

**DETERMINISTIC BEHAVIORAL STOCK
MARKET MODEL TO EXAMINE THE VOLATILITY IN
COLOMBO STOCK INDICES**

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Degree of Master of Science

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University of Moratuwa
Sri Lanka

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Thesis submitted in partial fulfillment of the requirements for the degree
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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

The study “Deterministic behavioral Stock Market Model to Examine the Volatility in Colombo Stock Indices” is done using daily stock market price indices of Colombo Stock Exchange (CSE) from 2000 to 2016. The main objective of the study is to build an appropriate model to estimate market volatility based on All Share Price Index (ASPI) and price indices of the selected sectors.

Stationarity and variance patterns of the ASPI are inspected by using descriptive time series plots of the original series, log transformed series and returns series. Box-pierce LM Test and ARCH Effect Test are used to check the existing of volatility clusters in returns series. Further Statistical Tests are applied to identify the asymmetric volatility clusters. Two distinct EGARCH models are built to examine the volatility in ASPI before and after the ending of war which was occurred till May 2009, Sri Lanka. The Diagnostic Checking of the fitted models is done by using Heteroskedasticity Test, Correlogram of the squared residuals. Assumptions of the Error distribution are validated by Q-Q plot.

Further, existence of volatility clusters and asymmetric patterns of price indices of Bank Finance & Insurance (BFI), Construction & Engineering (CE) and Manufacturing (MFU) sectors are tested using proper statistical tests. Diverse GARCH family models are used to inspect the variance of sector price indices. Diagnostic checking is performed for each built model and volatility of the sector indices are estimated by appropriate models.

Key Words: ASPI, Volatility, GARCH, Heteroskedasticity

TABLE OF CONTENTS

DECLARATION	I
ACKNOWLEDGEMENT	II
ABSTRACT.....	III
TABLE OF CONTENTS.....	IV
LIST OF FIGURES	VIII
LIST OF TABLES	IX
LIST OF ABRIVATIONS	X
CHAPTER 1: INTRODUCTION.....	1
1.1 Background of the Study	1
1.1.1 Financial Market Volatility	1
1.1.2 Types of Stock Market Indices	2
1.1.3 All Share Price Index (ASPI)	3
1.1.4 S&P Sri Lanka 20 (S&P SL20)	4
1.1.5 Sector Indices	4
1.2 Significance of the Study	5
1.3 Objectives.....	5
1.4 Outline of the Thesis	6
CHAPTER 2: LITERATURE REVIEW	6
2.1 Review on previous studies.....	7
2.2 Financial Time Series Modeling	8
2.3 GARCH Family Models.....	9
2.4 Sector-wise Stock market Indices	10
CHAPTER 3: METHODOLOGY	12
3.1 Arithmetic and Geometric returns.....	12

3.2 Auto Regressive Conditional Heterosedasticity (ARCH).....	12
3.2.1 GARCH(1,1) Model	12
3.2.2 GARCH (p,q) Model	13
3.2.3 The Exponential GARCH (EGARCH) Model	13
3.2.4 The Integrated GARCH (IGARCH) Model	14
3.3 Test for existing of Volatility	14
3.3.1 Box-pierce LM test:	14
3.3.2 Test for an ARCH effect.....	15
3.4 Testing for asymmetric volatilities.....	15
3.5 Model Selection Methods.....	16
3.5.1 Akaike Information Criterion (AIC).....	16
3.5.2 The Schwarz's BC Criterion	17
3.5.3 Durbin Watson statistic	17
3.6 Residual Diagnostics	18
3.6.1 Ljung-Box Test.....	18
3.6.2 Autocorrelation Test	19
3.6.3 Jarque-Bera Test	19
3.6.4 Histogram	20
3.6.5 Normal Distribution.....	20
3.6.6 Student-t Distribution	21
3.6.7 Normal Probability Plot.....	21
3.6.8 Q-Q Plot.....	22
3.6.9 Residuals.....	22
3.7 Methodology of the analysis	23
3.8 Data Description.....	24
CHAPTER 4: PRELIMINARY ANALYSIS	25

4.1 Monthly variation of three main market price indices	25
4.1.1 Monthly Market Price of ASPI.....	25
4.1.2 Monthly market price of S&P SL 20 Price Index	26
4.2 Daily variation of All Share Total Returns Index (ASTRI).....	27
4.2.1 Daily return index of ASTRI.....	27
4.2.2 Comparison of total market returns by ASPI and ASTRI.....	27
4.3 Descriptive Statistics of returns of the ASPI.....	28
4.3.1 Basic Statistics of the returns of ASPI.....	28
4.3.2 Q-Q Plot of the returns of ASPI	29
4.4 Monthly variation of market price indices of selected sectors.....	29
4.5 Descriptive statistics of market price indices of selected sectors.....	30
4.5.1 Basic Statistics of the returns of selected indices	30
4.5.2 Q-Q Plot of the returns of the selected sector indices	31
CHAPTER 5: FURTHER ANALYSIS.....	32
5.1 Modeling daily ASPI (2000-2009 May)	32
5.1.1 Identifying the Stationarity	32
5.1.2 Test for existing of volatility clusters in returns series of the ASPI.....	33
5.1.3 Test for asymmetry in volatility clustering:	35
5.1.4 GARCH model for the ASPI (2000-2009 May).....	35
5.2 Modeling daily ASPI (2009 May-2016)	40
5.2.1 Identifying the Stationarity	40
5.2.2 Test for existing of volatility clusters in returns series of the ASPI.....	41
5.2.3 Test for asymmetry in volatility clustering:	42
5.2.4 GARCH model for the ASPI (2009 May-2016).....	43
5.3 Modeling sector-wise daily price indices.....	47
5.3.1 Banking Finance & Insurance (BFI) sector price index (2000-2016).....	47

