A study on The Impact of Domestic Crude Oil Price on Stock Price Indices-An Emprical Study of BSE and NSE

K.Abinaya

(13PCO001)

Thesis Submitted to
Avinashilingam Institute for Home Science and Higher Education for Women,
Coimbatore-641 043

In Partial Fulfilment of the Requirements for the
Master of Commerce

March - 2015

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Signature of the Head of the Department

Signature of the Supervisor

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Introduction

CHAPTER - I

INTRODUCTION

"Oil price rise fuels India's inflation woe'

"High Oil Prices Hit India's Airlines"

The present research paper examines the impact of domestic crude oil price on stock price indices in India for the period for the period from 1st January, 2012 to 31st December, 2014 using appropriate statistics. The domestic crude oil price in India is eternally escalating inconsequence of its intense domestic demand on account of protection, liquidity along with spreader portfolio. It give the impression of being at the remarkable data brings to the plane that when the stockmarket crumples or when the dollar worsens, crude oil prolongs to be a safe haven investment because crude oil prices increase in such situations. The study is based on secondary data obtained from World Crude oil Council database and BSE and NSE database. Unit root test indicates that time series are not stationary at levels and the selected time series are stationary at 1st difference.Granger causality test illustrate that no causality exists between nifty and crude oil price, crude oil price and sensex and nifty and sensex and bidirectional causality exists between crude oil price and nifty, sensex and crude oil price and sensex and nifty.

Crude oil is worldwide required commodity. Any variation in crude oil prices can have both direct and indirect pressure on the economy of the different countries. The volatility of crude oil prices drove many companies away and its affect the stock market also. India fulfills its major crude oil requirements by importing it from oil producing nations. India meets more than 80% of its requirement by importing process. Therefore, any upward and downward motion of prices is closely tracked in the domestic market place. Many times it has been recorded that prices of essential products like crude also acts as a prime driver in becoming reason of up and down movement of price.

Continuous instability in crude oil has its impact on the other industrial segments also. Higher crude oil price involve to the higher price of energy, which negatively affects other trading practices. In all probability it is not too sufficient in itself to affect the market as oil prices have started fluctuating in 1973. But still investors react towards the rapidly changing oil prices for their interest as the different

industries also get affected by that. In the short term, price of crude oil is influenced by many factors like socio and political events, status of financial markets, whereas from medium to long run it is influenced by the fundamentals of demand and supply which thus results into self price correction mechanism. There are numerous factors which influence the price movement of crude oil in throughout the world.

Natural Causes

Natural causes act as a determinant in effective trading of commodities. In the past global communities have witnessed many events which affect the price stability of crude oil. For instance, the tropical cyclones have hit the major portion of globe, which as a result driven the crude oil prices to reach at its peak.

Inventory

Throughout the world, oil producing nations and their importer's stock crude oil for their future requirements. This gives rise to speculation on price expectations and sale chances in case any unexpected thing cracks during supply and demand equations. Any upward or downward movement in inventory level shoots up volatility in price index of crude oil, sometimes hedging leads to increase in crude oil prices which generate lot of changing movement in nifty.

Demand & supply

India is a developing nation with a steep rise in industrialization and oil acts as a primary input to these industries. With a sharp rise in economic demand, demand of crude oil is many times more than its limited supply.

Crude oil price increases are an extension of oil market developments originating in the 1990s. During that period, high stock and ample surplus production capacity served to limit oil price fluctuations. When spot market prices moved up or down, futures contracts requiring delivery in later months generally traded close to $20 per barrel, consistent with a market expectation that producers would ensure that spot prices would eventually return to that level. However, as top OPEC members shifted toward a tight inventory policy and global oil demand picked up from the slowing effect of Asia's financial crisis, the global market balance tightened and inventories declined sharply at the start of the present decade. Oil prices rose to $30 per barrel in what might be seen as the first leg of the upward trend. By 2003, inventories were brought down sufficiently such that subsequent increases in global demand brought oil production to levels near capacity. The large, unexpected jump in world oil consumption growth in 2004, fostered by strong growth in economic activity in

Asia, reduced surplus production capacity significantly. In mid-2008, despite high prices, world oil consumption growth remained strong, overall non-OPEC production growth continued to be slow, and OPEC oil production had not grown sufficiently to fill the gap. In addition, geopolitical risks create considerable uncertainty about future supplies. In 2010 prices rises to $144 per barrel, currently crude oil price is $ 97.80 per barrel (as on Oct.' 2013)

In the present study, co-integration and causality tests have been applied by using daily closing values of BSE 500, BSE 200 and BSE 100 Index between years 2012 -2014 and crude price in order to test the causality relationship between stock market in India and crude prices. It has been considered that the long time period which constitutes the scope of the study and separate consideration of the relationships between three fundamental index and international oil price distinguish the study from other studies in the literature and would make an important contribution to the field literature.

