Impact of Oil Prices on Gross Domestic Product, Exchange Rate and Wholesale Price Index

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ABSTRACT
As we know that all the Economies of the world are dependent on Crude Oil Prices. So Crude Oil Prices are supposed to affect the different component of an Economy. The crude Oil prices are very volatile due to demand & supply, keeping in the mind, the importance of oil prices this study has been done, with three important variables, namely, gross domestic product (GDP), exchange rate and wholesale price index (WPI). The main objective of this study is to analyse the impact of oil prices on selected economic variables, in this regard research framed theoretical model (Regression) for each dependent variable (GDP, Exchange rate and WPI) with independent variable (Oil prices), and found that the regression model statistically significantly predicts the outcome variable and there is a positive relationship between economic variable and oil prices.

INTRODUCTION
Crude oil is a complex mixture of various hydrocarbons found in the upper layers of the earth's crust. Crude oil is often attributed as the “Mother of all Commodities” because of its importance in the manufacturing of a wide variety of materials. Crude oil accounts for 35% of the world's primary energy consumption. Global proven oil reserves in 2011 was around 1652.6 thousand million barrels, of which the OPEC had 1196.3 thousand million barrels. Crude oil accounts for 33% of the world's primary energy consumption. Global oil demand was 88.3 million barrels per day (mmb/d) in 2011, an increase of around 0.7% from the previous year. In 2010, Russia, Saudi Arabia, the US and Iran were the top oil producing countries. Although the US is the world's third largest oil producing nation, it is the world's largest consumer and importer of oil followed by China, Japan and India. (MCX India)

Price Moving Factors (MCX India)
- OPEC output, supply and spare capacities
- Increased demand from emerging and developing countries; geopolitics
- US crude and products inventories data
- Currency fluctuations
- Weather conditions
- Speculative buying and selling
- Changes in the refining sector, for example, a drop in the refinery utilisation rate

REVIEW OF LITERATURE
Numbers of studies have been conducted to examine the impact of Crude Oil Price on Economic Variables. In the study of Fazel Bahador Khah & Abas Aminifard (2013) observed that the real price of oil and real interest rate are the cause of unemployment in Iran’s economy in the short-run and long-run. Ruhul Salim (2010) found that long – run relationship between oil prices, inflation, exchange rate and economic activity and also suggested that both oil prices and real effective exchange rates have strongly significant impact on economic activity. An increase in oil price or depreciation may enhance the economic activity. In the study of Dr. A. Hidayathullah & Mhammed Rafee B (2014) observed that the import of crude oil continues to rise up when the crude oil future price increases. The oil imports thus became a substantial source of demand for
dollar in India’s foreign exchange market. This strong demand contributes to strengthen the dollar against Indian rupee, among the other factors. SulimanZakaria SulimanAbdalla (2012) found that crude oil price fluctuations leads to increase stock market returns volatility. Amalendu Bhunia (2012) found that a co-integrated long-term relationship between three index (BSE 500, BSE 200 and BSE 100 Index of Bombay Stock Exchange) and crude price. Granger causality results reveal that there was one way causality relationship from all index of the stock market to crude price, but crude price was not the causal of each of the three indexes. Abderrazak Dhaoui and Naceur Khraief (2014) examined empirically whether oil price shocks impact stock market returns. Using monthly data for eight developed countries from January 1991 to September 2013, strong negative connections between oil price and stock market returns are found in seven of the selected countries (US, Swiss, France, Canada, UK, Australia, Japan & Singapore). Oil price changes are without significant effect on the stock market of Singapore. On the volatility of returns, the changes in oil prices are significant for six markets and they have not much effect on the others. Tarak Nath Sahu, Kalpataru Bandopadhayay & Tarak Nath Sahu Kalpataru Bandopadhayay (2014) According to Johansen's cointegration test and vector error correction model researcher found that there was along run cointegrating relationships between crude oil price and Indian stock indices, but it cannot be said with sufficient confidence that the direction of the relation in the long run is from the oil price to the Sensex. The Granger causality test also reveals that the volatility of stock prices in India can be explained to cause the movement of oil price and exchange rate in short run.

Motivation for Research

Crude Oil has been vital to the world economy since its discovery. Recently international crude oil price experienced a sharp increase. Most countries are significantly affected by hike in the oil market, either as producers, consumers, or both. (Dr. P. Srithar, N.Bairavi and G. Mariselvam 2014). According to above mention discussion as we could see that crude oil is most dominated commodity because it accounts for 35% of the world’s primary energy consumption (MCX India) and its important role arises the need to do research in this field by which economies could get idea about oil price volatility.

