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# Camel Rating Approach to Assess the Insurance Operators Financial Strength

## *(Pendekatan Penarafan Camel bagi Menilai Kekuatan Kewangan Pengedali Insurans)*

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*ABSTRACT*

*This study aims at looking at the financial strength based on the CAMEL rating system for each of the conventional life insurers and takaful operators. The existing financial indicators, such as the margin of solvency (MOS), risk-based capital (RBC) and claim paying ability (CPA) rating,present their own constraints in providing information concerning the financial position of the operators to the policyholders and the public. The data used for the twenty life insurance and takaful companies operating during the period of 2003 to 2007 consists of twenty-three financial ratios. The factors (values) generated by factor analysis applied on twenty-three financial ratios reflect the five components in the CAMEL rating system. The results show that the CAMEL rating is a promising approach in providing an overview of the financial strength of the life insurer/takaful operator for the benefit of policyholders and the public.*

*Keywords: CAMEL rating; Life insurer; Takaful operator; Factor analysis*

*ABSTRAK*

*Kajian ini bertujuan untuk melihat kekuatan kewangan berdasarkan sistem penarafan CAMEL bagi setiap penanggung insurans hayat konvensional dan pengendali takaful. Penunjuk kewangan sedia ada, seperti margin kesolvenan (margin of solvency [MOS]), modal berasaskan risiko (risk-based capital [RBC]) dan keupayaan membayar tuntutan (claim paying ability [CPA]) mempamerkan kekangan mereka yang tersendiri dalam menyediakan maklumat mengenai kedudukan kewangan pengendali kepada pemegang polisi dan orang awam. Data yang digunakan bagi dua puluh buah syarikat insurans hayat dan takaful yang beroperasi sepanjang tempoh 2003 hingga 2007 terdiri daripada dua puluh tiga nisbah kewangan. Faktor-faktor (nilai) yang dijanakan oleh analisis factor terhadap dua puluh tiga nisbah kewangan mencerminkan lima komponen dalam system penarafan CAMEL. Keputusan menunjukkan bahawa penarafan CAMEL adalah pendekatan yang meyakinkan dalam menyediakan gambaran tentang kekuatan kewangan penanggung insurans hayat/ pengendali takaful bagi manfaat pemegang polisi dan orang awam.*

*Kata kunci: Penarafan CAMEL; penanggung insurans hayat; pengendali takaful; analisa faktor*

## INTRODUCTION

Rating is intended to determine the relative financial strength of firms in an industry, which could build trust among consumers,promote better corporate governance, competitive advantage, transparency and better company image. Traditionally, notwithstanding that the financial soundness of life insurers is critical, the CAMEL rating has mainly been used to assess the performance of financial institutions and not for insurance companies. If this is questionable, all other evaluation factors, such as product availability, service quality and ethical behaviour, are meaningless (Black & Skipper 2000). In the case of Malaysia, there are several rating systems or financial indicators that aim to provide an insight into the financial strength of insurance companies. Among them are the margin of solvency (MOS), risk-based capital (RBC) and claim paying ability (CPA) rating.

However, the MOS, and the RBC are more internal, private and confidential. None of the related information is disclosed to the public but only to the insurer involved and the Central Bank of Malaysia (BNM).[1] The CPA rating is a bit more transparent, as the evaluation results obtained can be known. Consumers can get an idea of the insurer's financial performance and ability to pay. This information provides valuable input in the selection of insurers by the consumers. However, the CPA rating is not mandatory to all insurers, and, consequently, only performing insurers would be willing to be rated. Thus, the CPA rating may not provide a real picture of the financial performance or ability to pay the compensation for all the insurers operating in Malaysia.

It is thus necessary to establish a rating system that is more comprehensive, transparent and reliable for insurance companies that can be accessed by the public. Accordingly, this study will implement the CAMEL rating system.

There are four significant contributions of this study. First, this study is among the first attempts to implement the CAMEL rating approach involving both conventional insurance companies and *takaful* operators in Malaysia. Second, in matching the CAMEL rating and financial indicators, this study uses medians and quartiles for determination of the CAMEL interval, in contrast to Hsiao and Whang (2009),who used the mean and standard deviations. Thus, variation in the CAMEL rating interval is added, especially when faced with the problem of non-normal distribution. Third, we provide an alternative to the existing measurements, such as MOS, RBC and CPA rating. The rating should not be seen as a replacement for the existing measurement but rather as additional information. Finally, the findings of the study can be useful for policyholders and the public, especially concerning the financial strength of insurance company/ *takaful* operators, and, therefore, enable them to make wise and prudent decisions.

Thus, based on this background, this study aims to provide the financial strength rating of the insurers/ *takaful* operators registered in Malaysia for the interests of consumers in particular. The study is also expected to present and clarify the financial strength of conventional insurers and *takaful* operators. The findings revealed that most of the insurers/*takaful* operators achieved level 2 of the CAMEL rating. This indicates that, on average, the financial stability of insurers/*takaful* operators is fundamentally sound. However, there are companies that show unstable and weak financial performance.

In addition, in comparing the conventional insurers to *takaful* operators, it is observed that the financial viability of the *takaful* operators is better. This is evidenced in that none of the *takaful* operators obtain grade four or five of the CAMEL rating.

[1]The Insurance Annual Report only reveals the industry average value for MOS and CAR. CAR is shown from 2009. The value for individual insurers are confidential.

The remainder of this study proceeds as follows: section 2 describes the basic features of the CAMEL rating; section 3 discusses the literature on previous studies; section 4 describes the methodology, data and model specifications; section 5 discusses the experimental results; and, finally, section 6 concludes.

## THE CAMEL RATING SYSTEM

The CAMEL rating system applies to all financial institutions (FI) encompassing development banks, commercial banks, merchant banks and finance companies. It takes into account the managerial, financial, operational and compliance aspects of FI and the evaluation will be conducted in a comprehensive and uniform manner (Federal Deposit Insurance Corporation [FDIC] 2002; Trautmann 2005). It would be able to identify and categorize troubled FIs as well as those that have deficiencies in certain CAMEL components.The five appraisal components that form the CAMEL rating system are capital adequacy, asset quality, management quality, earnings and liquidity. Each component will be allocated with a value from one to five where one indicates the best. A composite rating is determined on the rating of each component, which represents the FI's overall rating. The rating takes values from one to five (National Credit Union Association [NCUA] 2003; FDIC 2002).