Many factors, such as enterprise performance, dividends, stock prices of other countries, gross domestic product,exchange rates, interest rates, current account, money supply, employment, their information etc. have an impacton daily stock prices (Kurihara, 2006: p.376).The issue of inter temporal relation between stock returns and exchange rates has recently preoccupied the minds of economists, for theoretical and empirical reasons, since they both play important roles in influencing the development of a country's economy. In addition, the relationship between stock returns and foreign exchange rates has frequently been utilized in predicting the future trends for each other by investors. Moreover, the continuing increases in the world trade and capital movements have made the exchange rates as one of the main determinants of business profitability and equityprices (Kim, 2003). Exchange rate changes directly influence the international competitiveness of firms, given their impact on input and output price (Joseph, 2002). Basically, foreign exchange rate volatility influences the value of the firm since the future cash flows of the firm change with the fluctuations in the foreign exchange rates. When the Exchange rate appreciates, since exporters will lose their competitiveness in international market,the sales and profits of exporters will shrink and the stock prices will decline. On the other hand, importers will increase their competitiveness in domestic markets Therefore, their profit and stock prices will increase. The depreciation of exchange rate will make adverse effects on exporters and importers. Exporters will have

advantage against other countries' exporters and increase their sales and their stock prices will be higher (Yauand Nieh, 2006). That is, currency appreciation has both a negative and a positive effect on the domestic stockmarket for an export-dominant and an import-dominated country, respectively (Ma and Kao, 1990). Exchangerates can affect stock prices not only for multinational and export-oriented firms but also for domestic firms. Fora multinational company, changes in exchange rates will result in an immediate change in value of its foreign operations as well as a continuing change in the profitability of its foreign operations reflected in successive income statements. Therefore, the changes in economic value of firm's foreign operations may influence stock prices. Domestic firms can also be influenced by changes in exchange rates since they may import a part of theirinputs and export their outputs. For example, a devaluation of its currency makes imported inputs moreexpensive and exported outputs cheaper for a firm. Thus, devaluation will make positive effect for export firms(Aggarwal, 1981) and increase the income of these firms, consequently, boosting the average level of stockprices (Wu, 2000). Thus, understanding this relationship will help domestic as well as international investors for hedging and diversifying their portfolio. Also, fundamentalist investors have taken into account these relationships to predict the future trends for each other.

Scope of the study

Stock market is distinguished as an extremely momentous factor of the financial sector of any economy. Besides, it plays an imperative role in the mobilization of capital in India.The importance of this paper curtails from the critical position of the Indian financial market for the following grounds:

(i) Indian financial market plays an important role in collecting money and encouraging investments, accordingly this paper was devised to search the impact of crude oilprice in India on stock market prices in BSE and NSE.

(ii) The importance of the paper gives a belief to domestic as well as foreign investors.

(iii) The results of this paper will provide investors helps to compose their individual proper investment decisions.

Objectives of the study

The plan of the paper was to establish, investigate and assess the impact of domestic crude oil price on stock price indices of BSE (SENSEX) and NSE (NIFTY). In this way, this paper would attempt to attain the objectives of:

- To analyse the crude oil price for the selected period.
- To analyse the causal relationship between domestic crude oil price and sensex and crude oil price and nifty.
- To examine the relationship among macroeconomic variables and Indian stock market.
- To analyze the impact of macroeconomic variables on Indian Stock market.

Hypothesis of the study

This paper aspires to study the change in daily crude oil price and its impact on stock price indices based on the following hypotheses

Hypothesis 1

8H0: There is no relationship between crude oil prices and Indian stock price indices;

H1: There is a significant relationship between crude oil prices and Indian stock price indices.

Hypothesis 2

H0: The selected variables are not non-stationary variables (there is unit root);

H1: The selected variables are non-stationary variables

(there is unit root).

