

Determinants of Corporate Demand for Islamic Insurance in Malaysia

MOHAMAD ABDUL HAMID^{a*}, JAMIL OSMAN^b AND BANY ARIFFIN AMIN NORDIN^c

^a *Graduate School of Business, Universiti Kebangsaan Malaysia*

^b *INSANIAH University College, Kedah*

^c *Universiti Putra Malaysia*

ABSTRACT

This study is the first attempt to empirically investigate the determinants of corporate demand for Islamic insurance (takaful) using data from main board of public listed companies at Bursa Malaysia. Factors like leverage, growth opportunities, expected bankruptcy costs, company size, managerial ownership, tax considerations and regulated effects have been examined in this study. The data covers a five-year period from year 2002 – 2006. 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 Islamic insurance in Malaysia. Our conclusions are robust to alternative specifications model of GLS with Fixed Effects that help us to control for unobservable heterogeneity.

Keywords: Islamic insurance, Takaful, Corporate demand

INTRODUCTION

In Malaysia, the government entrusted Bank Negara Malaysia (The Central Bank) with the regulatory and supervisory role over the conventional and Islamic insurance (takaful) industries¹. 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

* Corresponding author: Email: mdah@ukm.my

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

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of tabarru' (Jamil Osman, 2003). The word takaful is derived from the Arabic word kafala which means to guarantee, look after or trust. The noun takaful is derived from verb takafala which can be literally translated as "helping one another" or "looking after one another"². Tabarru' is derived from the Arabic noun that means donation, gift and contribution (Mohd. Ma'sum Billah, 2001). In relation to this, a participant agrees to contribute as tabarru', undertakes to pay thus enable him to fulfil his obligation of mutual help and joint guarantee should any of his fellow participants suffer a defined loss (Mohd. Fadzli Yusof, 1996).

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 Shariah³. However, 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 like underwriting procedures and claims considerations as well as reinsurance mechanism. The only and major difference is that, takaful is based on the shariah law, while conventional insurance does not.

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 2005⁴. An interesting fact is that, Syarikat Takaful Malaysia Berhad (The first Islamic Insurance Company in Malaysia) is among the top four companies in the insurance industry in Malaysia. For example, the company secured contributions (premiums) of about RM600 million in 2003. In addition, STMB ranked first in 2003 in fire takaful business in the insurance and takaful industry, collecting a contribution of RM132 million (Salahuddin Ahmed, 2006). The data also indicate that over 50 percent of total premium are from the business corporation for general takaful business. Therefore, it is important to highlight what are the factors affecting the corporate demand for takaful in Malaysia? Research should also be conducted

² Mohammad Daud Bakar, "The Problem of Risk and Insurable Interest in Takaful: A Jurisprudential Analysis"; A paper presented at the 4th International Conference on Islamic Economics and Banking, Loughborough University, UK, August 13-15,2000. pp 179-193.

³ Ibid p. 256

⁴ Concept and Operation of General Takaful Business in Malaysia, by Bank Negara Malaysia (2006) p. 7

to investigate the determinants of corporate demand for takaful in Malaysia since there has been no research in this area in Malaysia. Moreover, empirical research conducted on takaful is still quite scarce since its existence of more than 20 years in Malaysia. This research will focus on property or asset-based takaful due to properties or assets are the majority of risk exposures insured by the corporations. However, none of the empirical studies in this area of research have been explored in takaful. Due to the limited literature and empirical evidence on the topic, it is believed that the related studies, focusing on its alternative in the conventional insurance sector, specifically property insurance, would also be able to provide us with some useful insights and information on the factors affecting corporate demand for takaful. This is in line with a previous study like that of Norlida Abd. Manab *et al.* (2004), who use related studies focusing on its alternative conventional life insurance literature and apply them to a study of the awareness and ownership of family takaful schemes among the Muslim community in Malaysia.

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, 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, Adam and Buckle, 2003; Daniel and Paul, 2003; Zou and Adam, 2006). Among the factors affecting corporate insurance that has been studied are; Underinvestment problem and leverage, Growth opportunities, Managerial Ownership, Tax consideration, Expected bankruptcy costs, Company size and Regulatory environment. It is therefore, this study would like to examine the above mentioned factors affecting corporate demand for takaful by public listed companies of main board at Bursa Malaysia.