RAM (2008) elaborates that the CAMEL model incorporates analysis of both quantitative (financial ratios) and qualitative values (subjective elements driving the FI's operations). The elements in the CAMEL model cannot be applied singularly as any movement or decision on one element will definitely affect the others. A highly rated FI is not necessarily the one having the best attributes in each of the CAMEL elements, and neither does having the best accomplishments in terms of the quantitative elements of the CAMEL model automatically guarantee the highest rating.

The summary of the five composite ratings issued by the Federal Reserve System in the Commercial Bank Examination Manual (Barr et al. 2002)[2] is as follows, "CAMEL 1: An institution that is basically sound in every aspect; CAMEL 2: An institution that is fundamentally sound but has moderate weakness; CAMEL 3: An institution with financial, operational, or compliance weakness that gives cause for supervisory concern; CAMEL 4: An institution with serious financial weakness that could impair future viability; CAMEL 5: An institution with critical financial weakness that renders the probability of failure extremely high in the near term".

The CAMEL rating consists of five components, namely, capital adequacy, asset quality, management quality, earnings, and liquidity. However, the traditional

[2](Composite rating's detail available in FDIC's Manual of Examination Policies (2002) and at http://www.ncua.gov/letters/2003/03-cu-04.pdf)

CAMEL rating was replaced by the CAMEL-S rating in 1996, which takes into account the systematic risk. Therefore,'S' represents the sixth component, i.e., sensitivity to market risk. The descriptions of the six components of CAMEL-S, as much as possible, will try to adapt to the environment of life insurance companies and *takaful* operators. These components are described in Appendix.

## LITERATURE REVIEW

Althougha few previous studies applied the CAMEL rating to determinea firm's financial position, those concerning the CAMEL approach to insurance companies are very limited. One reason is that the CAMEL implementation is limited to development banks, commercial banks, merchant banks and finance companies. This means that the life and general insurance companies are not subject to the CAMEL rating (Malaysian Rating Corporation [MARC] 2006). Thus, most of the previous studies involving the CAMEL rating were done on the banking sector and other financial institutions. For instance, Gasbarro et al. (2002) concluded that the CAMEL ratings fail to reflect the actual state of banks' performance in Indonesia in severe economic conditions and they suggested that changes to the weights of CAMEL components should be done in this situation. In the same study, they agreed that sensitivity to market risk components should be included in the traditional CAMEL rating. In addition, a study by Barr et al. (2002), found that the CAMEL ratings are consistent with the efficiency scores obtained through (Data Envelopment Analysis [DEA]) analysis – an FI that has been awarded by CAMEL as strong, obtains a high efficiency score compared to a FI that has been classified as weak. Recently, Yang and Zhao (2009) developed a credit risk evaluation index system for commercial banks adopting the CAMEL components in the adaptive genetic algorithm (AGA). With the expansion of the Islamic banking system, the new CAMEL rating was proposed in the study by Sarker (2008), which involves an additional component of 'sharia' in accordance with the operation practiced in the Islamic banking system. Errico and Farahbaksh (1998) mentioned that the standard CAMEL rating system needs to be adjusted to an Islamic banking environment.In addition, the study by Adams, Burton and Hardwick (2003), and Guerrero (2000) are also very significant.

Nevertheless, in the context of insurance companies, the study of Hsiao and Whang (2009) is very meaningful and creative as they were able to use the CAMEL rating thinking in order to obtain the financial standing of life insurance companies in Taiwan. They employed thirty-two financial variables including net premium written, equity to total assets, liquid assets to total assets, return on equity, return on assets and many more. Their study was different from other studies in which the variables are not divided into independent and dependent variables. They performed factor analysis in order to determine the financial ratios that can represent the six components of the CAMEL-S rating. They were successful in classifying the companies' financial ratios based on each component of the CAMEL-S. Then, the total financial index (TFI) was calculated based on the results of the analysis. Finally, the TFI and the CAMEL-S rating level were matched to obtain the solvency score of insurers.

When exploringthe variables used in the financial performance literature,it is found that the selection of variables are mixed. These variables are usually divided into two – independent and dependent. Shiu (2005) used both the firm-specific and economic variables as independent variables. Her study, using panel data for 1986-1999, provided a comprehensive study on the United Kingdom life insurance market. After applying the random-effects model, she concluded that solvency was statistically significant and negatively related to the reserves-related variables, but was positively related to bonds-to-total assets, equities-to-total assets, and level of new business. In addition, unexpected inflation was also found to be negatively and significantly related to life insurance solvency. The study by Adams and Buckle (2003) was slightly different in that they only used the company characteristics as independent variables. They adopted the common-effects model on 47 major non-captive Bermuda insurers/reinsurers from the year 1993 to 1997. They claimed that leverage, liquidity, and type of company (direct insurer versus reinsurer) had a significant relationship with insurance solvency. On the other hand, Browne et al. (2001) conducted a study to determine the economic factors, market, and company characteristics affecting the solvency of life insurers. They employed National Association of Insurance Commissioners (NAIC) data from 1985-1995 for a large number of life insurers (1,539 insurers). Their findings using the random-effects model showed that economic, market, and firm-specific factors certainly have an impact on life insurer solvency. Insurance Regulatory Information System (IRIS) variables, Financial Analysis and Surveillance Tracking System (FAST) variables and Texas Early Warning Information System (EWIS) variables have also been used in the insolvency literature as independent variables in order to examine the probability of insolvency. In the studies discussed above, the dependent variables used were either binary value that take the value of 0 for the insolvent insurers and 1 for the solvent insurer, or financial ratios, such as the free asset ratio, return on assets and return on equity.

