THE IMPACT OF ENERGY CONSUMPTION & ECONOMIC GROWTH ON CARBON DIOXIDE (CO_2) EMISSIONS IN SRI LANKA: A MULTIVARIATE TIME SERIES ANALYSIS

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DECLARATION OF THE CANDIDATE AND THE SUPERVISOR

I declare that this is my own work and this 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 has made in the text.

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Name of the supervisor: T. S. G. Peiris

Signature of the supervisor: ……..……. Date: ..……...…

ABSTRACT

The studies on the impact of fossil fuel energy consumption and the economic growth of a country on carbon dioxide emissions have given high priority by many countries. Moreover, not much study on this approach had done in Sri Lanka, and most of the methods have not been tested statistically in studies of Sri Lanka. Therefore, this study utilized the Vector Error Correction Model (VECM) framework to observe the impact of fossil fuel energy consumption and economic growth on carbon dioxide (CO_2) emissions in Sri Lanka over the period of 1971 - 2014. The required secondary data obtained from one of the World Bank databases known as the world development indicators (WDI). The heterogeneity of variances in each series reduced by considering their natural logarithmic transformations and each series was not significantly different from normality. Entire log-transformed series were formed trend stationary at their first differences, and the Johansen's cointegrating analysis indicated that there was at most one cointegrating relationship among the log series at the first lag. Furthermore, the fitted VECM (1) model identified as a highly stable model, and errors were not significantly different from the white noise process. The long-run variables' trends revealed significantly that a unit increase in the present logarithmic level of both CO_2 emissions and economic growth (GDP) influenced positively, and surprisingly, that for fossil fuel energy consumption, influenced negatively on the continuous change in the logarithmic level of CO_2 emissions, in the long-run association. The analysis of impulse response functions (IRF) suggested that a positive shock of CO_2 emission has a positive influence on its increasing, and the positive influence has relatively long sustained effectiveness. The inferences derived in this study suggested that a significant transformation of sustainable low carbon future and green energy policy implementations could contribute to control the CO_2 emissions while sustaining long-run economic growth in Sri Lanka. Altogether, it recommended that similar studies might be carried out at regular intervals.

Keywords: Carbon dioxide **(**CO_2) emissions, Economic growth, Energy consumption, Johansen's cointegration, VECM

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey- Fuller
AIC	Akaike information criterion
ANN	Artificial neural network
ARCH	Autoregressive conditional hetroscedasticity
ARDL	Autoregressive distributed lag
BIC	Schwarz Bayesian information criteria
DOLS	Dynamic ordinary least squared
ECM	Error correction model
EKC	Environmental Kuznet's curve
FMOLS	Fully modified ordinary least squared
FPE	Final prediction error (criterion)
GHG	Greenhouse gas
GLS	generalized least squares
HQ	Hannan-Quinn (information criterion)
H_o	Null hypothesis
H_a	Alternative hypothesis
I(d)	Integrated of order d
iid	Independently identically distributed
IRF	Impulse response function
JB	Jarque-Bera (test)
LM	Lagrange multiplier (test)
LR	Likelihood ratio (test)
ML	Maximum Likelihood
OLS	Ordinary least squares
VAR	Vector autoregressive (process)
VEC	Vector error correction
VECM	Vector error correction model
Δ	Differencing operator