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Financial Risk Management by Malaysian Life Insurers: The Application of Reinsurance

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ABSTRACT

This research examines the determinants of reinsurance use as a tool for financial risk management in the Malaysian life insurance industry. We estimate a multivariate linear regression model using a sample of 17 Malaysian life insurers for the period between the years 2000 to 2003 with data taken from the Annual Insurance Report published by the Bank Negara Malaysia and Life Insurance Revenue Account of the respective insurer. Our results indicate that determinants of reinsurance used are negatively influenced by a firm's leverage and the availability of cash but positively influenced by bank affiliation relationship. This research however fails to find evidence that reinsurance decision is influenced by factors such as a firm's size, profitability, taxes and group memberships. We conclude that reinsurance is still being applied in Malaysia as a pure risk spreading or risk transfer tool with minimal role in managing the financial risk in the Malaysian life insurance industry.

Introduction

The purpose of the research study is to explore the use of reinsurance as a risk management tool in the Malaysian life insurance with the following aims:

- To develop the rationale for risk management in the life insurance industry;
- To investigate the factors which affect the decision to conduct reinsurance transactions;
- To examine the extent of reinsurance usage by life insurance firms in Malaysia.

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This research aims to contribute to the limited amount of literature existed in explaining the nature of life reinsurance demand in long term insurance business such as the ordinary and investment linked policies. This research is believed to be the first study conducted in Malaysia with specific focus and reference to life insurers underwriting long term insurance products in Malaysia. Both the empirical and theoretical studies would contribute insights into the motives underlying firm's activities in life reinsurance market when firm specific characteristics such as the size of the firm, leverage level, taxation and group affiliation are taken into consideration. The basic foundation of this research is to investigate the variation in the ratio of reinsurance premiums ceded among firms and factors, which relates it to demand of reinsurance for long term insurance lines. Thus, this study is able to merge several theories which has been used before in prior studies such as the risk bearer, agency and managerial discretion theories proposed by Myers and Smith (1981, 1986, 1988, 1990, 1992). Furthermore, since the purpose of using reinsurance as a risk management tool is quite similar with the use of financial derivatives, that is to hedge against unanticipated underwriting losses and to reduce volatilities in the firm's operating cash flows, this study can be complimentary to those growing literatures on the use of financial derivatives in the life insurance industry (Hardwick and Adams, 1999; Cummins et al, 1997; Colquitt and Hoyt, 1997).

Reinsurance has been defined in various ways by expert academicians. In simple terms, reinsurance is insurance for insurance companies provided in the form of a contract of indemnity rather than a liability contract. Generally, the direct insurer must first pay a loss and then seek reimbursement for that loss from its reinsurer. Stated another way, reinsurance essentially is an extension of the theory of insurance itself. The insurance risk is spread from one risk bearer to other risk bearers. This allows the initial risk bearer to continue to provide insurance products to its clients knowing that when losses occur, others will share those losses. Reinsurance also allows a direct insurer to strengthen its balance sheet by reducing its liability for loss and replacing that liability with an asset (Carter, 1995).

The Overview of Financial Risk Management

Risk management is the process by which an organization makes decisions to alter the risk-return profile of its future cash flows. The concept of risk management is not a modern invention. Nevertheless, this concept has received increased attention over the past two decades due to the increased volatility of financial markets. Until the 1970s, the standard view was that widely held corporation had no reason to manage their risk exposure, because shares of such corporations were held by diversified investors who could eliminate

non-systematic risk through their portfolio choices. Unlike individual risk management, risk management at the corporate level had no logic (Froot and Schaftstein, 1994). This view was triggered by the Modigliani and Miller (1958) propositions. In their studies, Modigliani and Miller showed that, in a world with no transaction costs or taxes and with equal information, managers could not benefit their shareholders by altering the risk profile of the firm's cash flow.

