

Effect of change in Crude Oil Price on NSE

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Abstract- Crude oil plays a very significant role in the development of economy of any country. Any slight change in the prices of crude oil causes a direct or indirect effect on the production level of any country. Due to fluctuations in crude oil price the stock market also gets disturbed. This paper attempts to analyse the reasons for fluctuations in the prices of crude oil and how these fluctuations affects the stock prices of NSE by taking three particular stock for the time period (2008-2017). Since in the mentioned period many historic and global events like Global Recession (2008), Arab Spring (2011) etc. happened hence they are also taken into account. The study employed trend analysis and regression as statistical tools. The results concluded that the historic events had major impact on the crude oil prices and there was a significant impact of fluctuations on stock market in particular to three stocks (ONGC, IOC, Reliance Ind.) of NSE.

Index Terms-Crude Oil Prices, Oil and Natural Gas Corporation Limited (ONGC), Indian Oil Corporation (IOC), Reliance Industries, National Stock Exchange of India (NSE).

1. INTRODUCTION

1.1 Brief

Crude oil plays a very significant role in the development of economy of any country. Nowadays crude oil prices are witnessing a slight rise. Since crude oil is the global oil that most of the countries uses, so they get significantly affected by change of prices in the oil market. There are many reasons for change in crude oil prices like increased demand from emerging and developing countries, speculative buying and selling, currency fluctuations and Organization of Petroleum Exporting Countries (OPEC) is one of the major influencer due to which oil prices fluctuate. OPEC controls around half of the world's supply of oil. It decides the production levels to meet global demand and thereby influences the prices. As India is not the member country of OPEC so it imports crude oil to meet its basic requirement as the level of production in India is low. In 2017 India imported 4.83 million barrels per day of crude oil making the highest record. More imports leads to increase in cost of production and its affects the expected returns from the business. The increase in prices puts inflationary pressure due to which Central bank increases the interest rate making the bonds to look more lucrative than stocks and thereby stock prices falls. This paper first tries to analyse the fluctuations of crude oil price for the time period of ten years (2008-2017), finding out how the major economic turmoil have led to fluctuations in the oil price and secondly the study also focuses to find out that how the change in crude oil prices affects the stock prices of NSE by taking three particular stocks. However before studying the impact of change in crude oil price on stock prices it is essential to know about the companies whose stock prices are taken into crude oil prices

ONGC- Oil and Natural Gas Corporation Limited (ONGC) is India's largest oil producer and gas exploration company. Its production of India's crude oil is around three-fourth around 77% which is equal to around one-third of the countries total demand and more than half of its natural gas.

Reliance Industries-It is one of the India's largest private sector company. Its headquarters are in Ahmedabad. The area of business interest lies in producing crude oil. However the company has sooner or later even started importing crude oil from US.

IOC-Indian Oil Corporation (IOC) is one of the Oil Marketing Companies. The business interest of the company lies in refining, transportation of pipeline petroleum products marketing, exploration of natural gas and production of petrochemicals and crude oil.

1.2 Objectives

- To analyse the fluctuations of crude oil price for the time period of ten years (2008-2017)
- To analyse the impact of change in crude oil price on NSE stocks with special reference to ONGC, Reliance Industries and IOC

1.3 Research Hypothesis

- H_0 : There is no significant impact of change in crude oil price on ONGC stock price.
- H_a : There is significant impact of change in crude oil price on ONGC stock price.

- H_0 : There is no significant impact of change in crude oil price on Reliance Industries stock price.
 H_a : There is significant impact of change in crude oil price on Reliance Industries stock price
- H_0 : There is no significant impact of change in crude oil price on IOC stock price.
 H_a : There is significant impact of change in crude oil price on IOC stock price.

1.4 Research Methodology

Research methodology deals with a systematic and scientific methods that can be adopted to solve research problems. The study deals with quantitative methods of analyzing the secondary data and concluding them into valuable findings. In the first part the method of trend analysis is adopted to study the fluctuations that have taken place in crude oil prices in last ten years (2008-17). For the second part the impact of crude oil price change on NSE stocks with special reference to ONGC, Reliance Industries and IOC stock prices. To study the impact simple linear regression were individually run where Crude Oil Price (COP) was taken as an independent variables whereas ONGC, Reliance Ind. and IOC stock prices are used as dependent variable.

