Multivariate Time Series Modelling Of Ex-Pump Prices Of Petroleum Products In Ghana

Chapter 4: Results and Discussions

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Introduction

Objective

The purpose of the study is to obtain a suitable model for the ex-pump prices of petroleum products in Ghana.

To examines how changes in the prices of one product cause changes in the price of others in both the short and long terms.

Data spanning January, 2007 to June, 2015 are obtained from the National Petroleum Authority of Ghana, covering four petroleum products; Gasoline, Gasoil, Kerosene, and Liquefied Petroleum Gas (LPG) .

Chapter 4: Result And Discussion

This chapter analyses and discusses the results. It presents results of the association between the prices of the products considered, namely;

- Gasoil
- Gasolin
- Kerosene
- Liquefied Petroleum Gas (LPG)

All associated tests and models are generated with R

Descriptive Statistics

In all, 204 observations are used (January, 2007 to June, 2015).

Training data of 144 observations (January 2007 to December 2012) for modelling

Testing data of 60 data points (January 2013 to June 2015) for model validations.

The descriptive statistics of the products are shown in Table 1 on page 5

Summary Statistics

Table: 1 Summary Statistics

Statistics	GASOIL	GASOLINE	KEROSENE	LPG
Mean	122.445	123.570	82.989	94.766
Maximum	175.480	177.090	120.420	136.190
Minimum	11.600	49.170	6.470	58.500
Standard Deviation	32.306	31.817	27.186	20.609
Skewness	-0.201	0.1307	-1.988	0.413
Kurtosis	3.374	2.123	6.293	2.292
Number of Observations	144	144	144	144

Plot of Original Data

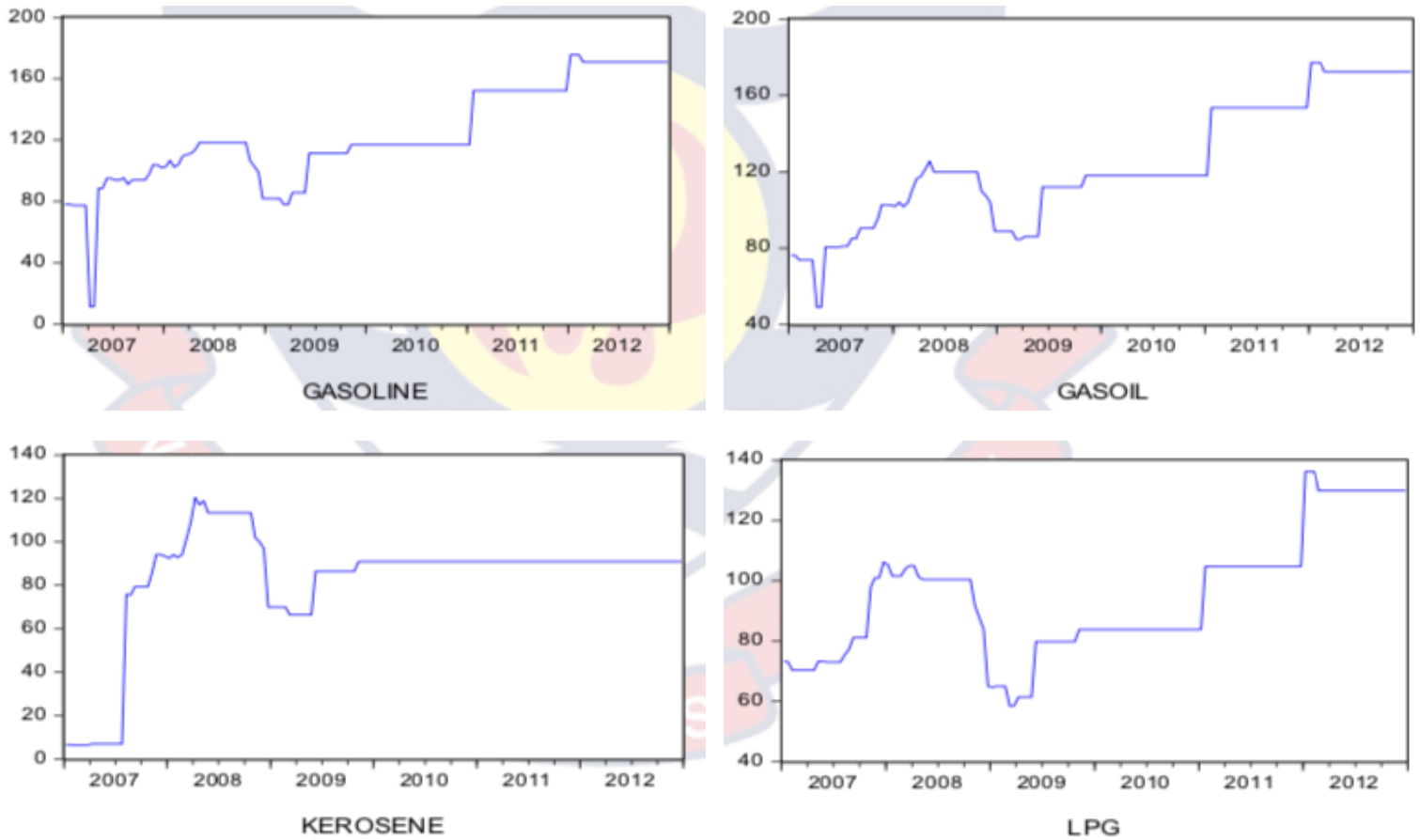

Figure: 1 Time Series Plot of the Original Series

Trend Test

For trend test, We have chosen to apply

Mann-Kendall Test

H0 : There is no monotonic trend in the dataset over time.
H1 : There is a monotonic trend in the dataset over time.

Sen's Slope Test

H0 : There is no tonic trend in the dataset over time.
H1 : There is a tonic trend in the dataset over time.

KPSS Test for Level Stationarity

H0 : The series is stationary
H1 : The series is not statrionary.

Staionarity Test

We have numerous ways of testing for the presence of a unit root. We have chosen to apply

Augmented Dickey-Fuller Test

H0 : The series is not stationary
H1 : The series is stationary.

Phillips-Perron Unit Root Test

H0 : The series is not stationary
H1 : The series is statrionary.

KPSS Test for Level Stationarity

H0 : The series is stationary
H1 : The series is not statrionary.