The factors motivating corporations in general to engage in risk management activities are also important in the insurance industry. Insurance companies can be viewed as financial intermediaries with relatively long term assets and liabilities. Therefore, life insurers are subject to significant interest rate risk. They also face liquidity risk due to their heavy investment in illiquid privately placed securities and real estate investments as well as embedded options in many insurance policies that permit buyers to withdraw funds in response to interest rate changes and other economic fluctuations. Furthermore, default risk can have a negative impact on life insurer cash flows. Additionally, due to the increasing activity in overseas markets, life insurers are exposed to exchange rate risk (Cummins et al., 1997).

For the purpose of this research, it focuses on the traditional side of risk management techniques which rely on balance sheet solutions. For example, companies controlled their interest rate exposure by aligning assets more closely with liabilities of matching maturities or through diversification (Baril et al., 1996). Insurance companies in particular can buy reinsurance to transfer the risk of unanticipated underwriting losses and financial risks from insurance to reinsurers. This so called on-balance sheet hedging is the scope of this research.

In Malaysia, it is a statutory requirement for all registered insurers to set up their own risk management committee. This committee will be responsible, amongst others, in reviewing and recommending risk management strategies, assessing the adequacy of risk management policies and framework, ensuring there are adequate resources for effective risk management to operate and reviewing reports from management on risk exposure.

Although the risk transferred through the use of reinsurance is different than the risk transferred through derivative transactions, the result is the same, that is, to reduce the variance of the firm's value and taxable income. Several studies (Colquitt and Hoyt, 1997; Cummins et al., 1997) argue that if this result can be achieved through the purchase of reinsurance, then there is no need to use derivatives.

However, Mayers and Smith (1990) suggest that a firm's purchase of reinsurance may be complementary to the derivatives trading. Reinsurance may also lack a direct relationship with derivatives as both are not perfect substitutes since they serve to reduce different types of risks faced by insurers (Marc D.C. et al., 2003).

The Significance of the Study

We consider this research to be quite important in the light of limited or almost non academic literatures concerning life reinsurance in Malaysia. This research is the first to offer insights into the motives behind the use of reinsurance as a tool for financial risk management in the Malaysian life insurance industry. We further motivate this research by extending the research of Mayers and Smith (1990) and Adams (1995) and examine the generality of their results in comparison with small country like Malaysia.

Overview of the Malaysian Long Term Insurance and Reinsurance Market

Long term insurance business is defined as

> 'Insurance business the benefits of which are payable primarily on the survival of the policyholder to a stipulated age or on death. Long term business will include life, annuity, pension, permanent health, capital and pension fund management business' (Association of British Insurers, 2000).

In Malaysian economy, the long term insurance business is considered to play an important part in which it represents around 3.6% of the total Gross National Product (GNP), compared to the general insurance business which counts for 1.6% of the GNP. This proves that the life or long term insurance business is developing in quite a fast pace more than the general insurance sector. In terms of the premium income, the long term insurance business recorded a total amount of RM15,143 million, compared to the general insurance business of RM8532 million in year 2004. The rapid growth of the life insurance industry is shown by the remarkable increased in the total premium income of RM1,643 million in year 1990 to a staggering amount of RM15,143 million in year 2004 (Bank Negara Malaysia, Annual Insurance Report, 2004).

Life insurance products such like the single premium investment linked and endowment were the main contributors to the rapid growth in life premium income for year 2004. These two products have been perceived by the consumers as affordable with such low risk premiums. Furthermore, investment linked products can best be considered nowadays as an alternative investment choice in the financial services market. Two other conventional life insurance products, term and whole life policies, also recorded a healthy growth in the industry. In year 2004, as a result of new product innovation in the market of combining both non-participating whole life and fixed deposits, sales of single premium whole life policies accounted for a larger share in new business single premiums of 8.6%, compared to 4.4% in year 2003 (Bank Negara Malaysia, Annual Insurance Report, 2004)

For term insurance, the demand remains modest with 60% of it was related to mortgage-related insurance as term insurance is highly correlated with the level of mortgage debt. Apart from mortgage-related term products, some other products such like the common group term policies and the individual non-mortgage specific consumer credit term plans were also well received by the public. The increasing demand for individual non-mortgage specific consumer credit term policies reflect the high level of awareness among Malaysians in managing their personal financial risk exposures. In years to come, the sales of this non-mortgage specific consumer credit term policies are forecasted to increase with higher premiums from plan for credit card holders (Business Times, June 14, 2005).