Our study will contribute to the existing literature where it will extend to study on the corporate demand for takaful. 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.

The rest of the paper is organized as follows: The next section discusses the literature review. Section 3 describes the research design, followed by the analysis of findings in Section 4. The final section provides the conclusion of the study and suggestion for future research.

LITERATURE REVIEW

Few studies have been conducted on the corporate demand for property insurance. This is mainly due to the lack of public information on insurance data at the firm level. Mayers and Smith (1990), Yamori (1999), Hoyt and Khang, (2000), Zou, Adams and Buckle (2003), Daniel and Paul (2003) and Zou & Adams (2006)

are among the empirical studies on the corporate demand for insurance. Mayers and Smith (1990) was 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 (1990) 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 (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. 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 (2000) was 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.

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. 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 (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 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 (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. Under an excess, the insurer does not participate in the loss until the actual loss exceeds a certain amount (Rejda, 2005). 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 (2003) who use excess value as a proxy for insurance demand is not accurate to justify the corporate behaviour of property insurance.

Zou and Adams (2005) 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.* (2003) using the Simultaneous Equation Method (SEM) of analysis.

Zou and Adams (2006) 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 (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 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 (Modigliani and Miller, 1958) and the practical importance of risk management decisions on insurance in modern corporations.

RESEARCH DESIGN AND HYPOTHESES DEVELOPMENT

Data Description

Data is divided into two categories, namely a) Dependent variables: takaful contribution ratio b) Independent variables: Financial data. The takaful and financial data are collected on an individual firm basis from public listed companies in the main board of Bursa Malaysia excluding finance sector. The data covers a five-year period from year 2002 – 2006. There are 112 public listed companies on the main board which have been identified to have the property takaful coverage with the two 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. We use an unbalanced firm-level panel data set of 68 public listed companies at Bursa Malaysia in which their properties are insured using Islamic insurance. Property takaful premium

(known as takaful contribution) will be used as a proxy for demand which is as a dependent variable. The data is collected from two takaful companies 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 takaful premium by a firm is represented by the ratio of property takaful 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 takaful or insurance policy. 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.

The financial data of public listed companies are considered as measurable variables (independent variables). The ownership data are obtained directly from company's annual report. Other firm's financial data on the other hand, are collected from DataStream International, a financial database provider. The financial data and hypotheses statements are developed as follows:

Financial Data and Hypotheses Development

Leverage: Debt / Equity ratio

A general characteristic of the claims of bondholders is that bondholders must be paid before the shareholders of the firm receive any funds. This characteristic can distort the investment choices of shareholders following a major loss in two ways. First, shareholders sometimes will have an incentive to forego good investment projects (positive Net Present Value) following a loss that causes a firm to experience financial distress. Second, shareholders may have an incentive to invest in some negative net present value projects with high risk.

Some positive net present value projects may not be undertaken following a major loss that causes financial distress because the returns from the new investment will mostly accrue to the bondholder who must be paid before the shareholders. This is known as the underinvestment problem (Mayers and Smith, 1982). Suppose that a corporation experiences a major disaster like fire that destroys its plant, the corporation will be unable to pay its bondholders or lenders what they were promised unless the corporation replaces the plant. The shareholder of the corporation, however, may be reluctant to pay for the replacement after the fire even if the cost of replacement is less than the total returns from the replacement. The reason is that the returns from the replacement following the fire will mostly accrue to the bondholders. That is, replacement bails out the bondholders. Property insurance like fire insurance would provide the funds necessary to replace the equipment and, therefore, commit the shareholders to replacement following a major disaster like

fire. Since insurance commits the firm to replacement which alleviates bondholders' concern about being paid following a loss. Bondholders or lenders, therefore, are willing to lend money at lower rates when the firm is insured.

Mayers and Smith (1987) also state that one possible solution to this underinvestment problem involves bonding the investment decision through the purchase of insurance. Thus, 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 for takaful:

Hypothesis 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.* (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 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 for takaful:

Hypothesis 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, Long-term debt ratio and Interest Coverage ratio

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 for takaful:

- Working capital to Total Assets ratio

Hypothesis 3_a: 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.

