An Empirical Evaluation on the Financial Performance of the Companies in Malaysia with Z Score Model

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Abstract. Most companies wish to achieve financial stable condition and good financial performance. The companies with unstable financial condition will face bankruptcy. Financial ratios analysis is very important for evaluation on the financial performance of the companies. The \textit{Z} score model has been introduced to evaluate the financial performance of the companies based on the financial ratios analysis. The objective of this paper is to evaluate the financial performance of the companies in Malaysia with \textit{Z} score model. Besides that, the significant financial ratios that will be affecting the \textit{Z} score are identified in this study with regression model. The data of this study consists of the financial ratio of some financial variables for 18 financial sector companies that listed in Malaysian stock market. The results of this study show that the financial condition of the companies is identified whether the companies are in safe zone, grey zone or financially distressed based on the \textit{Z} score. The companies with \textit{Z} score below 1.81 indicate the companies are financially distressed whereas the \textit{Z} score above 2.99 indicates the companies are in safe zone. The companies with \textit{Z} score between 1.81 and 2.99 indicate the companies are in grey zone and need to be observed. This study is significant because it will predict the solvency of the companies and further promote economic growth in Malaysia.

1. Introduction
The performance of the financial sector in the country plays the most significant role owing to its ability to affect the economic development. Hence, the activity of this sector can threaten the entire economy of the country which in return can influence the employment, prices and national income [1]. Financial ratios analysis is important for evaluation on the financial performance of the companies [2-4]. A poor financial performance will discourage and lower down investors’ confidence in investing in a company. This issue encouraged Beaver [5] to develop the first bankruptcy prediction...
Altman [6] improved the existing model and developed the Z-score model to evaluate the financial performance of companies. The model combined five financial ratios, working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets, market value of equity to total liabilities and sales to total assets to predict the likelihood of a company encountering financial distress, failure or bankruptcy [6]. The model was demonstrated to have a high precision in forecasting company’s distress as well as bankruptcy [6,7]. Based on past studies, the Z-score model was computed to form a financial early-warning system in the modern enterprise financial management [8]. The study was conducted to identify the potential financial risk for the operators and management authorities to take proper action to hedge against potential risk. Next, Salehi and Abedini [7] applied this model to investigate the distress level of listed companies in Tehran Stock Exchange (TES) in Iran. Sixty companies were classified between financial distress company and non-financial distress company using the Z-score model. The distress problem was examined using financial ratios in liquidity and profitability aspect. The study showed that the model performs high accuracy in foreseeing company’s financial status. Moreover, Pardeshi et al. [9] utilized Z-score model to determine the financial performance of India listed airline operators. The purpose of the study was to decrease the rate of bankruptcy caused by funding problem. In addition, since financial crisis is an urgent issue to the Spain financial sector, Lious et al. [1] conducted ratio analysis to thirty financial institutions to identify the impact before and after banking reform. Apart from that, similar studies were done in different field using Z score model such as pharmaceutical companies [10] and manufacturing companies [11]. This indicates that Z-score model has the ability in predicting bankruptcy owing to its utilization in different sectors.

The financial health of the companies listed in Malaysian stock market should be investigated in order to enhance the development of the financial sector in Malaysia. This study was thus conducted with two objectives, first to investigate their financial performance of 18 companies listed in Malaysian stock market over the duration of five years and second to validate the significance of the five financial ratios using regression analysis. Regression analysis was conducted to identify significant variables for each company.

2. Materials and Methods

In the literature, various approaches to deterministic models for LSA have been developed. Some popular deterministic models for LSA are the infinite slope, SHAllow Landsliding STABility (SHALSTAB), Stability INdex MAPping (SINMAP), Transient response, Transient Rainfall Infiltration and Grid-based Regional Slope-stability analysis (TRIGRS), etc.

This study is separated into two stages: in the first stage, the Altman Z score model was applied to investigate the financial performance of 18 listed companies in the financial sector in Malaysia. The Altman Z score model is employed in this study because it has a high precision in forecasting company’s distress as well as bankruptcy [6,7]. The Z score model was built based on the classification of five categories which are liquidity, profitability, leverage, solvency and activity. In the second state, regression models were used to identify the significance of the five financial ratios in the Z score model. The data for the study was obtained from the annual reports of the selected companies in Bursa Malaysia starting from year 2012 until 2016.

