International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Solvency Analysis by Business Classifications of General Insurance Industry in Malaysia

Saiful Hafizah Jaaman[a]*, Ong Cae Xinn[b]

[a]*Centre for Modelling and Data Science, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia*

[b]*Actuarial Science Programme, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia*

[a]*Email: shj@ukm.edu.my*

Abstract

A healthy and well developed insurance industry will improve the stability of an economy by transferring risks to various parties through insurance and reinsurance activities. Insurance companies' performances have direct impact on the public welfare, to the regulatory authorities and to potential investors. Insolvency within the insurance industry has become a major concern and identification of potentially troubled firms has become a major regulatory research objective. The regulatory authority of the insurance industry in Malaysia has made compulsory the employment of risk-based capital (RBC) on the insurance industry with the objective to measure the minimum amount of capital required by an insurance company to ensure the continuous solvency and smooth running of the insurer's business operations. The measurement of RBC known as the capital adequacy ratio (CAR) must be adopted by each insurance company. However, different methods are practiced by other countries in allocating RBC. The objective of this study is to evaluate the performance of different insurance policies offered by the general insurance companies using the RBC system enforced by BNM and the RBC based on Butsic method. Study uses annual financial reports data of nineteen general insurance companies in Malaysia from 2009 to 2015. Results of the capital adequacy ratio (CAR) and expected policy deficit (EPD) found that the personal accident policy to be the most profitable and ensure solvency for the general insurance companies.

Keywords: capital adequacy ratio; expected policy deficit; risk based capital; solvency.

---

* Corresponding author.

1. Introduction

Insurance companies provide unique financial services to the public and economic entities ranging from the underwriting of inherent risks to the mobilization of funds through premiums for long term investments . Insurers' role of risk absorption promote financial stability in the financial markets thus renders tranquility to economic entities. This ability to cover risk in the economy hinges on insurer's capacity to create profit or value for shareholders. A well developed and evolved insurance industry is fundamental to the nation's economic development as it delivers long-term funds for deliverables. The financial performances of insurance companies have direct implications on the public extending from policyholders to shareholders, from company employees to intermediaries, and from regulatory authorities to potential investors. Insolvency within the insurance industry has become a major issue of public debate and concern, and the identification of potentially troubled firms has become a major regulatory research objective [1]. This concern has stemmed from the perceived need to protect the general public from the aftermath of insurer insolvency and to try to minimize the costs associated to this difficulty such as the insurance guaranty funds. Therefore, the measurement and assessment of the financial performances of insurance companies are of utmost importance. To safeguard interets of all stakeholders, it is vital for insurance companies to be under stringent regulations. The solvency requirement enforced by the regulatory body protects the availability of the promised insurance protection to an acceptable degree of certainty. The solvency of an insurer is closely related to the condition of its balance sheet. Capital is the excess of assets over obligations, representing the equity of the company, or shareholders' stake. Under the Generally Accepted Accounting Principles (GAAP) capital is known as equity while under Statutory Accounting Principles (SAP) capital is called surplus. Reference [2] define risk as the potential for divergence between the actual outcome and what is expected. In insurance, risk is the uncertainty regarding loss. Management do not know what premiums to charge, nor how much to reserve, nor what investment return will be made. Both the variability and the uncertainty are important in understanding risk [3]. Risk-Based Capital (RBC) is a method used to measure the theoretical amount of capital needed to absorb the risks of conducting an insurance business. RBC was introduced by the National Association of Insurance Commissioners (NAIC) [4], a trade organisation established in 1992 in the United States. RBC is the amount of capital required to assure major parties to insolvency that the danger of failure is acceptably low. Insolvency occurs when obligations exceed assets, this condition is known as technical insolvency. In Malaysia, the increasing liberalization in the insurance industry has posed a great deal of challenges for insurance regulatory authorities in monitoring the financial soundness of insurance companies and ensuring their solvencies. This study aims to determine and compare the solvency of different line of business offered by general insurance companies in Malaysia employing two different RBC measurements, the Expected Policy Deficit (EPD) developed by [5] and the Capital Adequacy Ratio (CAR) enforced by insurance industry regulator in Malaysia, Bank Negara Malaysia (BNM).