OBJECTIVES

There are following objectives of this study.

- To study the relationship between Crude Oil price and selected economic variables.
- To analyse the impact of Crude oil prices on selected economic variables.

RESEARCH HYPOTHESES

H0 = there is no significant relationship between Crude Oil Prices and selected economic variables.
Ha = there is a significant relationship between Crude Oil Prices and selected economic variables.

H01 = there is no impact of Crude oil prices on selected economic variables.
Ha1 = there is an impact of Crude oil prices on selected economic variables.

RESEARCH METHODOLOGY

This study is based on secondary data collected from RBI database, Index Mundi database used for 2004 to 2013 with a number of 10 observation. This study focused on three economic variables, Namely, Gross Domestic Product (GDP), Exchange Rate and Wholesale Price Index. By using these variables researcher try to find out the impact of crude oil prices (as independent Variables) on economic variables (as dependent variables) and to make the findings logical, we used descriptive statistical techniques and inferential statistical techniques by using different software, Namely, Excel, SPSS and Eviews, in this regard researcher framed following theoretical models individually.

First Crude Oil Price (COP) and GDP (Gross Domestic Product)

\[ GDP = \alpha + COP\beta + \mu \]
Second Crude Oil Price (COP) and Exchange Rate
Exchange Rate = α + COPβ + µ -------- (2)

Third Crude Oil Price and Wholesale Price Index (WPI)
Wholesale Price Index = α + COPβ + µ -------- (3)

EMPIRICAL RESULT
Model: 1
The impact of Crude Oil Price on GDP is measured with the help of simple regression analysis, that is \( Y = a + bX \) where, \( Y \) denotes GDP, \( X \) denotes Crude Oil price, \( b \) denotes Regression Coefficient, \( a \) is constant and \( e \) is error. The results are given in the following table (1)

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>R2</th>
<th>Correlation(r)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.842</td>
<td>.843</td>
<td>0.842</td>
<td>.000</td>
</tr>
</tbody>
</table>

According to above mentioned table, it could be observed that GDP & Crude Oil price has positive correlation with value 0.842 and the value of R Square indicates that the how much of the total variation in the dependent variable, GDP, can be explained by the independent variable, oil price. In this case, 84.3% can be explained. Here, the value of \( p \) is less than 0.05, which indicates that, the regression model statistically significantly predicts the outcome variable.

Model: 2
In this second model research took, exchange rate as an dependent variable \( (Y = \text{exchange rate}) \) the results are given in the following table (2)

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>R2</th>
<th>Correlation(r)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>.739</td>
<td>.546</td>
<td>.739</td>
<td>.000</td>
</tr>
</tbody>
</table>

As we can see in table 2, that exchange rate & Crude Oil price has positive correlation with value .739 and the value of R Square indicates that model is good fit for the data and the value of \( p \) is less than 0.05, which indicates that, the regression model statistically significantly predicts the outcome variable.

Model: 3
The impact of Crude Oil Price on wholesale price index is measured by regression analysis, that is \( Y = a + bX \) where, \( Y \) denotes wholesale price index, \( X \) denotes Crude Oil price, \( b \) denotes Regression Coefficient, \( a \) is constant and \( e \) is error. The results are given in the following table (3)

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>R2</th>
<th>Correlation(r)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.90</td>
<td>.809</td>
<td>0.90</td>
<td>.000</td>
</tr>
</tbody>
</table>

According to above mentioned table (3), Research could be observed that wholesale price index (WPI) & Crude Oil price has positive correlation with value 0.90 and we can say that 1% of change in the oil price will bring out 0.90% change in WPI when other variables are constant. So now we can say that there is the relationship between oil prices and economic variable (WPI, GDP & Exchange Rate), along with there are also other variables which are unexplained here. The value of \( p \) is less than 0.05, which indicates that, the regression model statistically significantly predicts the outcome variable.
CONCLUSION

As we know that India is a developing country and needs more development in this regard there is one aspect which we supposed to be study that is oil prices because it played very important role as we could say that most of activities totally dependent on oil price in which production is one of them so keeping in the mind of oil price importance this study has been done and researcher found that there is significant relationship between economic variables and oil prices and oil price has a strong impact on economic variables.

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