk management decisions on insurance in modern corporations.

MATERIAL AND METHOD

Data Description: Data is divided into two categories, namely a) Dependent variables: insurance and takaful premium ratio (b) Independent variables: Financial data. 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.

Ratio of property conventional insurance premium and ratio of property insurance premium for takaful (known as takaful contribution) by corporate sector of public listed companies are used as a proxy for demand which is as a dependent variable. The data is collected from Etiqa Insurance Berhad and two takaful operators in Malaysia. Previous studies like Yamori, Hoyt and Khang, Zou, Adams and Buckle and Zou and Adam [30-33] 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. This is according to the Replacement or Reinstatement Basis Clause stated in insuranceor insurance policy. Previous studies like Hoyt and Khang, Zou, Adam and Buckle, Zou and Adam [34-36] 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 insurance coverage with these takaful companies. 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 conventional insurance companies (i.e. MNI and MBGAB). Out of the 124 companies, 42 companies were excluded because of having property insurance with the conventional insurers 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 companies for the period of 2002-2006.

Table 1: Industrial Classification for All Companies

NO.	INDUSTRY	CDI	CDT
1.	PLANTATION	7	4
2.	TECHNOLOGY	1	4
3.	CONSUMER PRODUCTS	11	6
4.	INDUSTRIAL PRODUCTS	21	12
5.	TRADING/SERVICES	18	20
6.	PROPERTY	11	16
7.	INFRASTRUCTURE PROJECT	2	-
8.	HOTEL	3	1
9.	CONSTRUCTION	8	5
	TOTAL	82	68

CDI: Number of Listed Firms Using Conventional Insurance

CDT: Number of Listed Firms Using Takaful

As shown in Table 3.1, companies in all industries using conventional insurance and takaful were included in the study on each corporate demand for conventional insurance and takaful. Five companies are considered as regulated companies (regulated for risk management practice i.e. utility industry and oil and gas industry) in corporate demand for takaful and three companies are considered as regulated companies in the corporate demand for conventional insurance. These companies are put as a dummy variable of 1 for regulated firms in using insurance/takaful and other companies are being put as a dummy variable of 0 for unregulated firms in using insurance/takaful.

The financial data of public listed companies are considered as explanatory or measurable 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 statements are developed as follows:

Financial Data and Hypotheses Development: The financial data of public listed companies are considered as explanatory or measurable 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. Based on an earlier discussion of the theoretical framework in Chapter three, financial data and hypotheses statements are developed as follows:

Underinvestment Problem and 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, Zou *et al.*, Daniel and Paul, Zou and Adams [37-40],

Therefore, the following hypotheses are proposed:

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

Growth Opportunities: Market to Book Value: According to Froot *et al.* [41], 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, Daniel and Paul, Zou and Adams [42-44]. 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 hypotheses are proposed:

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

Expected Bankruptcy Costs: Working Capital to Total Assets Ratio: The amount of expected bankruptcy costs can be defined as bankruptcy costs multiplied by the bankruptcy probability [45]. As, according to Warner [46], 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. Therefore, natural logs of firm size measured by total assets can proxy the absolute amount of bankruptcy costs. Meanwhile, the bankruptcy related literature [47-48] 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 and Daniel and Paul [49-50] also use the formula to measure the probability of bankruptcy.

Therefore, the following hypotheses for conventional insurance and takaful are proposed:

Conventional insurance:	H_3:	Highly expected bankruptcy costs firms (small firms) are likely to purchase more conventional insurance. Therefore, expected bankruptcy costs are expected to be negatively related with conventional insurance.
Takaful:	H_3:	Highly expected bankruptcy costs firms (small firms) are likely to contribute more to takaful. Therefore, expected bankruptcy costs are expected to be negatively related with takaful

Tax Considerations: Total Depreciations to Total Fixed Assets: The component of the tax effect hypothesis is the insurance on depreciated property says that demand for insurance would grow when 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 [51] 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. DeAngelo and Masulis argue that firms use other non-interest items like depreciation, amortization, tax credit and pension funds to derive the tax benefits. In this study, the depreciation expense over total fixed assets is used as a proxy for Insurance on depreciated property.

