A Critical Analysis of the Malaysian Risk-Based Capital Framework: A Comparison between General Insurance and Takaful

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Abstract: *This paper aims to critically analyse the Malaysian solvency system by comparing the existing Risk-Based Capital (RBC) framework for Conventional and Takaful against the seven specific objectives of the original US Risk-Based Capital which was introduced in 1994. In addition, the Malaysian Risk-Based Capital framework is also assessed against the four extended objectives developed by Holzmüller in 2009. The critical evaluation results indicate that the Malaysian Conventional and Takaful Risk-Based Capital frameworks have various shortcomings from both qualitative and quantitative aspects. The framework only fully meets three out of seven objectives of the US Risk-Based capital framework and fulfils one out of four additional objectives developed in 2009: Malaysia's Risk-Based Capital framework only fulfils the following: the appropriate incentive for capital expansion, measurement of economic values of assets and liabilities, sound financial reporting and assessment of management. As a consequence, it is clear that the current one-size-fits-all approach must be reviewed to improve the Malaysian RBC Framework in view of different sizes and assets of existing firms in the industry.*

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JEL classification: G2, L5, O2

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1. Introduction

As an important component of the evolving financial services industry, insurance is one the most regulated industries in the Asian region. Likewise, in Malaysia, the insurance sector is under the purview of Bank Negara

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Malaysia (BNM). However, due to its dual business models i.e. the Conventional Insurance and Takaful, both entities fall under different laws. The Conventional Insurance is regulated under the Malaysian Insurance Act (1996) while the Takaful is regulated by the Malaysian Takaful Act (1984). Basically, the law provides for licensing and regulation of insurance businesses such as insuring broking business, adjusting business and other related purposes. According to Lai (2011), in order to maintain stability and financial soundness of the insurance industry, BNM has adopted a risk-based supervision approach for insurers including Takaful. Risk-based supervision involves the regulatory authorities who focus on aspects of the financial system which cause the greatest risk to its stability. The nature and level of supervisory activity of insurance are conducted by profiling risk and assessment of risk management. By focusing on risks, BNM can detect potential risks that will jeopardise the stability of the financial system. Through the regulatory and surveillance units of BNM, practice note, guidelines and standards that cover various aspects such as valuation of assets and liabilities, solvency regulations, risk management practices were introduced as part of the legal framework to provide guiding principles in monitoring insurance and Takaful companies. Ensuring insurers' solvency has always been a focal point of regulation, and BNM uses various methods to promote insurers' financial strength and protect policyholders from losses due to insolvency.

At present, the literature on the effectiveness of the Malaysian Risk-Based Capital is scarce. Risk-Based Capital (RBC) is defined as the minimum amount of capital that an insurer should hold based on the degree of risks it bears to protect its customers against adverse development. Generally, the risk-based capital model is a factor-based model which aggregates the chosen risk types that are faced by insurers. A single number is then produced to represent the capital level required to cushion against unexpected losses of insurers. An interesting fact about the Malaysian insurance industry is that since the implementation of Risk-Based Capital framework, there has been no case of regulatory action reported. Certainly, there has not been any worst case of insolvency reported. This could be attributable to Malaysia's strong institutional framework related to its financial sector as Malaysian life and general insurers have a strong financial condition with Capital Adequacy Ratio way above the supervisory level of 130%. Despite this, a study done by Yakob, Yusop, Radam, and Ismail (2012) shows there could be potential risk as they found three insolvent companies detected under the CAMEL approach.

On the other hand, studies from US Risk-Based Capital provide a different view. According to Cummins, Harrington, and Klein (1995) and Lin, Lai, and Powers (2014), risk-based supervision does not guarantee the soundness and safety of the insurers' financial condition. Cummins et al.

(1995); Cummins, Grace, and Phillips (1999); Cummins and Phillips (2009) and, Cheng and Weiss (2012) state that US RBC is not a good predictor of insolvency. In addition, Lin et al. (2014) claim that US RBC regulation is ineffective in ensuring poorly capitalised insurer to limit its risk taking; it is worsened by US RBC regulation inability to intervene and take corrective measure. Thus, this brings into question how effective is the Malaysian Risk-Based Capital and what makes it so different from US Risk-Based Capital, of which BNM used as a foundation to develop its own solvency framework. Therefore, determining the factors that contribute to the financial strength of Malaysian insurers is vital.