1.5 Limitation of the Study

- The study was limited to companies' stock prices and crude oil prices for the period 2008-2017.
- The stock prices are averaged monthly and converted the data to stationary.
- The study was limited to only the historical global events that happened over the period 2008-2017

2. LITERATURE REVIEW

In the emerging market many studies has been done mainly focusing to find out that how change in the prices of crude oil will effect on stock market. In India, however, only very few studies has been done to show this effect. Some of the selected studies relevant to the present study are reviewed.

Shaharudin et al (2009) have analyzed the sluggish nature of crude oil price movement on the stock prices of gas and oil companies in various markets i.e. in US, India and UK. Using the economic variables like industrial production and interest over the period of 2003-2008 analysis was conducted. Various statistical test like variance auto regression, unit root tests, co-integration tests were applied on ARCH/GARCH models. The results were that oil price vitality has continuous effect on the stock prices of oil companies that were taken into account for study.

Ravichandran and Alkhatlan (2010) tried to analyze the sluggish nature of crude oil prices on Gulf Cooperation Council (GCC) stock market. Data used for this study were the oil prices of the index NYMEX which started from March 2008 to April 2010. The author has applied Johansen's Co-integration, VAR and VECM which proved the influence of oil price change in GCC stock market.

Chung-Rou Fang (2010) review the impact of structural oil price shocks in the BRIC countries that were Brazil, Russia, India and China on the India's stock market return. The results found that the oil price shocks have no significant impacts on India's stock return, it also concluded that shocks have significantly positive impact on Russia stock returns while the impact of oil price shocks on China stock return as the mixed condition between Russia and India. Further the reason of such volatile returns have been studied by the author. The result was consistent with the empirical finding.

Chittedi (2011) founded the long run relationship between oil prices and stock prices in India. The author made efforts to know the volatility of stock prices due to volatility of oil prices. The author used Auto Regressive Distributed Lag (ARDL) Model as statistical tool. The analysis resulted that there is no significant impact of change in the oil price on stock prices.

Thai-Ha Le and Youngho Chang (2011) this study contributes in examining the reaction of stock market to volatility in stock market in Japan, Malaysia, Singapore and Korea. The analysis has been done on monthly data over the period 1986-2011. The results came that the stock market reaction to shocks in oil prices was very great. The stock market of Japan gave positive response, reaction of stock market of Malaysia was negative, it was not clear for the rest countries.

Lis, B., Nebler, C. et al (2012) has made efforts to understand if there is impact of oil prices on the stock returns of automotive companies. The stock returns of US, German and Japanese car companies and different crude oil price were taken into consideration. OLS and EGARCH on the data for further analysis. The result was that the car companies stocks are not impacted by change in oil price but in the overall market Japanese companies did not show sensitivity at all, German and US companies were more sensitive to changing crude oil price in the given time period.

Asteriou, D., Dimitras A., & Lendewig A. (2013) investigates that how oil price fluctuations impact the stock markets and the interest rates with reference to oil importing and exporting countries. Vector Autoregressive (VAR) models was used to make the data stationary and pairwise Granger Causality tests were used to analyzed the transitory relationships among the variable the Johansen approach was

applied for multiple equations and also test for integration among the series is applied. The results showed that there is relationship of stock prices with oil prices, it was also found out that the influence on oil importing countries is more significant than on oil exporting countries

