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IMPACT OF CRUDE OIL PRICE AND EXCHANGE RATE VOLATILITY ON THE PERFORMANCE OF NSE NIFTY: AN EMPIRICAL ANALYSIS

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Abstract

The aim of the research paper is to analyse the impact of crude oil price and exchange rate volatility affect the performance of stock return in India. Auto Regressive Distributed Lag Bound Test Modelhelps to analyse the dynamic relationship between oil prices, exchange rate and stock market return in India during 1995 to 2018.The estimated results suggest that there exist along run co-integrationor relationship between crude oil price, exchange rate and Indian stock market return.The impact of crude oil rice and exchange rate volatility significantly negative contribution to the performance of Indian stock market. The Error Correction Model (ECM) provides a framework for establishing links between the short-run and long-run approaches to econometric modelling. The equilibrium correlation coefficient is estimated -0.85 is highly significant at one percent. This result confirm the existence of bound test. The co-efficient of ECM is highly significant with negative sign, which confirms the result of Bound Test for co-integration. In short the speed of adjustment towards long run equilibrium at the rate of 85 percent monthly.

Keywords: Crude oil price; Exchange rate, Stock Market; Co-integration**.**

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Introduction

Stock markets are generally considered as one of the indicators of the health of the economy. Any upside or downside in the economy affect the stock market performance.India's popular stock exchanges are the Bombay Stock Exchange and National Stock Exchange. The purpose of stock exchange is to facilitates the exchange of securities and other financial instruments between buyers and sellers and reduce the risk of investing. An ideal capital market is one where finance is available at reasonable cost. The process of economic development is facilitated by the existence of a well-functioning capital market. If the market goes up, it means the economy is doing well. So that the people in the country are generally doing well. Indian capital market has seen many ups and down and its one of the fastest growing capital market of the world which attract investors from all part of the world.

The Indian capital market has witnessed major reforms in the decades of 1990s and thereafter. The Government of India and SEBI has taken a number of measures in order to improve the working of the Indian capital market and to make it more progressive and vibrant. As the part of capital market reforms programs Government approved new laws and regulations aimed at creating the proper legal and regulatory framework for capital market to flourish. TheIndian capital market is one of the emerging markets in the world. That isdomestic investors in India and foreign investors have keen interest for investment in the Indian stock market because of huge capital appreciation and return.

If the economies of the world are dependent on crude oil. Large number of company's performance mainly depend on the volatility of crude oil price. Generally increase in crude oil price have negative impact on the stock price. On the other hand oil producing companies in the country could benefit from a rise in oil price.Thus, the price of the crude oil affected the Indian economy in last few years indifferent ways. There is a direct relationship between crude oil prices and Indian economy. Rise in oil price leads to increase India's import bill whichintern leads to increase in fiscal deficit, increase in current account deficit, decreasegrowth rate, inflation increases etc. On the other hand decrease in crude oil price will allow consumers to spend their saving elsewhere increasing overall demand in the system. It will cut inflation and stimulate the market. The stock exchange of every country keep a close eye on the volatile movement of the

crude oil price. Generally there is an inverse relationship between crude oil price and stock return. The increase in oil price leads to decrease the return of capital market because of increase the cost of production of the companies. Thus, changes in oil prices may affect the stock market by influencing earnings of the firms.

The foreign exchange market and stock market are the two fundamental financial market in the world. These two markets are playing key role in an international business all over the world. It is necessary to understand the relationship between the both markets so that the investor may be able to invest in better way by taking the minimum risk. The crude oil prices and exchange rates are also interlinked.Increase in oil prices may lead to increase currentaccount deficit which results in the depreciation in theexchange rate except in the case of oil producing countries. Due to increase in crude oil price, the import cost increase and thus current account deficit widens which result in depreciation in exchange rate.

Understanding the relationship between oil prices, exchange rates and the performance stock market isan important topic because the volatility of these macroeconomic variables affect the performance of capital market directly. In this complexsituation, this study analyse the dynamic relationship among crude oil price, exchange rate and Indian stock market.

Literature Review

The first category of review of literature related to the relationship between crude oil price and stock market,while second category of literaturereview is related to the impact or relationship betweenexchange rate and stock market return. The third category of literature review on the combined impact of oil prices,exchange rate on stock market performance.

Large number of empirical studies have examined the co-integration or relationship between oil prices and stock return. According to Jones and Kaul (1996) analyse the impact of change in crude oil price affect the performance of four developed capital markets like United States, Canada, Japan and the UK. They found that oil price volatility have negative impact on the performance of stock returns for all these countries.Dhaoui and Khraief (2014) investigate the effect of volatility of oil price on

the performance of stock market for eight developed countries over the period 1991-2013. The outcome of the research paper is that there exists a strong negative relationship in all countries except Singapore.