Therefore, the following hypotheses for conventional insurance and takaful are proposed:

Conventional insurance:	H_4:	Firms with higher depreciated property are likely to purchase more conventional insurance. Therefore, depreciated property is expected to be positively related with conventional insurance.
Takaful:	H_4:	Firms with higher depreciated property are likely to contribute more to takaful. Therefore, depreciated property is expected to be positively related with takaful

Managerial Ownership: the Proportion of Shares Owned by Managers: Obviously, managers may or may not have the same incentives as owners and, therefore, the more conflicting interest exists the higher will be the privately motivated influence of managers on corporate insurance demand. Since 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 [52]. However, Smith and Stulz [53] 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 [54-56].

Therefore, the following hypotheses for conventional insurance and takaful are proposed:

Conventional insurance:	H_5:	Firms with high levels of managerial ownership are likely to purchase more conventional insurance. Therefore, managerial ownership is expected to be positively related with conventional insurance
Takaful:	H_5:	Firms with high levels of managerial ownership are likely to contribute more to property takaful. Therefore, managerial ownership is expected to be positively related with takaful

Company Size and Insurer's Risk Management Services: The Natural Logarithm of Total Assets: Previous study like Hoyt and Khang [57] 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 [58], 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, Yamori, Zou *et al*., Daniel and Paul and Zou and Adams [59-62] using the natural logarithm of total asset.

Therefore, the following hypotheses for conventional insurance and takaful are proposed:

Conventional insurance:	H_6:	Small Companies are likely to purchase more conventional insurance. Therefore, size is expected to be negatively with conventional insurance.
Takaful:	H_6:	Small Companies are likely to contribute more to takaful. Therefore, small size is expected to be negatively related with takaful

Regulatory Environment: Dummy (1, If the Firm Is in a Regulated Industry, 0, Otherwise): According to Yamori [63], the electric power and gas industry is the typical regulated industry in Japan. Daniel and Paul [64] group the data in five industries and a finer industry classification would be desirable. However, small sample size prevents them from such an analysis. Hoyt and Khang [65] include only one industry which is price regulated i.e. utility industry. All of the above studies use a dummy variable which is 1 if a firm is classified into regulated industry and zero if classified otherwise. This study follows regulated industry suggested by Yamori [66] and Hoyt and Khang [67] i.e. Utility industry and oil and gas industry are also considered as highly price regulated in Malaysia. Thus, a dummy variable is 1 if a firm is classified into regulated industry and zero if classified otherwise. However, previous studies like Hoyt and Khang, Zou *et al*. and Daniel and Paul [68-70] show that financial theory does not make any clear prediction as to whether regulation has an effect on property insurance. Hoyt and Khang [71] also argue that contradictory hypotheses exist. However, this study has revisited the possible relationship proposed by Mayers and Smith [72] where firms in a regulated industry would purchase more insurance than those in an unregulated industry.

Therefore, the following hypotheses for conventional insurance and takaful are proposed:

Conventional insurance:	H_7:	Regulated firms are likely to purchase more conventional insurance. Therefore, regulatory environment is expected to be positively related with conventional insurance
Takaful:	H_7:	Regulated firms are likely to purchase more to takaful. Therefore, regulatory environment is expected to be positively related with takaful

Model Development: A pooled combination of cross sectional and time series that incorporates fixed effect, random effect for both time and specific correlation are deployed. The techniques used are the Generalized Least Squares (GLS) for panel data regression technique of non effect, fixed effect and random effects models. Under these techniques, the insurance premium ratio is

regressed against the explanatory variables. The purpose of this regression is to identify the determinants of corporate demand for insurance and to asses or evaluate the direction of the coefficients with the theory. Thus, this study would employ a cross-sectional and time-series regression model by using panel data. The model has the following functional form:

- Property Insurance Premium and Takaful Contribution = *f* (Leverage, Growth Opportunities, Bankruptcy Costs, Regulated Industries, Managerial Ownership, Company Size, Tax Considerations).

