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A Study on Cointagration and Error correction Model Based on Maruti Suzuki and Tata Motors Closing Share

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INTRODUCTION

Econometrics is the quantitative application of statistical and mathematical models using data to develop theories or test existing hypotheses in economics, and for forecasting future trends from historical data.

TATA MOTORS

Tata Motors Limited (TML), a $42 billion organisation, is India's largest automobile company and is a leading global manufacturer of cars, utility vehicles, buses, trucks and defense vehicles. Incorporated in India in the year 1945, Tata Motors is a part of the over $100 billion Tata Group founded by Jamsetji Tata in 1868. Recognized for its world-class quality, originality, engineering and design excellence, the Company is on the path of shaping the future of mobility in India.

MARUTI SUZUKI

Maruti Suzuki India Limited (Formally known as Maruti Udyog Ltd) was established in 1981, February 24th. It was organized as a legal corporation beneath the provision of the Indian Companies ACT, 1956 to converge the rising demand of personal transportation by the lack of an efficient public transport system.

STATEMENT OF THE PROBLEM

Investing in a good stock but at a bad time can have disastrous result. While investing in a stock at the right time can bear profits. Financial investors of today are facing this problem of trading as they do not properly understand as to which stocks to buy or which stocks to serll in order to get optimum result. So, the purposed project will reduct3ion the problem with suitable accuracy faced in such real time scenario

OBJECTIVES OF THE STUDY

1. To forecast the share price of Maruti Suzuki and Tata Motors for the period (1.01.2018 to 23.10.2018) based on ARIMA MODEL.

2. To find out the granger causality test between Maruti Suzuki and Tata Motors.

3. To find the long run equilibrium between Maruti Suzuki and Tata Motors.

4. To identify the short run equilibrium between Maruti Suzuki and Tata Motors.

5. To comparative the Granger causality between Maruti Suzuki and Tata Motors.

SCOPE OF THE STUDY

The present research focused on Maruti Suzuki and Tata motors only for pried (1.01.2018 to 23.10.2018) analysis and interpretation of data.
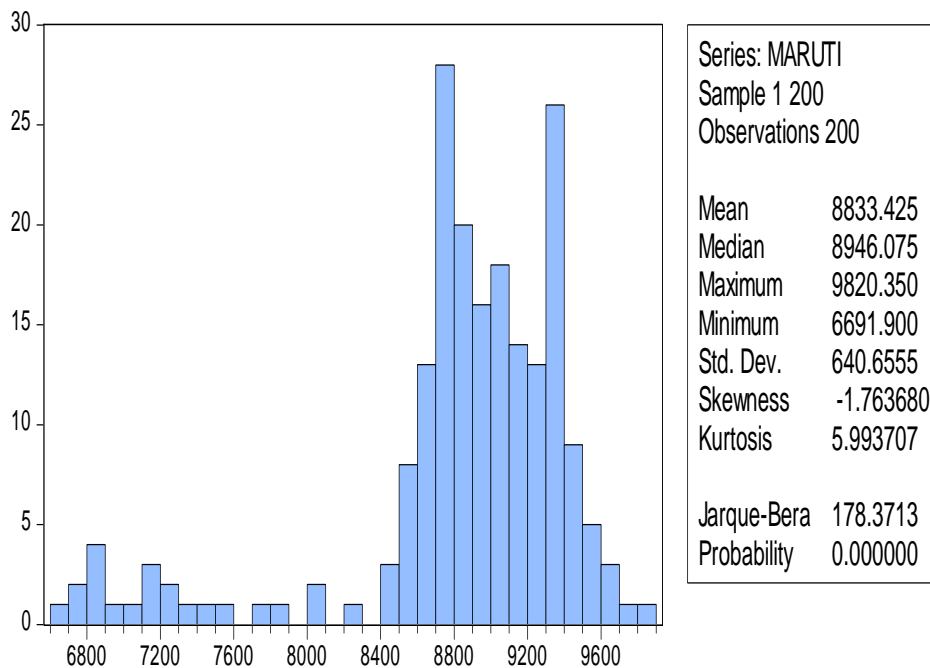
UNIT ROOT TEST

Many economic and financial time series exhibit trending behavior or non-stationarity the mean. Leading examples are asset prices, exchange rates and the levels of macroeconomic aggregates like real GDP. An important econometric task is determining the most appropriate form of the trend in the data. For example, in ARMA modeling the data must be transformed to stationary form prior to analysis. If the data are trending, then some Form of trend removal is required.

REVIEW OF LITERATURES

Behzad Saberi (2018[1] The Role of the Automobile Industry in the Economy of Developed Countries The article is devoted to the analysis of the role of the automobile industry in the economy of developed countries. The work reflects the extremely high role of the automotive industry in GDP growth and employment generation, the ability of the automotive industry to form a taxable base and revenues of the state budget, As well as the role of the automobile industry in the development of auxiliary industries and the stimulation of scientific and technological progress.

Caroline Rodrigues Vaz (2017)[2] Sustainability and Innovation in the Automotive Sector: A Structured Content Analysis This study aims to analyse the scientific literature on sustainability and innovation in the automotive sector in the last 13 years. The research is classier as descriptive and exploratory. The process presented 31 articles in line with the research topic in the Scopus database. The bibliometric analysis identified the most relevant articles, authors, keywords, countries, research centers and journals for the subject from 2004 to 2016 in the Industrial Engineering domain. We concluded, through the systemic analysis, that the automotive sector is well structured on the issue of sustainability and process innovation. Innovations in the sector are of the incremental process type, due to the lower risk, lower costs and less complexity.