This study aims to analyse the Malaysian RBC framework against seven objectives set by Cummins, Harrington, and Niehaus (1993). They had developed the first conceptual framework to evaluate Risk-Based Capital criteria that can be used by different stakeholders of insurance company. The Risk-Based Capital standards are based on an analytical review of an insurer's insolvency risk and outlines major principles and purposes behind the solvency regulation. In addition to the seven (7) criteria set by Cummins et al. (1993), the Malaysian Risk-Based Capital is analysed against additional objectives proposed by Holzmüller (2009). This is to cater to current changes and trends involving the insurance market that has become more risk-sensitive.

This paper contributes to the extant literature by reviewing critically the Risk Based Capital Framework in order to improve the Malaysian solvency system, namely its regulation and supervision, for the benefit of all stakeholders. The rest of the paper is outlined as follows. Section 2 provides review of main literature on Malaysian Risk Based Capital framework, Section 3 assesses the Malaysian Risk Based Capital framework against the objectives set by Cummins et al. (1993) and Holzmüller (2009) while Section 4 provides findings of the assessment. The final section concludes the paper.

2. Literature Review

2.1 Development of Risk-based Capital

The solvency regulation consists of requirements related to reserves, restrictions on investment and capital and other financial matters. Among these, capital requirement receives significant attention as solvency concerns the minimum capital requirement. In the past, regulatory requirement on capital is just a fixed minimum amount of capital. This approach has been adopted by many countries such as Solvency I for European Union in 2002, Thailand in 2007 and Singapore in 2010. In Malaysia, the traditional capital adequacy requirement is formerly known as the margin of solvency which came into effect in 2006. The fixed minimum amount of capital or better

known as "one-size-fits-all" approach has evolved and been implemented around the world, but few studies have been conducted into its effectiveness. Cummins and Phillips (2009) report that EU Solvency I does not consider the risk differences among lines of insurance while Pichet (2007) finds that the traditional approach does not reflect asset allocation and asset mix of an insurance company and does not reward good risk management practices undertakes by an insurer. To date, the traditional approach becomes irrelevant due to these reported weaknesses. With the advancement of capital adequacy regulation, a new risk-based capital requirement was developed.

The development of risk-based capital requirement was initiated by Canada in 1985 and followed by the US in the 1990s. Since then, this new risk-based capital adequacy requirement continues to evolve as it could address the risk profile of insurance companies compared with the previous traditional approach. In Southeast Asia, the first country that implemented the risk based capital requirement was Indonesia in 1999, followed by Singapore in 2004. In Malaysia, the Risk-Based Capital framework for conventional insurer was launched in 2009 while the Takaful Risk-Based Capital framework was introduced in 2014. Meanwhile, European Union applied the fixed minimum amount of capital by replacing Solvency I with Solvency II in 2012.

Over the years, the risk-based capital model has proven to be the most popular method in identifying insolvency cases. Many studies predicted insolvency of insurance companies using Risk-Based Capital ratio (Grace, Harrington & Klein, 1993; Cummins et al., 1995; Cheng & Weiss, 2012) while some studies compared Risk-Based Capital models with previous solvency systems (Bratton, 1994; Holzmüller, 2009). Pottier and Sommer (2002) compared the accuracy of various Risk-Based Capital models while Cummins et al. (1999) developed a new approach in determining risk-based capital.

Cummins et al. (1993) developed an economic overview of Risk-Based Capital requirements with the objective to provide a conceptual framework for policymakers. This concept is set as a benchmark for the policymakers to analyse their Risk-Based Capital framework. There are seven objectives to be fulfilled where any Risk-Based Capital framework should provide incentive for weak companies and able to identify the highest cost company. Furthermore, the framework should have a mechanism for any misreporting of the document and the formula for capital adequacy under the framework should cover and proportioned to major risks, reflects economic value and be as simple as possible.