Where property insurance and takaful premium denote the dependent variable and leverage, growth opportunities, bankruptcy costs, managerial ownership, company size and tax consideration represent variables measuring the firm's various operating characteristics relevant to the study. Hence, the following general model will be used to verify the determinants of corporate demand for insurance (CDI) and takaful (CDT). The general estimation model can be specified as follows:

$$CIPR_{it} = \alpha_0 + \beta_1 DER_{it} + \beta_2 MBVR_{it} + \beta_3 WCR_{it} + \beta_4 DEP_{it} + \beta_5 MOWN_{it} + \beta_6 LNTA_{it} + \beta_7 REGDMY_{it} + \varepsilon_{it}$$

$$TCR_{it} = \alpha_0 + \beta_1 DER_{it} + \beta_2 MBVR_{it} + \beta_3 WCR_{it} + \beta_4 DEP_{it} \beta_5 MOWN_{it} + \beta_6 LNTA_{it} + \beta_7 REGDMY_{it} + \varepsilon_{it}$$

Variable Definitions:

CIPR = The ratio of property conventional insurance premium to insurable assets
TCR = The ratio of property takaful contribution (premium) to insurable assets
DER = Debt / Equity ratio
MBVR = Market to Book Value
WCR = Working Capital to Total Assets ratio
DEP = Total Accumulated Depreciation / Total Fixed Assets
MOWN = Managerial Ownership
TA = Total Assets
REGD = Regulated Industry (1, if the firm is in a regulated industry, 0, otherwise)

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

Model 1-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 in recognition of the fact that each individual, or cross sectional unit, may have some special characteristics of its own.

Model 2-Random Effects Model: The random effects model treats both firm and period specific factors as random. By following steps suggested by Gujerati, 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.

RESULTS

Table 4.1 of Panel A and Panel B presents the descriptive statistics for the conventional insurance premium ratio (CIPR) and Takaful contribution ratio (TCR) and the firm-specific characteristics for the pooled company/year sample of 82 and 68 public listed companies of Bursa Malaysia for the period of 2002-2006 respectively. The result shows that the CIPR and TCR, which is derived by dividing total property insurance premium by total property, plant and equipment plus inventory, indicates that the average conventional insurance premium was roughly 0.2 percent relative to the value of insurable physical assets (Property, plant and equipment plus inventory). This observed level of property insurance premium is much lower than the same figures reported in the developed insurance markets (e.g., the US). For example, Hoyt and Khang [73] report that the average value of property insurance premiums purchased by US corporations was around 5 percent of the value of insurable assets. The mean and median ratios of the property insurance premium show 0.2 percent and 0.09 percent respectively. However, there is a big dispersion on the conventional insurance demand evident from the ratio of standard deviation of 0.9 percent. This situation is supported by the findings of Daniel and Paul, Zou *et al.* and Zou and Adams [74-76], which show that the dispersion on the insurance demand is the result of firms in different industries that tend to pay their relative premium over time.

Table 1: Descriptive Statistics

Panel A: Corporate Demand for Conventional Insurance (CDI)

Variables	Mean	Median	Std Dev	Skewness	Kurtosis	Jarque-Bera
CIPR	0.0024	0.0009	0.0091	9.4855	101.0425	167034.8***
DER	1.0478	0.5223	2.2768	4.9845	34.8518	18658.16***
MBVR	0.0012	0.0002	0.0041	8.0187	73.7432	88135.15***
WCR	0.1305	0.1312	0.2214	-1.1229	9.8416	868.5014***
DEP	0.0159	0.0105	0.0224	3.9516	24.8683	9056.492***
MOWN	0.1299	0.0372	0.1734	1.2723	3.4375	111.6556***
TA	2081.850	618.55	4505.34	4.2660	22.86008	7825.910***
REGD	0.0373	0.0000	0.1898	4.8825	24.8388	9585.798***

Panel B: Corporate Demand for Takaful (CDT)

Variables	Mean	Median	Std Dev	Skewness	Kurtosis	Jarque-Bera
TCR	0.0012	0.0009	0.0025	-12.1436	199.6210	531506.0***
DER	0.4451	0.3932	2.8216	-16.3002	285.2023	1092825***
MBVR	0.0008	0.0002	0.0018	8.4745	109.6924	158038.5***
WCR	0.1374	0.1143	0.1949	0.1361	3.5060	4.4712***
DEP	0.0137	0.0109	0.0148	0.4222	10.6918	810.8355***
MOWN	0.1172	0.0020	1.0470	17.5928	314.5459	1331130***
TA	3035.05	693.62	8949.921	5.3252	32.7576	13527.42***
REGD	0.0708	0.0000	0.2568	3.3476	12.2066	1754.834***

*** Significant at 1%

**Notes:*

Variable Definitions:

CIPR = The ratio of property conventional insurance premium to insurable assets
TCR = The ratio of property takaful contribution (premium) to insurable assets
DER = Debt / Equity ratio
MBVR = Market to Book Value
WCR = Working Capital to Total Assets ratio
DEP = Total Accumulated Depreciation / Total Fixed Assets
MOWN = Managerial Ownership
TA = Total Assets
REGD = Regulated Industry (1, if the firm is in a regulated industry, 0, otherwise)

Test of Multicollinearity: In the presence of multicollinearity, the OLS estimator is still the best linear unbiased estimator (BLUE). However, Belsley, Kuh and Welsh describe the possibility of other variables' involvement being obscured by a dominant relation as being high when diagnostic procedures for collinearity exhibit: 1) High variance decomposition proportions for two or more coefficient variances and 2) this occurs in a single high condition index.

Panel A1 and A2 of Table 4.2 presents the results of the Pearson's correlation coefficients among independent variables for corporate demand for conventional insurance and takaful data respetively. For univariate analysis between conventional insurance premium ratio (CIPR) and independent variables using Pearson's correlation indicates DEP and MOWN are found to be significantly related to property insurance, though the finding MOWN is inconsistent with expectations.

Panel B1 in Table 4.2 presents the Pearson's correlation coefficients among independent variables for corporate demand for takaful data. For univariate analysis between takaful contribution ratio (TCR) and independent variables using Pearson's correlation indicates, DER, WCR, DEP, TA and REGD are found to be significantly related to property takaful, although the result of WCR is inconsistent with the expected result.

The statistically significant correlations between some of the independent variables reported in Panel A1, Panel B1 of 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 results of variance inflation factors and condition indices are reported in Panel A2 and Panel B2 of Table 4.2.

Table 2: Pearson's Correlations

Panel A1: Pearson's Correlations for CDI

	DER	MBVR	WCR	DEP	MOWN	TA	REGD
DER	1.00						
MBVR	0.015	1.00					
WCR	-0.200***	-0.027	1.00				
DEP	-0.119***	-0.016	0.152***	1.00			
MOWN	0.014	-0.068*	0.057	-0.134***	1.00		
TA	0.013	-0.053	-0.106**	-0.036	-0.122***	1.00	
REGD	0.025	-0.049	-0.074*	-0.020	-0.145***	0.272***	1.00

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

Panel B1: Pearson's Correlations for CDT

	DER	MBVR	WCR	DEP	MOWN	TA	REGD
DER	1						
MBVR	0.013	1					
WCR	0.122**	.137***	1				
DEP	-.070	-.034	.196***	1			
MOWN	0.006	-.014	-.021	-.049	1		
TA	0.061	-.105**	-.102**	.011	-.028	1	
REGD	0.029	-.090	-.208***	-.029	-.026	.423***	1

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

PANEL A2 and B2: Collinearity Diagnostics for CDI and CDT

	CDI			CDT	
	Condition Index[a]	VIF		Condition Index[a]	VIF
DER	1.655	1.244	DER	1.489	1.091
MBVR	1.723	1.077	MBVR	1.723	1.035
WCR	1.891	1.092	WCR	1.774	1.164
DEP	2.409	1.057	DEP	2.210	1.137
MOWN	2.608	1.075	MOWN	2.522	1.014
LNTA	3.375	1.221	LNTA	2.741	1.424
REGD	4.313	1.119	REGD	4.664	1.291

[a] A condition index is the square root of the ratio of the largest Eigenvalue to the individual Eigenvalue

According to econometric practice, 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. Kennedy suggests that a VIF of more than 10 indicates harmful collinearity. Panel A2 and Panel B2 of Table 4.2 show that the calculated VIF are all less than 2 and the (largest) condition indices in both models are less than 10. Therefore, multicollinearity does not appear to be a severe problem in this study.

Determinants of Corporate Demand: In verifying the determinants of corporate demand for conventional insurance and takaful based on the profile reported above, the regression analysis is carried out using GLS techniques on the corporate demand for conventional insurance and takaful. The GLS minimizes the weighted sum of residual squares. In the GLS, the weight assigned to each observation is proportional to its $ó_i$, that is, observations coming from a population with larger ói will get a proportionately larger weight in minimizing the residual sum of squares. The ideal estimation is to give more weight to observations that are closely clustered around their mean than those that are widely scattered.