## DATA

The players in the life insurance market consist of direct insurers (composite and life) constituted in and outside Malaysia, professional life reinsurers constituted in and outside Malaysia and *takaful* operators. Based on the Annual Insurance Report and Annual *Takaful* Report from BNM, for the period 2003-2007, there were twenty-two players in the industry throughout the period.[3] However, for the purpose of this study, the selection of the firms is restricted to direct insurers (composite and life) operating in Malaysia (including 15 direct insurers constituted in Malaysia and one constituted outside Malaysia) and *takaful* operators. The study excludes the professional life reinsurers, which are constituted inside and outside of Malaysia. These classes have to be excluded because of data difficulties and differences in the nature of business. Furthermore, the data for this study are limited to life and family *takaful* business only. For the composite insurers, which offer general and life products, the data is segregated between the two lines of business and can be obtained from the companies' financial report. The study also totally excluded the new entrants during the study periods but maintained the firms involved in merger and acquisition (M&A) activities. Finally, this leaves a sample of twenty firms, which represents about ninety-one percent of the total players for the study period. The sample also accounts for approximately more than two-thirds of the total assets of life insurance fund assets and family *takaful* fund assets in the overall life insurance industry. Data on the financial statement of the firms are adopted from the Companies Commission of Malaysia. The analysis is conducted on the balanced panel data set of twenty firms for the period of five years. The firms under observation according to the type of business are depicted in Table 1.

## METHODOLOGY

Based on the previous studies (as discussed above), we will apply the method used by Hsiao and Whang (2009) to calculate the solvency score of insurers/*takaful* operator. This is partly due to the suitability of the data that do not require separation between independent and dependent variables. The analysis in this study will be divided into three stages in which the first stage is to identify variables that can truly represent the six components/CAMEL-S factor (as explained in Appendix) by factor analysis; the second stage is to calculate the TFI using a factor derived from the first stage; and, the final stage is matching the computed TFI with CAMEL-S rating.

### MODEL SPECIFICATIONS

*Factor Analysis* The dependent variable in most insurance companies' financial performance studies was either the binary value of 1 to represent the solvent (favourable financial condition) or 0 to represent not solvent (impaired financial condition) or financial ratios. Such binary values, as the financial indicator are reasonable because the experience of insolvency among the life insurers has indeed occurred, particularly in studies conducted in the USA. Conversely, the studies that were done in countries where the experience of insolvency is low or none, the financial ratio is more appropriate. However, the study by Hsiao and Whang (2009) is quite different. They adopted the Total Financial Index (TFI) and the CAMEL-S rating as the financial indicator in order to assess the financial

TABLE 1. The list of firms under observation 2003-2007

| No. | Name of Firm | Type of Business |
|---|---|---|
| 1 | Allianz Life Insurance Malaysia Berhad (Allianz) | Life |
| 2 | Uni. Asia Life Assurance Berhad (UAsia) | Life |
| 3 | Manulife Insurance (Malaysia) Berhad (Manulife) | Life |
| 4 | Asia Life (M) Berhad (Asia) | Life |
| 5 | Mayban Life Assurance Bhd (MLife) | Life |
| 6 | Great Eastern Life Assurance (Malaysia) Berhad (GE) | Life |
| 7 | Commerce Life Assurance Berhad (Commerce) | Life |
| 8 | Tahan Insurance Malaysia Berhad (Tahan) | Composite |
| 9 | Hong Leong Assurance Berhad (HLeong) | Composite |
| 10 | AmAssuranceBerhad (AmAssurance) | Composite |
| 11 | MCIS Zurich Insurance Berhad (MCIS) | Composite |
| 12 | Malaysian National Insurance Berhad (MNI) | Composite |
| 13 | Malaysian Assurance Alliance Berhad (MAA) | Composite |
| 14 | *Takaful* NasionalSdn. Bhd. (TN) | Composite |
| 15 | *Takaful* Ikhlas Malaysia Sdn. Bhd. (TI) | Composite |
| 16 | Syarikat *Takaful* Malaysia Berhad (TM) | Composite |
| 17 | Mayban *Takaful* Berhad (MTak) | Composite |
| 18 | Prudential Assurance Malaysia Berhad (PRU) | Composite |
| 19 | ING Insurance Berhad (ING) | Composite |
| 20 | American International Assurance Company, Limited (AIA) | Composite |

[3]The proportion is fifteen direct insurers constituted in Malaysia, one player for each direct insurer constituted outside Malaysia, professional life reinsurer constituted in Malaysia and professional life reinsurer constituted outside Malaysia, and 4 *takaful* operators.

soundness of life insurers in Taiwan. TFI is obtained by performing factor analysis on several financial ratios that have been identified in describing the six components of the CAMEL-S. This method does not require cases of solvent or insolvent among insurers and at the same time takes into account various financial ratios that are believed to affect the financial position of insurers. Based on the suitability of the insurance market experience in Malaysia, which still does not have a record of insolvent insurance companies, the TFI approach will be adopted.

Thus, using a similar approach to Hsiao and Whang (2009), the TFI will be obtained through the factor analysis of a number of variables that affect the six components of CAMEL-S. Factor analysis is best explained as an interdependency technique for determining "whether a number of variables of interest $Y_1$, $Y_2$,…,$Y_t$, are linearly related to a smaller number of unobservable factors $F_1$, $F_2$,…, $F_k$" (Tryfos, 1997). According to Hsiao and Whang (2009), although the number of factors that represent the original structure of the data is relatively small, "the explanatory power of the original data structure is not lost". In the implementation of factor analysis, several assumptions are required, as follows:

> *A1*: The error terms $e_i$ are independent of one another, and such that $E(e_i) = 0$ and $Var(e_i) = \sigma_1^2$.
> *A2*: The unobservable factors $F_j$ are independent of one another and of the error terms, and are such that $E(F_j) = 0$ and $Var(F_j) = 1$.
>
> (Tryfos, 1997)

Each observable variable is a linear function of independent factors and error terms, and can be written as:

$$Y_i = \beta_{i0} + \beta_{i1}F_1 + \beta_{i2}F_2 + \cdots + \beta_{ik}F_k + e_i \quad (1)$$