Doff (2008) analyses the Solvency II with respect to the work of Cummins et al. (1993) while Holzmüller (2009) also reports a thorough evaluation on the Solvency II, US Risk-Based Capital and Swiss Solvency Test against the same criteria. Based on the analysis, Doff (2008) concludes

that Solvency II satisfied most of the criteria. The same conclusion is also drawn by Holzmüller (2009). Despite that, US Risk-Based Capital also fails in most of the other criteria. Among its weaknesses are:

   i.   The Risk-Based Capital formulation rewards insurer that holds lower reserves, which could lead to a reduction in capital requirement and a higher insolvency risk;

   ii.   The US Risk-Based Capital is not risk sensitive as capital charges do not reflect the risk of business written;

   iii.   The US Risk-Based Capital does not work in the stochastic nature, imbalance weighted capital requirement and omit any correlation. Its time horizon for property & liability is one year, which does not take into account the long term claims and Incurred but Not Reported claims (IBNR);

   iv.   The Risk-Based Capital requirement is not dependent on the risk assessment of insurer but the size of the company; and

   v.   The US Risk-Based Capital adopts a factor-based approach with the application of historical statutory value instead of net-worth or market value.

Compared with Solvency II and Swiss Solvency Test, the calculation of individual risk charges is simpler even though it requires a longer data set. In addition, Holzmüller (2009) adds four more criteria to reflect current economic conditions and advancement in the global insurance industry. First objective relates to the adequacy of capital in economic crises and anticipation of systemic risk: Solvency regulation should anticipate systemic risk and prevent the insurance industry from being trapped in a vicious cycle when economic crises occur.

Next is the assessment of management: A solvency system should take into consideration ''soft'' factors which include management capabilities. The third objective is on flexibility of framework over time: A model should be flexible with regards to its general concept and to its parameters. Empirical insights and theoretical development, such as new models and concepts should lead to continuous improvement. The final objective is to strengthen the risk management and market transparency: Solvency regulation should require insurers to handle the predominantly quantitative risks with sound risk management. Increased market transparency will, in the long run, reduce the need for regulation. Again, US Risk-Based Capital fails the additional criteria. The advantages that Solvency II and Swiss Solvency Test possess compared with Risk-Based Capital are the use of internal model (fits the insurer risk profile), the estimation of asset and liability based on market value, and public disclosure that foster market transparency.

So far, there has been no study done that reviewed the Malaysian RBC against the conceptual framework set by Cummins et al. (1993). However, there are few studies on the solvency issue of insurance companies in Malaysia. Yakob et al. (2012) measured the soundness of conventional and Takaful operators using Risk-Based Capital, margin of solvency and claim paying ability of Rating Agency Malaysia. Data from 22 insurance firms from 2003 to 2007 were collected and analysed using balanced panel data and generalised least square model. The study concluded that insolvency was not a major problem for life insurers. Yakob et al. (2012), assess the insurer's financial strength using the CAMEL approach on 20 life insurers and Family Takaful operators from 2003 to 2007 and detected 3 insolvent companies. Likewise, Chiet, Jaaman, Ismail, and Shamsuddin (2009) applies Artificial Neural Network to create an early warning system for solvency prediction and find that the model can be used predict insolvency. According to Ismail (2013), solvency margin has a negative and significant effect on the performance of general insurer and Takaful operators. All these results show that Malaysian Risk-Based Capital framework is effective at preventing an insurance company from becoming insolvent.

2.2   Malaysian Risk-Based Capital Framework

2.2.1 Conventional risk based capital

Risk-based capital is defined as the minimum theoretical amount of capital based on the degree of risk taken by an insurance company that an insurer should hold to protect customers against adverse developments. Generally, the risk-based capital model is entirely factor-based model which aggregates the chosen various risk types faced by insurers. A single number is then produced to represent the capital level required to cushion against unexpected losses of insurers.