Hypothesis 3

H0: There is no causal relationship between the selected variables;

H1: There is a significant causal relationship between the selected variables.

Limitations of the study:

- The study has covered only last three financial years.
- The data collected for the study was only secondary data.

Chapter scheme

"A study on The Impact of Domestic Crude Oil Price on Stock Price Indices-An Emprical Study of BSE and NSE"

has been presented in the following chapters

- First chapter deals with introduction, scope of the study, its objective and its limitation.
- Second chapter deals with the review of literature, under which a brief description of earlier studies where included.
- Third chapter deals with research methodology, which includes description regarding sources of data, collection of data and tools for analysis of data.
- Fourth chapter deals with analysis and interpretations, under which data collected through secondary data were analyzed and interpreted.
- Fifth chapter deals with summary and conclusion.

Chapter-II

Review of literature

Review of related studies

There are diverse studies, technical papers and articles covenanting in aspects that influence stock market prices at the global level such as:

- **Rabi N. Mishra and G. Jagan Mohan, 2012**, in their study entitled "Crude oilPrices and Financial Stability in India" proved that domestic and international crude oilprices are closely interlinked. The paper also concludes that implications of correction in crude oilprices on the Indian financial markets are likely to be muted.
- **Mahmood Yahyazadehfar and Ahmad Babaie (2012**), the relationship between nominal interest rate and crude oilprice with stock price are negative. Also, the results of Impulse-Response Functions shocks show that stock price reaction to the shocks is very fast.Thai-Ha Le and Youngho Chang (2011) made a study on "Dynamic Relationships between the Price of Oil, Crude oiland Financial Variables in Japan: A Bounds Testing Approach" and they confirmed that the price of crude oiland stock, among others, can help form expectations of higher inflation over time. In the short run, only crude oilprice impacts the interest rate in Japan. Overall the findings of this study could benefit both the Japanese monetary authority and investors who hold the Japanese yen in their portfolios.
- **Yen-Hsien Lee, Ya-Ling Huang & Hao-Jang Yang (2012)** examined the asymmetric long-run relationship between crude oil and crude oilfutures. This study employs the momentum threshold error-correction model with generalized autoregressive conditional heteroskedasticity to investigate asymmetric cointegration and causal relationships between West Texas Intermediate Crude Oil and crude oilprices in the futures market. From the study it is clear that an asymmetric long-run adjustment exists between crude oiland oil. Furthermore, the causalityrelationship shows that West Texas Intermediate Crude Oil plays a dominant role.
- **Graham Smith (2001) empirically** investigated the relationship between crude oilprices and stock price indices on US market using Unit Root Test,

Johansen's Co Integration Test, Vector auto regression and VECM. He confirmed that The short-run correlation between returns on crude oiland returns on US stock price indices is small and negative and for some series and time periods insignificantly different from zero. All of the crude oilprices and US stock price indices are I(1). Over the period examined, crude oilprices and US stock price indices are not cointegrated. Granger causality tests find evidence of unidirectional causality from US stock returns to returns on the crude oilprice set in the London morning fixing and the closing price.

- **Sadorsky (1999)** examined the relationship between shocks that occurred in oil prices in U.S.A and the stock exchange. As a result of the study performed in the period between 1947-1996, in which VAR and GARCH analyzes were applied and interest rate and industrial production output were included, it was revealed that oil prices and volatility in the oil prices play essential role in affecting the returns of stocks and shock volatilities that occurred in oil prices have asymmetric effect on the economy.
- **Papapetrau (2001**) in his study investigated the dynamic relationship between oil price shocks, stock exchange (stock prices) and economic activities (interest rate, work force) in Greece. As a result of the research study performed in the period between 1989-1999 and where VAR analysis was applied, it was determined that the changes in the oil prices affect the real economic activities and are important factors in studying the stock exchange price movements of oil price.
- **Maghyereh (2004)** looked into the interaction between shocks that occurred in oil prices and stock markets of relevant countries. According to the results of the study, it was found that shocks that occurred in oil prices did not have meaningful effect on stock index returns of developing countries.
- **Sari and Soytas (2006)** examined the relationship between crude oil price, stock return, interest rate and output within the period 1987 -2004 in the scope of Istanbul Stock Exchange (ISE). According to the results of the research, shocks that occurred in oil prices did not have meaningful effect on stock returns. In their studies Anoruo and Mustafa (2007) looked into the relationship between oil and stock market returns in the period 1993 -2006 in U.S.A. According to the result of the study, in which co-integration test and

VECM model were used, it was revealed that there was a long term relationship (cointegration) between stock market and oil market and there was a one way causality relationship from stock market returns to oil market returns.

