AN IMPLEMENTATION OF KMV-MERTON MODEL IN RANKING THE TOP NINE MALAYSIAN GIANT CONSTRUCTION COMPANIES

Samshela Ismail, Nur Maisarah Mohamad, Nur Izzati Mohammad Nazam & Norliza Muhamad Yusof*

Faculty of Computer and Mathematical Sciences,
Universiti Teknologi MARA (UiTM) Cawangan Negeri Sembilan
Kampus Seremban, Persiaran Seremban Tiga/1, 70300 Seremban, Negeri Sembilan.

*corresponding author: norliza3111@.uitm.edu.my

keywords: KMV-Merton Model

Introduction

In most cases, information on a company's revenue is used by decision-makers to determine which firm is the best to invest in. If, on the other hand, the value of the company's liabilities is high or almost equal to its revenue, the company's assets will not be sufficient to satisfy its liabilities. Then, the company is said to be in default. According to Zeitun, Tian, and Keen (2007), default can be understood as a firm that is unable to satisfy its obligations on the due date. Companies with high default risk may rank low among their competitors. The ranking is assumed important in an organization since it can be one of the benchmarks to the performance of companies. Thus, the use of KMV-Merton is introduced in this study as an indicator to indicate the companies' financial health. KMV-Merton model is a model developed by KMV Corporation based on the Black-Scholes-Merton option pricing theory. The KMV model is primarily used to estimate the likelihood of default of a firm. It is widely used due to its simple structure to be implemented and market based. Parameters involved to predict default are the firm's market value of the asset, book value of liabilities, volatility, and growth rate. However, there is a restriction where volatility, the market value of the asset, and the book value of liability cannot be equal to zero to predict the probability of default of firms. Zero values in those parameters may occur due to the static asset values in a certain period and the possibility of a firm having zero liability or asset. Based on Yusof and Jaffar (2012), if the market value of the asset is equal to zero and other parameters are greater than zero, then it is said that the firm has no chance for recovery and tends to go bankrupt. Contradicted to the case when the firm has zero liability, typically the firm is hard to be in a default situation. But if the firm's assets remain unchanged, then no return and volatility are generated.

This article applies the KMV-Merton model to rank the top nine Malaysian giant construction companies listed on the Bursa Malaysia website. In addition, a modified KMV-Merton model

proposed by Yusof and Jaffar (2012) is used to fulfil the gap that exists in the mathematical structure of the KMV-Merton model.

Methodology

The steps involved in this research are as follows; 1) data collection, 2) calculating asset volatility, 3) estimating the companies' distance to default (DD) and default rate using the KMV-Merton model, and lastly, 4) ranking the selected companies using the estimated DD. In the data collection process, a list of the top nine Malaysian giant construction companies listed by Bursa Malaysia for the year 2012 is used as a sample of data. This includes the daily data for the year 2012 on closing shares from the website of Yahoo Finance, outstanding shares, current liabilities, and long-term liabilities, earnings before interest and tax (EBIT), and revenue, obtained from the selected companies' financial reports. The product of the share price and the outstanding share is obtained to get the market value of equity of the companies. These values are added to the current liabilities and half long-term liabilities to produce the market value of the assets of the companies. From this, the asset volatility is generated by finding the standard deviation of the asset returns for the past of the year. Meanwhile, the result from the division of EBIT to the revenue is assumed to be the companies' growth rate. Based on these values, the DD and default rate are estimated using the formula given in the KMV-Merton model to rank the companies.

Results and Discussion

Table 1: The parameters values of estimating default rate of the companies using the KMV-Merton model

Name of Company	Market Value of Asset (RM mil)	Book Value of Liabilities (RM mil)	Growth Rate %	Asset Volatility %	Distance to Default (DD)	Default Rate %
Gamuda Berhad	3932.4175	1850.6775	23.51	17.67	10.94	0
Malaysian Resources Corporation Berhad (MRCB)	2740.1609	1352.35	10.71	58.91	2.55	0.54
WCT Berhad	1327.5336	924.9295	12.71	22.02	4.29	0
Eversendai Berhad	619.3524	232.3525	13.33	27.72	7.94	0
Mudajaya Group Berhad	124.2071	14.258	99.21	22.89	27.43	0
Hock Seng Lee Berhad	132.1867	15.6515	19.58	21.88	21.19	0
Banalec Holding Berhad	200.7400	0	95.68	27.87	44.73	0
Europlus Berhad	580.0404	87.4785	187.78	0.06	12162.97	0
Muhibbah Engineering Berhad (MEB)	630.0720	318.7555	0.77	13.71	9.96	0

Table 1 shows the results from the steps taken to determine the companies' default risk. This includes the values from the parameters such as the market value of the asset, book value of liabilities, growth rate, asset volatility, DD, and default rate. To determine the default risk of a company, all the parameters must be considered together. The higher value of asset and growth rate, and lower value of liabilities and volatility, produced higher DD and thus, lower default rate. Overall, the default rates were predicted low, which is mostly zero for all companies. In addition, a modified KMV-Merton model proposed by Yusof and Jaffar (2012) is used in the case of estimating the default risk of Benalec Holding Berhad due to the zero value in liabilities. In this case, the possibility of Benalec Holding Berhad to default is predicted to be zero. In conclusion, the low default rates are predicted to be compatible with the title of top-nine giant companies in the construction industry.