2. Risk-Based Capital

The insurance industry in Malaysia includes life insurance, general insurance, and Islamic insurance known as Takaful. In the general insurance category, more products are offered to businesses in the commercial lines which include liability insurance, marine, aviation, engineering, burglary, and fidelity guarantee insurance. The

personal category designed specifically for the public include medical and health insurance, personal accident, travel, and motor insurance. Motor vehicle and fire insurances are the two largest classes of general insurance in Malaysia providing higher premiums registered a 1.5% growth in 2018 with gross written premiums amounted to RM 17.92 billion. Motor vehicle remained the largest line of business with a market share of 47.3% followed by Fire at 19.6% and Marine Aviation & Transit (MAT) at 7.4% [6]. The insurance industry in Malaysia began applying the risk based capital system since 2009. The RBC system tests the solvency of an insurance company through the Capital Adequacy Ratio (CAR) measurement. CAR measures the adequacy of the capital available for the insurer in two respective funds, insurance and shareholders, in supporting the total capital required. Malaysian insurance regulator has set a supervisory target capital adequacy rate of 130% for an insurance company to be considered solvent in terms of financial position else the regulator will intervene at the earliest stages of financial difficulties faced by the insurer. The Expected Policy Deficit (EPD) was developed by Butsic whom introduce a method of RBC that identifies the capital and risk to measure the solvency of an insurance company. EPD measures the insolvency risk whereby a standard minimum level of protection can be applied to all classes of policyholders and insurers. Based on Butsic, the relevant measure of solvency is the present value of the expected policyholder deficit as a ratio to the expected loss. EPD thus computes the difference between the expected amount payable by the insurance company and the actual amount of claims paid to the policyholder. EPD can be applied equally to all risk elements, whether assets or liabilities. Policyholder is guaranteed a consistent minimum level of protection by requiring insurer to maintain adequate capital to meet or exceed a common expected policyholder deficit ratio level. There are limited studies on the financial performance of insurance companies in Malaysia. No study has been done to examine financial performance by business classifications. Reference [7] employed Risk-Based Capital, margin of solvency, and claim paying ability of Rating Agency Malaysia to evaluate the soundness of conventional and Takaful operators concluded that insolvency was not a major problem for life insurers. According to [8], solvency margin has a significant negative effect on the performance of general insurer and Takaful operators. Reference [9,10] discussed the elements of Total Capital Available (TCA), TCA is the excess of assets and liabilities with assets being represented by the size of firm, concluded that measurement of solvency target large insurance firms. Reference [11] created an early warning system for solvency prediction by applying Artificial Neural Network and found that the model could be used to predict insolvency. Reference [12] examined the Malaysian RBC framework against seven objectives set by [13] and four additional objectives developed by [14]. They concluded that Malaysian RBC fully satisfy four objectives and partially satisfy three objectives. Results of these studies show that Risk-Based Capital framework is effective at preventing Malaysian insurers from becoming insolvent. Reference [15] concluded that insurance data by line of business could serve to be useful for insurance companies to identify low trading and risky products, thus be able to take necessary preventive measures before company breaches solvency capital requirements.

3. Data and Methods

3.1 Data

The coverage period for general insurance policies is for one year with premiums paid on a one-time basis. There are twenty-two licensed general insurance companies in Malaysia in 2019. For this study, data of nineteen

general insurance companies that have not been taken over or merged that are operational through the years 2009 to 2015 are collected. The general insurance companies investigated in this study are presented in table 1. Table 2 classify the general insurance companies by business classification. General insurance companies' data is collected from the Annual Financial Report.