- **Park and Ratti (2008)** looked into the effect of the shocks that occurred in oil prices on stock exchange returns in the scope of U.S.A. and 13 European countries. In the study performed for the period 1986-2005 and in which VAR model was used, it was determined that price shocks that occurred in general basis had effect on stock exchange returns, oil price increase in Norway also increased stock exchange returns and increase in volatility of oil prices in many European countries except U.S.A. had negative effect on stock exchange returns.
- **Cong, Wei, Jiao and Fan (2008)** examined the interactive relationship between shocks that occurred in oil prices and stock market in China. In the study performed in the period between 1996 and 2007 and where VAR model was used, it was revealed that shocks that occurred in oil prices did not have meaningful effect on stock returns and some important shocks that occurred, negatively affected the stocks of oil companies.
- **Miller and Ratti (2009)** investigated the long term relationship between world crude oil prices and international stock exchanges. According to the results of the study performed within period of 1971-2008 (seperated based on periods) in the scope of OECD countries and in which VECM model was used, it was observed that there had been a long term relationship between variables between periods 1971-1980 and 1988-1999 and the stock exchange had responded negatively to the increase in oil prices in the long term.
- **Oberndorfer (2009)** looked into the relationship between developments that had occurred in energy markets in Euro zone and prices of energy stocks in Europe. In the research performed for the period 2002-2007 and in which ARCH and GARCH analyzes were applied, it was revealed that increases in oil prices negatively affected European stock returns, and volatilities in coal prices affected stock returns, but did not have a big impact as much as oil price, and the natural gas had no effect on the prices of energy stocks.
- **Arouri, Lahiani and Bellalah (2010)** examined the relationship between shocks that had occurred in oil prices and stock returns by using linear and

non-linear models within the period of 2005-2008 among countries exporting oil. According to the results of the research, it was revealed that stock returns in Qatar,Oman, Saudi Arabia and United Arab Emirates had responded to changes in oil prices, though change that had occurred in oil prices in Bahrain and Kuwait did not affect the stock return

- **Jesus Alvarez and Ricardo Solis (2010)** presented empirical research on market inefficiencies focuses on the detection of autocorrelations in price time series. In the case of crude oil markets, statistical support is claimed for weak efficiency over a wide range of time-scales.
- **Samuel Imarhiagbe (2010)** analyzed the impact of oil prices on stock prices of selected major oil producing and consuming countries with nominal exchange rate as additional determinant. Daily stock prices, oil prices, and exchange rates for six countries (Mexico, Russia, Saudi Arabia, India, China, and the US.) from January 26, 2000 to January 22, 2010, are modeled as a co integrated system in Vector Autoregressive analysis
- **Miller J. Isaacc and Ronald A. Ratti (2008)** have analyzed the long run relationship of oil prices and international stocks by using VECM. Kilian Lutz and Park Cheolbeom (2007) illustrated the response of aggregate U.S. real stock returns may differ greatly depending on whether the increase in the price of crude oil is driven by demand or supply shocks in the crude oil market
- **Radhika Pandey (2005)** examined One of the significant developments affecting the global economy in the current scenario is the phenomenal increase in the crude oil prices and explore the possible conflicts which policy makers experience while framing policies for curbing the adverse impact of oil price hike.
- **Ibrahim Tuhran and et.al (2012)** examined the dynamic relationship between oil prices and exchange rate of selected emerging economies. It contributes to the literature in at least three points, first contrary to the general use of developed economies, the author opted emerging markets to study the relationship between oil prices and exchange rates. Second , un-parallel to the literature using monetary models to explore the exchange rates with low frequency data, oil is taken as alternative asset class and use daily oil price data to investigate the dynamics of exchange rate of an emerging

market. Third, this paper shows how this relation has changed by comparing the relationship before and after the financial crisis. The study used exchange rates of 13 emerging countries during 2003-10.The study used 5 day week daily time series data for the period 01-03-2003 to 06-02-2010. Dated Brent Oil price and the US dollar and the US dollar price of JPMorgan emerging market bond index plus (EMBI+) countries exchange rates are sourced from Bloomberg. The study employed three different unit root tests for each returns and each time frame separately. Although the unit root tests sometimes yield contradictory results, the results indicate that in all time frames all exchange rates returns and oil returns are stationary inlevels. The results show that oil price movements get an increased importance after the financial crisis, as oil prices rise there is an apparent depreciation of the local currency against the US dollar and the co-movements has increased during the study period. There are number of reasons why this co-movement is getting stronger. One reason is that emerging economies have recovered more quickly than developed countries from the crisis Increasing oil prices create a positive sentiment to emerging economies as they are expected to grow faster than the developed economies.