The Altman [6] Z score model is as shown below:

$$Z = 1.2x_1 + 1.4x_2 + 3.3x_3 + 0.6x_4 + x_5$$

where

- $x_1 = \text{working capital to total assets (WC/TA)}$
- $x_2 = \text{retained earnings to total assets (RE/TA)}$
- $x_3 = \text{earnings before interest and taxes to total assets (EBIT/TA)}$
- $x_4 = \text{market value of equity to total liabilities (MVE/TL)}$
- $x_5 = \text{sales to total assets (S/TA)}$
WC/TA indicates the liquidity ratio where working capital denotes the difference between current assets and current liabilities. RE/TA refers to the ratio that measures the cumulative profit of the company based on retained earnings that are either distributed as dividends or retained for operation. EBIT/TA calculates the effectiveness of generating earnings while MVE/TL signifies the market value of the company in accordance to the company’s stock price and outstanding shares. The last financial ratio S/TA defines the sales generating capacity of the company.

The Z score values estimated using the model above could be further grouped into three categories. First, Z score value lower than 1.81 denotes that a company is undergoing financial distress and has the possibilities of bankruptcy. The range from 1.81 until 2.99 indicates that the company is under the grey zone which comprises the distress and non-distress levels. Finally, value greater than 2.99 implies that a company is in the safe zone, or financially stable.

Statistical analysis was conducted using the Ms Excel and SPSS software version 16. The Z-score indices and percentages of companies in each financial status category were estimated using the Ms Excel. Multiple linear regression analysis was conducted to identify the variable X1-X5 that were associated with the Z-scores over the duration of 5 years (2012-2016) for the 18 companies. The duration of 5 years from 2012 until 2016 are used to conduct each regression analysis for the 18 companies. The step-wise variable selection procedure was used to determine the variables in the final model. The Z is the dependent variable and X1-X5 are the independent variables. The p-value lower than 0.05 was used as the criteria of retention for the variables to determine the significant variables that influence the company Z-score.

3. Results and Discussion
The 18 listed companies were evaluated using Z score model. Table 1 reveals the findings of five financial ratios and Z values for the companies in 2016. In year 2016, only 4 companies were in the non-financial distress level. The companies include APEX, ECM, LPI and MAA. MAA has the highest Z score value of 15.57 and the second highest is ECM with a value of 8.74. APEX and LPI did not differ much with the Z score values of 5.72 and 3.81 respectively. The BURSA was the only company with scores in the grey zone which indicates that the company requires some monitor to hedge against the risk of bankruptcy. The remaining companies had scores in the distress level with the Z score values below 1.8.
Table 1. Variables and Z-score values for 2016.

| No | Company name                          | Abbreviation | X1     | X2     | X3     | X4     | X5     | Z       |
|----|---------------------------------------|--------------|--------|--------|--------|--------|--------|---------|
| 1  | AEON CREDIT SERVICE (M) BERHAD        | AEONCR       | 0.2509 | 0.1151 | 0.0495 | 0.4106 | 0.1583 | 1.0300  |
| 2  | APEX EQUITY HOLDINGS BERHAD           | APEX         | 0.6303 | 0.2192 | 0.0443 | 7.3262 | 0.1126 | 5.7178  |
| 3  | BIMB HOLDINGS BERHAD                 | BIMB         | 0.1256 | 0.0049 | 0.0138 | 0.1136 | 0.0558 | 0.3270  |
| 4  | BURSA MALAYSIA BERHAD                | BURSA        | 0.1639 | 0.1329 | 0.1111 | 3.0596 | 0.1940 | 2.7791  |
| 5  | ECM LIBRA FINANCIAL GROUP BERHAD     | ECM          | 0.6968 | 0.6717 | 0.0896 | 10.6914| 0.2509 | 8.7382  |
| 6  | HONG LEONG BANK BERHAD               | HLBANK       | 0.0848 | 0.0443 | 0.0125 | 0.1526 | 0.0332 | 0.3300  |
| 7  | HONG LEONG FINANCIAL GROUP BERHAD    | HLFG         | 0.1384 | 0.0391 | 0.0122 | 0.0837 | 0.0306 | 0.3419  |
| 8  | JOHAN HOLDINGS BERHAD                | JOHAN        | -0.0996| -0.2341| -0.0472| 0.1239 | 0.2183 | -0.3104 |
| 9  | LPI CAPITAL BHD                      | LPI          | 0.7368 | 0.2074 | 0.1419 | 2.9899 | 0.3771 | 3.8141  |
| 10 | MAA GROUP BERHAD                     | MAA          | 0.9319 | 0.4257 | 0.4743 | 20.4518| 0.0233 | 15.5738 |
| 11 | MANULIFE HOLDINGS BERHAD             | MANULIFE     | -0.0197| 0.1346 | 0.0122 | 0.1417 | 0.2029 | 0.4929  |
| 12 | MALAYAN BANKING BERHAD               | MAYBANK      | 0.1872 | 0.0196 | 0.0120 | 0.1225 | 0.0607 | 0.4259  |
| 13 | MALAYSIA BUILDING SOCIETY BERHAD     | MBSB         | 0.2254 | 0.0163 | 0.0078 | 0.1012 | 0.0757 | 0.4555  |
| 14 | MNRB HOLDINGS BERHAD                 | MNRB         | 0.0176 | 0.1306 | -0.0044| 0.0730 | 0.3085 | 0.5419  |
| 15 | PACIFIC & ORIENT BERHAD              | P&O          | 0.5610 | 0.1647 | 0.0299 | 0.4060 | 0.3001 | 1.5463  |
| 16 | PUBLIC BANK BERHAD                   | PBBANK       | 0.0833 | 0.0445 | 0.0172 | 0.2209 | 0.0529 | 0.4045  |
| 17 | RHB BANK BERHAD                      | RHBBANK      | 0.1193 | 0.0345 | 0.0094 | 0.0845 | 0.0331 | 0.3063  |
| 18 | SYARIKAT TAKAFUL MALAYSIA BERHAD     | TAKAFUL      | -0.5532| 0.0678 | 0.0285 | 0.4836 | 0.2595 | 0.0748  |

