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## Impact of fluctuation in oil prices on Indian industries

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### Abstract

On a day to day basis, millions of tons of oil is being moved around the world and it then refined to make diesel, gasoline, lubricants and other petroleum products. Though petrol and diesel are used to run engines, other fuels are used in numerous industries to produce commodities like metal, plastic and furniture. The key businesses of any country are dependent on oil prices e.g. power sector, mining sector, auto-mobile industry, airline industry, consumer goods industry, transport industry, chemical and pharmaceutical industry, food industry, textile industry and aerospace industry.

**Keywords:** petroleum, fuel, oil, price

### Introduction

Petroleum based fuels currently meet the majority of human energy requirements [7]. Hence, economy of any country can't run without oil and any fluctuation in crude oil prices affects its economy directly. When crude oil prices are high, it leads to slower economic growth [4]. Since crude oil prices are directly linked with the economy, therefore high oil prices can lead to high inflation and thereby retarding economic growth. Any fall in crude oil price leads to lower inflation which increases economic growth. Since inflation decreases, interest rates reduces while consumer and business Spending's increases. Any fluctuation in crude oil prices has distinct effect on stock market as well [8, 9]. This fact is difficult to conceptualize but same has been observed throughout the world.

This single international price is a key component that will continue to dominate investment picture for years to come on. It acts as a key variable in evaluation of economic development, energy policy decisions and stock markets [5].

A prior knowledge of oil price fluctuations helps oil producers to take decision regarding increase or decrease in production levels. Oil prices help strategically in macroeconomic projections and macroeconomic risk analysis for central and private banks. They are helpful in predicting recession in business cycles [10]. They are helpful in planning regulatory policies regarding taxes & standards. Businesses dependent on oil will be benefited as firms will be in position to take measures to control manufacturing and sales of their products in line with expected trend of forecasted oil prices.

Accurate forecasting helps Non-OPEC countries to take effective measures so that their growth remains robust and thus benefiting their consumers. Further, economic policies can be formulated in a way to overcome recession and unemployment. Oil price fluctuations are of deep economic risk, both to producers as well as to consumers. Fluctuating prices and regional supply disruptions lead to considerable uncertainty to the near-term outlook.

Crude oil is traded in global market and thus oil price volatility has become a prime feature of global oil market. According to EIA, geopolitical and economics events have strong impact on crude oil markets over last 40 years. Oil prices are affected by geopolitical and economic events that have potential to disrupt the flow of oil and petroleum products to markets. These events cause disruption in the supply-demand framework, leading to an increase in volatility of oil prices. Crude oil prices have react to variety of events ranging from happening of cuts in OPEC production target, financial crisis, terrorist attacks to political disruption in oil exporting countries.

### Research Study

Oil prices rose to \$30 per barrel by end of 1996 but due to Asian financial crisis in 1997 quarter 1, prices declined drastically to \$16 per barrel by end of 1998. As a consequence

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of cuts in OPEC production targets by 1.7 mmbpd, oil prices increased to more than \$35 per barrel in late 2000. The impact of such extreme events is of prime importance as they impact the oil market. These price fluctuations were reproduced due to divergent factors such as Iran-Iraq political conflicts, OPEC supply disruptions, 9/11 attacks or global financial crisis.

In quarter 3, 2001 when oil prices were around \$34 per barrel, terrorist activity (9/11 attack) led to increase in volatility of oil prices, soaring oil prices above \$54 per barrel in late 2004. Further, oil prices steadily rose for

several years and reached a record high of \$145 per barrel in July 2008 due to low spare capacity. Afterwards, global financial crisis in 2008 caused oil prices to plunge to around \$43 per barrel by end of 2008. In quarter 1 2009, OPEC cut production targets by 4.2 mmbpd and thus oil prices rose from \$43 per barrel to \$91 per barrel by end of 2011. Basis above details, the question that arises is whether volatility in oil prices is due to variation in availability or are there any other political or economic indicators to blame. Therefore, it is essential to analyse the key indicators driving oil prices.