- **Mohammad Shaidan Shaari and et.al (2012)** studied the effects of oil price shock on inflation in Malaysia using monthly data from 2005 to 2011.The study used world crude oil price index(in Malaysian Ringgit, RM) consumer price index, CPI (based index value of 100 in year 2005) and exchange rate (RM per $ 1 US dollar). VAR-VECM and Granger causality model were employed to analyze the data. The empirical findings show, that the co-integration between all variables exists at 5percent significance level in the long run. But in the short run only crude price affected the inflation. From Granger causality test, it is found that inflation does not granger cause the exchange rate but it does granger cause the oil price. The oil price does granger cause the inflation but it does not granger cause the exchange rate. The exchange rate does not granger cause both of the variables (inflation and oil prices). So, the change in crude price changes the inflation. This finding will contribute to Malaysian government in making policy to control the petrol price to combat inflation.

- **Ademola Ojebiyi and David Olugbenga Wilson (2011)** analysed exchange rate volatility through an analysis of the relationship between the Nigerian Naira, oil prices and US dollar. The model results show that there is a weak/negative relationship between exchange rate and oil price as there are other factors that bring about changes in oil price other than the exchange rate. The activities of cartel pricing policy and oil speculators too have come to greatly affect the price of crude oil. The results convey that there are other factors that affect the change in oil price apart from the exchange rate. Crude oil price change is usually very sensitive to events around the world and tensions in the oil producing nations. OPEC too affects the price of crude oil by increasing or decreasing the allocations to be sold by the countries.
- **Syed Abul Basher and et.al (2010)** investigated the dynamic relationship between real oil prices, exchange rate index for major currencies, emerging market stock prices, interest rates, global real economic activity and oil supply. The results of this paper support to some extent that oil prices respond to movements in exchange rates. Further, the result reported in the paper offered some support for higher oil prices affecting exchange rates in the short run. In particular positive oil shock leads to immediate drop in the trade weighted exchange rate. On the other hand oil prices respond negatively to an unexpected increase in oil supply and oil prices respond positively to an unexpected increase in demand. These results are consistent with the prediction from a demand and supply model for the oil market. Oil prices respond positively to positive shock in emerging stock markets, while respond negatively to the positive shock. These results are important in establishing that in addition to global supply and demand conditions for oil, oil prices also respond to emerging economy equity markets and global capital markets.
- **Mukhriz Izraf Azman Aziz (2009)** estimated the long run effect of oil price and real interest rate differential on real exchange rate for a monthly panel of 8 countries from 1980 to 2008. Data are sourced from International Financial Statistics (IFS) published by IMF. Real exchange rate is constructed by using domestic price level and price level in a foreign country. Real exchange rate is equal to nominal exchange rate (foreign price level/domestic price level). Real oil prices are defined as the price of Dubai crude oil expressed in US

dollar. The panel tests are based on within dimension approach (that is panel co-integration statistic) like v-statistic, panel p-statistic, panel Ipp-statistic and panel ADF-statistic. The paper has found evidence of non-stationarity for the three series for all groups of countries. For real oil price and real exchange rate, the series contain unit root as all panel unit root tests fail to reject the null hypothesis of unit root at 1percent level of significance. For real interest rate differential, it appears to be weekly non-stationary especially for oil exporting countries and panel of eight countries as the null hypothesis of unit root can only be rejected at 10 percent significance level by most unit root tests. The paper has shown evidence of long-term relation between the three series and of causality running from real oil price to the real exchange rate.