Financial status of the 18 companies over the duration of five years, from 2012 to 2016 based on the Altman’s Z-score model is shown in Table 2. Only one company, APEX was in safe-zone throughout the duration. The ECM showed a drastic improvement from distressed zone in 2012 to safe zone in 2013; the z-score however dropped over the duration of 2013-2015, but remained in the safe zone. The LPI was in grey zone between the year 2012 to 2015, and improved to safe zone between 2015 and 2016. The BURSA improved from grey zone in 2012 to safe zone between the years 2013-2015. The company was found to be in the grey zone again in year 2016. The rest of the companies had values falling mostly in the distressed zone. The percentage and number of financial distress companies based on the Z-scores is shown in Table 3 and graphically illustrated in Figure 1. It is found that most of the companies were in the distressed zone between year 2012 and 2016. The number of companies in safe zone increased slightly over the years from 5.56% to 22.22%, accompanied by a slight decrease in the percentage of companies in grey zone.
Table 2. The Z-score for 18 companies between year 2012 to 2016.

| No | Company name                               | Abbreviation | 2012  | 2013  | 2014  | 2015  | 2016  |
|----|--------------------------------------------|--------------|-------|-------|-------|-------|-------|
| 1  | AEON CREDIT SERVICE (M) BERHAD             | AEONCR       | 1.8922| 1.3847| 1.0888| 1.0419| 1.0300|
| 2  | APEX EQUITY HOLDINGS BERHAD                | APEX         | 3.2341| 3.9548| 6.7046| 5.1707| 5.7178|
| 3  | BIMB HOLDINGS BERHAD                       | BIMB         | 0.2181| 0.2388| 0.2374| 0.2627| 0.3270|
| 4  | BURSA MALAYSIA BERHAD                      | BURSA        | 2.5986| 4.1729| 4.2053| 3.2052| 2.7791|
| 5  | ECM LIBRA FINANCIAL GROUP BERHAD           | ECM          | 0.6709| 22.8828| 18.7288| 13.0292| 8.7382|
| 6  | HONG LEONG BANK BERHAD                     | HLBANK       | 0.3184| 0.3354| 0.3463| 0.3413| 0.3300|
| 7  | HONG LEONG FINANCIAL GROUP BERHAD          | HLFG         | 0.3191| 0.3583| 0.3788| 0.3553| 0.3419|
| 8  | JOHAN HOLDINGS BERHAD                      | JOHAN        | -0.1179| 0.0017| -0.1153| 0.1300| -0.3104|
| 9  | LPI CAPITAL BHD                            | LPI          | 2.0454| 2.0507| 2.1668| 3.0575| 3.8141|
| 10 | MAA GROUP BERHAD                           | MAA          | 0.4486| 0.2528| 0.2197| 0.3487| 15.5738|
| 11 | MANULIFE HOLDINGS BERHAD                   | MANULFE      | 0.6155| 0.6335| 0.6062| 0.5238| 0.4929|
| 12 | MALAYAN BANKING BERHAD                     | MAYBANK      | 0.2873| 0.3291| 0.3038| 0.3675| 0.4259|
| 13 | MALAYSIA BUILDING SOCIETY BERHAD           | MBSB         | 0.2784| 0.3564| 0.5163| 0.4549| 0.4555|
| 14 | MNRB HOLDINGS BERHAD                       | MNRB         | 0.4380| 0.3467| 0.3173| 0.2932| 0.5419|
| 15 | PACIFIC & ORIENT BERHAD                    | P&O          | 1.7348| 1.9635| 1.8967| 1.8031| 1.5463|
| 16 | PUBLIC BANK BERHAD                         | PBBANK       | 0.3400| 0.3454| 0.3573| 0.3838| 0.4045|
| 17 | RHB BANK BERHAD                            | RHBBANK      | 0.2641| 0.2879| 0.2900| 0.2865| 0.3063|
| 18 | SYARIKAT TAKAFUL MALAYSIA BERHAD           | TAKAFUL      | -0.4659| -0.4247| -0.3493| -0.0997| 0.0748|