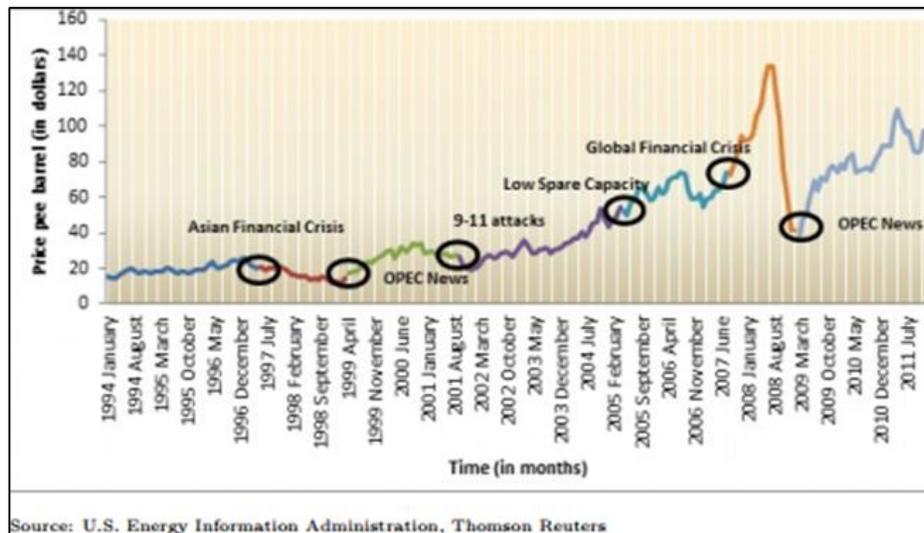


Fig 1: Crude oil prices and Geopolitical & Economic events

The “price of oil” is a critical factor that has substantial impact on world economics, be it part of OPEC or Non-OPEC countries. Oil prices have been steadily rising for several years and in July 2008 stood at a record high of \$145 per barrel. Later, it declined due to global economic crisis at the end of 2008, and then recovered to \$75 per barrel by 2010. Recently, oil prices have set records by surpassing \$100 per barrel for the first time in the year (in money-of-the-day terms). This rise or decline in oil prices stimulates for studying in detail the factors behind movements in the price of oil. Understanding complex oil price movements and indicators driving them was the impetus for Energy Information Administration (EIA) to launch a monthly report assessing the physical market, financial and trading factors influencing oil prices.

Looking ahead, there are several issues that can inform us about the direction of oil prices. These include the behaviour of future markets, an assessment of the degree to which speculation are driving current price development, supply-demand framework, expected future reserves and impact of geopolitics on behaviour of stock market. Any rise or decline in these factors creates imbalance in the market which critically impact oil market participants and makes markets unpredictable

### Discussion

Forecasting of crude oil prices has never been an easy task, though it is important for so many economic policies. Many institutions – including central banks and international organization—are currently using NYMEX oil futures as key indicator for the market’s expectation regarding spot price development, but there are high number of external factors which are complex, noisy, and uncertain that drive crude oil

prices [11]. Thus, it becomes crucial to develop predictive models using various influential factors that drive crude oil prices to understand the complex and dynamic nature of oil prices.

As discussed, there is no solitary indicator (lags, future prices or macroeconomic variables) which can provide a complete picture of how prices can be determined but definitely, there are several factors that can inform us about the direction of future price path. The key factors driving oil prices can give us a snapshot of some fluctuations in oil prices and by modelling these key snapshots can give a clear picture on direction of oil prices. Taking into account that complex and chaotic tendency of crude oil prices are due to significant variation in key external factors, a combination of these key factors can help to overcome some of the drawbacks of previous econometric models used for forecasting of oil prices.

There is colossal collection of data for factors, ranging from demand-supply, inventories, reserves to varied market, but an important task is to discover knowledge by identifying useful patterns in data. The process of mining information from data includes an important step of selecting an appropriate set of input variables. In most of the studies, the choice of input variables for oil price forecasting is carried on judgemental criterion or trial and error procedures. Little attention is paid on selecting influential factors and more is on assessing new techniques for oil price forecasting. The central problem of identifying a representative set of features to construct a prediction model for oil prices is a major issue of concern. To address this issue, primarily, there is an essential need to identify most relevant and non-redundant features that can explain the characteristics of oil market.

The accuracy of predicted crude oil prices is the biggest hurdle faced by the global oil markets. Accurate forecasting of crude oil will help both oil producers and consumers to a large extent. Oil producing countries shall be benefited as they shall be in a position to increase or decrease their productions basis the predicted prices. Consumers shall be benefited as their economy is highly dependent on oil. Accurate forecasting will help Non-OPEC countries to take effective measures so that their growth remains robust.

The businesses which are dependent on oil will be benefited as they shall be in a position to take measures in advance to control their manufacturing, sales, and inventories basis expected trends of forecasted oil prices. With accurate projection of oil prices, economic policies would be formulated to overcome recession, high inflation & unemployment.

Using future prices only as a stand-alone instrument to forecast spot price development doesn't seem to be recommendable. For designing better structural forecasting models, it is important to identify the key factors driving crude oil prices during the time frame of happening of such extreme events. In this context, a feature selection algorithm (based on dependency and association of key factors with oil prices) is required to identify the minimal set of key factors for achieving high prediction performance.

Thus, the business problem of this thesis is to identify key drivers of oil prices for better investment decisions, find ways to overcome prolonged instability within economy and form better economic policies to overcome sudden change in demand-supply framework so as to reduce public deficits.

### Conclusion

Oil plays an inevitable role in the current scenario and is termed as black gold. Oil will remain the world's primary fuel and is projected to remain the energy source with largest share for many years to come. This single international price acts as a key variable in evaluation of economic development, energy policy decisions and stock markets. Oil prices have risen or fallen due to happening of various geopolitical and economic events. These fluctuations in oil prices raise an important question whether this rise or fall in oil price is due to squeeze in availability or are there any other political or economic indicators to blame. Researchers have forecast oil prices using future prices as key indicator but future prices as sole indicator is not sufficient. There are high number of external factors that drive oil prices. The key factors driving oil prices can provide a clear picture about direction of oil prices.

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