The existence of a relationship between stock prices and exchange rate has received considerable attention. Early studies (Aggarwal, 1981; Soenen and Hennigar, 1988) in this area considered only the correlation between the two variables-exchange rates and stock returns. Theory explained that a change in the exchange rates would affect a firm's foreign operation and overall profits which would, in turn, affect its stock prices, depending on the multinational characteristics of the firm. Conversely, a general downward movement of the stock market will motivate investors to seek for better returns elsewhere. This decreases the demand for money, pushing interest rates down, causing further outflow of funds and hence depreciating the currency. While the theoretical explanation was clear, empirical evidence was mixed. It was Maysami-Koh(2000), who examined the impacts of the interest rate and exchange rate on the stock returns and showed that the exchange rate and interest rate are the determinants in the stock prices. It was in 1992 that Oskooe and Sohrabian used Cointegration test for the first time and concluded bidirectional causality but no long term relationship between the two variables. Najang and Seifert(1992), employing GARCH framework for daily data from the U.S, Canada, the UK, Germany and Japan, showed that absolute differences in stock returns have positive effects on exchange rate volatility. Ajayi and Mougoue in 1996 picked daily data from 1985 to 1991 for eight advance economic countries; employed error correction model and causality test and eventually discovered that increase in aggregate domestic stock price has a negative short-run effect and a positive long-run effect on domestic currency value. On the other hand, currency depreciation has both negative short-run

and long-run effect on the stock market. Abdalla and Murinde(1997) used data from 1985 to 1994, giving results for India, Korea and Pakistan that suggested exchange rates *Granger cause* stock prices. But, for the Philippines the stock prices lead the exchange rates. Furthering into Indian context, work in this area for the Indian Economy has not progressed much. Abhay Pethe and Ajit Karnik (2000) has investigated the inter – relationships between stock prices and important macroeconomic variables, viz., exchange rate of rupee vis - a -vis the dollar, prime lending rate, narrow money supply, and index of industrial production. The analysis and discussion are situated in the context of macroeconomic changes, especially in the financial sector, that have been taking place in India since the early 1990s. There are some other related studies though not specifically focused to this aspect. Studies like Agarwal, 1997; Chakrabarti, 2001; and Trivedi & Nair, 2003, though, have shown that equity return has positive impact on FII. In 1998, Ajayi et al. investigated the causal relations for seven advanced markets from 1985 to 1991 and eight Asian emerging markets from 1987 to 1991 and supported unidirectional causality in all the advanced economies but no consistent causal relations in the emerging economies. They explained the different results by the differences in the structure and characteristics of financial markets between these groups. Morley and Pentecost (2000) conducted a study on G-7 countries, finally stating that the reason for the lack of 7 strong relationships between exchange rates and stock prices may be due to the exchange controls that were in effect in the 1980s. Similarly, Nieh and Lee in 2001 examined the relationship between stock prices and exchange rates for G-7 countries for the period from October 1, 1993 to February 15, 1999.They claimed no long-run equilibrium relationship for each G-7 countries. While one day's short-run significant relationship has been found in certain G-7 countries, there is no significant correlation in the United States. These results might be explained by each country's differences in economic stage, government policy, expectation pattern, etc. In 2003, Kim showed that S&P's common stock price is negatively related to the exchange rate. Contemporarily, Smyth and Nandha studied the relationship for Pakistan, India, Bangladesh and Sri Lanka over the period 1995-2001 and proved no long run relationship between variables. Unidirectional causality was seen running from exchange rates to stock prices for only India and Sri Lanka. Also, Ibrahim and Aziz analyzed dynamic linkages between the variables for Malaysia, using monthly data over the period 1977-1998 and their results showed that exchange rate is

negatively associated with the stock prices. Results that came from Gordon & Gupta in 2003 and Babu and Prabheesh in 2007 claimed bidirectional causality stating that foreign investors have the ability of playing like market makers given their volume of investments