Equation (1) can also be written in matrix form as follows:

$$\begin{bmatrix} Y_1 \\ Y_2 \\ \cdots \\ Y_n \end{bmatrix} = \begin{bmatrix} \beta_{11}\beta_{12}\cdots\beta_{1k} \\ \beta_{21}\beta_{22}\cdots\beta_{2k} \\ \cdots \\ \beta_{n1}\beta_{n2}\cdots\beta_{nk} \end{bmatrix} \begin{bmatrix} F_1 \\ F_2 \\ \cdots \\ F_n \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \\ \cdots \\ e_n \end{bmatrix} \quad (2)$$

where
$Y_1$ are independent variables; $i = (1,2,...,n)$
$F_2$ are the unobservable common factors; $i = (1,2,...,n)$
$\beta_{ik}$ are factor loadings.
$e_i$ are the error terms

Before applying factor analysis, the correlation between the variables should be examined. A strong correlation denotes that the variables do belong to the same group, and the appropriateness of factor analysis should not be questionable. Two statistical tests will be performed for this purpose, namely, Bartlett's test of sphericity and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO). The null hypothesis for Bartlett's test is "The intercorrelation matrix comes from a population in which the variables are non-collinear (i.e., an identity matrix)" (Friel 2009). If the null hypothesis cannot be rejected then it means that the data matrix has insufficient correlations to justify the application of factor analysis (Hair et al. 2006: 114). Whereas, the KMO test measures the degree of intercorrelation between the variables and gives the index values between 0 and 1. The interpretation of the KMO index values is as follows: 0.9 to 1, marvellous; 0.8 or above, meritorious; 0.7 or above, middling; 0.6 or above, mediocre; 0.5 or above, miserable; and below 0.5, unacceptable or do not factor (Friel 2009; Hair et al. 2006). This explains that the factor analysis can proceed if the value of KMO is above 0.5 (Hair et al. 2006).

Perhaps the most common method for extracting the factors that can represent the structure of the variables or the method for determining the first loadings are the principal component analysis and the common factor analysis. In summary, the difference between the two methods is described by Hair et al. (2006):

> Component analysis is used when the objective is to summarize most of the original information (variance) in a minimum number of factors for predicting purposes. In contrast, common factor analysis is used primarily to identify underlying factors or dimensions that reflect what the variables share in common.

They also stressed that the selection of both methods very much depends on the objectives of the factor analysis and the amount of initial information about the variance in the variables involved. However, the interesting part is that empirical research has demonstrated that both methods produce similar results in many instances (Velicer and Jackson 1990). Usually the first factor solution (unrotated) cannot provide sufficient information for the interpretation of the variables involved. Rotational methods have been proposed "to achieve [a] simpler and theoretically more meaningful factor solution" because the factor rotation will improve and simplify the factor structure (Hair et al. 2006). Although several rotational methods are used, the most widely applied is the varimax criterion. Tryfos (1997) noted that, "The varimax method encourages the detection of factors each of which is related to few variables. It discourages the detection of factors influencing all variables". Based on the above explanation and the appropriateness of data, this study adopts the principal component method with varimax criterion to conduct the factor analysis. However, in using the principal component method, the variables should be standardized so that all have a mean of zero and variance equal to one. This should be done, especially when the variables are measured in different units, as the principal component method tends to favour variables with large variances compared to small variances (Tryfos 1997). All are standardized according to the following formula:

$$Y'_{im} = \frac{Y_{im} - \overline{Y}_i}{S_t} \quad (3)$$

where
$Y'_{im}$ = standardized variable
$Y_{im}$ = variable
$\overline{Y}_i$ = the mean of the variable
$S_i$ = the standard deviation of the variable
$m$ = 1,2,...20 insurers for 5 years

After taking into account the appropriateness of the data and the situation of the life insurance market in Malaysia, together with the prior literature that has been reviewed, twenty-three life insurer financial ratios were identified and used in the factor analysis, which is thought to be represented by six components of CAMEL-S. The variables are listed in Table 2.

TABLE 2. Factors affecting the solvency of insurers

| Variable | Name |
|---|---|
| $Y_1$ | Net premium written to equity |
| $Y_2$ | Equity to total assets |
| $Y_3$ | Cash to total assets |
| $Y_4$ | Return on equity |
| $Y_5$ | Net operating expenses to operating revenues |
| $Y_6$ | Net operating expenses to net premium written |
| $Y_7$ | Benefit payment to net premium written |
| $Y_8$ | Management expenses to net premium written |
| $Y_9$ | Change of total premium receipts |
| $Y_{10}$ | Change of reserves |
| $Y_{11}$ | Turnover rate of total assets |
| $Y_{12}$ | Turnover rate of fixed assets |
| $Y_{13}$ | Fixed assets to total assets |
| $Y_{14}$ | Reserves to equity |
| $Y_{15}$ | Capital to total assets |
| $Y_{16}$ | Change of total assets |
| $Y_{17}$ | Change of operating revenues |
| $Y_{18}$ | Change of profit or loss for the year |
| $Y_{19}$ | Possesses percentage of total gross premium |
| $Y_{20}$ | Net operating revenues to total assets |
| $Y_{21}$ | Return on assets |
| $Y_{22}$ | Fixed assets to equity |
| $Y_{23}$ | Commissions to agents to net premiums return |

*Note*: Turnover rate = operating revenues*100%/item;
Possesses rate of item = item of insurers * 100%/total sum of industry

## TOTAL FINANCIAL INDEX (TFI)

After the solvency variables are grouped into factors that reflect the elements of the CAMEL rating, next, the TFI for each life insurer is calculated using the following formula and is assumed to follow normal distribution.

$$(TFI_m) = \Sigma\Sigma W_{ij} * Y_{ijm} \quad (4)$$

where
$W_{ij} = (H^2_{ij} / \Sigma H^2_{ij}) * (G_j / \Sigma G_j) * 100)$
$Y_{ijm}$ = variable i for j factor of m insurer
$H$ = loading of j factors
$G$ = eigenvalue

TFI has been adopted by Hsiao and Whang (2009) to measure the financial health of life insurers in Taiwan, which is then matched by the composite rating level of CAMEL-S. Table 3 below describes the five composite rating levels of the CAMEL-S system.