Miller and Ratti (2009) analyse the long-run and shot run co-integration between the world crude oil price and international stock markets, and identify that capital market performance is negatively related to increases in the price of oil. Chen (2010), investigated the casual relationship between hike in oil prices and its impact on stock market returns. The findings of the study revealed that there is high probability of a bear market emergence as a result of increase in crude prices. Jung wook and Ronald (2008) investigated the impact of crude oil price change affect the performance of developed stock market. They found that crude oil price volatility affect six percent volatility in developed stock market. Basher and Sadorsky (2006) have conducted to determine the relationship between oil price fluctuations and stock returns of the Asia Pacific countries. In VAR framework, they found or exhibits a positive association between oil price fluctuations and stock returns in Asia Pacific countries.

The second category of review of literature discussed the relationship between exchange rate volatility and stock market. MA and Kao (1990) identified that currency depreciation stimulate export and make more expensive in import. An appreciation of currency hampers export and make import cheaper. Abdalla et al; (2010) analyse the interrogation of stock market prices and exchange rate in Korea, Pakistan and the Philippines with Bivariate Vector Autoregressive Model (BVAM) and found unidirectional causality from exchange rate to stock market prices in all the countries.

The third category of literature explain the performance of capital market due to the influence of crude oil and exchange rate. Sharma (2015)identified that crude oil price and exchange rate volatility negatively affect the American capital market.Chinzara (2011)explained the combine impact of oil price and exchange rate significantly influences stock market volatility in South Africa. Basher, Haug and Sadorsky (2012) have tried to investigate the dynamic relationship between oil prices, exchange rates and emerging capital market return. They use different statistical techniques like Vector Auto Regression Model and Granger Causality test analyse the impact of macroeconomic variables on emerging stock markets return.

Research Problem

From the review of the literature observed that a large number of studies have been made to determine the relationship of macro economic variables and capital market of developed and developing countries. These findings are mainly depend on the economic stability of the country, time period, methodology employed and the performance of stock market indicators. There are various macroeconomic variables on the performance of Indian stock market. Crude oil price and exchange rate are the most crucial macroeconomic indicators on the performance of Indian stock market. Thus this paper is an attempt to analyse the combined impact of crude oil price and exchange rate volatility on Indian stock market.

Objectives of the study

1. To examine the relationship between crude oil price, exchange rate and NIFTY return in India.
2. To investigate the impact of crude oil price and exchange rate volatility on Indian stock market with special reference to NIFTY return.

Hypothesis of the study

There is a significant relationship between crude oil price volatility and NIFTY return.
There is a significant relationship between exchange rate volatility and NIFTY return.

Research methodology

Data Collection

This study is mainly concentrate on secondary data. For the purpose of the study three variables have been taken i.e. NSE NIFTY return, crude oil price and exchange rate. NIFTY return is taken as Dependent Variable (DV) while exchange rate and crude oil price are taken as Independent Variable (IV). The monthly return of NIFTY (NSE) have been considered as a proxy for measuring the performance of the Indian Stock market return. The Real Effective Exchange Rate (REER) index has been considered as a proxy of exchange rate. The required information related to exchange rate, crude oil price and NIFTY return have gathered from various sources i.e. RBI Bulletin, Publications from Ministry of Commerce, SEBI Handbook, Handbook of statistic of Indian economy, RBI database etc. The current study considers twenty three years data starting from 1995 to 2018.

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Data Analysis

In order to capture the dynamic link between *oil price, exchange rate and stock market return in India an* advance econometric techniques like Auto Regressive Distributed Lag (ARDL) Model is used for determine the long run and short run dynamic relationship of the model. Augmented Dickey Fuller (ADF) test is used to test the data series is stationary or not. It can be analysed by using the statistical package of Eviews 8.

Empirical Model

The model of macroeconomic determinants of NIFTY return (SMR) in India is formulated with two independent variables. It include Crude Oil Price (COP) and Real Effective Exchange Rate (REER). We develop a linear equation model such that:

$$SMR = f(COP, REER)$$

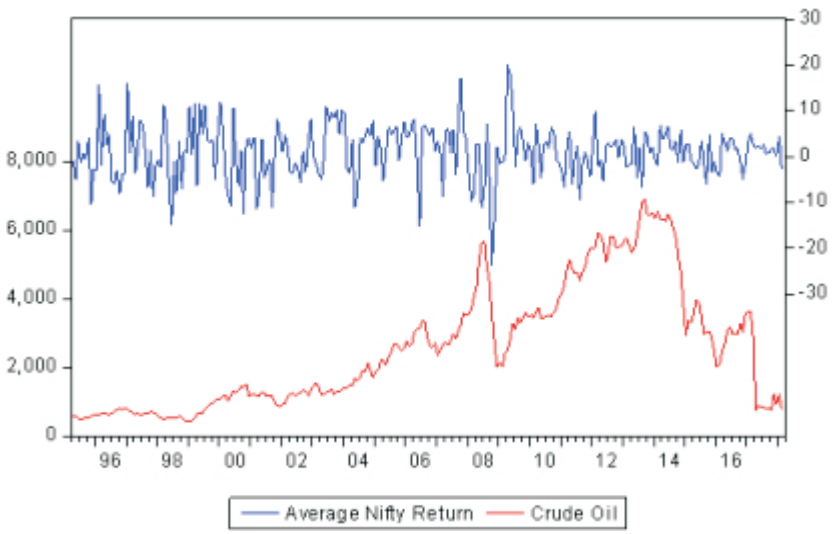
$$SMR = \alpha + \beta_1 SMR_t + \beta_2 COP_t + \beta_3 REER_t + \beta_4 REER_{t-1} + \beta_5 REER_{t-2} + \epsilon$$

SMR=NIFTY Return

COP= Crude oil price

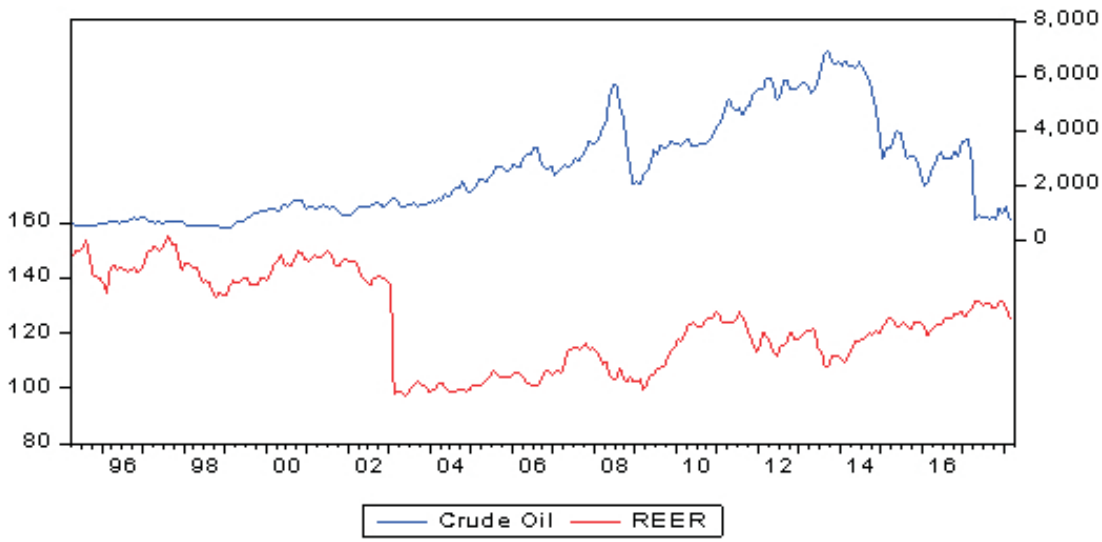
REER=Real Effective Exchange Rate

Figure 1: Correlation between Crude Oil Price and Stock Return



There is a negative correlation between crude oil price volatility and stock market return in India (refer Figure 1). The effect of increase in crude oil price causes negative impact on profitability of the selected listed companies inIndian stock market. On the other hand decline in crude oil price helps to improve the investors' confidence in Indian capital market.

Figure 2: Correlation between Crude Oil Price and Exchange Rate



Stationarity Test

The Augmented Dickey-Fuller Unit root test is used to check the stationarity of the time series.From the Table 1 shows that NIFTY return is stationary at level i.e., I (0). At the same time crude oil price and exchange rate are stationary at first difference i.e. I (1).