MARUTI SUZUKI HISTOGRAM

Series: MARUTI	
Sample 1 200	
Observations 200	
Mean	8833.425
Median	8946.075
Maximum	9820.350
Minimum	6691.900
Std. Dev.	640.6555
Skewness	-1.763680
Kurtosis	5.993707
Jarque-Bera	178.3713
Probability	0.000000

The above histogram table explains the nature of normality of the data series.

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[1] **Behzad Saberi (2018)** International Robotics & Automation Journal Volume 4 Issue 3 - 2018 Received: April 19, 2018 | Published: May 17, 2018.

[2] 2 **Caroline Rodrigues Vaz (2017)** sustainability journal Sustainability 2017, 9, 880; doi: 10.3390/su9060880

MARUTI SUZUKI CLOSING SHARE PRICE GRAPH
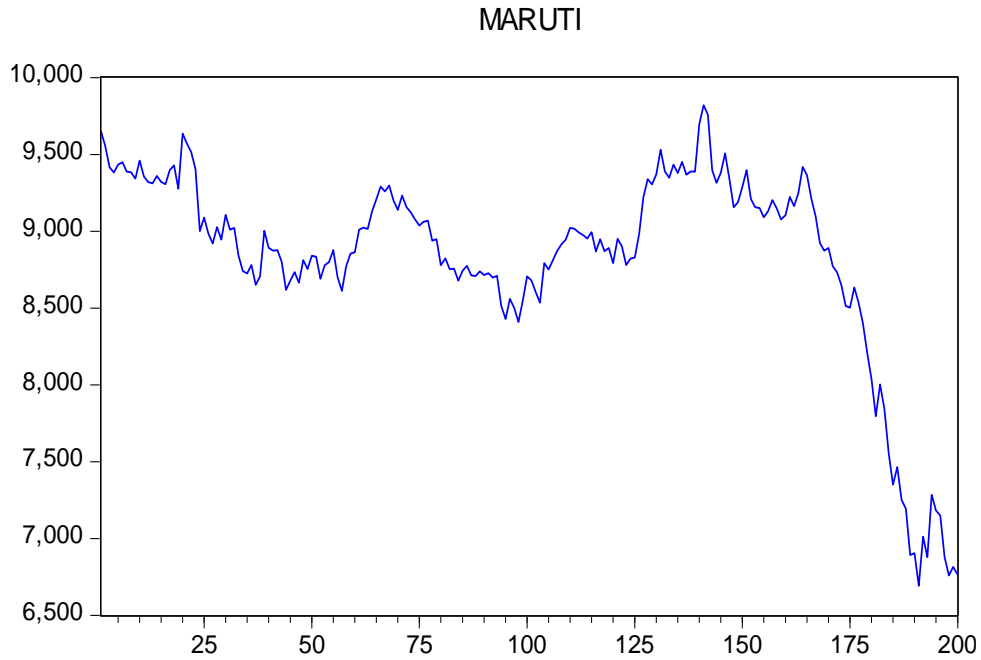
MARUTI

The above chart had shown the trend of maruti Suzuki share prices trend.

UNIT ROOT TEST INTERCEPT WITH FIRST DIFFERENCES

Null Hypothesis: D(MARUTI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=14)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-14.67311	0.0000
Test critical values:	1% level	-3.463405	
	5% level	-2.875972	
	10% level	-2.574541	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MARUTI,2)
Method: Least Squares
Date: 03/05/19   Time: 23:40
Sample (adjusted): 3 200
Included observations: 198 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MARUTI(-1))	-1.045967	0.071285	-14.67311	0.0000
C	-14.75480	8.761082	-1.684130	0.0937
R-squared	0.523462	Mean dependent var		0.236869
Adjusted R-squared	0.521031	S.D. dependent var		176.9144
S.E. of regression	122.4382	Akaike info criterion		12.46314
Sum squared resid	2938257.	Schwarz criterion		12.49635
Log likelihood	-1231.851	Hannan-Quinn criter.		12.47658
F-statistic	215.3002	Durbin-Watson stat		1.997555
Prob(F-statistic)	0.000000			

The above table shows that the data taken for the analysis does not have a unit root problem it is the data fulfill the stationary condition. Because the p-value of ADF test is 0.000 it is more than 0.05 levels.

ECM MODEL

Dependent Variable: D(TATA)
Method: Least Squares
Date: 02/28/19   Time: 23:44
Sample (adjusted): 2 200
Included observations: 199 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.030905	0.434279	-2.373830	0.0186
D(MARUTI)	0.016736	0.003541	4.725602	0.0000
Z(-1)	-0.013155	0.008257	-1.593160	0.1127
R-squared	0.111494	Mean dependent var		-1.275377
Adjusted R-squared	0.102428	S.D. dependent var		6.420859
S.E. of regression	6.083140	Akaike info criterion		6.463880
Sum squared resid	7252.900	Schwarz criterion		6.513527
Log likelihood	-640.1560	Hannan-Quinn criter.		6.483973
F-statistic	12.29757	Durbin-Watson stat		1.839419
Prob(F-statistic)	0.000009			

Co-integration condition

TATA	**MARUTI**
AT LEVEL I(0)	AT LEVEL I(0)
Non-Stationary	Non-Stationary
AT LEVEL I(1)	AT LEVEL I(1)
Non-Stationary	Non-Stationary

Conclusion

If the above co-integration model proves that there is long term relationship exists between TATA share price and MARUTI share price. Therefore the researches applied the following ECM method to know the short run relationship.

Table no:

The above table show that the error corrected value Z (-1) shows that the P value 0.1127 is less than 0.05, therefore it is significant and also the co-efficient value shows the positive symbol (0.013155). It integrates that the convergent tex place after 13% of the time period.

From the above it is concluded that the short run relationships exist between Tata share price and marutishare price from the period 2018 to 2019.

If both variable non-stationary (at least) I(0)but these are stationary at 1st difference I(1).

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