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

Hypothesis 3_b: It is believed that the higher a firm's interest coverage ratio, the lower its long-term debt ratio. Therefore, there will be a positive relationship between interest coverage ratio and takaful demand and a negative relationship between long term debt ratio and takaful demand.

Tax Considerations: Total Depreciations to Total Fixed Assets

According to Hoyt and Khang (2000), the purchase of property insurance has two effects. First, the firm is able to deduct the insurance premium when calculating taxable earnings, regardless of whether a loss occurs. Second, if a loss occurs, the firm will have to recognize a capital gain equal to the insurance indemnity payment. If the income tax rate exceeds the capital gains tax rate, the income tax savings from deducting the premium exceed the expected capital gains tax payment. Hoyt and Khang (2000) suggest that the larger the amount of depreciation of a firm's asset, the greater will be the demand for insurance and the greater the reduction in the payment of tax. The statement may be supported by the fact that most fixed assets of the firm are insured on a replacement cost basis, according to the 1990 Cost of Risk Survey (Hoyt and Khang, 2000). Hoyt and Khang (2000) use the ratio of depreciation to fixed assets to show the relationship between insurance and depreciated property. Therefore, the following hypothesis is proposed for takaful:

Hypothesis 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

Two conflicting inferences are possible on the corporate demand for insurance reported in the finance literature when the management compensation is a function of a firm's value (Mayers and Smith, 1982 & 1987). The two competing hypotheses are the managerial risk-aversion and incentive-alignment hypotheses. According to the managerial risk-aversion hypothesis, when the bankruptcy probability of a firm is extremely low, the manager is inclined to purchase less insurance if the portion of holdings of common stocks and stock options is relatively large (Smith and Stulz, 1985). On the other hand, incentive-alignment hypothesis mentioned that if the bankruptcy risk is relatively high, the manager may have a strong incentive to buy more insurance regardless of his or her holdings of common stocks and stock options (Smith and Stulz, 1985). Therefore, the influence of managerial stock and option holdings (managerial ownership) is ambiguous (Daniel and Paul, 2003). Most of the studies offer no prediction as to the direction of managerial ownership but leave it as an issue for empirical investigation.

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 for takaful:

Hypothesis 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 (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 for takaful is proposed:

Hypothesis 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)

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 industries 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 (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. Hoyt and Khang (2000) also argue that contradictory hypotheses exist as described in the theoretical background. However, this study has revisited the possible relationship proposed by Mayers and Smith (1982) where firms in a regulated industry would purchase more insurance than those in an unregulated industry. Therefore, the following hypothesis for takaful is proposed:

Hypothesis 7: Regulated firms are likely to contribute more to takaful. Therefore, regulatory environment is expected to be positively related with takaful

Methodology

A pooled combination of cross sectional and time series that incorporates non-effect, fixed effect and random effect for both time and specific correlation are deployed. Thus, this study would employ a cross-sectional and time-series regression model using panel data. The model has the following functional form:

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

Hence, the following general model will be used to verify the determinants of corporate demand for takaful (CDT). The general estimation model can be specified as follows:

$$TCR_{it} = C + {}_1DER_{it} + {}_2MBVR_{it} + {}_3WCR_{it} + {}_4ICVR_{it} + {}_5LTDR_{it} + {}_6DEP_{it} + {}_7MOWN_{it} + {}_8LNTA_{it} + {}_9REGDMY_{it} + \epsilon_{it}$$

Definition of Variables;

Variable definitions:	
TCR	= The ratio of property takaful contribution to 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:

- **Model 1: Non Effect Model:** It assumes that the slope and intercept of firms are constant across individuals and time.
- **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 in recognition of the fact that each individual, or cross sectional unit, may have some special characteristics of its own.
- **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 1 presents the descriptive statistics for the takaful contribution ratio (TCR) and the firm-specific characteristics for the pooled company/year sample of 68 public listed companies of Bursa Malaysia for the period of 2002-2006. Overall, Table 4.1 shows 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 takaful 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 1 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***
ICVR	94.9117	4.8918	942.6284	14.7894	236.6920	751384.2***
LTDR	0.1216	0.0873	0.1282	1.2215	4.0099	94.6406***
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%