Other components of life insurance such like the medical and health insurance were also in great demand as a result of rising healthcare costs but the growth recorded in year 2004 was slightly slower due to the increment in the rate of premium (Bank Negara Malaysia, Annual Report, 2004).

With strong consumer confidence and a healthy economic outlook for the years to come, the life insurance sector is looking promising to continue its growth. With the increased number in distribution system channel such as the bancassurance and higher capital investments in technology, the life insurance sector is poised to continue its dominance over the general insurance sector in terms of premium income generated.

The life insurance market in Malaysia consists of only pure stock firms or public listed companies. The Malaysian life insurance industry is quite small with a total of RM69,814 billion of life insurance fund assets. There are 16 insurers underwriting life insurance business, seven of them are purely life insurance underwriter and the remaining nine insurers underwrite both life and non-life insurance business. As in other life insurance markets worldwide, the Malaysian life insurance industry consists also by large subsidiaries firms that Mayers (1990) referred to as 'group affiliation' and also the existence of several numbers of subsidiaries owned by non-Malaysian parents firms. It is interesting to see whether this group affiliation characteristic would affect the decision to use reinsurance or it would not be relevant in explaining the relationship between the two variables of reinsurance and group.

Hypotheses Development and the Review of Literature

Hypothesis 1: Smaller size insurers are expected to use more reinsurance than larger size insurers

This hypothesis is based on the theory of economic efficiency (Hardwick and Adams, 1999), risk bearing theory (Mayers and Smith, 1994), agency theory (Cummins et al., 1997; Zahra and Pearce, 1989, Jensen and Meckling, 1976) and transaction cost theory (Doherty and Smith, 1993). The economic efficiency

argument presumes that larger firms are able to produce more service efficiencies as a result of economic of scale. Operational aspects in life office such as claim handling ability and underwriting are expected to be more proficient for larger size insurers since they are able to utilize specialized staff that might be competence in their specific task in relative to smaller firms. Furthermore, larger firms will normally have their own reinsurance department to handle the entire reinsurance placement. This reasoning however suggests that bigger firms are more inclined to use reinsurance.

The risk bearer theory however suggests that the owners in smaller size firms are more inclined to use reinsurance since they are less able to tolerate the strain of financing new business, volatility in their cash flow and the severity of abnormal loss experience (Adams, 1995). Furthermore, the services rendered by professional reinsurers such like claims administration and construction of policy wording are highly sought by smaller insurers underwriting income protection insurance business (Carter, 1995). The risk bearer theory implies more reinsurance usage by smaller insurers.

Hedging through derivatives market is highly related with the existence of agency incentive conflict rather than the use of reinsurance but since both have similar purposes, this hypothesis suggests that the argument use to explain the existence of hedging can also be applied to reinsurance. Transaction cost theory anticipates more reinsurance application by smaller firms since large firms would prefer to avoid cost such as the legal fees and also trying to accrue cash flow benefits by retaining all premium income (Doherty and Smith, 1993). This reasoning suggests that larger firms are more inclined to retain a large proportion of the premium income with less reinsurance to avoid the outflow of premium income.

Overall, the relationship between the use of reinsurance and size of the firm produces mixed results on the probable outcomes of this hypothesis. The sign of the coefficient can be either positive or negative and therefore, the effect of this variable on reinsurance usage is unclear.

Hypothesis 2: Levered insurers are associated with additional reinsurance demand

The financial distress costs theory is particularly important in the insurance industry as insurers are subject to strict solvency regulation. The function of solvency margin is to act as a guarantee or protection to the policyholder of an insurance company. In the event that premium fund collected by insurer is insufficient to meet claims arising, the shareholders fund will be available to meet the insurer's obligation to pay these claims and the insurer need not become insolvent. Capital gives policyholders' confidence that an insurer will be able to pay claims despite period of unusually high losses. This capital also permits an insurer to stay in the market after a period of adversity and re-price its coverage at a more adequate premium rates. Insurers must have

enough capital to pay claims and maintain their ability to write future business but how much would it be is a question left to be answered.