Table 1: List of General Insurance Companies

1.	AIG Malaysia Insurance Berhad	11.	Lonpac Insurance Berhad
2.	AXA Affin General Insurance Berhad	12.	MPI General Insurance Berhad
3.	Allianz General Insurance Company (Malaysia) Berhad	13.	MSIG Insurance (Malaysia) Bhd
4.	AmGeneral Insurance Berhad	14.	Overseas Assurance Corporation (Malaysia) Berhad
5.	Berjaya Sompo Insurance Berhad	15.	Pacific & Orient Insurance Co. Berhad
6.	Chubb Insurance Malaysia Berhad	16.	Pacific Insurance Berhad
7.	Danajamin Nasional Berhad	17.	Progressive Insurance Berhad
8.	Liberty Insurance Berhad	18.	QBE Insurance (Malaysia) Berhad
9.	RHB Insurance Berhad	19.	Tune Insurance Malaysia Berhad
10.	Tokio Marine Insurance (Malaysia) Berhad		

Table 2: Business Classification of General Insurance Companies

Type of Insurance	**General Insurance Companies**
Motor Vehicle	AIG, Allianz, AmGeneral, AXA Affin, Berjaya Sompo, Chubb, Liberty, Lonpac, MPI, MSIG, Overseas, Pacific & Orient, Progressive, QBE, RHB, The Pacific, Tokio Marine, Tune
Fire / Houseowner / Householder	Allianz, AXA Affin, Berjaya Sompo, Liberty, Lonpac, MPI, Overseas, Progressive, QBE, RHB, The Pacific, Tokio Marine, Tune
Combination	AIG, Chubb, Progressive, QBE, The Pacific, Tokio Marine, Tune
Personal Accident	Liberty, Pacific & Orient, Progressive

Four main business classifications that are examined are motor insurance, fire/houseowner/householder insurance, personal accident insurance and combination of various insurance. By Malaysian law, motor insurance is mandatory to all vehicles using Malaysian public roads. The basic fire insurance protects building from loss or damage caused by fire and lightning. There are three types of fire insurance policies offered; the basic or extended fire insurance, to include houseowner policy, to include householder policy. An insured may opt to take the *All Risk Policy* that provides comprehensive coverage. Unlike life insurance, personal accident insurance is an annual policy that provides compensation in the event of injuries, disability or death caused by accident, violent and other events.

3.2 Capital Adequacy Ratio (CAR)

The RBC system in Malaysia employs the capital adequacy ratio (CAR) to measure the solvency level of an

insurance company. The CAR is expressed as:

$$\text{CAR} = \frac{\text{Total Capital Available (TCA)}}{\text{Total Capital Required (TCR)}} \times 100\% \quad (1)$$

The TCA comprises total equity where the TCR is the sum of credit risk capital charges, market risk capital charges, insurance liability risk capital charges and operational risk capital charges. The CAR is used to assess the financial strength with BNM imposing a minimum supervisory target capital level of 130%. The risk based capital adequacy ratio consists of total capital available (TCA) and total capital required (TCR). There are four capital charges under TCR as shown below.

$$\text{TCR} = \sum \begin{bmatrix} \text{Credit risk capital charges} \\ + \quad \text{Market risk capital charges} \\ + \quad \text{Liablity risk capital charges} \\ + \text{ Operational risk capital charges} \end{bmatrix} \quad (2)$$

Credit Risk Capital Charges (CRCC) focuses to mitigate risk of losses resulting from assets default and related loss of income, and the inability or unwillingness of a counter-party to fully meet its contractual financial obligations. Market Risk Capital Charges (MRCC) focuses to mitigate risks of financial losses arising from the reduction of market value of assets and the non-parallel movement between the value of liabilities and the value of assets backing the liabilities due to interest rate movement. Liabilities Risk Capital Charges (LRCC) focuses to address risks of under-estimation of the insurance liabilities and adverse claims experience developing over and above the amount reserves already provided related to claims or unexpired risks. Currently the actuarial computation is set at the 75% level of confidence. The Operational Risk Capital Charges (ORCC) focuses to mitigate the risk of losses arising from inadequate or failed internal processes, people and systems (Aida and his colleagues 2016).