TABLE 3. The CAMEL-S composite rating level

| The Composite Rating Score | Financial Status |
|---|---|
| 1 | A financial institution is basically sound in every respect. |
| 2 | A financial institution is fundamentally sound but has moderate weakness. |
| 3 | A financial institution with financial, operational, or compliance weakness that gives cause for supervisory concern. |
| 4 | A financial institution with serious financial weakness that could impair future viability. |
| 5 | A financial institution with critical financial weakness that renders the probability of failure extremely high in the near term. |

*Source:* Barr et al. (2002)

## CAMEL-S RATING

TFI obtained in step 2 will be compared with the CAMEL-S rating. The procedure used by Hsiao and Whang (2009) to match between the TFI value and the CAMEL-S score is illustrated in Figure 1 below.

Score 1 will be assigned when the $TFI_m$ is greater than $\tilde{y}+1.5\sigma$; score 2 will be given when $TFI_m$ is between $(\tilde{y}+0.5\sigma)$ and $(\tilde{y}+1.5\sigma)$; score 3 means that the value of $TFI_m$ is between $(\tilde{y}-0.5\sigma)$ and $(\tilde{y}+0.5\sigma)$; score 4 refers

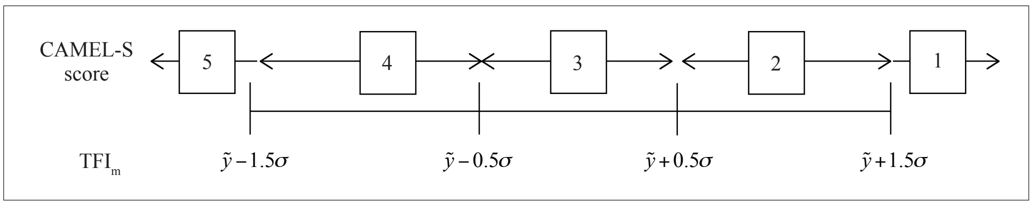


FIGURE 1. CAMEL-S Score's Number Line

to TFI$_m$ ranging from $(\tilde{y}-1.5\sigma)$ to $(\tilde{y}-0.5\sigma)$ and, finally, score 5 will be assigned when TFI$_m$ is less than $\tilde{y}-1.5\sigma$ ($\tilde{y}$ and $\sigma$ are mean and standard deviation). Based on this match, the life insurers that have a CAMEL-S score of grade four and five are classified as insolvent insurers (Barr et al. 2002; Rehm 2001), while for those who have obtained grade one to three are categorized as solvent insurers.

After these three stages are completed, finally, a CAMEL score for each insurer/*takaful* operator will be obtained which takes the value from 1-5, in which a score of 1 indicates that a financial institution is basically sound in every respect, while a score of 5 indicates critical financial weakness that renders the probability of failure extremely high in the near term (the details of financial status based on CAMEL score are presented in Table 3).

## EMPIRICAL RESULTS

Factor analysis was conducted on twenty-three variables in the early stages. Although the Bartlett's test of sphericity showed that collectively there is a correlation between the variables and significance at the 0.05 level, and the overall KMO value also falls within the acceptable range (above 0.5) with a value of 0.515, there exists several variables with very low individual KMO values. After examination of the KMO for each variable, $Y_7$, $Y_{11}$, $Y_{18}$ and $Y_{23}$ had to be removed. The reduced set of variables consisting of nineteen variables shows that the overall KMO value exceeds the threshold value (0.5) with a value of 0.617. This value indicates that the degree of common variance among the nineteen variables is mediocre (Hair et al. 2006). The results of Bartlett's test of sphericity, which show the value of the Chi-square statistic as 2373.48 and the p-value as 0.000, allow the null hypothesis[4] to be rejected at the 0.05 significance level. Both of these results warrant a factor analysis to be performed. Table 4 presents the information of nineteen potential factors and the eigenvalues. The eigenvalues can explain the importance of each component and also assist in selecting the number of factors. Referring to the latent root criterion of retaining factors with eigenvalues greater than 1.0 (column 2), five factors are retained. The scree plot (Figure 2), however, illustrates six possible factors. The eigenvalue of the sixth factor is 0.82, which is not relatively very close to the latent root criterion value of 1.0, and, as a result it can be ignored for inclusion. Column 3 of Table 4 gives the percentage of total variance that is represented by each factor. For the five-factor solution the percentages of total variance are 31.93%, 18.12%, 13.67%, 11.11% and 7.70%. Collectively, the five factors considered represent 82.53% (column 4) of the variance of the nineteen variables; this percentage is high and sufficient for total variance explained. Based on all these criteria, this study will maintain the five factors for subsequent analysis.

TABLE 4. Factor Analysis Results - Extraction of Component Factors

For the purpose of identifying the number of factors that can be represented by 19 solvency variables

| | Eigenvalues | | |
|---|---|---|---|
| Component | Total | % of Variances | Cumulative % |
| 1 | 6.07 | 31.93 | 31.93 |
| 2 | 3.44 | 18.12 | 50.05 |
| 3 | 2.60 | 13.67 | 63.72 |
| 4 | 2.11 | 11.11 | 74.83 |
| 5 | 1.46 | 7.70 | 82.53 |
| 6 | 0.82 | 4.31 | 86.84 |
| 7 | 0.65 | 3.42 | 90.26 |
| 8 | 0.48 | 2.53 | 92.79 |
| 9 | 0.42 | 2.19 | 94.98 |
| 10 | 0.26 | 1.34 | 96.32 |
| 11 | 0.21 | 1.13 | 97.45 |
| 12 | 0.15 | 0.79 | 98.23 |
| 13 | 0.13 | 0.66 | 98.89 |
| 14 | 0.09 | 0.45 | 99.34 |
| 15 | 0.05 | 0.29 | 99.63 |
| 16 | 0.04 | 0.19 | 99.82 |
| 17 | 0.02 | 0.09 | 99.90 |
| 18 | 0.01 | 0.07 | 99.97 |
| 19 | 0.005 | 0.03 | 100.00 |

Table 5 shows the rotated factor matrix obtained from the varimax rotation, and the communality[5] of each variable. In this study, the significant factor loading is 0.55, which is based on a sample size of 100 (Hair et al. 2006). Factor loadings less than 0.55 have not been shown and all the variables have been sorted according to the significant factor loading on each factor. This leads to four variables for factors 1, 3 and 4, five variables for factor 2, and two variables for factor 5. The high communalities confirm the inclusion of each variable.