Table 3. The distribution of financial status of 18 companies in Malaysia between 2012 to 2016.

| Year | 2012 | 2013 | 2014 | 2015 | 2016 |
|------|------|------|------|------|------|
| Distress Zone (Z<1.81) | 14 (77.78%) | 13 (72.22%) | 13 (72.22%) | 14 (77.78%) | 13 (72.22%) |
| Grey Zone (1.81 ≤ Z ≤ 2.99) | 3 (16.67%) | 2 (11.11%) | 2 (11.11%) | 0 (0%) | 1 (5.56%) |
| Safe Zone (Z> 2.99) | 1 (5.56%) | 3 (16.67%) | 3 (16.67%) | 4 (22.22%) | 4 (22.22%) |
The regression of Z-score with the X1, X2, X3, X4 and X5 variables are shown in Table 4. The predictors could be estimated for the 18 companies. The most frequently associated factor was X1, which turned as significant predictor of Z-score for 11 companies, followed by X2 and X4, which predicted the Z-scores for 7 companies each.

Table 4. The regression of X1-X5 variables with the Z-scores

| Abbreviation of company names | Significant X variable | Regression coefficient, (β) | 95% CI of Regression coefficient, (β) | R2 |
|------------------------------|------------------------|----------------------------|--------------------------------------|----|
| AEONCR                       | X2                     | 24.541**                   | 18.537, 30.554                      | 0.983 |
|                              | X1                     | 0.476**                    | 0.464, 0.489                        | 1.00  |
|                              | X4                     | 0.625**                    | 0.625, 0.625                        | 0.925 |
| APEX                         | X5                     | 2.962**                    | 2.958, 2.966                        | 0.990 |
| BIMB                         | X1                     | 1.240**                    | 0.728, 1.752                        | 1.00  |
| BURSA                        | X4                     | 0.732**                    | 0.599, 0.865                        | 1.00  |
|                              | X3                     | 22.818**                   | 14.516, 31.120                      | 1.00  |
| ECM                          | X4                     | 0.627**                    | 0.608, 0.646                        | 0.827 |
| HLBANK                       | X1                     | 1.664*                     | 0.265, 3.062                        | 0.954 |
| HLFG                         | X1                     | 1.929**                    | 1.149, 2.710                        | 0.989 |
|                              | X2                     | -2.113*                    | -3.808, -0.419                      | 1.00  |
| JOHAN                        | X3                     | 21.066**                   | 13.828, 28.305                      | 1.00  |
| LPI                          | X2                     | 15.808**                   | 8.173, 23.442                       | 0.935 |
|                              | X1                     | 1.795*                     | 0.812, 2.777                        | 1.00  |
| MAA                          | X4                     | 0.648**                    | 0.590, 0.706                        | 1.00  |
|                              | X1                     | 2.631**                    | 2.623, 2.638                        | 1.00  |
|                              | X3                     | 18.802**                   | 18.718, 18.887                      | 1.00  |
| MANULFE                      | X4                     | -1.171*                    | -1.1825, -1.160                     | 0.989 |
|                              | X1                     | 1.241**                    | 1.115, 1.366                        | 1.00  |
| MAYBANK                      | X4                     | 1.033**                    | 0.677, 0.389                        | 1.00  |
7.295** 5.643, 8.947 0.996
MBSB X3 2.945* 0.324, 5.566
MNRB X1 0.621** 0.436, 0.805 0.975
X1 2.069** 1.710, 2.428 0.997
P&O X2 0.592* 0.083, 1.100
X1 0.869* 0.450, 1.287 0.995
PBBANK X2 3.035* 1.071, 4.998
X2 3.177* 0.791, 5.562 0.857
RHBANK X1 1.313* 0.640, 1.986 0.998
TAKAFUL X4 0.659** 0.455, 0.863
* = p<0.05  ** = p<0.01

4. Conclusion
Company’s financial performance and potential distress can be evaluated using the Altman’s Z score model. The financial distress level of the companies that listed in the financial sector in Malaysia were studied. Five financial ratios were used to evaluate the performance of each of the companies over a duration of five years. The findings reveal that most of the companies in financial sector were under financial distress level, only a small number of companies were in the safe zone. However, the percentage of safe zone companies shows an increasing trend whereas the percentage for distress companies remains stable. The regression model predicted working capital to total assets as the most significant factor for the examined companies. Retained earnings to total assets as well as market value of equity to total liabilities were the second most associated factors for the Z-score model. This study will provide early signal for the companies to take corrective measures for improvement on the financial performance.

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