Primary insurers are required to maintain a minimum solvency margin, expressed as a proportion of net premium income. In Malaysia, the margin for insurers is 20% of net premium income or RM5 million, whichever is higher. This implies that the written premium shall not exceed five times the capital and free reserves of the insurer. In other words, insurer has to either increase paid up capital or reduces volume of premium or arranges reinsurance to reduce written premium but maintain the gross volume of premium.

Garven and Tennant (1997) and Krammer and Von Eije (1993) highlight the point that reinsurance is essentially a substitute for capital equity in terms of leverage effect. For example, Mayers and Smith (1990) mention about the organizational structure that allows the holding companies to issue debt in order to reduce regulatory constraint on leverage on behalf of the owners in the subsidiaries firms which is closely held. This would also suggest an intra group transaction between the subsidiaries and its holding companies.

The risk bearer theory also suggests that as the leverage of the life insurance firm reaches the long term solvency constraint prescribed by internal actuarial rules or external regulation, the amount of reinsurance will increase subsequently. In other words, reinsurance safeguards policyholder' utility by helping to mitigate a potential claims dilution problem resulting from the writing of high risk business (Adams, 1995). The cost of bankruptcy and moral hazard are also highly associated with highly levered firms. Moral hazard could be related to increase cost of capital to the firm associated with its greater potential for insolvency and bankruptcy creates unnecessary administrative and legal costs which subsequently reduces firm value (Main, 1982). All of the above suggests that insurers with greater default risk will cede more reinsurance. It is predicted that the sign of the estimate coefficient of leverage is expected to be positive.

Hypothesis 3: Insurers with group relationship or in the same group with Banks are expected to utilize more reinsurance than stand-alone insurers.

The research on the relationship between group members and the amount of reinsurance ceded has not been encouraging until the year 2003 when Powell and Sommer came out with a research on the use of reinsurance as a source of internal or external capital markets in the insurance industry. Mayers and Smith (1990) were the first to come out with the hypothesis that there might be a significant relationship between group membership and their reinsurance demand. They suggest that specific motivations that might induce reinsurance transaction among firms in a group are factors like tax incentive, leverage and investment management. The tax incentive argument implies that reinsurance will enable the transfer of profits within the group. In so doing, it will allow the

recognition of profits and in consequence, the group taxes are reduced accordingly.

Garven and Louberge (1997) specify the motivation of transferring insurance risk from subsidiaries to its parents when there is differential tax treatment across countries. In other words, subsidiaries in high taxed countries are tempted to cede part of their risks to their parents companies in low tax countries. Powell and Sommer (2003) conclude that internal and external reinsurance are not perfect substitutes. Their two stage least squares regression results show that internal reinsurance ceded is significant and negative in the equation for external reinsurance but external reinsurance ceded is not significant in the internal reinsurance equation.

Insurers may purchase external reinsurance to take advantage of the reinsurer's comparative advantage in real service production. If sharing real service expertise adds value to the group then affiliates may benefit from each other's real service efficiencies regardless of internal reinsurance contracts. Another interesting explanation derived from Powell and Sommer (2003) is that the cost of internal reinsurance is less because of no asymmetric information problem. Assuming the individual insurers within an insurer group are being managed to maximize the value of the group as a whole, reinsurance transactions among group members should involve lower asymmetric information costs compared to transactions between an insurer and an unaffiliated reinsurer.

Is there any significant reason in explaining more reinsurance activity if insurers are part of a larger financial group which includes bank as a main contributor to the total group assets? The underlying motives, if any, is not yet explored and tested before. However, Powell and Sommer (2003) propose that for an insurer that represents only a small friction of the group's total assets, the rest of the groups might have the capacity to assume a significant portion of the insurer written premiums but our proposed hypothesis is slightly different.

