UNIVERSITI TEKNOLOGI MARA

MODIFIED KMV-MERTON MODEL USING FREE CASH FLOW VARIABLE FOR EVALUATING CREDIT DEFAULT RISK

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MSc

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Credit default risk is the risk that affects banks when a borrower such as a company or organisation does not make payment on a loan when the time comes. Many alternative ways are implemented by banks in order to manage this kind of risk continuously. In academic literature, one of the approaches to monitoring this credit default risk is structural approach, known as the KMV-Merton model. This model is greatly informed by the company's market value such as when the company's market value falls, then the probability of default increases. However, it is clear that most of the short-term movements are due to the company's sector or the overall market in general. Therefore, a company's probability of default for this model can increase due to the sector or market, while a company's fundamental ability to repay debt has not really changed. Consequently, this model gives too much weight to non-company-specific factors and is insufficient of the existing KMV-Merton model in grading a company in terms of the company's ability to repay their debts. Apart from that, the credit rating grade for a corporate company usually proceeds with a request from the potential clients to perform that rating grade by rating agencies. In addition, the request for the credit rating grade should be made in advance so that rating agencies have sufficient time for the rating process. Here, not all companies have been graded by rating agencies unless they request to be graded. Due to that, the objectives of this study are to modify the KMV-Merton model by considering the free cash flow variable in predicting credit default risk of companies, and to develop the standardised credit rating grade using the KMV-Merton model with the rating given by Malaysian Rating Corporation Berhad (MARC) and RAM Holdings Berhad (RAM) to conform to reality. This study has verified the modified model using the credit rating grade issued by MARC and RAM and compare with the KMV-Merton model. Here, this study has modified the KMV-Merton model by considering the free cash flow variable in predicting credit default risk. Then, this study proposes a standardised credit rating grade that can be used to provide a rating grade to any corporate companies by using the KMV-Merton model with the rating grade given by MARC and RAM. The standardised credit rating grade was done by using the K-Means clustering that involved eight iterations and solving the gapping problem by using the Geometric Mean. The standardised rating grades from MARC and RAM have been used as a benchmark. This study introduces the standardised credit rating grade by using the star rating grade to reflect the rating grade issued by the rating agencies. As an example, the 6-star rating grade as a standardised credit rating grade to reflect AAA standardised rating grade which are viewed as strong financial fundamentals. Apart from that, this study used the Pearson correlation coefficient in order to obtain the correlation between rating grades issued by rating agencies with the standardised credit rating grade proposed by this study and to verified the modified model. As a result, the modified model by adding a free cash flow variable enhances the credit default risk probability, which is 0.7250, compared to the KMV-Merton model, which is 0.6890, that is aligned with the credit rating grades issued by rating agencies. The free cash flow is the amount that a company spends for business need as well as the company can use excess cash to distribute dividends. In conclusion, the standardised credit rating grade can be used as a proxy in monitoring credit default risk in case the companies do not have their credit rating grade from MARC and RAM.

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