UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

THE APPLICATION OF KMV-MERTON MODEL AND ALTMAN Z-SCORE MODEL IN DETERMINING CREDIT SCORE OF FIRMS
(P34S18)

'AFIFAH FILZA BINTI AHMAD RUBAA'I
NURUL ATIQAH SYAZWANI BINTI SAMSUDIN
HUMAIRAH 'AISYAH BINTI AZMI

Report submitted in partial fulfilment of the requirement
For the degree of
Bachelor of Science (Hons.) Mathematics
Faculty of Computer and Mathematical Sciences

DECEMBER 2018

ACKNOWLEDGEMENT

Alhamdulillah, praises and gratitude to Allah for His Almighty and His utmost blessings, we were able to complete this final year project within the time given.

First and foremost, we would like to take the opportunity to express our gratitude and give massive appreciation to our supervisor, Madam Norliza binti Muhamad Yusof. Most thanks for her guidance, moral support, advices and encouragement throughout this research study.

We were honored to expresses our gratitude and special thanks to our parents who had supported morally and financially in order for us to finish this research study successfully. Their blessings give us strength to complete this research.

Lastly, our appreciation goes to all our dearest friends that contributed directly or indirectly in this research study. All helps and encouragement given were appreciated.

ABSTRACT

Most of the firms' managers believe that their firms are in a good condition as they are able to generate profits. They are not aware that the obligations holds on debts or liabilities will probably cause them to default. Default is an element of the credit risk where it is defined as a risk that arises due to the failure to make required payments. Identifying the possibility of a firm to default is significant in maintaining good financial health of firms. Default will likely fall into bankruptcy. Bankruptcy may highly occur when the firms continuously suffer from losses. In specific, the default and bankruptcy are related as the higher default will results in the higher probability of bankruptcy. Therefore, default prediction is extremely needed to avoid the firm's bankruptcy. KMV-Merton model and Altman Z-Score model are introduced in this study as the default predictive models. The models are implemented in this study to predict the probability of default alongside to predict the probability of bankruptcy. Data of the 16 selected firms is collected within 2 years, which is from 2016 to 2017. The predicted probability of default and the predicted probability of bankruptcy are analysed its compatibility by comparing the results. The firms' credit scores are also determined by applying the FRISK® score developed by CreditRiskMonitor. The result of this study is that the probability of default and the probability of bankruptcy for the 16 firms for the year 2017 are clearly predicted where 56.25% of the firms are in the best conditions while 18.75% of the firms are worst. Besides, the credit score of the firms are determined from the range of 1 to 10. These predictive models are significance to be applied to estimate the future financial conditions of the firm's. This study gives opportunity to the firms to secure their financial condition.

TABLE OF CONTENTS

CONTENT	PAGE
ACKNOWLEDGEMENT	ii
ABSTRACT	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vi
LIST OF TABLES	vii
CHAPTER 1:INTRODUCTION	1
1.1 Problem Statements	2
1.2 Objectives	3
1.3 Scope and Limitations	3
1.4 Significance of Studies	4
CHAPTER 2: LITERATURE REVIEW	5
2.1 Default Risk	5
2.2 Method to Predict Default Risk	6
2.3Altman Z-Score Model	7
2.4 Previous Studies on Altman Z-Score Model	10
2.5 KMV-Merton Model	12
2.6 Credit Scoring	17
2.7 Summary	19

CHAPTER 3: METHODOLOGY 20
3.1 Overview of Methodology 20
3.2 Stages in Research Process 21
3.2.1 Model Description 21
3.2.1.1 KMV-Merton Model 21
3.2.1.2 Altman Z-Score Model 22
3.2.2 Data Description 23
3.2.3 Predicting Probability of Bankruptcy 24
3.2.4 Predicting Probability of Default 25
3.2.5 Comparing and Validating the Results Predicted 26
3.2.6 Determining the Credit Score of the Company 26

CHAPTER 4: RESULTS AND DISCUSSIONS 27
4.1 Altman Z-Score Model 27
4.2 KMV-Merton Model 38
4.3 Model Validation and Credit Scoring 47

CHAPTER 5: CONCLUSION AND RECOMMENDATION 53
REFERENCES 55
APPENDICES 57
APPENDIX A: EXAMPLE OF CALCULATION OF KMV-MERTON MODEL 57
APPENDIX B: EXAMPLE OF CALCULATION OF ALTMAN Z-SCORE MODEL 58