- **Darrat (1990)** analyzed and tested that the stock market of Canada, its efficiency and the expected returns are constant over time using the multivariate Granger-causality technique.This study considered that the Canadian stock prices fully reflect all available information on monetary policy moves.
- **Kwon and Shin (1999)** used Granger causality tests and Engle-Granger co-integration test through vector error correction model and started that Korean stock market index of economic variables such as production; exchange rates, trade balances and the money supply are co-integrated.
- **Maghayereh (2003)** investigated the long run relationship between the Jordanian stock prices and selected macroeconomic variables using cointegration analysis and monthly time series data from January 1987 to December 2000
- This study treasures that macroeconomic variables as exports, foreign reserves, interest rates, inflation, and industrial production are reflected in stock prices in the Jordanian capital market. The study concludes that macroeconomic variables are significant in predicting changes in stock prices.
- **Erdogan and Ozlale (2005)** investigated the influence of varying macroeconomic variables on stock return of Turkey and found that industrial production and exchange rates were positively related with the stock return. On the other hand, Circulation in Money (M1) had no any significant impact on stock return
- **Gan, Lee, Yong and Zhang (2006)** examined the relationship between stock prices and macroeconomic variables for New Zealand. The variables are long-run and short-run interest rate, inflation rate, exchange rate, GDP, money supply and domestic retail oil price. Their findings suggest that there exist a long term relationship between stock prices and selected variables in New Zealand. However, the Granger causality test suggests that New

Zealand stock exchange is not a good indicator for macroeconomic variables in New Zealand.

- In a study of **Tripathy, (2011)** exhibits relationship between macroeconomic variables and Indian stock market from the month of January 2005 to February 2011 applying several tests such as Ljung-Box Q test, Breusch-Godfrey LM test, Unit root test and Granger causality test. This test brings bidirectional relationship in interest rate, exchange rate, international market with Indian stock market. The study brings significant impact of international market on Indian stock market. This study also confirms the impact of exchange rate and interest rate on stock price.
- **Naik and Padhi (2012)** studies association between the Indian stock market index (BSE Sensex) and various macroeconomic variables as industrial production index, wholesale price index, money supply, treasury bills rates and exchange rates from the time period 1994 to 2011. The analysis reveals that macroeconomic variables and the stock market index are cointegrated and, hence, a long-run equilibrium relationship exists between them. This study perceived that the stock prices are positively relate to the money supply and industrial production but negatively relate to inflation. The exchange rate as well as short-term interest rate is found to be insignificant in determining stock prices. There is bidirectional causation exists between industrial production and stock prices but unidirectional causation from money supply to stock price, stock price to inflation and interest rates to stock prices is established.
- **Ray (2013)** examined the relationship between macroeconomic variables and stock prices. The Industrial production presents a measure of overall economic activity in a country and moves stock prices through its influence on expected future cash flows. Thus, it is expected that an increase in industrial production index is positively related to stock price. The causal relationship between industrial production and stock price in India is covered for a period, 1990-91 to 2010-11. The findings specified that there exist no significant causal relationship between industrial production and share price in India. The result of regression, of course, suggests that there may have been positive relation between stock price and real industrial production. The increase in production of industry can enhance stock price and vice versa.

- **Sireesha (2013)** examined the impact of macroeconomic factors upon the movements of the Indian stock market index Nifty, gold and silver prices through linear regression technique. Gold returns, Silver returns are selected for the analysis as they are important now a days and are studied along with the stock returns. The performance of internal variables shows the interdependence between these variable with returns on stock, gold and silver. Stock return is significantly influenced by GDP and inflation while gold return is significantly influenced by money supply.External variables show significant impact on dependent variables.
- **Luthra and Mahajan (2014)** studied the impact of macroeconomic factors on BSE Bankex.Macroeconomic variables involved GDP growth rate, inflation, gold prices and exchange rate. Bombay Stock Exchange Limited launched "BSE BANKEX Index". This index includes major public and private sector banks listed on BSE.The BSE BANKEX Index is displayed online on the BOLT trading terminals nationwide. The results conclude that inflation, exchange rate and GDP growth rate affect the Bankex positively. However Gold Prices affect BSE Bankex negatively but none of these variables have a significant impact on the stock prices of banks.
- **Mishra and Gupta (2014)**studied the major factors responsible for up-down movement in Indian stock market. The relationship between Sensex and macroeconomic variables- IIP, WPI, Interest Rate and Morgan Stanley Capital International Index of India during the period from 2006 to 2012. Multiple correlation and multiple regressions is used to analyze the relationship among variables. The results show very high and positive correlation with Sensex and are significant during the period of study. Studies on the relationship between macroeconomic variables and national stock market have been the cornerstone of most economic literature for quite some time.During the last decade and a half, it has been recognized that external sector indicators like exchange rate, foreign exchange reserves and value of trade balance can have an impact on stock prices. Early studies **(Aggarwal, 1981; Soenen and Hennigar, 1988)** in the area of exchange rates – stock prices considered only the correlation between the twovariables. Theory explained that a change in the exchange rates would affect a firm'sforeign operation and overall profits. This would, in turn, affect its

stock prices. Thenature of the change in stock prices would depend on the multinational characteristics ofthe firm. Conversely, a general downward movement of the stock market will motivate investors to seek for better returns elsewhere. This decreases the demand for money,pushing interest rates down, causing further outflow of funds and hence depreciating thecurrency. While the theoretical explanation was clear, empirical evidence was mixed.