We predict a positive sign in the coefficient of bank subsidiary variable. The reason is simple, banks provide loans to their customers and at the same time they need insurance protection against any default risks. To protect against this type of risk, they would then require insurer within a same financial group to underwrite a Mortgage Reduction Term Assurance (MRTA). The resulting business generated by the underwriting of the MRTA policies might lead to more reinsurance demand by the insurer and this slightly increment in reinsurance volume, if any, is contributed by the bank within the same financial group. Another reason is reinsurance usage is more likely because insurers can benefit from already available technical expertise and economy of scales of their parents' bank.

Hypothesis 4: Insurers engage reinsurance to reduce their expected tax liability

The structure of the tax code can make it advantageous for firms to take positions in reinsurance markets. If a firm's effective tax function is linear, that is, when the firm faces a constant effective marginal tax rate, then the firm's expected tax liability is unaffected by the volatility of taxable income. However, if a firm faces a convex tax function (i.e., one that is progressive), then hedging, that reduces the volatility of taxable income, reduces the firm's expected tax liability (Rawls and Smith, 1990). However, we are not very sure on the rational of including the variable tax since in Malaysia, firms are allowed to carry losses forward for up to seven years that might suggests that reinsurance might not be en efficient tool in reducing the firm's expected tax liability.

Hypothesis 5: Sufficient cash motivates more reinsurance activities as a means to increase firm's value

The variable is constructed to measure the effect of cash available to the business on the propensity of reinsurance use. Firms generally maintain some cash and cash equivalents for business transactions needs. Cash availability is a very important issue for a firm's management because it can provide internal funding for growing firms and minimize illiquidity risk, which is particularly significant in the insurance industry since insurers can be faced with large and unanticipated claims. For this reason, it is predicted that insurers with more cash available to business will tend to use less reinsurance.

Hypothesis 6: Insurers with less profit might engage in more reinsurance activities.

Generally, the lower the firm's profit, the less it is to take on various risks and therefore, firms might find it useful to hedge these risks with reinsurance. Profitable firms have less need to use reinsurance as they, for example, generate sufficient income to finance growth opportunities or to pay for unanticipated claims from retained earnings. Conversely, profitable firms have more funds to set up and run their own reinsurance department and programs. Therefore, the effect of this variable on reinsurance usage is unclear.

Methodology and Model Specification

The sample selected consisted of a total of only 17 insurers underwriting long term insurance business in Malaysia. All data are compiled from the Insurance Annual Report published by the Bank Negara Malaysia (BNM) from year 2000 to 2003. Apart from that, reinsurance figures which are not available in the Insurance Annual Report are compiled by looking at the annual Life Insurance Revenue Account of each insurer published on their websites. We have decided

to omit data for year 2004 since some of these insurers have not yet finalized their account for their respective accounting period. In order to make sure data collected are useful, two criteria need to be fulfilled. First, all insurers selected must have non-zero total premium income and non-zero actuarial reserves. Second, all insurers must be active in underwriting new business in any class of long term insurance business during the selective period.

The followings explain the methodology applied in this research and the theoretical explanations on the estimators used. The dependent variable is defined as: y = Reinsurance, where,

Reinsurance = total reinsurance premiums ceded / total gross premium

The independent variables are: X_1= leverage; X_2= taxation; X_3= cash; X_4= profit; X_5= size; X_6= bank subsidiary; X_7= group;

Analysis of Data and Conclusion

Table 1: Descriptive Statistics

Variables	Mean	Standard Deviation
lnREINS	-3.6118	0.7430
lnLEV	0.0448	0.1958
lnTAX	-4.0066	1.0616
lnCASH	19.1719	1.0770
lnPROFIT	-1.7887	0.6307
lnSIZE	20.6526	1.3360
Bank Subsidiary	0.3100	0.4670
Group	0.4400	0.5000

