

**MODELLING EXCHANGE RATE OF USD TO SRI
LANKAN RUPEES WITH OIL PRICES, GOLD PRICES,
SILVER PRICES AND RETURN OF ALL SHARE
PRICE INDEX OF SRI LANKA**

M. H. Shanika

(188867B)

Degree of Master of Science

Department of Mathematics

University of Moratuwa

Sri Lanka

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Menikpura Hewage Shanika

(188867B)

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Department of Mathematics

University of Moratuwa

Sri Lanka

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Declaration

The work described in this dissertation was carried out by me in association with my supervisors and the Department of Mathematics, University of Moratuwa, Sri Lanka under the guidance of coordinator and has not been submitted elsewhere.

Signature:

Date: 23-11-2022

The above candidate has carried out research for the Masters thesis under our supervision.

Name of the supervisor: Dr. (Mr).P.M.Edirisinghe

Signature of the supervisor:

Date: 23-11-2022

Name of the supervisor: Dr. (Mrs).S.C.Mathugama

Signature of the supervisor:

Date: 23-11-2022

Abstract

This report contains the analysis of secondary values of US dollar foreign exchange rate (LKR per USD), Gold price (LKR per Troy ounce), Oil price (LKR per barrel), Silver price (LKR per Metric Ton), and Stock return (All Share Price Index) in Sri Lanka. The purpose of this study is to find the relationship among these variables and forecast the US dollar foreign exchange rate in Sri Lanka. This study has used the EViews8 data analysis package to develop time series models to identify the significance of the relationship between exchange rate and other factors using monthly data from October 2000 to December 2019. Log transformed first differenced series were used in Autoregressive Conditional Heteroskedasticity/ Generalized Autoregressive Conditional Heteroskedasticity modeling. The best model fits for the exchange rate was an exponential GARCH model with EGARCH (2,2). All variables were significant at the 5% level of significance and free from the serial correlation/ heteroskedasticity. The model is sufficient but residuals are not normal. Finally, USD forecasting was done for January to December 2019 using the best fitted model. The mean average percentage error value (5.27%) is in between the highly accurate range (0%-10%).

Key Words: US dollar, ARCH, GARCH, EGARCH, conditional heteroskedasticity

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LIST OF ABBREVIATIONS

Abbreviation	Description
ACF	Auto Correlation Functions
ADF	Augmented Dickey and Fuller
APGARCH	A power of Generalized Autoregressive Conditional Heteroskedasticity
ARCH	Autoregressive Conditional Heteroskedasticity
ARMA	Autoregressive Moving-average
ASPI	All Share Price Index
CCGARCH	Conditional Correlation Generalized Autoregressive Conditional Heteroskedasticity
EGARCH	Exponential Generalized Autoregressive Conditional Heteroskedasticity
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GARCH-M	Generalized Autoregressive Conditional Heteroskedasticity in Mean
GED	Generalized Error Distribution
MAPE	Mean Absolute Percentage Error
PACF	Partial Auto Correlation Functions
SVAR	Structural Vector Autoregressive
TGARCH	Threshold Generalized Autoregressive Conditional Heteroskedasticity
USD	United States Dollar
VAR	Vector Autoregressive
VECM	Vector Error Correction Model