5.3.2 Construction & Engineering (CE) Sector Price Index (2000-2016).....	54
5.3.3 Manufacturing (MFU) Sector Price Index (2000-2016).....	61
CHAPTER 6: GENERAL DISCUSSION & CONCLUSION.....	69
6.1 General Discussion.....	69
6.1.1 Overview of the Study.....	69
6.1.2 Discussion on GARCH family models.....	71
6.2 Conclusions	75
6.3 Recommendations and Limitations.....	75
REFERENCES.....	76

LIST OF FIGURES

Figure 4.1: Monthly ASPI over 2000-2016	26
Figure 4.2: Monthly S&P SL 20 over 2013-2016.....	26
Figure 4.3: Daily ASTRI over 2004-2016	27
Figure 4.4: Time Series Plot of Returns of ASPI and Returns of ASTRI in 2016	27
Figure 4.5: Q-Q Plot of the Returns of ASPI.....	29
Figure 4.6: Time series Plot of three selected price indices	29
Figure 4.7: Q-Q Plot of the Returns of Selected Sector Indices	31
Figure 5.1: Time Series plot of the daily ASPI (2000-2009 May)	32
Figure 5.2: Returns Series of the ASPI (2000-2009 May).....	33
Figure 5.3 : Q-Q plot of the EGARCH (1, 1) model	38
Figure 5.4 : Actual & fitted volatility in return series of the ASPI(2000-2016 May) .	39
Figure 5.5 : Time Series plot of the daily ASPI (2009 May-2016)	40
Figure 5.6 : Returns Series of the ASPI (2000-2009 May).....	40
Figure 5.7 : Q-Q plot of the EGARCH (2, 2) model	46
Figure 5.8 : Actual & fitted volatility in return series of the ASPI.....	46
Figure 5.9 : Time Series plot of the Daily BFI	47
Figure 5.10 : Log Transformed series of the BFI	48
Figure 5.11 : Returns series of the BFI.....	48
Figure 5.12 : Q-Q plot of the GARCH (1, 2) model.....	53
Figure 5.13 : Actual & fitted volatility in return series of the BFI	54
Figure 5.14 : Time Series plot of the daily CE	54
Figure 5.15 : Log Transformed series of the CE	55
Figure 5.16 : Returns series of the CE	55
Figure 5.17 : Q-Q plot of the GARCH (1, 2) model.....	60
Figure 5.18 : Actual & fitted volatility in return series of the CE	61
Figure 5.19 : Time Series plot of the daily MFU.....	61
Figure 5.20 : Log Transformed series of the MFU	62
Figure 5.21 : Returns series of the MFU.....	62
Figure 5.22 : Q-Q plot of the EGARCH (2, 2) model	68
Figure 5.23 : Actual & fitted volatility in return series of the MFU.....	69

LIST OF TABLES

Table 4.1: Basic Statistics values of the returns of the ASPI.....	28
Table 4.2: Basic Statistics values of the returns of the selected indices	30
Table 5.1: Results of the secondary regression run for the squared residuals	34
Table 5.2 : Parameter Estimation of the E-GARCH(1,1) Model.....	36
Table 5.3 : Heteroskedasticity Test for EGARCH (1,1) model.....	37
Table 5.4 : The correlogram of Standardized Residuals.....	37
Table 5.5: Results of the secondary regression run for the squared residuals	42
Table 5.6 : Parameter Estimation of the EGARCH(2,2) Model	43
Table 5.7 : Heteroskedasticity Test for EGARCH (2,2) model.....	44
Table 5.8 : The correlogram of standardized residuals.....	45
Table 5.9 : Results of the secondary regression run for the squared residuals	49
Table 5.10 : Parameter Estimation of the GARCH(1,2) Model	51
Table 5.11 : Heteroskedasticity Test for GARCH (1,2) model	51
Table 5.12 : The correlogram of standardized residuals.....	52
Table 5.13 : Results of the secondary regression run for the squared residuals	57
Table 5.14 : Parameter Estimation of the GARCH(1,2) Model	58
Table 5.15 : Heteroskedasticity Test for GARCH (1,2) model	59
Table 5.16: The correlogram of standardized residuals.....	59
Table 5.17 : Results of the secondary regression run for the squared residuals	64
Table 5.18 : Parameter Estimation of the EGARCH(2,2) Model	65
Table 5.19 : Heteroskedasticity Test for EGARCH (2,2) model.....	66
Table 5.20: The correlogram of standardized residuals.....	66

LIST OF ABRIVATIONS

AIC	Akaike Information Criterion
ARCH	Autoregressive Conditional Heteroskedasticity
ARIMA	Autoregressive Integrated Moving average
ASPI	All Share Price Index
ASTRI	All Share Total Return Index
BFI	Bank Finance & Insurance
CE	Construction & Engineering
CSE	Colombo Stock Exchange
DW	Durbin-Watson Value
EGARCH	Exponential Generalized Autoregressive Conditional Heterotedasticity
GARCH	Generalized Autoregressive Conditional Heterotedasticity
GDP	Gross Domestic Product
GED	Generalized Error Distribution
JB	Jarque-Bera
MAPE	Mean Absolute Percentage Error
MFU	Manufacturing
MPI	Milanka Price Index
MSCI	Morgan Stanley Capital International
SBC	Schwartz's Bayesian Criterion
TGARCH	Threshold Generalized Autoregressive Conditional Heterotedasticity
TRI	Total Return Index