Table 1 provides the means and standard deviations of the variables included in this research. To avoid the problem of heteroscedasticity, we compressed the data by applying log transformation. Instead of regressing: REINS = 0.040 − 0.015 (LEV) + 0.130 (TAX) − (5.047E-11) (CASH) + 0.016 (PROFIT) + (5.574E-12) (SIZE) + 0.026 (BANK) + 0.007 (GROUP), we transformed it to:

ln (REINS) = ln[0.040 − 0.015 (LEV) + 0.130 (TAX) − (5.047E-11) (CASH) + 0.016 (PROFIT) + (5.574E-12) (SIZE) + 0.026 (BANK) + 0.007 (GROUP)]

Table 2: Summary of Regression Analysis

Independent Variables	Coefficient ( )	Standard Error	Student's t	Probability
Constant	-1.266	2.028	-0.624	0.535
lnLEV	-1.266	0.508	-2.494	0.016
lnTAX	0.001	0.082	0.007	0.994
lnCASH	-0.088	0.183	-0.482	0.061
lnPROFIT	-0.052	0.162	-0.319	0.751
lnSIZE	-0.046	0.172	-0.268	0.789
Bank Subsidiary	0.495	0.239	2.073	0.043
Group	0.266	0.229	1.160	0.251

$R^2 = 0.286$ Adjusted $R^2 = 0.197$
Durbin-Watson = 2.315
$F_{7,56} = 3.205$ Probability = 0.006 (significant at 0.05 level)

The 'reinsurance use' equation is estimated as a multivariate regression model and a number of additional diagnostic statistics is calculated. The parameter estimates and test statistics which resulted from the estimation are shown in Table 2. The significance of the regression model is tested with an F-Test. The F ratio for the multivariate regression model with seven independent variables is 3.205 and it is also statistically significant at 0.05 levels, indicating that the additional independent variables are substantial in adding to the regression model's predictive ability.

To avoid specification bias, a Durbin-Watson test is used to detect the problem of serial or autocorrelation in the residuals. Based on Table 5.5, the Durbin-Watson critical values are 2.315. Since the values obtained from the test are higher than 1.44 or 1.77, we assume that the there is no such autocorrelation problem in the model and it is also statistically significant at 5% level. Of the seven independent variables included in the model, only the estimators for leverage, cash and bank subsidiary have any significant influence on the extent of reinsurance usage by the life insurance firms in our sample. In this model, the coefficient of determination (r squared) is quite low (0.286) but the log transformation of the whole model allows us to reject the assumption of heteroskedasticity. The final output of the regression model should be interpreted as:

$$\ln REINS = -1.266 - 1.266(\ln LEV) - 0.088(\ln CASH) + 0.495(BANK\ SUBSIDIARY)$$

Implications of the Results

Firm Size

The purpose of constructing the variable LnSIZE is to determine whether firm size has any effects on the use of reinsurance. In the regression model, the estimate of the coefficient of the logarithm of total assets is negative but not statistically significant at any given level. Thus, there is no evidence to support our hypothesis that smaller insurers have a greater propensity to use reinsurance than larger insurers as proposed by Adams (1995).

Risk of Insolvency

Risk of insolvency is proxied by the leverage, InLEV, variable. In the regression model, the coefficient of the InLEV variable is negative and statistically significant at the 0.05 level. This finding would appear to contradict previous theories of reinsurance use. Previous empirical results (Mayers and Smith, 1990; Adams, 1995, Garven and Lamm Tennant, 1997) prove that leverage was positively related to reinsurance participation. Hence, higher leverage and higher expected costs of financial distress are associated with increased reinsurance usage and it appears that reinsurance is being utilized in the US and New Zealand insurance industry in order to reduce the probability of financial distress costs. Our finding shows that the level of leverage does affect the decision to use reinsurance but surprisingly, lower levered insurers are associated with more reinsurance usage.

Taxes

The existence of tax convexity has been predicted to induce insurers to use reinsurance in order to stabilize their pre-tax income. In the regression model, the estimate of the coefficient of the tax variable (InTAX) is positive and insignificant at any given level. So predictions that tax convexity induces firms to use reinsurance to stabilize pre-tax cash flows are not supported in this analysis.