The Risk Based Capital (RBC) Framework for conventional insurers introduced in 2009 by Bank Negara Malaysia (BNM) concentrated on financial risks such as credit, market, underwriting and concentration risk. As the insurance industry is evolving and moving to a developed market, the RBC framework needed a revamp in terms of risks which were not specified by the earlier framework. Thus, in 2011, BNM introduced the enhanced RBC framework with broad risks to be managed. Based on the documents issued by BNM, the revised RBC focuses on credit risks (assets default and failure of counter-party), market risks (reduction in assets market value and non-parallel in asset-liability), liability risk (insurance liabilities underestimation and adverse claims experience) and operational risk (failed system and human capital process). According to Frenz and Soualhi (2010), the principles of the framework are as follows:

Figure 1: The principles of risk based capital
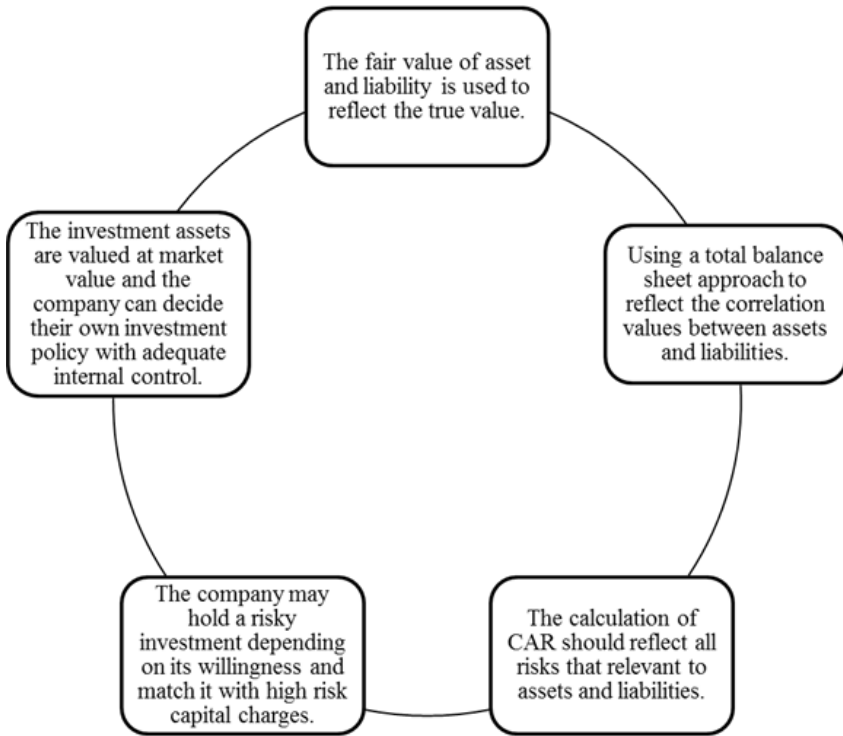
Source: Frenz & Soualhi (2010).

2.2.2 Takaful risk based capital

Takaful Malaysia was established in 1984 wherein it first introduced Islamic insurance (Takaful) in Malaysia. Currently there are 15 Takaful operators in Malaysia. In 2010, new operational and valuation guidelines were issued in order to improve the Takaful regulatory framework. Further, in 2011, the first draft of Risk-Based Capital Guidelines for Takaful Operators was issued and took effect on 1 January 2014. This framework is part of a requirement for solvency under the Islamic Financial Services Board (IFSB) "Standard for Solvency Requirements in Takaful Undertakings" (E&Y, 2012). The RBC for Takaful Operators is similar to its counterpart in the following areas:

   i.   BNM imposes 130% minimum supervisory target capital level or Capital Adequacy Ratio (CAR) to assess the financial strength at an operational level.

  ii.   The management of Takaful operators must set an individual capital level target that matches the risk profiles and risk management practices. The dividend pay-out is available if the target capital level is achieved.

 iii.   Similar to a conventional insurer, the risk-adjusted capitalisation or the available capital is based on Tier 1 and Tier 2 categories (Odierno, 2010).

 iv.   The main difference of Takaful from conventional RBC is the introduction of "qard" or interest-free loan from the Shareholder's fund in any event of shortage in the Participant's Risk Fund (PRF). This would enable the PRF to meet its obligations.