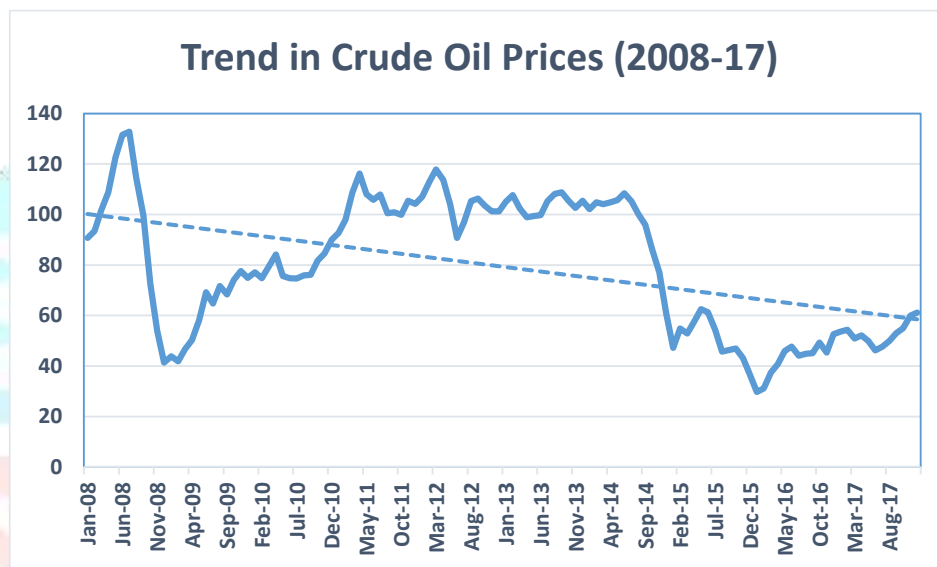
3. DATA ANALYSIS AND INTERPRETATION

3.1 Data Sources

For the first objective i.e. to study the fluctuations in the oil prices, the data of Crude Oil Price for ten years i.e. 2008-2017 is collected from Moneycontrol.com. The data is available in US dollars on monthly basis for ten years.

While for the second objective i.e. to study relationship between crude oil prices and stock market, the stock prices of ONGC, Reliance Ind. and IOC are collected from "National Stock Exchange of India," The effect of corporate actions are adjusted in the closing prices. All the selected prices are averaged monthly.

3.2 Trend Analysis of Crude Oil Price



Trend in Crude Oil Prices (2008-2017)

Many researches have indicated that the fundamentals of demand and supply are important to understand fluctuations in the oil market, both the short term and long term fluctuations. The fluctuation studies are helpful for investors to decide which investment is profitable and which is not. There are many other factors of fluctuation in prices of oil like increase in demand from developing countries, Currency fluctuations-when there is an increase in US dollar it will be expensive for India to import oil thereby affecting its demand and price, many weather conditions also decides the prices and speculative buying and selling also OPEC being the producer of 40% global oil also fluctuates the prices. The point to note is that the fluctuations in oil prices is not solely due to financial speculations but majorly due to oil demand and oil supply. Apart from these there are many disturbances in the economy that causes the crude oil price to fluctuate, these disruptions remain for the short period of time because as the production pattern changes around the world the price also starts reacting accordingly. It was found that many historic and global events had a negative effect on the changes in the oil prices which further affected the production process in many countries. Some of the events were US subprime crisis, the global recession (2008) the crude oil price fell from \$101.84 a barrel to \$41.34 a barrel (as shown in fig 1), The Arab Spring (2011-12) made the crude oil price to touch \$100 a barrel. In May, 2011 due to flooding of Mississippi River the oil prices fluctuated. In 2014 OPEC vowed to keep crude oil price above \$100 a barrel foresighting the future but in mid-2014, the price of oil began to fall from \$100 a barrel to be touching \$36 a barrel. The reason for availability of cheap oil was OPEC as it did not allow to cut oil production as a result the prices started to dwindle. Even post demonetization and GST the crude oil price recovery was sluggish. Thus this historical global events have majorly impacted the crude oil price, the recovery from which is still continuing.

3.3 Relation of Crude Oil Price and Stock Market (NSE)

In the first objective the reasons of fluctuations in crude oil price are observed and since crude oil price is used in production at a global level. So the fluctuations in oil prices changes the production cost which affects the expected rate of profit from the business which is shown in the form of dampen losses. The consumers demand are also tied with oil prices, when the oil price increases people demand less as a result there are low revenues for the company. Company experiences increased expenses and decreased revenues

thus the stock prices began to tumble. Since oil is seen to rise costs for every participant in economy it puts inflationary pressure due to which Central bank increases the interest rate making the bonds to look more lucrative than stocks and thereby stock prices falls. So change in crude oil price either directly or indirectly effects the stock market.

In order to study the impact of change in crude oil price on NSE stock prices. The stock prices of three companies ONGC, Reliance Industries and IOC are taken into consideration. To estimate the impact simple linear regression model is applied over the period 2008-17 where Crude Oil Price (COP) was taken as an independent variables whereas ONGC, Reliance Ind. and IOC stock prices are used as dependent variable.