This study had to accede to the five factors that are retained, which means ideally suited to five CAMEL components (capital, asset quality, management, earning and liquidity), even though, initially, the study was interested in the six components of CAMEL -S (inclusion of sensitivity to market risk). Table 6 presents the nineteen variables assigned to the five CAMEL components based on the factors of the varimax rotation (see Table 5). The Cronbach's alpha (reliability analysis) for all components is 0.88, 0.87, 0.92, 0.63 and 0.86 (see Table 6), which exceeds the lower limit (0.7) of Cronbach's alpha (Hair et al., 2006; Nunnally and Bernstein 1994) except for the earnings component. Nevertheless, DeVillis (1991) explained that 0.6 to 0.9 could still be considered as

[4](the null hypothesis is that the factorability of an intercorrelation matrix does not exist)

[5](the sum of squared factor loadings)

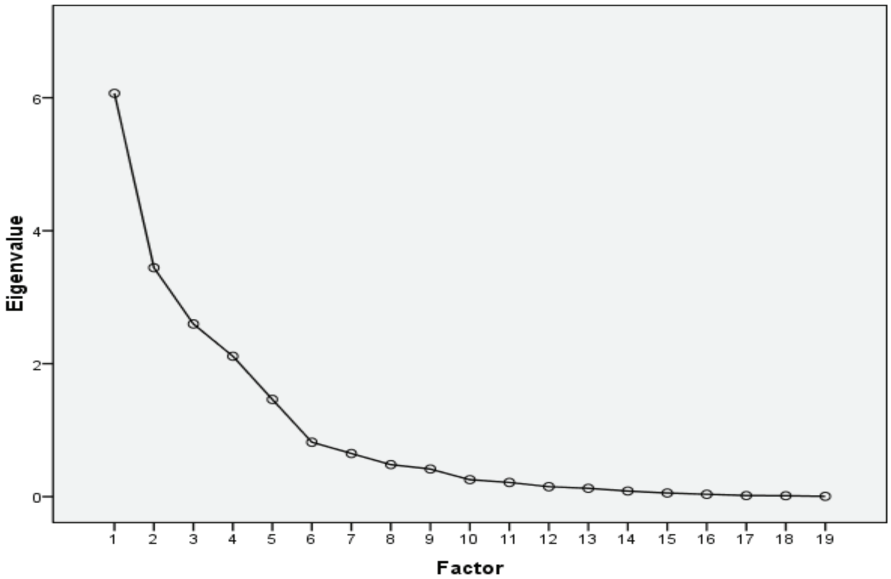


FIGURE 2. Scree Plot for Component Analysis

an acceptable range for reliability coefficients. Thus, it confirms that the following variables are measuring the same component, and, therefore, are highly intercorrelated.

After identifying all the relevant factors and variables, the TFI can be calculated. The TFI obtained for each insurer will be assigned to the composite CAMEL rating according to the classification that has been

TABLE 5. Varimax Rotated Component Analysis Factor Matrices

The varimax rotational method is applied to improve and simplify the factor structure obtained from the principal component method

| | | Varimax-Rotated Loadings Factor | | | | | |
|---|---|---|---|---|---|---|---|
| Variable | Name | 1 | 2 | 3 | 4 | 5 | Communality |
| $Y_2$ | Equity to total assets | 0.91 | | | | | 0.87 |
| $Y_{13}$ | Fixed assets to total assets | 0.82 | | | | | 0.77 |
| $Y_{15}$ | Capital to total assets | 0.89 | | | | | 0.94 |
| $Y_{20}$ | Net operating revenues to total assets | 0.81 | | | | | 0.73 |
| $Y_9$ | Change of total premium receipts | | 0.83 | | | | 0.95 |
| $Y_{10}$ | Change of reserves | | 0.91 | | | | 0.96 |
| $Y_{12}$ | Turnover rate of fixed assets | | 0.79 | | | | 0.71 |
| $Y_{16}$ | Change of total assets | | 0.90 | | | | 0.88 |
| $Y_{17}$ | Change of operating revenues | | 0.58 | | | | 0.93 |
| $Y_1$ | Net premium written to equity | | | 0.89 | | | 0.85 |
| $Y_{14}$ | Reserves to equity | | | 0.92 | | | 0.89 |
| $Y_{19}$ | Possesses percentage of total gross premium | | | 0.75 | | | 0.84 |
| $Y_{22}$ | Fixed assets to equity | | | 0.77 | | | 0.63 |
| $Y_3$ | Cash to total assets | | | | 0.55 | | 0.71 |
| $Y_5$ | Net operating expenses to operating revenues | | | | 0.93 | | 0.87 |
| $Y_6$ | Net operating expenses to net premium written | | | | 0.95 | | 0.92 |
| $Y_8$ | Management expenses to net premium written | | | | 0.82 | | 0.74 |
| $Y_4$ | Return on equity | | | | | 0.92 | 0.90 |
| $Y_{21}$ | Return on assets | | | | | 0.67 | 0.62 |

TABLE 6. Reliability Analysis Results

The Cronbach's Alpha test
Nineteen variables assigned to the five CAMEL components based on the factors of the varimax rotation

| Component | Variable | Name | Reliability |
|---|---|---|---|
| Capital | $Y_1$ | Net premium written to equity | 0.88 |
| | $Y_{14}$ | Reserves to equity | |
| | $Y_{19}$ | Possesses percentage of total gross premium | |
| | $Y_{22}$ | Fixed assets to equity | |
| Assets | $Y_2$ | Equity to total assets | 0.87 |
| | $Y_{13}$ | Fixed assets to total assets | |
| | $Y_{15}$ | Capital to total assets | |
| | $Y_{20}$ | Net operating revenues to total assets | |
| Management | $Y_9$ | Change of total premium receipts | 0.92 |
| | $Y_{10}$ | Change of reserves | |
| | $Y_{12}$ | Turnover rate of fixed assets | |
| | $Y_{16}$ | Change of total assets | |
| | $Y_{17}$ | Change of operating revenues | |
| Earning | $Y_4$ | Return on equity | 0.63 |
| | $Y_{21}$ | Return on assets | |
| Liquidity | $Y_3$ | Cash to total assets | 0.86 |
| | $Y_5$ | Net operating expenses to operating revenues | |
| | $Y_6$ | Net operating expenses to net premium written | |
| | $Y_8$ | Management expenses to net premium written | |