Profitability

The coefficient of the InPROFIT variable is negative and insignificant at any given level. Therefore, this result does not lend any support to the view that profitability of a firm and reinsurance use is inversely related.

Cash Proportion of the Business

The rationale behind constructing cash availability variable (InCASH) is that cash available for the business could be used for expansion plans without the necessity of getting funds from the capital markets, which in turn excludes monitoring of external agencies. In addition, life insurers may be faced with unpredictable claims and therefore cash availability is very important. Financial risk management with reinsurance can reduce the volatility of insurer cash flows. The coefficient of variable InCASH is negative, as expected, and statistically significant at 0.10 levels.

Bank Subsidiary and Group Relationship

The estimate of the coefficient of the dummy variable GROUP is positive but not significant at any given level. Thus, there is no sufficient reason to support our hypothesis that group membership could motivates more intra group reinsurance usage or internal reinsurance transfer. Therefore, use of reinsurance in Malaysia does not depend on the group relationship factor.

On the other hand, the estimate of the coefficient of the dummy variable BANK is positive and significant at the 0.05 level (one-tailed test). This finding is indeed interesting because it implies that when life insurer is within the same group or a subsidiary of a bank, the reinsurance demand would be increased. Previous research on the application of derivatives in life insurers operation shows that life insurers, which are owned by banks, are more likely to use derivatives due to the informational and scale economies as well as the expertise of their parents (Radchenko, 2001). This does make sense since banks have traditionally been involved in derivatives' trading and therefore have the resources and necessary expertise to manage a portfolio of derivatives.

However, the above finding related to the derivatives application does not really make sense to support our hypothesis because reinsurance transaction is the forte of insurance companies and banks are not specialized in providing any expertise or having the resources to manage it. As explained in Chapter 4, there could be one possible reason in supporting the hypothesis. The possible theory is that the bank will enter into insurance agreements or memorandums with their affiliated insurance carriers within the same financial group that issue mortgage insurance on loans originated by the bank and this will eventually leads to more reinsurance demands by the insurers underwriting the mortgage reduction term assurance (MRTA) policies. The above reasoning, however, has not yet been supported in any other literatures related to reinsurance demand.

Conclusion

This study aimed to investigate the determinants of reinsurance demand as a tool for financial risk management by Malaysian life insurers. Life insurance industry specific hypotheses and explanatory variables are formulated. This research employs a multivariate regression model to investigate the participation decision of life insurance firms in the reinsurance market. The results of the regression model suggest that the participation decision is negatively influenced by a firm's leverage and the availability of cash but positively influenced by bank affiliation relationship.

This research however fails to find evidence that reinsurance decision is influenced by factors such as a firm's size, profitability, taxes and group memberships. The results obtained basically contradict the previous empirical evidence. The only exception to this is the result for cash availability hypothesis. In other words, the Malaysian life insurance industry does not appear to follow the previous literature. In conclusion, the findings of this research demonstrate that reinsurance does not play a major role in managing the financial risk in the Malaysian life insurance industry but is still demanded for its role in protecting the insurance companies from becoming a ruin due to unexpected adverse underwriting result and risk spreading.

The limitations of this research surround the proxies used to test the relationships hypothesized in previous literature. The low 0.286 of the r squared values show that our regression models have only limited explanatory power and future researches should try to explore new variables with higher explanatory power. Furthermore, our life insurance industry is quite small in relative to other countries and this might affects the validity of the results obtained from the regression model. Another potential limitation of this research is on the duration selected on the sample period where there could possibly be an unobserved cyclical behavior with occasionally soft or hard market periods. Indeed, the best way to overcome the problem of the industry cyclical behavior is to increase the data to many more years.

References

Adams, M.B. (1995). *The Reinsurance Decision in the Life Insurance Firm*, Working Paper, 95, Massey University, New Zealand.