2.2.3 Capital adequacy ratio

Each insurance company and Takaful operator is classified based on Capital adequacy Ratio (CAR) which is expressed as:

$$CAR = \frac{TCA}{TCR}$$

Where TCA is total capital available and TCR is total capital required. The TCA comprises total equity whereas TCR is the sum of credit risk capital charges, market risk capital charges, insurance liability risk capital charges and operational risk capital charges. These charges must be determined at a funding level. The CAR is used to assess the financial strength with BNM imposing a minimum supervisory target capital level of 130%. The same methodology and assumptions as outlined in the RBC requirements for conventional business have been used to determine each of these capital charges which were drafted for Takaful business.

Figure 2 illustrates the Malaysian Risk Based Capital Framework for both Conventional and Takaful Operators. Based on Figure 2, the risk based capital adequacy ratio consists of total capital required (TCR) and total capital available (TCA). There are four capital charges under TCR. Credit Risk Capital Charges (CRCC) aims 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) aims 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.

Figure 2: Malaysian risk based capital framework
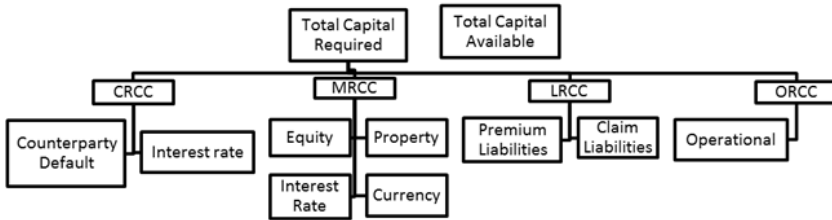
Notes: CRCC-Credit risk capital charges, MRCC-Market risk capital charges, LRC-Liability risk capital charges and ORCC-Operational risk capital charges.

Liabilities Risk Capital Charges (LRCC) aims 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. The RBC is currently setting the actuarial computation at the 75% level of confidence. Operational Risk Capital Charges (ORCC) aims to mitigate the risk of losses arising from inadequate or failed internal processes, people and systems.

3.   Framework of Analysis

This section discusses the criteria used to assess the Malaysian Risk-Based Capital framework. This paper uses the criteria established by Cummins et al. (1993) and further compares the Malaysian Risk Based Capital framework with additional criteria set by Holzmüller (2009).

3.1 Risk Based Capital Assessment Framework

According to Cummins et al. (1993), "*a well-designed risk-based capital system must achieve an appropriate balance among a number of specific objectives related to risk measurement and market responses to risk-based capital requirements*". The Risk Based Capital formulation should be closely reflecting the outcome of competitive market when asymmetric information is available. Our goal is to evaluate the Malaysian RBC and assess the advantages and disadvantages of the framework according to specific objectives set as follow:

Objective 1:   The risk-based capital formula should provide incentives for weak companies to hold more capital and/or reduce their exposure to risk without significantly distorting the decisions of financially sound insurers.

Objective 2:   The risk-based capital formula should reflect the major types of risk that affect insurers and be sensitive to how these risks differ across insurers.

Objective 3:   The risk-based capital charges (or weights) for each major types of risk should be proportional to their impact on the overall risk of insolvency.

Objective 4:   The risk-based capital system should focus on identifying insurers that are likely to impose the highest risk of insolvency.

Objective 5:   The formula and/or the measurement of actual capital should reflect the economic values of assets and liabilities wherever practicable.

Objective 6:   To the extent possible, the risk-based capital system should discourage underreporting or loss of reserves and other forms of manipulations by insurers.

Objective 7:   The formula should avoid complexity that is of questionable value in increasing accuracy of risk measurement.

Holzmüller (2009) added four more objectives to the universal Risk Based Capital objectives. The aim was to capture the dynamic relationship between the financial players in capital markets.

Objective 8:   Adequacy in economic crisis and anticipation of systematic risk.

Objective 9:   Assessment of management.

Objective 10:   Flexibility of framework over time.

Objective 11:   Strengthening risk management and market transparency.

The following section reports the findings of this paper.

