UNIVERSITI TEKNOLOGY MARA

A STOCHASTIC *MUDHARABAH* MODEL FOR INVESTMENT IN BURSA MALAYSIA SYARIAH COUNTERS

ASLINA BINTI OMAR

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

Faculty of Computer and Mathematical Sciences

September 2013

AUTHORS'S DECLARATION

I declare that the work in this thesis/dissertation 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 relugations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Aslina Binti Omar
Student I.D. No.	:	2010672268
Programme	:	Master of Science (Mathematics)
Faculty	:	Computer and Mathematical Sciences
Thesis Title	:	A Stochastic *Mudharabah* Model for Investment in Bursa Malaysia Syariah Counters
Signature of Student	:	.....
Date	:	September 2013

ABSTRACT

In Islam, all decisions, activities, policies, strategy and interaction in the economy do not end with the profit or loss only, but are directly related to human relationships. This is also believed in other religions. Hence in the Islamic financial system, the *syariah* rules are considered in all economic activities including investment. Investment is money or capital commitment for the purchase of financial instruments or other assets to recover the benefits in the form of interest income. Most of the investment opportunities offered are interest based but Islamic law strictly prohibits interest or *usury*, also commonly called *riba* in Arabic. The prohibition of *riba* has led to the creation of alternatives schemes for the compensation of investment capital. One of the methods of compensation is by means of profit-sharing and one of the financial contracts that internalize profit sharing is *mudharabah*. It is an investment partnership in which one party called *rab ul mal* provides capital while the other party called *mudharib* brings labor and effort with the provision of profit sharing in some pre-determined proportions. This study derives the new *mudharabah* investment model by using the stochastic calculus. This model can be used in stock market investment. Based on the results it shows that the new *mudharabah* investment model is useful in investing in stock market since it has the accurate forecasting stock prices and profit rate.

TABLE OF CONTENTS

		Page
AUTHOR'S DECLARATION		ii
ABSTRACT		iii
ACKNOWLEDGEMENT		iv
TABLE OF CONTENT		v
LIST OF TABLES		viii
LIST OF FIGURES		x
CHAPTER ONE: INTRODUCTION		
1.1	Background of The Study	1
1.2	Islamic Investment	10
1.3	Prohibition of *Riba* In The Holy Quran and *Hadith*	11
1.4	Mathematical Model Based On Islamic Principles	13
1.5	Stock Market	14
1.6	Stock Market Indices	16
1.7	Geometric Brownian motion	18
1.8	Problem Statement	19
1.9	Objective	21
1.10	Significance of Research	21
1.11	Scope and Limitation Of Research	21
1.12	Thesis Outline	22
1.13	Summary	23
CHAPTER TWO: PRELIMINARIES DEFINITIONS AND CONCEPTS		
2.1	Stochastic Calculus Formula	24
	2.1.1 The Drift	27
	2.1.2 The Wiener Process	27
	2.1.3 Stochastic Differential Equations	29
	2.1.4 Stochastic Integration	30
	2.1.5 Mean Square Limit	30

2.1.6 Function of Stochastic Variables And Ito's Lemma 33
2.1.6.1 The 1-Dimensional Ito Processes 34
2.1.6.2 The Multi-Dimensional Ito Formula 36
2.1.7 Brownian Motion with Drift 38
2.1.8 The Lognormal Random Walk 38
2.1.9 Properties of Brownian motion 39
2.2 Measuring Return 40
2.3 Measuring Risk or Volatility 41
2.4 Measuring Beta Market Risk 42
2.5 Measuring of Relationship 43
2.6 Treynor's Index 44
2.7 Sharpe's Index 44
2.8 Symmetric Error Statistic 45
2.8.1 Mean Absolute Error 45
2.8.2 Mean Absolute Percentage Error 46
2.9 The Current *Mudharabah* Model Used By Islamic Bank 47
2.10 Determination of The Approximation Values of The Profit Rates and The Profit Sharing Rates 47
2.11 Summary 48

CHAPTER THREE: METHODOLOGY

3.1 Research Conceptual Framework 49
3.2 Data Collection 51
3.3 Forecasting The Stock Market Indices By Using Geometric Brownian Motion 53
3.4 Forecasting Prices of *Syariah* Counters In Bursa Malaysia 57
3.5 The Measurement Performance of *Syariah* Counters 60
3.5.1 Measuring Relationship 61
3.5.2 Treynor's Index 62
3.5.3 Sharpe's Index 62
3.6 The New *Mudharabah* Investment Model By Using Stochastic Calculus 63
3.7 Summary 63