TABLE 7. The TFI and CAMEL Ratings

$$(TFI_m) = \Sigma\Sigma W_{ij} * Y_{ijm}$$

Matching process between TFI and CAMEL score is based on figure 1

| Insurer | TFI (CAMEL Rating) | | | | |
|---|---|---|---|---|---|
| | 2003 | 2004 | 2005 | 2006 | 2007 |
| Allianz | 12.91 (3) | 16.03 (2) | 12.36 (3) | 12.22 (3) | 12.20 (3) |
| UAsia | 17.39 (2) | 6.87 (3) | 7.07 (3) | 8.61 (3) | 8.33 (3) |
| Manulife | 9.51 (3) | 8.66 (3) | 8.17 (3) | 8.74 (3) | 9.29 (3) |
| Asia | 8.74 (3) | 9.07 (3) | 9.03 (3) | 9.05 (3) | 9.14 (3) |
| MLife | 9.20 (3) | 8.84 (3) | 9.35 (3) | 9.26 (3) | 6.53 (4) |
| GE | 23.00 (1) | 21.97 (1) | 24.38 (1) | 26.83 (1) | 20.93 (1) |
| Commerce | 10.15 (3) | 12.83 (3) | 10.65 (3) | 14.46 (2) | 14.45 (2) |
| Tahan | 0 (4) | 11.98 (3) | 11.21 (3) | 24.3 (1) | 7.59 (3) |
| HLeong | 10.12 (3) | 8.73 (3) | 9.02 (3) | 7.85 (3) | 8.13 (3) |
| AmAssurance | 10.78 (3) | 9.83 (3) | 9.70 (3) | 9.70 (3) | 8.38 (3) |
| MCIS | 8.47 (3) | 8.08 (3) | 7.79 (3) | 10.12 (3) | 9.16 (3) |
| MNI | 8.06 (3) | 6.29 (4) | 6.42 (4) | 7.56 (3) | 6.64 (4) |
| MAA | 13.18 (3) | 12.99 (3) | 14.11 (2) | 20.74 (2) | 20.20 (2) |
| TN | 8.67 (3) | 8.44 (3) | 9.65 (3) | 9.44 (3) | 16.26 (2) |
| TI | 100 (1) | 78.41 (1) | 34.27 (1) | 22.60 (1) | 27.21 (1) |
| TM | 8.83 (3) | 10.93 (3) | 10.39 (3) | 6.97 (3) | 9.84 (3) |
| MTak | 20.58 (2) | 16.71 (2) | 12.52 (3) | 7.94 (3) | 53.42 (1) |
| PRU | 16.04 (2) | 16.51 (2) | 16.71 (2) | 21.07 (1) | 19.34 (2) |
| ING | 10.20 (3) | 10.45 (3) | 10.66 (3) | 11.16 (3) | 11.25 (3) |
| AIA | 15.28 (2) | 12.80 (3) | 12.54 (3) | 16.62 (2) | 12.05 (3) |

*Note*: $\overline{y}_{TFI} = 14.19$; $\sigma_{TFI} = 12.86$

established by the Board of Governors of the Federal Reserve System (Peek et al. 1999; Barr et al. 2002). The first three classifications (grade 1-3) are considered as a solvent group whereas the others (grade 4-5) are assumed to be an insolvent group (Rehm 2001; Barr et al. 2002). Table 7 presents the financial performance according to TFI and CAMEL rating for all the insurers. It shows that the mean of the TFI is 14.19, the median is 10.29 and the standard deviation is 12.86. On average, the insurers/*takaful* operatorsare atlevel two of CAMEL rating, which means that the financial stability of insurers/*takaful* operators is fundamentally sound. The TFI is unlikely to show a normal distribution, and, therefore, this study uses medians and quartiles instead of mean and standard deviation for the determination of the CAMEL rating intervals. Perhaps this approach is different from that performed by Hsiao and Whang (2009) who used the mean and standard deviation.

From the same table, it also indicates that the TI and GE have received a financial rating of one for five consecutive years. In addition, the PRU also showed a favourable financial situation by achieving the financial rating of two for four years and one for only one year. There are three insurers that show progress each year including Commerce, MAA, and TN. In contrast, UAsia, Tahan, MLife and MNI should be given proper attention by the authorities because of their reduced or weak financial situation year by year. Meanwhile, MTak showed a very encouraging financial situation by year 2007. Generally, the results of the CAMEL rating suggest that three insurers are classified as insolvent (at least for one year), while the other seventeen insurers are solvent. The insolvent insurers are MNI (three years), MLife (one year) and Tahan (one year). In addition, it can be seen that the *takaful* operators display a better financial position compared to the conventional life insurers from their absence in the group of insolvent insurers.

## CONCLUSION

The study intends to establish a financial indicator that can be used by policyholders and the public to get an overview of the financial position of the life insurer and *takaful* operators, i.e., CAMEL rating, which has been extensively used by the banking sector.

Based on the results obtained, on average, the financial stability of insurers/*takaful* operators are fundamentally sound. Even so, the authorities still need to implement precautionary measures and aggressive monitoring because, individually, there are companies that show unstable and weak financial performance. Comparing the conventional insurers to *takaful* operators, it is observed that the financial viability of the *takaful* operators is better. This is evidenced in as much as none of the *takaful* operators received a CAMEL rating of grade four or five.

The results are quite sensible based on several current facts, for example, GE has already been impressive and has been involved for a long period and it is in fact listed in the top five life insurance companies in Malaysia. Similarly, PRU is currently competing with GE to attain the top position. Meanwhile, TI has been doing quite well since it was introduced in 2002 with a niche market and has been offering quality underwritings and products. Therefore, it is not surprising that GE and TI are rated among the best along with PRU.

On the other hand, our study supports the fact that the financial positions of MNI and Tahan are quite alarming and need the attention of the regulator. Indeed, it should be remembered that, in 2005, Mayban Fortis Holdings Berhad acquired MNI, and, similarly, AXA Life fully acquired Tahan in 2007. Corporate restructuring is quite common when there are significant financial problems within a firm.