Table 2(a) presents the Pearson's correlation coefficients among independent variables. The correlation coefficients between pairs of independent variables are generally low suggesting that a serious collinearity problem is unlikely. However, the statistically significant correlations between some of the independent variables reported in the table raise the possibility of multicollinearity. Therefore, 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. The calculated VIF are all less than 2 and the (largest) condition indices are less than 10 as shown in table 2(b). Therefore, multicollinearity does not appear to be a severe problem in this study.

Table 2(a) Pearson's Correlations for CDT

	DER	MBVR	WCR	ICVR	LTDR	DEP	MOWN	TA	REGD
DER	1								
MBVR	.013	1							
WCR	.122**	.137***	1						
ICVR	-.010	-.035	.042	1					
LTDR	.226***	-.032	-.185***	-.046	1				
DEP	-.070	-.034	.196***	.041	-.285***	1			
MOWN	.006	-.014	-.021	-.008	.092**	-.049	1		
TA	.061	-.105**	-.102**	.064	.332***	.011	-.028	1	
REGD	.029	-.090	-.208***	-.036	.068	-.029	-.026	.423***	1

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

Table 2(b) Collinearity Diagnostics

	Condition Index	VIF
DER	1.489	1.091
MBVR	1.723	1.035
WCR	1.774	1.164
ICVR	1.791	1.017
LTDR	2.028	1.365
DEP	2.210	1.137
MOWN	2.522	1.014
TA	2.741	1.424
REGD	4.664	1.291

Table 3 reports the results of the GLS regression with non effects, fixed effects and random effects on the corporate demand for takaful (CDT). 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 shows the results of the Chow and Hausman test. The table exhibits the result of the Chow test for a pooled model (non-effect) vs a fixed-effects model, $F=8.60$, 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, $\chi^2=17.65$, 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.

Table 3 Panel regression results

Specification	Expected Sign	Non-Effect	Fixed Effect	Random Effect
Constant	+/-	0.00078 (3.12373)	0.00074 (20.96580)***	0.00081 (2.49195)**
DER	+	0.00075 (27.54458)***	0.00078 38.13419***	0.000808 (54.81683)***
MBVR	+	0.00052 (0.33949)	-0.00395 (-1.74688)*	-0.00511 (-0.37342)
WCR	-	0.00046 (3.62381)***	0.00035 (5.07929)***	0.00063 (1.60435)
ICVR	+	1.56E-08 (0.83261)	5.32E-08 (8.97253)***	3.99E-08 (1.79883*)
LTDR	-	-0.00208 (-9.28661)***	-0.00252 (-17.28272)***	-0.00276 (-4.60224)***
DEP	+	4.98E-05 (0.05158)	0.00909 (9.24419)***	0.009719 (1.21349)
MOWN	+	3.26E-05 (1.22728)	4.02E-05 (2.22066)**	4.30E-05 (3.98772)
LNTA	-	5.01E-08 3.84068***	7.49E-08 (6.95075)***	3.19E-08 (1.64169)
REGD	+	0.00091 (1.74229)*		0.000492 (1.84322)*
N		325	325	325
R2		0.91546	0.96525	0.89151
Adj. R ²		0.91201	0.95479	0.88841
F-test		165.3191***	44.83278***	287.6086***
DW-test		1.79103	1.84079	1.65129

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

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

Table 4 Panel specifications tests

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	χ^2	17.6510	0.0240

Therefore, the discussions of corporate demand for takaful is 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 takaful contribution. This means that higher debt-financing leads to greater contribution to takaful. This supports hypothesis H₁, that

firms with a high leverage are more likely to use property takaful than companies with less debt in their capital structure in order to mitigate the agency conflicts between the shareholder and debtholder. This finding also indicates that takaful is relevant to be used to overcome the issue of the underinvestment problem which is consistent with the earlier findings on corporate demand for conventional insurance. The finding is also in line with the previous studies like Hoyt and Khang (2000).

