

**IMPACT OF MACRO ECONOMIC DETERMINANTS ON
INFLATION IN SRI LANKA - A STATISTICAL APPROACH**

Padmika Hiranthi Walpita

(128959E)

Dissertation submitted in partial fulfillment of the requirements of the degree of
Master of Science in Business Statistics

Department of Mathematics

Faculty of Engineering
University of Moratuwa
Sri Lanka

May 2015

DECLARATION OF THE CANDIDATE AND SUPERVISOR

I hereby declare this project report is the product of my own and is based on a research that I performed independently without the participation of any other person or authority. The references made to other researches here have been acknowledged appropriately with due appreciation. The sources of data and information external to the dissertation and the research have been acknowledged appropriately. Also the substance in this research has never been submitted for any other degree, anywhere else. I hereby give my consent to making this available by photocopy for inter-library loans, and for the title and summary of the dissertation to be made available for use by other institutions of learning.

Signature:

Date: 27 May 2015

P. H. Walpita (128959E)

I have supervised and accepted this thesis for the submission of the degree.

Signature:

Date:

ABSTRACT

This study attempts to analyze the experience of inflation in Sri Lanka for the period 1960 to 2013 using the econometric framework of Johanson and Juselius cointegration approach, Granger causality analysis and vector error correction model (VECM). The data used are annual series of Colombo Consume Price Index as a proxy variable for inflation rate, gross national product, broad money supply, budget deficit and exchange rate. The empirical results of the study indicate the existence of long run dynamic relationships among the variables. However, VECM identified that broad money supply growth and exchange rate depreciation have significant positive effects on inflation. The errors of the VECM model was found as white noise. The results would be useful how business and industry play on the economy of the country. Furthermore, the results of this study emphasize the need to put in place a stable macroeconomic policy environment relating to these variables in an effort to maintain price stability, since low inflation would enhance economic growth.

Keywords: Budget deficit, Co-integration, Granger causality, Inflation, Money supply

ACKNOWLEDGEMENT

First I must thank to the Head of the Department of Mathematics, Faculty of Engineering, University of Moratuwa Prof. T. S. G. Peiris for organizing the Master of Science Degree in Business Statistics which provides a vast knowledge in the statistics theory and practical in many areas in Statistics. I thoroughly believe that this course has made a distinguished path of my academic and employment career. I also understood that the course which I followed has given me satisfactory fulfillment in statistics work in my office.

In the first place I would like to my gratitude to Prof. T. S. G. Peiris, Professor in Applied Statistics for his supervision, advice and guidance from the very early stage of this thesis as well as giving me very invaluable experiences throughout the work.

I wish to express my sincere thanks to the Director General of the Department of Census and Statistics, Mr. D. C. A. Gunewardhane and all of the staff of my office, those who helped and support to me in various ways to complete this course without any disturbance.

I gratefully acknowledge to the lectures that involved in lecturing in this course and all other officers in the Department of Mathematics, Faculty of Engineering who helped me to finish this course successfully.

Finally, I forward my thanks to our family members and my friends.

TABLE OF CONTENTS

	Page No
Declaration of the candidate and supervisor	i
Abstract	ii
Acknowledgement	iii
Table of Contents	iv
List of Figures	vii
List of Table	viii
 Chapter 1: Introduction	
1.1 Background of the Study	1
1.2 Trend of Inflation in Sri Lanka	2
1.3 Measures of Inflation in Sri Lanka	5
1.4 Importance of the Study	6
1.5 Objectives of the Study	7
1.6 Organization of Thesis	7
 Chapter 2: Literature Review	
2.1 General Concept of Inflation Rate	8
2.2 Related Studies in Sri Lanka	9
2.3 Related Studies in Other Countries	10
2.4 Summary	16