As far as the financial strength is concerned, this CAMEL rating provides additional information that is required by the policyholders and the public because it considers various aspects including capital adequacy, asset quality, management quality, earnings and liquidity. The most important result is that the life insurers/*takaful* operators can be classified into solvent and insolvent. However, it should be stressed that this rating is not a substitute for the existing measurement, but rather an additional financial indicator that aims to protect the policyholder and public interest. For future research, the identification of the determinants of financial strength for conventional life insurers and *takaful* operators using TFI or CAMEL rating as the dependent variable would be an excellent idea.

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## APPENDIX

### Components of camel rating system

#### Capital adequacy

The financial soundness of a FI is usually measured by the capital adequacy requirements set by the central bank, so that if the capital of the FI is impaired, it can be considered as failed (RAM 2008). Meanwhile, according to Gasbarro et al. (2002), capital adequacy refers to the leverage ratio of core capital to assets. However, their study was performed on the banking sector. For insurance companies, the capital strength relative to the risks taken will determine the overall strength of its ability to pay claims in the future. As noted by RAM (2011), "Capital serves as an insurer's cushion in absorbing expected and unexpected losses. …Companies that have robust capitalization levels are more capable of shouldering losses arising from claims, thus implying a strong ability to pay claims". RAM uses seven variables to represent the capital strength of an insurance company in Malaysia, namely, gearing ratio, operating profit debt coverage, external liabilities ratio, insurance liability ratio, technical reserve ratio (only for general insurance), capital adequacy ratio and retention ratio. Castries (2005) noted that capital is a very important item for insurance companies compared to other companies.

#### Asset quality

Based on Hsiao (2005), the components of asset quality, namely, credit risk and asset/liability mismatch should be considered accordingly. This is because poor asset quality can lead to institutional failure, for example, when two of the USA's leading life insurers, First Executive and Travelers declared asset quality problems – writing down the value of its bond portfolio – their stock prices declined sharply (Fenn and Cole 1994). They concluded that the life insurer's share price is highly dependent on the structure of their assets and liabilities. In insurance, asset-liability mismatch seems to be more relevant. Asset-liability mismatch in terms of maturity may expose the insurer to reinvestment, refinancing and market value risk (Black and Skipper 2000).

#### Management quality

The quality of management can be associated with the firm response in handling risk. According to Santomero and Babble (1997), there are four reasons why a firm manages risk – managerial self-interest, the non-linearity of taxes, the cost of financial distress and the existence of capital market imperfections. In conclusion of the four reasons above, Black and Skipper (2000) stated that the managers should emphasize not only the expected profit but also the fluctuation of reported earnings and market values. Meanwhile, according to Gasbarro et al. (2002), the aspect of management is the most qualitative and subjective, and cannot be reflected in the financial statements. The insolvency of a firm is also associated with certain factors of management, such as "individual accountability of poor performance, write-offs and losses" (Mackensizie 1993). Hsiao (2005) added that management control culture and efficient computer personnel and system are also very crucial.

#### Earnings

To date, there is no standard definition of life insurers' earnings. According to Gold (1968), the statutory earnings are less accurate because it does not take into account the value of the in-force business. He also said that the earnings of life insurers are difficult to determine because "A life insurance company must adopt a long-range outlook, since the earnings on any block of policies are not known until the final contract has expired". In many cases, the term of earnings and profits are used interchangeably. However, Wright (1992) explained the difference between profits and earnings. He said that the profitability of insurers would be more realistic if the calculation takes into account "the security reserve of the Mandatory Security Valuation Reserve (MSVR) (Wright 1992: 7) at the beginning of each year". Then, earnings could be defined as net gains from operations "from which dividends to policyholders must be subtracted since they are a normal part of insurance practice. However, capital gains or losses on investment funds should also be factored in, since they reflect financial results of the companies in a given year".

Liquidity

Liquidity measures the ability of insurers to generate sufficient financial resources to meet their payment commitments (Katsikiotis and Wu, 2011). Shiu (2006) concluded that the life insurers have a smaller probability of liquidity problems than the non-life insurers and banks. This is because the duration of contracts/liabilities in the life insurance industry usually takes a longer period (Lorent 2008; Shiu 2006), and the existence of higher surrender charges (Babbel and Santomero 1997; Herrington 1994). However, Newton et al. (2009) claimed that although the insurer reserves are supported by strong assets and there is no leveraging of loans as for banks, severe liquidity problems could cause insurers to become insolvent. In matters pertaining to insolvency, Hsiao (2005) asserts that, "Insolvent probability is correlated to fewer liquid assets". What is most disturbing to many life insurance companies in relation to liquidity risk is "mass surrenders of policies owing to a loss of confidence in its financial strength" (Kelliher et al. 2005), as experienced by Equitable Life in the United Kingdom. Meanwhile, Ozdemir and Balkanli (2011) have proven empirically that the liquidity risk had increased among the life insurers compared to non-life insurers. In addition, it also appears that, generally, the small-sized insurers were facing a higher liquidity risk than large-sized insurers.

Sensitivity to market risk

As has been noted, this last component 'S' is included as an enhancement to the CAMEL rating system due to the importance of market risk to the solvency of a financial institution. Specifically, the definition of market risk for insurer relates to the volatility of the difference between the market values of assets and liabilities within a certain time frame due to future changes in asset prices, yields or returns. Changes in liability cash flow, due to effects on (expected) future profit sharing, should also be taken into account, while free assets may be ignored (Mourik 2003). Market risk is also known as systematic risk, and can be hedged but cannot be diversified completely (Santomero and Babbel 1997). To lessen their financial performance sensitivity to market risk, insurers will try their best to assess the effects of these particular market risks on performance and hedge against them. Based on previous studies, the components 'S' in the CAMEL rating refers to the interest rate, foreign exchange rates, investment, financial derivatives, trading activities, price risk, political and economic environment (Shaw 1996; Petrou 1996; Pickering 1997; Maimbo 2000; and Gasbarro et al. 2002). Meanwhile, Hsiao (2005) pointed out that sensitivity to market risk caused by fluctuations in interest rates, foreign exchange as well as commodity and equity prices could affect the insurers' assets, earnings, liabilities and capital values.