3.3 Expected Policy Deficit (EPD)

EPD represents the expected value of the losses that will not be covered with a given amount of capital or surplus. EPD does not just measure the probability of insolvency, but it also measures how severe the insolvency might be. The EPD approach to solvency thus is more focused on the costs transferred to other insurers than on the reliability of claim payments to claimants. Butsic assumed that EPD for all insurers to be consistent at 5%. The EPD calculation is given as:

$$\text{EPD} = \frac{\text{Loss reserve} + \text{Claims paid}}{\text{Loss reserve}} \quad (3)$$

In addition, the capital ratio per loss is also determined. This ratio provides the capital that needs to be allocated for a given loss. A smaller capital ratio per loss value indicates good company performance, vice versa. Both the EPD and capital ratio per loss are the tools employed under the Butsic methods to measure the solvency and financial performance of the general insurers. A negative EPD indicates that the general insurance company's claims payment exceed its premiums collected. This will lead to the capital ratio per loss value to be greater than

1, implying that company needs to allocate a higher amount of capital for a given claim.

4. Findings

4.1 Solvency Based on Capital Adequacy Ratio (CAR)

Based on the Capital Adequacy Ratio, *Bank Negara Malaysia,* which is the Central Bank of Malaysia and the insurance industry regulator, has set the minimum capital target level of an insurance company to be at 130% based on the Capital Adequacy ratio. Table 3 presents the solvency level based on CAR for the nineteen general insurers examined in this study.

Table 3: Percentage of Solvent and Insolvent General Insurers

	Year						
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Solvent (%)	22.22	18.18	56.25	44.44	47.06	50.00	33.33
Insolvent (%)	77.78	81.82	43.75	55.56	52.94	50.00	66.67

In 2009 when RBC was first imposed only about 22% of the general insurers were categorized as solvent while the other 77.8% fell under the insolvent category. The solvency level only improves following the consolidation orchestrated by BNM after the financial crisis, in 2011 56.25% of the insurance companies recorded CAR above 130%.

Table 4: Percentage of Solvent and Insolvent Insurers Based on Type of Insurance Products

Year	**Performance**	**Type of Insurance**			
		Motor Vehicle	**Fire / Houseowner / Householder**	**Combination**	**Personal Accident**
2009	Solvent	22.22	12.50	20.00	-
	Insolvent	77.78	87.50	80.00	-
2010	Solvent	18.18	10.00	33.33	50.00
	Insolvent	81.82	90.00	66.67	50.00
2011	Solvent	56.25	46.15	57.14	100.00
	Insolvent	43.75	53.85	42.86	0.00
2012	Solvent	44.44	38.46	28.57	100.00
	Insolvent	55.56	61.54	71.43	0.00
2013	Solvent	47.06	30.77	42.86	100.00
	Insolvent	52.94	69.23	57.14	0.00
2014	Solvent	50.00	38.46	57.14	100.00
	Insolvent	50.00	61.54	42.86	0.00
2015	Solvent	33.33	30.77	28.57	66.67
	Insolvent	66.67	69.23	71.43	33.33
Average	Solvent	38.78	29.59	38.23	73.81
	Insolvent	61.22	70.41	61.77	11.90

Over the years from 2009 to 2015 the only line of business that is profitable to insurance companies and able to

assist insurers in strengthening solvency is the personal accident insurance with over 70% of companies selling the personal accident product line maintaining solvency. From the years 2011 to 2015 the personal accident line of business is 100% solvent based on CAR. On the other hand, insurance products under the motor vehicle, fire and combination categories fall below the solvency target level indicating that companies should increase the amount of capital hold to be able to offer these line of businesses comfortably.

4.2 Solvency Based on Expected Policy Deficit (EPD)

Table 5 gives the solvency results for the years 2009 to 2015 for all general insurers employing the expected policy deficit method developed by Butsic.