Table 1: Augmented Dickey-Fuller Unit Root Test for Determinants of Stock Return

Variables	ADF Unit root test
SMR	I(0)
COP	I(1)
REER	I(1)

Source: Author's calculation

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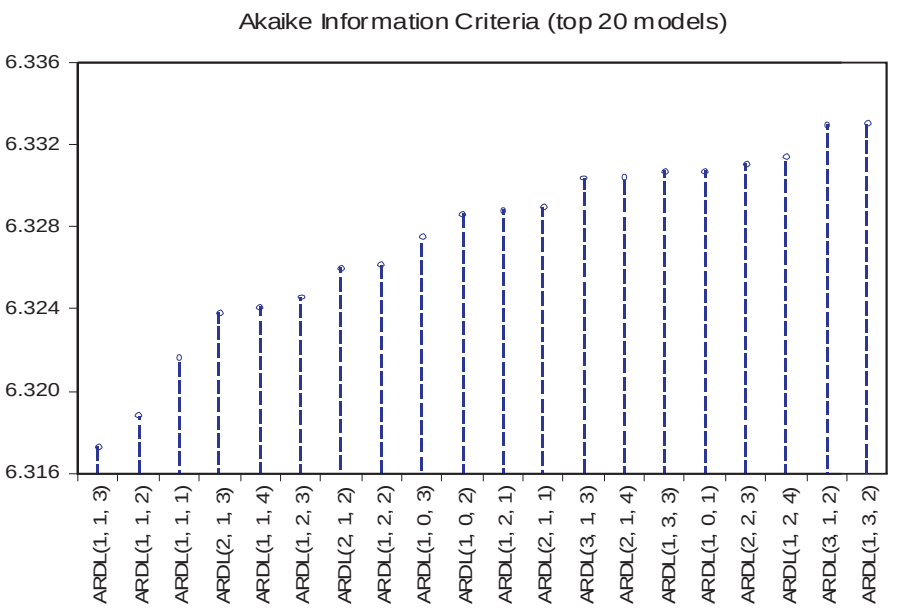
Optimum Lag Length Selection Criteria

Akaike Information Criteria (AIC) is used to choose the optimum lag length of the model. The result shows 20 best model with lowest AIC values. The Figure 3 shows that the optimal lag length of the ARDL model is (1, 1 and 3)

Figure 3: Optimum Lag Length



ARDL Bound Test Approach for Co-integration

ARDL Bound Test approach developed by Pesaran et al. (2001) to investigate the long-run impact of macroeconomic variables like exchange rate and crude oil price on stock market return in India. After specifying the parliamentary procedure of integration and lag length, the following measure is to employ bounds test to corroborate the long-run relationship among the variables of the model.The bounds test result confirm that there exist a long-run relationship among the variables of the model because the computed F-statistics value is 66.79 which is greater than the critical value of the upper level of bounds at the 5 % significance level(refer Table 2). This indicate that there is a long run relationship between stock market return and selected macroeconomic variables in India.

Table 2: ARDL Bounds Test

ARDL Bounds Test
Null Hypothesis: No long -run relationships exist

Test Statistic	Value	k
F-statistic	66.79053	2

Critical Value Bounds

Significance	I(0) Bound	I(1) Bound
10%	3.17	4.14
5%	3.79	4.85
2.5%	4.41	5.52
1%	5.15	6.36

Source: Author's calculation

Table3: Estimated Co-integrating Form and Long-run Coefficients Using ARDL Approach

ARDL Cointegrating And Long Run Form
Dependent Variable: SMR

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(COP)	0.002331	0.001266	1.842156	0.0666
D(REER)	0.300082	0.109418	2.742523	0.0065
D(REER(-1))	0.010807	0.157867	0.068455	0.9455
D(REER(-2))	0.166348	0.109185	1.523533	0.1288
CointEq(-1)	-0.850061	0.060101	-14.143830	0.0000

Cointeq = SMR - (-0.0005*COP -0.0810 *REER + 12.3795)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COP	-0.000486	0.000261	-1.863581	0.0635
REER	-0.080964	0.028396	-2.851256	0.0047
C	12.379518	3.927728	3.151826	0.0018

Source: Author's calculation

The Table 3estimate the result of coefficient of long run and short run relationship between variables by applying ARDL Methodology. The impact of crude oil price and exchange rate volatility contributes significantly negative impact to the performance of Indian stock market. The coefficient of the Error Correction Term (ECT) is highly significant with negative sign, which confirm the result of Bound Test for co-integration. The bigger the error correction coefficient the faster will be the return to balance. The equilibrium correlation coefficient is estimated -0.85 is highly significant at one percent. That means the speed of adjustment towards long run equilibrium at the rate of 85 percent monthly. This result confirm the existence of Bound Test.

Conclusion

This study presented the evidence on the relationship among crude oil price, exchange rate and stock market return in India. The empirical analysis shows that the coefficient of correlation between these variables are indicated slight negative relationship. The empirical evidence indicate that there is a significant negative long run co-integration or long run relationship between crude oil price, exchange rate and stock market return in India. Therefore the policy makers consider controlling the exchange rate movements and taking remedial measures during the volatility of crude oil price and exchange rate crisis period. These measures will definitely affect the performance of Indian capital market in future.

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