4.   Findings

The assessment of the Malaysian risk based capital against the 11 objectives established as the criteria is as follows:

4.1   *Provide Incentive for Weak Companies*

One of the Risk-Based Capital goals is to provide incentives for weak insurers to hold more capital or to reduce risk exposure when their financial state is at stake (Holzmüller, 2009). Policyholders, in order to protect their interest, demand insurers to hold more capital to avoid insolvency. However,

the increase in capital hold should be parallel to increase in risk exposure, based on theory of risk and capital (Merton & Perold, 1993).

The Malaysian Risk-Based Capital fulfils this objective of appropriate incentives. Each capital charge will be calculated based on risk charges set by Bank Negara Malaysia which allows the increase of capital requirement based on the increase in exposure of risk. For example, the liability risk charge is applicable on both claim liabilities and premium liabilities where the risk charges for marine, aviation and professional liability (high severity risks) are determined by the highest value (45%). According to Cummins et al. (1993), the RBC requirements need to be set at adequate and optimal level because if otherwise, it will have no effect on insolvencies while setting it too high will affect financially sound insurers. Bank Negara Malaysia fixed the minimum supervisory Capital Adequacy Ratio at 130%, which for conventional insurer stood at 220.7% in 2013 (The Star, 2014).

4.2 The Formula Should Cover Major Risks

Under this objective, the Risk Based Capital formula should cover all major types of risk and accurately measured. The formula should also be sensitive to all segments of the insurance industry. The major types of risk include market, credit, operation, underwriting, catastrophe risks, liquidity and business or strategic. (Holzmüller, 2009).

The Malaysian Risk Based Capital is a one-size-fits-all framework that is applicable to all insurers, whether they are Takaful operators or reinsurers. There is no mutual and classification between small and large insurers in the Malaysian insurance industry. The framework only covers the first three risks stated above with interest rate (profit rate for Takaful operators) and currency risk included in market risk. However, the framework does include liability risk, which accounts for claims under-estimation and fluctuation of experience (Rejda, 2011). In terms of risk sensitive, Malaysian Risk Based Capital factor-based charges takes into account the level of risk for each business written. This statement is validated together with the first objective. Thus, Malaysian Risk Based Capital partly fulfils the objective in terms of risk sensitiveness.

4.3 The Formula Should Be Proportioned to Major Risks

This objective emphasises on the importance of each type of risk in determining the risk of insolvency. The Malaysian Risk Based Capital assumes that each individual risk (capital charge) is independent and disregards correlation and covariance terms. According to Butsic (1993), not all risks occur simultaneously and when risk is not dependent, this would lead to under-estimation of capital. The formula surrounding the Malaysian

Risk Based Capital for total capital required is straight forward; a summation of all risk charges with no individual weight is given to each individual risk. For time horizon, all general insurance and Takaful policies are effective in one year, thus facing a short term risk. The long term risk exists when there are cases of incurred but not reported claims and dispute in claim settlement (De Ceuster, Flanagan, Hodgson, & Tahir, 2003).

Similar to US Risk Based Capital, Malaysian Risk Based Capital does not operate in stochastic nature where there is no capital requirement calibration (Holzmüller, 2009). The Value-at-Risk stress testing is only applicable to evaluate the liability risk at 75% confidence level. Therefore, Malaysian Risk Based Capital fails to fulfil this objective due to imbalance weights for each major capital charge.

4.4   Able to Identify Highest Insolvency Costs Company

Another objective of Risk Based Capital is to minimise insolvency costs and this can be achieved by focusing on the financial health of large insurers that would be expected to post the greatest financial instability. Malaysian Risk Based Capital framework targets large insurers where the formula depends on the size of the company. Lazam, Tafri, and Shahruddin (2012) and Jaaman, Ismail, and Majid (2007) explain the elements of Tier 1 and Tier 2 in deriving the Total Capital Available (TCA). In short, TCA is the excess of assets and liabilities and assets represent the size of the company (De Haan & Kakes, 2010; Pasiouras & Gaganis, 2013; Pitselis, 2009).