Table 4.3 report the results of GLS regression with fixed effects (Model 1) as well as the GLS regression with random effects (Model 2) on the corporate demand for conventional insurance (CDI) and takaful (CDT) respectively.

Table 3: Multivariate results

		Fixed Effects		Random Effcets	
Specification	Expected Sign	CDI	CDT	CDI	CDT
Constant	+/-	0.00229	0.00074	0.00038	0.00081
		(49.69480)***	(20.96580)***	(1.25509)	(2.49195)**
DER	+	0.00014	0.00078	0.00033	0.000808
		(13.45323)***	38.13419***	(2.40769)**	
(54.81683)***					
MBVR	+	-0.00708	-0.00395	-0.02418	-0.00511
		(-1.54627)	(-1.74688)*	(-1.10667)	(-0.37342)
WCR	-	-0.00020	0.00035	-0.00133	0.00063
		(-1.18301)	(5.07929)***	(-0.50453)	(1.60435)
DEP	+	0.01689	0.00909	0.14299	0.009719
		(11.02951)***	(9.24419)***	(1.92109)*	(1.21349)
MOWN	+	0.00036	4.02E-05	-0.00165	4.30E-05
		(3.43793)***	(2.22066)**	(-1.58374)	(3.98772)
LNTA	-	2.90E-08	7.49E-08	6.60E-08	3.19E-08
		(3.40286)***	(6.95075)***	(2.31738)**	(1.64169)
REGD	+			-0.00119	0.000492
				(-0.83738)	(1.84322)*
N		402	325	402	325
R^2		0.90063	0.96525	0.17529	0.89151
Adj. R^2		0.87228	0.95479	0.15635	0.88841
F-test		30.45072***	44.83278***	9.25732***	28.6083***
DW-test		1.80224	1.84079	2.13423	1.65129

Figures in the parentheses for directional prediction are t-statistics.

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

Notes: Results are based on White-Hetroscedasticity Corrected Regression.

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 Johnson, this study omit the regulated firm dummy (REGD) from this regression because it does not vary over time. Studies by Zou *et al.*, Daniel and Paul and Zou and Adams [77-79] also omit the regulated firm dummy in their fixed effect analysis.

Models Selection Tests: Panel A and Panel B in Table 4.4 show the results of the Chow test and the Hausman test for CDI and CDT respectively.

As shown in Panel A of Table 4.4, the result of the Chow test for a pooled model (non-effect) vs a fixed-effects model for CDI, F = 13.94, is significant at 1% level (one-tailed), suggesting that a heterogeneous fixed effects model is superior to the pooled model. While the Hausman test for random-effects vs a fixed-effects model, x^2 = 128.89, 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 is better in the estimation process than the other two models (non effects and random effects) in this study for CDI.

Panel B of Table 4.4 exhibits the result of the Chow test for a pooled model (non-effect) vs a fixed-effects model for CDT, F = 8.60, as being significant at 1% level (one-tailed), suggesting that a heterogeneous fixed effects model is superior to the pooled model. While the Hausman test for the random-effects vs the fixed-effects model, x^2 = 17.65, is significant at 5% 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 is also better in the estimation process than the other two models (non effects and random effects) in this study for CDT.

These findings are consistent with the previous studies like Zou *et al*, Daniel and Paul and Zou and Adams [80-82] who find that the fixed effects model can derive consistent estimates when they perform the Hausman test. That is to say that the fixed effects model that treats omitted company specific variables as constant over time or period-specific variables as invariant across companies is more reliable in the case of this study for conventional insurance and takaful. In contrast, the random effects model which treats company and period-specific factors as random is not very reliable for conventional insurance and takaful demand.

Table 4: Panel Specifications Tests

Panel A: CDI

Test	Statistics	Statistics Value	p-value
Chow test for Pooled Model vs Fixed-Effects Model	F	13.9392	0.0000
Hausman test for a Random Effects vs Fixed-Effects Model	x^2	128.8916	0.0000

Panel B: CDT

Test	Statistics	Statistics Value	p-value
Chow test for a Pooled Model vs Fixed-Effects Model	F	8.6035	0.0000
Hausman test for a Random Effects vs Fixed-Effects Model	x^2	17.6510	0.0240

Therefore, the discussion on the corporate demand analysis for conventional insurance and takaful in the next section is based on Model 2: the GLS with fixed effects.

