

UNIVERSITI TEKNOLOGI MARA

**A MODIFIED KMV-MERTON
MODEL FOR PREDICTING THE
LEVELS OF CREDIT RISK AMONG
MALAYSIAN PUBLIC LISTED
COMPANIES**

NORLIZA BINTI MUHAMAD YUSOF

Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

Faculty of Computer and Mathematical Sciences

December 2013

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 result 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 other degree of 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.

Name of Student : Norliza Binti Muhamad Yusof

Student's ID No. : 2010606232

Programme : Master of Science

Faculty : Computer and Mathematical Sciences

Thesis Title : A Modified KMV-Merton Model for Predicting the
Levels of Credit Risk among Malaysian Public Listed
Companies

Signature of Student :

Date : December 2013

ABSTRACT

Measuring credit risk is always a primary matter, mainly in the institution of banking. Several efforts have been adopted by banks to ensure the security of their loans. Accordingly, three objectives are introduced in this study as an effort to complement banks' current credit risk management tools. The first objective is to modify the KMV-Merton model according to the assumptions and condition of companies' extreme cases made in this study. The second objective is to adapt the modified KMV-Merton model to the cases of estimating the probability of default of Malaysian companies, and the results of the adaptation are validated through credit ratings and EBIT interest coverage ratios. It appears that the probability of default estimated by the modified KMV-Merton model is able to react significantly and coincides with the given credit ratings and EBIT interest coverage ratios in a way of measuring the credit risk of Malaysian companies. This study also focuses on the probability of default estimated by the modified KMV-Merton model for the PN17 Companies. The analysis shows that the modified KMV-Merton model is able to predict future default of the companies up to three years in advance. These conclude that the modified KMV-Merton model is a convincing default forecaster model for Malaysian companies. Consequently, a framework which is called the Loan Credit Risk Indicator (LCRI) is developed as the last objective of this study. The LCRI is developed to assist banks in the loan decision-making and the repayment process.

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and the Most Merciful

Alhamdulillah, all praises to Allah for the blessing and strength given to complete this thesis.

Special appreciation goes to my supervisor, Associate Professor Dr. Maheran Mohd Jaffar, for the constructive comments and suggestions throughout the thesis work. Her supervision and constant support truly helps me to complete this research.

Great appreciation goes to Associate Professor Dr. Kamarularifin Abd Jalil, the Head of Center for Graduate Studies, Faculty of Computer and Mathematical Sciences, for his support and help. Appreciation also goes to all examiners of mock viva involved in the improvement of this thesis. Their comments are indeed helpful and appreciated. Not forgotten, thanks to lecturers and staff in the Faculty of Computer and Mathematical Sciences for their precious ideas, especially to Ms. Zati Aqmar Zaharudin and Mrs. Shamsimah Samsuddin.

I would like to express my appreciation to Ms. Nik Amanina Nik Mohd Alias, the librarian of PTAR 2, Universiti Teknologi MARA, for her patience in helping me searching for data. My acknowledgement also goes to both credit rating agencies, Malaysian Rating Corporation and RAM Holding Berhad for their cooperation in giving information.

To all my friends mainly Norlyda Mohamed and Nazifah Zainol Abidin, thanks a lot for the kindness and moral support. Our friendship will always be remembered. Deepest appreciation goes to my family exclusively my beloved parents, and Mr. Muhamad Yusof Rais for their endless love, prayers and encouragement.

Lastly, I would like to express my gratitude to all those who indirectly have contributed to this research. Thank you very much.

TABLE OF CONTENTS

	Page
AUTHOR'S DECLARATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
CHAPTER ONE: INTRODUCTION	
1.1 BROAD THEME OF THE STUDY	1
1.2 BACKGROUND OF CREDIT RISK IN MALAYSIA	2
1.3 BANKS' CREDIT RISK MANAGEMENT STRATEGIES	4
1.4 CREDIT RISK MODELING LITERATURE	6
1.5 THE FOUNDATIONS OF MERTON MODEL	8
1.6 PREVIOUS STUDIES DONE ON THE KMV-MERTON MODEL	10
1.7 THE ADJUSTMENTS OF THE KMV-MERTON MODEL	11
1.8 ANALYSIS OF THE KMV-MERTON MODEL VALIDITY	15
1.9 ANALYSIS OF THE DETERMINANTS OF KMV-MERTON MODEL	18
1.10 PROBLEM STATEMENTS	20
1.11 OBJECTIVES	21
1.12 SIGNIFICANCE OF THE STUDY	21
1.13 SCOPE AND LIMITATIONS OF THE STUDY	22
1.14 THESIS OUTLINE	23
1.15 SUMMARY	23
CHAPTER TWO: PRELIMINARY CONCEPT	
2.1 RISKS IN PERSPECTIVE OF FINANCE	24
2.2 CREDIT RISK IN BANKING PERSPECTIVE	25
2.3 THE BEHAVIOR OF ASSETS	26