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 regulations 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 : 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

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