SIMULATING STOCK PRICES USING GEOMETRIC BROWNIAN MOTION: EVIDENCE FROM A FRONTIER MARKET

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DECLARATION

I declare that this is my own work and this thesis/dissertation 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. Also, I hereby grant to the University of Moratuwa the non-exclusive right to reproduce and distribute my thesis/dissertation, in whole or in part in print, electronic, or other medium. I retain the right to use this content in whole or part in future works (such as articles or books).

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ABSTRACT

When looking at the simulation of the stock price, the Geometric Brownian motion model is a widely used share price prediction model in various countries. But, in the Sri Lankan context, the use of the Geometric Brownian Motion model in stock price prediction is not observable. As a filling of the gap and identifying the validity of the Geometric model in Sri Lanka were the main purposes of conducting this research

To obtain the validity of the GBM model was checked by using two hundred and fifty (250) companies in the Colombo Stock Exchange, which analyzed was forecasted from 2014 to 2018. The accuracy was verified by using the Mean Absolute Percentage Error (MAPE) value. A number of scholars used the MAPE-based judgment method to evaluate the accuracy of the forecast resulted from GBM. Since the MAPE values are between 0% and 10%, it implies that the GBM model is a highly accurate model for forecasting stock prices on the Colombo Stock Exchange in Sri Lanka. The forecast was limited only for one day. The mean value of the MAPE of the sample of 250 companies is 4.49 %. Further, 97.2% of the sample, the MAPE value was below 10%. It implies that a one-day price forecast is highly accurate in the Sri Lankan context.

Geometric Brownian motion model has been developed in the study to predict stock price behaviour, and the model has subsequently been used to exchange. The results of the simulated or forecasted prices were subsequently compared to the actual prices obtained. The results show that the model consistently predicts stock behaviour in more than 95% of the cases. A procedure to mathematically examine the probabilistic distribution of stocks has also been provided. It is expected that this scholarly work will help investors and other stakeholders, especially on the stock market in Colombo, to make informed decisions on trading and valuation. However, in this study, the forecast is limited only for one day. In other words, utilizing historical data until trading day t, someone can forecast the price of the trading day t+1.

Key Words: *Geometric Brownian Motion, Share Price Prediction, Colombo Stock Exchange*

DEDICATION

To my parents and my Supervisor, Mr Rohana Dissanayake

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LIST OF ABBREVIATIONS

GBM:	Geometric Brownian Motion
MAPE:	Mean Absolute Percentage Error

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