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 premiums and takaful contribution paid per unit value of insurable assets. That is, higher debt-financing leads to more insurance and takaful purchases. This supports the hypothesis H_1, that firms with a high leverage are more likely to use property conventional insurance 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 [83] who claim that property insurance is found to be used to reduce the underinvestment problem and agency costs.

The hypotheses 3 are the hypotheses for the expected bankruptcy costs factor. WCR is not statistically significant as predicted in hypothesis H_3 for CDI. However,. WCR is positive and significant at 1 percent level which contradicts the expected sign in H_3 for CDT. The rationale behind this finding is related to the finding of firms' size factor which will be explained below 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 tax effect hypothesis (H_4) is strongly supported by the empirical evidence which is significant at 1 percent level and positively related to property insurance as well as takaful. This finding is supported by Hoyt and Khang [84] who claim that the greater the amount of cumulative depreciation, the more insurance is purchased. 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 taken 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 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 and takaful. This finding is compatible with Smith and Stulz's [85] managerial risk-aversion hypothesis, but inconsistent with the incentive-alignment hypothesis. This finding suggests that managers with relatively high levels of share ownership are more likely to purchase insurance 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 [86] but contrary to the evidence documented in Hoyt and Khang [87].

Contrary to hypothesis H_6, the coefficient for size measured by the natural log of total assets (TA) is positive and statistically significant at 1 percent level for both CDI and CDT. 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 opetators which contradicts the hypothesis. This runs contrary to the evidence documented in most of previous studies like Yamori, Hoyt and Khang, Zou *et al*, Daniel and Paul and Zou and Adams [88-91] whey they find that size is negatively relation with the insurance 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 through the risk management services of insurers and also expected bankruptcy costs of the firms.

Table 5: Summary of Empirical Findings

		Consistent with Previous Findings		
Determinant Factors	Predicted Sign	CDI	CDT	
Leverage	DER: Positive	Positive***	Positive***	Hoyt and Khang and Daniel and Paul [94-95]
Growth Opportunities	MBVR: Positive	Insignificant	Negative*	Daniel and Paul [96]
Expected Bankruptcy Costs	WCR: Negative	Insignificant	Positive***	Insignificant:Hoyt and Khang [97], Positive/Significant: Daniel and Paul [98]
	ICVR: Positive	Positive***	Positive***	Daniel and Paul [99]
	LTDR: Negative	Negative***	Negative***	Daniel and Paul [100]
Tax Considerations	DEP: Positive	Positive***	Positive***	Hoyt and Khang [101]
Managerial Ownership	MOWN: Positive	Positive***	Positive**	Zou and Adams [102]
Size of the Company	TA: Negative	Positive***	Positive***	-
Regulatory Environment	Dummy: Positive	Inconclusive	Inconclusive	Zou *et al.*, Daniel and Paul and Zou and Adams [103-105]

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

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 3, indicates that WCR is not related to the dependent variable. This finding shows bankruptcy costs are not related to size in managing risks via insurance. This implies that even large firms can be expected to have smaller relative bankruptcy costs as mentioned before, large corporations are more likely to purchase insurance and takaful to reduce the probability of incurring these costs. The finding is consistent with previous research like Zou and Adams [92].

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 and takaful parallel with the findings in Daniel and Paul [93]. It is worth noting that MBVR appears to be negatively related to property insurance, suggesting that firms might prefer to use other kinds of risk management mechanisms for investment in their new projects.

CONCLUSION

A major strength of our analysis is that, we extend to study on the comparison between corporate demand for Islamic and conventional insurance in Malaysia. In contrast of all other previous studies like Mayers and Smith, Yamori, Hoyt and Khang, Zou, Adam and Buckle, Daniel and Paul and Zou and Adam [106-111] studied the corporate demand for conventional insurance only [112-116]. It is found that corporate finance factors of leverage, expected bankruptcy costs, firm size and managerial ownership as well as tax consideration play an important role for determining the insurance and takaful demand in Malaysia. This is an interesting results where corporate demand for insurance in Malaysia are also related 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 and takaful companies in which they should take action and attention from the findings of this study despite of some important factor like growth opportunities and regulated industries show insignificant factors. For instance, insignificants results in the growth opportunities and the corporate decision on property insurance put a sign that insurance and takaful companies may wish to make better reflect of risk management needs of enterprises in their product innovation and market strategies.

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