However, the main part of this objective which is the identification of high expected insolvency case requires further analysis since there is no empirical research on the effectiveness of Malaysian RBC.

4.5   The Formula Should Reflect the Economic Value

The economic value of assets can be defined as the ability to pay while liabilities are the actual amount that has to be paid. The difference between these two is the economic value of an insurer's net worth, which can differ significantly from the statutory or accounting calculation of a company's net worth (Cummins & Lamm-Tennant, 1994). The valuation of asset and liabilities are based on market value, wherever possible. The Signing Authority of the insurance company is given the permission to use the best estimate of value.

Malaysian Risk Based Capital fulfils this objective as both general insurers and Takaful operators are bound to the approved accounting standard set by Malaysian Accounting Standard (MASB) to value assets and liabilities. On the other hand, similar to Swiss Solvency Test, the calculation

of Capital Adequacy Ratio is based on a statutory balance sheet in which data does not follow market movements (Holzmüller, 2009).

4.6 The System Should Discourage Misreporting

An insurance company might manipulate financial results to avoid stern action from a regulatory body. This is the result of having a poorly designed Risk Based Capital framework, which can affect the capital requirement and also policyholder's security. Bank Negara Malaysia makes it mandatory for an insurance company to report on details of the estimation of Capital Adequacy Ratio together with each capital charge, and penalty will be imposed on any misreporting. Currently, there is no case of misreporting being recorded, thus, this objective is fulfilled.

4.7 The Formula Should Avoid Complexity

In order to have the best possible accuracy, the formula of Risk Based Capital should be as simple as possible, as increased level of complexity will cause an increase in premium by an insurance company (Van Rossum, 2005). In addition, if the formula is too complex, the fulfilment of the regulation will be more theoretical than empirical.

Even though the Malaysian Risk Based Capital formula is straightforward, the estimation of underlying capital charges is quite complicated. For instance, the calculation of credit risk comprises debt obligation and asset default, where a different set of estimation of credit risk is mitigated using collateral, guarantees and secured properties. Nonetheless, the formula is relatively simple, but the accuracy of the risk measurement is still in question. Based on these findings, Malaysian Risk Based Capital partly fulfils the last objective.

4.8 Adequacy in Economic Crisis and Anticipation of Systematic Risk

Holzmüller (2009) emphasises the need to include systematic risks and adequacy of Risk Based Capital during economic crisis due to increase in securitisation and globalization of the insurance industry. The development of an internal model as a tool to estimate the risk-based capital adequacy would reduce the impact of external shocks. This is one of the sources of systematic risks. Nebel (2004) agrees the application of various models would reduce systematic risks.

Since the RBC formula for a conventional and Takaful company is the same whereby one-size-fits-all, it does not satisfy Objective 8 as it may expose the insurer to systematic risks.

4.9   Assessment of Management

In order to satisfy Objective 9, a solvency system should not rely solely on quantitative assessment, but also on the full casual chain of insurance failure, such as an experienced management team, early warning indicators and a sound business plan (Ashby, Sharma, & McDonnell, 2003).

   Similar to Swiss Solvency System, Malaysian Risk Based Capital fulfils this objective through its Insurance Act (1996) and Takaful Act (1984) where the insurance company must appoint "fit and proper" managers and executives to warrant a sound business practice. Furthermore, the details of qualitative requirements and rules of supervision are provided.

4.10   Flexibility of Framework over Time

Bank Negara Malaysia issued the first draft of Malaysia Risk Based Capital for Conventional insurer in 2006 and it took three years for the system to be implemented. It has been six years since the Risk Based Capital framework took effect while Takaful Risk Based Capital was enforced on January 1, 2014. Solvency I has been in effect for nearly thirty years (Dickinson, 1997) while US Risk Based Capital for more than twenty years (Eling & Holzmüller, 2008). It is compelling to see that the system is flexible enough towards changes and does not require a lengthy bureaucratic procedure for reforms.

   Malaysian Risk Based Capital is applicable to insurance, reinsurance and Takaful operators that operate within the Malaysia region. However, the Malaysian RBC faces inflexibility due to interest of multiple stakeholders on the reformation of the solvency system. Therefore, Objective 10 is not fulfilled.