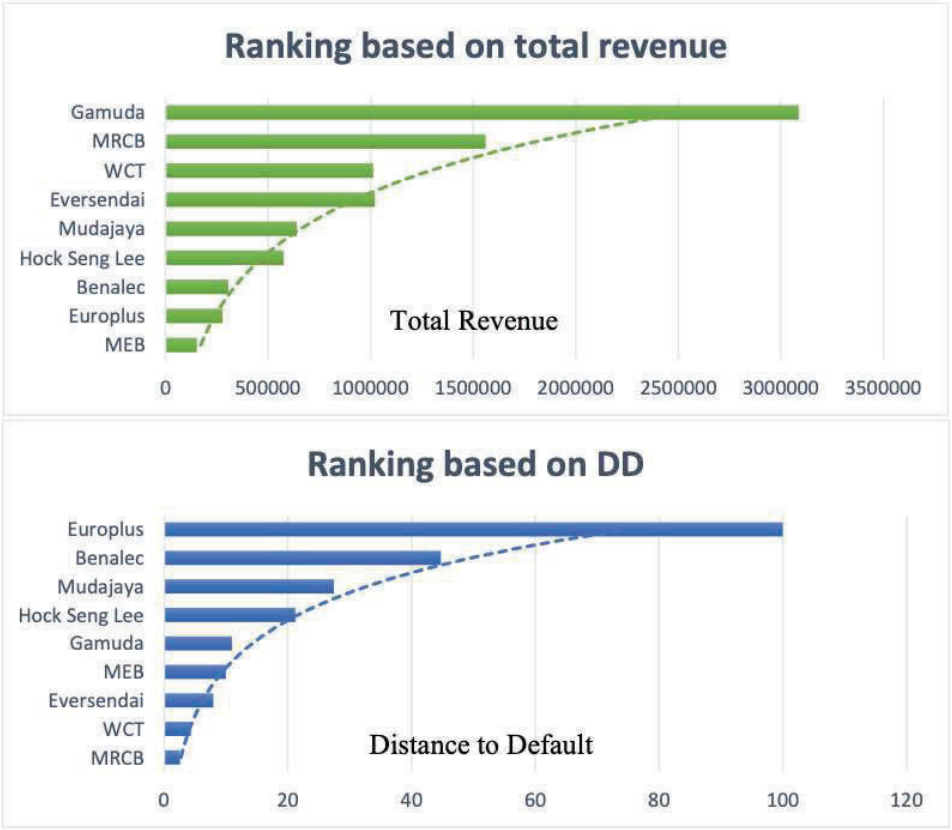

Figure 1: Ranking of the top nine Malaysian giant construction companies based on the distance to default and revenue

Based on the estimated DD in Table 1, the ranking of the top nine Malaysian construction companies is shown in Figure 1. The company is ranked higher if DD is higher and vice versa. Europlus for example is ranked first due to the highest DD (12162.97). Meanwhile Benalec is ranked second followed by Mudajaya, Hock Seng Lee, Gamuda, MEB, Eversedai, WCT and lasly MRCB. This shows that Europlus has the lowest possibility of getting default in its debts compared to the other companies. However, Figure 1 shows that the rankings based on

revenue and DD are different. Based on revenue, Gamuda is said to be ranked first instead of Europlus. Similarly, to the rankings of other companies such as MRCB that ranked second instead of ranked last by DD. This shows that even though the company generates higher revenue, the company may not be in its best financial position. For example, even though Gamuda owns the highest revenue, the company is not in its best financial position among the companies as DD is considered.

Conclusion

Our study provides a simple way of ranking companies using the KMV-Merton model. In the previous analysis, economists used the company's revenue to rank companies while this research used the company's distance to default. We discovered that ranking using DD differs significantly from the ranking based on revenues. Still, the KMV-Merton model is found able to estimate low default rates that suit the companies ranking as the top-nine Malaysian giant construction. The use of the KMV-Merton may also help investors and companies' risk analysts in making financial decisions. However, more research is needed to determine the accuracy of the ranking.

References

Yusof, N.M., & Jaffar, M.M. (2012). The analysis of the KMV-Merton model in forecasting default probability. *2012 IEEE Symposium on Humanities, Science and Engineering Research*, 93-97.

Zeitun, R, Tian, G. & Keen, K., (2007). Default probability for the Jordanian companies: a test of cash flow theory. *International Research Journal of Finance and Economics*, 8, 147-62.