Table 5: Percentage of Solvent and Insolvent General Insurers

	Year						
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Solvent (%)	27.27	25.00	40.00	58.82	61.11	66.67	77.78
Insolvent (%)	72.73	75.00	60.00	41.18	38.89	33.33	22.22

Similar to CAR findings, the EPD results too show that companies were categorized as insolvent in the earlier years before risk-based capital was imposed. As shown in Table 5, in 2009 only about 27% insurers were considered solvent compared to 73% that fell into the insolvent category. The level of solvency increases starting from year 2012 onwards. Table 6 provides the findings produced by EPD by type of insurance business.

Table 6: Percentage of Solvent and Insolvent Insurers Based on Type of Insurance Products

Year	**Performance**	**Type of Insurance**			
		Motor Vehicle	**Fire / Houseowner / Householder**	**Combination**	**Personal Accident**
2009	Solvent	27.27	30.00	0.00	100.00
	Insolvent	72.73	70.00	100.00	0.00
2010	Solvent	25.00	27.27	0.00	50.00
	Insolvent	75.00	72.73	100.00	50.00
2011	Solvent	40.00	33.33	14.29	66.67
	Insolvent	60.00	66.67	85.71	33.33
2012	Solvent	58.82	58.33	33.33	66.67
	Insolvent	41.18	41.67	66.67	33.33
2013	Solvent	61.11	53.85	14.29	66.67
	Insolvent	38.89	46.15	85.71	33.33
2014	Solvent	66.67	61.54	14.29	66.67
	Insolvent	33.33	38.46	85.71	33.33
2015	Solvent	77.78	76.92	42.86	66.67
	Insolvent	22.22	23.08	57.14	33.33
Average	Solvent	50.95	48.75	17.01	69.05
	Insolvent	49.05	51.25	82.99	30.95

Results of the Expected Policy Deficit show that motor vehicle and personal accident line of businesses are able to survive through the years from 2009 to 2015. This suggest that these two type of insurance policies are able to generate sufficient premiums in order to pay incurred claims. The findings also indicate that general insurance companies fare better selling designated products to a specified type of clients. The Capital Adequacy Ratio and Expected Policy Deficit solvency measures are complementary methods to ensure financial stability of the insurance industry. Capital Adequacy Ratio is a tool of Risk Based Capital that acts a means to supervisory regulators to discipline financially weak insurance companies. On the other hand, Butsic's Expected Policy Deficit provides insight on longer term risk by slicing risks into one-year time horizon in order to address the risks effectively and to calibrate capital each year to the target EPD. Thus, any capital inadequacy short of total exhaustion that has emerged during a year can be corrected at the end of that particular year. This will ensure potential exposure to capital exhaustion at the start of each successive one-year time horizon is maintained at the target level. This will allow insurance companies to take necessary actions before any intervention by the regulators.

5. Conclusion

The financial performance of the insurance industry reflect the growth ability of a country. Insolvency risk occurs when assets become insufficient for an insurance company to meet its contractual and other financial obligations. Insurer insolvency exposes claimants and policyholders to an unexpected financial loss and may potentially be associated with considerable personal and economic cost. Further, the insurance industry is built on policyholder confidence that insurance contracts will be fulfilled and eligible claims paid. Insurer insolvency may therefore lead to reduced confidence in financial institutions. Having an outlook on which line of general insurance business would be profitable and assist in maintaining solvency would be an advantage. In this study the Capital Adequacy Ratio imposed by Malaysian regulator and the Expected Policy Deficit developed by Butsic are employed to evaluate the solvency level of general insurance companies in Malaysia by line of products offerred. These two complementary methods use different risk components should be used jointly to measure the solvency level of insurance companies. Results of both methods found that the personal accident policy to be the most profitable and ensure solvency for the general insurance companies. Results are mixed for the motor vehicle insurance, EPD measurement indicates that motor vehicle line of business is able to provide premiums and warrant solvency while results of CAR suggest that more capital is needed for the motor vehicle insurance to stay viable. For the past thirty years Malaysia's motor insurance premium had been standardized according to a tariff structure. However since July 2017 Malaysia implement motor detariffication which means that insurance companies are free to set prices based on the risk-based pricing commensurate to the risk profile of insured and insurance policies offered.