Associatioon of British Insurers (2000). Insurance Statistics Yearbook 1989-1999, ABI, http://www.abi.org.uk.

Baril, C. et al. (1996). Managing Risk with Derivatives, *Management Accounting*, 78 (5), 20-27.

Carter, R.L. (1995). *Reinsurance*, 3rd edition, The Merchantile and General Reinsurance Company Plc, Reactions Publishing Group.

Colquitt, L.L. and Hoyt, R.E. (1996). Determinants of Corporate Hedging Behaviour: Evidence from Life Insurance Industry, *Journal of Risk and Insurance*, 64 (4), 649-671.

Cummins, D. et al. (1997). *Corporate Hedging in the Insurance Industry: The Use of Financial Derivatives by US Insurers*, Working Papers, The Wharton School, University of Pennsylvania.

Doherty, N. and Clifford, S. (1993). Corporate Insurance Strategy: The Case of British Petroleum, *Journal of Applied Corporate Finance*, 6 (3), 4-15.

Froot, K. et al. (1993). Risk Management: Coordinating Corporate Investment and Financing Policies, *The Journal of Finance*, 48 (5), 1629-1648.

Garven, J.R. and Lamm, T. (1997). *The Demand for Reinsurance: Theory and Empirical Test*, Economic Working Paper, Baylor University, US.

Garven, J.R. and Louberge, H. (2000). Reinsurance, Taxes and Efficiency: A Contingent Claims Model of Insurance Market Equilibrium, *Journal of Financial Intermediation*, 5, 74-93.

Hardwick, P. and Adams, M.B. (1999). The Determinants of Financial Derivatives Use in the UK Life Insurance Industry, *Abacus*, 35 (2), 163-185.

Jensen, M.C. and Meckling, W.H. (1976). Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure, *Journal of Financial Economics*, 3, 305-360.

Kramer, B. and Eije, H.V. (1993). *The Demand for Equity and Reinsurance by Non-Life Insurance Companies if Consumers React and Interest Rates Change*, Working Paper, University of Groningen.

Marc, D.C. et al. (2003). Determinants of Derivative Usage in the Life and General Insurance Industry: The Australian Evidence, *Review of Pacific Basin Financial Markets and Policies*, 6 (4), 405-431.

Mayers, D. and Clifford, S. (1981). Contractual Provisions, Organizational Structure and Conflict Control in Insurance Markets, *Journal of Business*, 54, 407-434.

Mayers, D. and Clifford, S. (1982). On Corporate Demand for Insurance, *Journal of Business*, 55 (2), 281-296.

Mayers, D. and Clifford, S. (1983). The Interdependence of Individual Portfolio Decisions and Demand for Insurance, *Journal of Political Economy*, 91 (2), 304 -311.

Mayers, D. and Clifford, S. (1986). Ownership Structure and Control: The Mutualization of Stock Life Insurance Companies, *Journal of Financial Economics*, 16, 73-98.

Mayers, D. and Clifford, S. (1987). Corporate Insurance and the Underinvestment Problem, *Journal of Risk and Insurance*, 54 (1), 45-54.

Mayers, D. and Clifford, S. (1988). Ownership Structure Across Lines of Property-Casualty Insurance, *Journal of Law and Economics*, 31, 351-378.

Mayers, D. and Clifford, S. (1990). On the Corporate Demand for Insurance: Evidence from the Reinsurance Market, *Journal of Business*, 63 (1), 19-40.

Mayers, D. and Clifford, S. (1992). Executive Compensation in the Life Insurance Industry, *Journal of Business*, 65 (1), 51-74.

Mayers, D. and Clifford, S. (1994). Managerial Discretion, Regulation and Stock Insurer Ownership Structure, *Journal of Risk and Insurance*, 61 (4), 638-655.

Modigliani, F. and Miller, M. (1958). The Cost of Capital, Corporation Finance and Theory of Investment, *The American Economic Review*, 48 (June), 261-297.

Myers, S. (1977). Determinants of Corporate Borrowing, *Journal of Financial Economics*, 5, 147-175.