3.3.1 Impact of change in crude oil price on ONGC stock price:

The impact of crude oil price change on stock price of ONGC is measured with the help of simple linear regression analysis. The fixed regression model is

$$Y = a + bX$$

Where, Y=ONGC stock price, X=Crude Oil Price b=Regression coefficient a=Constant

The results can be seen from table 1.

Table 1: Crude Oil Price and ONGC stock price

Variables	Coefficient Beta	T-value	P- value	Correlation	R ²
Crude Oil Price	-0.702	-3.952	0.000	-0.341	0.116

It could be observed from table 1 that the correlation is -0.341 which shows negative relationship of crude oil price with ONGC stock price. To measure the impact of change in crude oil price on ONGC stock price a hypothesis was framed that "There is no significant impact of change in crude oil price on ONGC stock price". To test the above hypothesis regression tools were used.

The regression coefficient of oil prices has negative impact on ONGC stock prices i.e. 1% of change in crude oil price will bring about -0.702% change in ONGC stock price keeping other variables constant. As the P-value is less than 0.05 level of significance thereby the model is significant and the null hypothesis will be rejected which means that the volatility in crude oil price will have effect on ONGC stock prices.

3.3.2 Impact of change in crude oil price on Reliance Industries stock price:

The impact of oil price change on stock price of Reliance Industries is measured with the help of simple linear regression analysis. The fixed regression model is

$$Y = a + bX$$

Where, Y= Reliance Industries stock price, X=Crude Oil Price b=Regression coefficient a=Constant

The results can be seen from table 2.

Table 2: Crude Oil Price and Reliance Industries stock price

Variables	Coefficient Beta	T-value	P- value	Correlation	R ²
Crude Oil Price	-3.91	-2.543	0.01	-0.227	0.051

It could be observed from table 2 that the correlation is -0.227 which shows negative relationship between crude oil price and Reliance Industries stock price. To measure the impact of change in crude oil price on Reliance Industries stock price a hypothesis was framed that "There is no significant impact of change in crude oil price on Reliance Industries stock price". To test the above hypothesis regression tools were used.

The regression coefficient of oil prices has negative impact on Reliance Industries stock prices i.e. 1% of change in crude oil price will bring about -3.9% change in Reliance Industries stock price keeping other variables constant. As the P-value is less than 0.05 level of significance thereby the model is significant and the null hypothesis will be rejected which means the volatility in crude oil price will have effect on Reliance Industries stock prices.

3.3.3 Impact of change in crude oil price on IOC stock price:

The impact of global oil price change on stock price of IOC (Indian Oil Corp.) is measured with the help of simple linear regression analysis. The fixed regression model is

$$Y = a + bX$$

Where, Y= IOC (Indian Oil Corp.) stock price, X=Crude Oil Price b=Regression coefficient a=Constant

The results can be seen from table 3.

Table 3: Crude Oil Price and IOC stock price

Variables	Coefficient Beta	T-value	P-value	Correlation	R ²
Crude Oil Price	-1.763	-7.134	0.000	-0.548	0.301

It could be observed from table 3 that the correlation is -0.548 which shows negative relationship between crude oil prices with IOC stock price. To measure the impact of change in crude oil price on IOC stock price a hypothesis was framed that “There is no significant impact of change in crude oil price on IOC stock price”. To test the above hypothesis regression tools were used.

The regression coefficient of oil prices has negative impact on IOC stock prices i.e. 1% of change in crude oil price will bring about -1.7% change in IOC stock price keeping other variables constant. As the P-value is less than 0.05 level of significance thereby the model is significant and the null hypothesis will be rejected which means the change in crude oil price will have effect on IOC stock prices.

4 RESULTS AND CONCLUSION

The study focused to find out how the fluctuations of crude oil price and how do these fluctuations impacts the stock market over a period. Apart from the demand and supply it was ascertained that there were some historical global socio-economic events which happened between the time periods which made the crude oil prices to go volatile. It was also found that the change in crude oil price do affects the stock market in particular NSE. Three stocks of NSE-ONGC, Reliance Industries and IOC were taken into consideration to analyse the impact. The simple linear regression model resulted that the change in crude oil price will have significant impact on the stock prices of the three companies. The study does not taken into considerations all the reasons that causes the oil prices to fluctuate hence, there is further scope of study. One can further find out some macro-economic factors which will affect the stock prices keeping more focus on the stock market of India as well as globally.

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