4.11   Strengthening of Risk Management and Market Transparency

The final objective is to evaluate whether Bank Negara Malaysia is effective in strengthening risk management and increasing market transparency. This touches on qualitative aspects of the solvency system where transparency is the main focus. Due to market transparency, regulator will enforce little regulation and promote appropriate insurer behaviour (Eling, Schmeiser, & Schmit, 2007). Malaysian Risk Based Capital has no provision for assessing the risk management of insurance companies. Furthermore, there is no transparency or public disclosure as the result of Capital Adequacy Ratio for each insurance company is confidential. Thus, Malaysian Risk Based Capital fails to meet the last objective.

5. Discussion and Policy Implications

The Malaysian Risk Based Capital framework was introduced in 2009 and 2014 for conventional insurers and Takaful operators respectively. The limited research on Malaysian Risk Based Capital makes this study a contribution in this area. Based on Cummins et al. (1993) paper titled "An Economic Overview of Risk-Based Capital Requirements for Property-Liability Insurance Industry", this paper aims to evaluate Malaysian Risk Based Capital for general insurer and Takaful operators against seven objectives. The Risk Based Capital framework is further assessed against four additional objectives developed by Holzmüller (2009).

It can be stated that Malaysian Risk-Based Capital fulfils Objective 1, 5, 6, 9; partly fulfils Objective 2, 4, 7 and does not fulfil Objective 3, 8, 10 and 11. This allows the increase of capital requirement based on the increase in exposure to risk, even though it does not fully cover all major types of risk. The framework also applies market valuation of assets and liabilities according to internationally accepted accounting standards. In terms of qualitative measure, the Malaysian regulatory body imposes a heavy penalty for misreporting although there is no public disclosure requirement. Table 1 summarises the analysis related to Malaysian Risk Based Capital. A "double tick" indicates that the objective is "fully satisfied"; a "tick" indicates "partly satisfied"; a "cross" indicates "not satisfied". Some recommendations to improve the weaknesses identified in each criterion are also highlighted.

Table 1: Summary of the analysis

Objective	Indicator	Assessment of Malaysian RBC	Recommendation to improve
1. Provides incentive for weak companies.	√√	Each capital charge allows the increase of capital requirement based on the increase in exposure of risk.	Nil.
2. The formula should cover major risks.	√	- One-size-fits-all. - Only covers market, credit, operational and liability risk charges.	To include other major types of risks such as catastrophe and liquidity risks.

Table 1: (Continued)

3. The formula should be proportioned to major risks.	X	- No covariance adjustment. - No individual weight to each risk charges. - Value at risk applies on liability risk only.	Each individual risk is aggregated against some standards with possible correlations.
4. Able to identify highest insolvency costs company.	√	- RBC target large insurers depending on the size of their assets. - No evidence of effectiveness.	Empirical analysis on the effectiveness of RBC to identify high insolvency exposure.
5. The formula should reflect the economic value.	√√	Value assets and liabilities based on market value approach.	Nil.
6. The system should discourage misreporting.	√√	Mandatory for reporting documents.	Nil.
7. The formula should avoid complexity.	√	- Formula is straightforward but underlying estimation is complicated. - Accuracy still in question.	Increase accuracy by appropriate aggregation of risks.
8. Adequacy in economic crisis and systematic risk.	X	All insurers/ Takaful operators use the same model may lead to systematic risk	- Shifting from formula-based to principle-based (e.g. Solvency II). - Internal model to reduce systematic risk.
9. Assessment of management.	√√	Appoint "fit & proper" managers & executives to ensure sound business practices.	Nil.

Table 1: (Continued)

10. Flexibility of framework over time.	X	Due to slowness of legislation process and apply rules-based approach.	Shift to principles-based approach which has flexibility.
11. Strengthening of risk management and market transparency.	X	- Formulation approach as similar to US RBC. - No market transparency.	Encourage insurers to develop internal models for their risk management.

Notes: √√-Fully satisfied, √-Partly satisfied, X-Not satisfied.
Source: Holzmuller (2009).

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