Chapter 3: Materials and Methods

3.1	Secondary Data	17
3.1.1	Data Sources	17
3.2	Details of Variables Used	17
3.2.1	Colombo Consumers' Price Index (CCPI)	17
3.2.2	Gross National Product (GNP)	18
3.2.3	Budget Deficit (BD)	19
3.2.4	Broad Money Supply (BMS)	19
3.2.5	Exchange Rate (ER)	20
3.3	Methodology of Statistical Analysis	20
3.3.1	Model Specification	21
3.3.2	Testing for Stationary - Unit Root Test	21
3.3.2.1	Augmented Dickey-Fuller Test	22
3.3.2.2	Philip Perron Test	23
3.3.3	Johanson Co-integration Test	23
3.3.4	Determination of Lag Length for VAR Model	24
3.3.5	Long-Run Relationship	25
3.3.6	Granger Causality Test	25
3.3.7	Vector Error Correction Model	26
3.3.8	Vector Auto Regression Model (VAR)	27

Chapter 4: Results and Discussion

4.1	Temporal Variation of the Variables	28
4.2	Check for Stationary	31
4.3	Stability of the Variables	31
4.4	Stationary of Log Series	32
4.5	Estimation of Long - Run Equation	36
4.6	Identification of Optimal Lag Length	37
4.7	Test for Causality between Series	38
4.8	Estimation of the Johansen Co-integration Model	39
4.9	Determination of Vector Error Correction Model	42
4.10	Check Long Run and Short Run Causality	44
4.11	Model Checking	45
4.12	Summary	47
	Chapter 5: Conclusion	48
	References List	49

LIST OF FIGURES

	Page No	
Figure 1.1	Trend of Inflation in Sri Lanka, 1953 - 1977	3
Figure 1.2	Trend of Inflation in Sri Lanka, 1978 - 2013	3
Figure 4.1	Time Series Plot for Inflation	28
Figure 4.2	Time Series Plot for Gross National Product	29
Figure 4.3	Time Series Plot for Budget Deficit	29
Figure 4.4	Time Series Plot for Exchange Rate	30
Figure 4.5	Time Series Plot for Money Supply	30
Figure 4.6	Time Series Plot for Log Transformation of the 1 st Difference Series of Inflation	33
Figure 4.7	Time Series Plot for Log Transformation of the 1 st Difference Series of Gross National Product	34
Figure 4.8	Time Series Plot for Log Transformation of the 1 st Difference Series of Budget Deficit	34
Figure 4.9	Time Series Plot for Log Transformation of the 1 st Difference Series of Exchange Rate	35
Figure 4.10	Time Series Plot for Log Transformation of the 1 st Difference Series of Money Supply	35
Figure 4.11	Normality Test	46

LIST OF TABLES

	Page No
Table 1.1 Inflation rate in SAARC Countries, 1990 - 2013	4
Table 4.1 Results of Augmented Dickey-Fuller (Unit root test) and P-P Tests	31
Table 4.2 Results of Augmented Dickey-Fuller (Unit root test) and P-P Tests for Log Transformation Series	32
Table 4.3 Results of Augmented Dickey-Fuller (Unit root test) and P-P Tests for Log Transformation of 1 st Difference Series	32
Table 4.4 Results of the Estimated Simple Linear Regression model	36
Table 4.5 Results of Selecting Appropriate Lag Length	37
Table 4.6 Pair wise Granger Causality Test	38
Table 4.7 Results of Trace Test for Log Transformation Series	40
Table 4.8 Results of Maximum Eigen Value Test for log Transformation Series	40
Table 4.9 Results of Trace Test for Original Series	41
Table 4.10 Results of Maximum Eigen Value Test for Original Series	41
Table 4.11 Co-integration Results for Error Correction Model	42
Table 4.12 Coefficients of the Error Correction Terms	43
Table 4.13 Error Correction Terms to Determine Long Run Causality	44
Table 4.14 Error Correction Terms to Determine Short Run Causality (Wald Test)	45
Table 4.15 Test of Residual Autocorrelation	45
Table 4.16 Test of Serial Correlation	46
Table 4.17 ARCH LM Test	47
Table 4.18 White Heteroscedasticity Test	47