The detariffication is believed will induce the growth of the motor vehicle insurance and encourage insurance companies to introduce creative and economical insurance products. Further research would be to examine on the factors that may steer towards risk of insolvency, be it financial and non-financial determinants. Identifying factors which could lead to solvency issues will assist in providing an early warning frame work. Improvements in solvency supervision of insurance companies can be achieved through better understanding of the causes of insolvency.

References

[1] Brockett, P. L., W. W. Cooper, L. L. Golden, and U. Pitaktong, 1994, A Neural Network Method for Obtaining an Early Warning of Insurer Insolvency, Journal of Risk and Insurance, 61: 402-424.

[2] Bodie, Z., Kane, A. & Marcus, A, Jain R. 2014. Investments. McGraw-Hill Asia Global Edition: Singapore.

[3] Hooker, N.D., Bulmer, J. R., Cooper, S.M., Green, P.A.G., Hinton, P.H. 1996. Risk-Based Capital in General Insurance. British Actuarial Journal 2 (2): 265-323.

[4] Barth, M.M. 2000. A comparison of risk-based capital standards under the expected policyholder deficit and the probability of ruin approaches. The Journal of Risk Finance 67(3): 397 – 413.

[5] Butsic, R.B. 1994. Solvency measurement for property-liability risk-based capital applications. The Journal of Risk and Insurance 61(4): 656-690.

[6] Persatuan Insurans Am Malaysia. (2019). General Insurance Industry Grew 1.5% in 2018. www.piam.org.my. 6th July 2019

[7] Yakob, R., Yusop, Z., Radam, A., & Ismail, N. (2012). Camel Rating Approach to Assess the Insurance Operators Financial Strength. Jurnal Ekonomi Malaysia, 46(2), 3-15.

[8] Ismail, M. (2013). Determinants of financial performance: The case of general takaful and insurance companies in Malaysia. International Review of Business Research Papers, 9(6): 111-130.

[9] Jaaman, S.H., Ismail, N., & Majid, N. (2007). Assessing risk and financial strength of general insurers in Malaysia. Journal of Quality Measurement and Analysis, 3(1): 65-73.

[10] Lazam, N.M., Tafri, F.H., & Shahruddin, S.N.S.S.M. (2012, September). Impact of the Risk Based Capital implementation: A case study on an insurance company in Malaysia. In Statistics in Science, Business, and Engineering (ICSSBE) International Conference

[11] Chiet, N.S., Jaaman, S.H., Ismail, N., & Shamsuddin, S.M. (2009, December). Insolvency prediction model using artificial neural network for Malaysian general insurers. In World Congress on Nature & Biologically Inspired Computing, 2009. NaBIC 2009: 584-589. IEEE.

[12] Aida Y.Y., Wee Y.L., Ahmad F.O. 2016. A critical analysis of the Malaysian Risk Based Capital framework: A comparison between General Insurance and Takaful. Institutions and Economics 8 (4): 23-41.

[13] Cummins, J.D., Harrington, S., & Niehaus, G. (1993). An economic overview of risk-based capital requirements for the property-liability insurance industry. Journal of Insurance Regulation, 11(4): 427-447

[14] Holzmüller, I. (2009). The United States RBC standards, Solvency II and the Swiss solvency test: a comparative assessment. The Geneva Papers on Risk and Insurance-Issues and Practice, 34(1), 56-77.

[15] Mafimisebi, O. P. 2018. Risky business: Data on trading results for UK general insurance firms during and after the global financial crisis. Data in Brief, 21: 2384-2389