The hypotheses 3_a and 3_b are the hypotheses for the expected bankruptcy costs factor. Consistent with hypothesis H_{3b} and also earlier findings on the corporate demand for conventional insurance, two of the measures for expected bankruptcy costs (ICVR and LTDR) are significant at 1 percent. The positive and statistically significant at 1 percent level for ICVR and the negative and statistically significant at 1 percent level for LTDR which is consistent with the theory shows that when firms have high borrowing capacity, no underinvestment problem exists between firms and debtholders. However, one of the measures for expected bankruptcy costs (i.e. WCR) is positive and significant at 1 percent level which contradicts the expected sign in H_{3a} . The rationale behind this finding is related to the finding of firms' size factor which will be explained below.

Consistent also with the earlier finding on the corporate demand for conventional insurance and previous literature like Hoyt and Khang (2000), the tax effect hypothesis is strongly supported by the empirical evidence which is significant at 1 percent level and positively related to property takaful. That is, the greater the amount of cumulative depreciation, firms would make more takaful contributions. The explanation is similar to the conventional insurance where physical assets of corporations are covered 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 takaful contribution. This clause is imposed by the Malaysian General Insurance Association in its Fire insurance Tariff (1996).

Consistent with the hypothesis H_5 and also consistent with the earlier study on the corporate demand for conventional insurance, the coefficient for MOWN is positive and statistically significant at 5 percent level on the corporate demand for takaful. This finding suggests that managers with relatively high levels of share ownership are more likely to make more takaful contribution in managing assets risk when 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 measured by the natural log of total assets (TA) is positive and statistically significant at 1 percent level. It is supported by the earlier finding on the corporate demand for conventional insurance. The significant positive sign which is consistent with the finding of conventional

insurance strongly suggests that large corporations in Malaysia benefit more from the risk management services of insurers which contradicts the hypothesis. The contrary sign from the evidence documented in most previous studies like Yamori (1999), Hoyt and Khang (2000), Zou *et al.* (2003), Daniel and Paul (2003) and Zou and Adams (2006) due to several reasons as has been explained in the corporate demand for conventional insurance analysis. An example is the risk management programmes by the Malaysian corporations are still at the infancy and development stage as compared to other countries like Japan, the United States, the United Kingdom and China.

However, firm size is associated with the incentive to purchase insurance or takaful through the risk management services of insurers and also expected bankruptcy costs of the firms. As mentioned before, 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) indicates that WCR is also positive and significantly at 1 percent level related to the corporate demand for takaful. This finding shows bankruptcy costs are not related to size in managing risks via insurance. This implies that large firms in the sample of study for takaful, which are more exposed to the expected financial distress, need takaful to reduce the probability of incurring expected bankruptcy costs. Besides that, MBVR which is a proxy of measurement for growth opportunity is negative and significant at 10 percent level. Although it is significant at 10 percent, it can be considered that the factor is not an important determinant of the corporate demand for takaful. 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

This paper investigates the determinants of corporate demand for property takaful in Malaysia by utilizing a panel data analysis of public listed companies at Bursa Malaysia. A major strength of our analysis is that, we extend the study on the corporate demand for Islamic insurance which is known as takaful. 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 only studied the corporate demand for conventional insurance. We find that leverage, expected bankruptcy costs, tax consideration, managerial ownership and company size play an important role for determining the takaful demand in Malaysia. This is an interesting results where takaful, as an alternative mechanism of 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. However, further study should be explored for

corporate demand for conventional insurance in Malaysia to compare this research findings of corporate demand for takaful.

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 takaful operators in which they should take action and attention from the findings of this study despite of some important factor like growth opportunities show insignificant results. For instance, insignificant result in growth opportunities of the corporations and the corporate decision on property takaful put a sign that takaful operators may wish to make better reflect of risk management needs of enterprises in their product innovation and market strategies.

ACKNOWLEDGEMENT

We would like to express our appreciation to the paper discussant and participants of the Oxford Business and Economic Conference 2008 (OBEC 2008), St. Hugh College, University of Oxford, England on 22-24 June 2008 on their constructive comments.

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