- **Aggarwal (1981)** found a significant positive correlation between the US dollar and US stock prices while Soenen and Hennigan (1988) reported a significant negative relationship. Soenen and Aggarwal (1989) found mixed results among industrial countries. Ma and Kao (1990) attributed the differences in results to the nature of the countries i.e. whether the countries were export or import dominant. Morley and Pentecost (2000), in their study on G-7 countries, argue that the reason for the lack of strong relationship between exchange rates and stock prices may be due to the exchange controls that were in effect in the 1980s.
- **Bahmani-Oskooee and Sohrabian (1992)** were among the first to use cointegrationand Granger causality to explain the direction of movement between exchange rates andstock prices. Since then various other papers analyzing these aspects and using this technique have appeared covering both industrial and developing countries (for example,Granger et.al. [2000]; Ajayi et.al. [1998]; Ibrahim [2000]). The direction of causality,similar to earlier correlation studies, appears mixed. For Hong Kong, Mok (1993) foundthat the relationship between stock returns and exchange rates are bidirectional in nature.For the United States, Bahmani-Oskooee and Sohrabian (1992) point out that there is a two-way relationship between the U.S. stock market and the exchange rates
- **Abdalla and Murinde (1997**) found out that the results for India, Korea and Pakistan suggest that exchange rates *Granger cause* stock prices, which is consistent with earlier study by Aggarwal (1981). But, for the Philippines, Abdalla and Murinde found out that the stock prices lead the exchange rates. This is consistent with Smith's (1992) finding that stock returns have a significant influence on exchange rate in Germany, Japan and the United States. For the Indian Economy, work in this area has not progressed much.

- **Abhay Pethe and Ajit Karnik (2000)** has investigated the inter – relationships between stock prices and important macroeconomic variables, viz., exchange rate of rupee vis - a -vis the dollar, prime lending rate, narrow money supply, and index of industrial production. The analysis and discussion are situated in the context of macroeconomic changes, especially in the financial sector, that have been taking place in India since the early 1990s. There are some other related studies though not specifically focused to this aspect the connections between oil price and stock returns has come to the forefront of public attention and this probably because of the fact that Crude oil prices have been showing an exceptional volatility which has led to an increase in uncertainty of the energy sector, the whole economy as well as the financial markets . The problems caused there to be a concern with a re-examination of what exactly can be the explication of the negative connection between oil prices and the stock returns. Previous studies in this subject document that oil price increases and volatility lead to rising inflation and unemployment and therefore depress macroeconomic growth and financial assets (Shimon and Raphael, 2006).

  The oil price changes have attached a great deal of attention of both financial practitioners andmarket participants because of two reasons. Firstly, they affect substantially decisions made by producers and consumers in strategic planning and project appraisals. Secondly they determine investors' decision in oil-related activities, portfolio allocations as well as risk management. Because of these influences the ability to accurately forecast the oil price changes is of high importance for decision making in the financial area

- **Reboredo and Rivera-Castro (2013)** examine the connection between oil price and stock market returns using daily data that consists of the aggregate S&P 500 and Dow Jones Stoxx Europe 600 indexes and US and European industrial sectors (automobile and parts, banks,chemical, oil and gas, industrial goods, utilities, telecommunications, and technologies) over the period from 01 June 2000 to 29 July 2011. Based on wavelet multi-resolution analysis they found that oil price changes have no much effect on stock market returns in the pre-crisis period at either the aggregate as well as the sectoral level. With the onset of the financial crisis, their findings support the positive interdependence between oil price shocks and the stock returns at

both the aggregate and the sectoral level.The analysis of the relationship between oil price risk and stock returns have been also the subject of the study of **El-Sharif et al. (2005)** for a sample composed of the UK-listed oil and gas firms. They find that changes in crude prices, the stock market condition as well as the exchange rate as risk factors exert significant impacts on oil and gas stock returns.

- **Aloui and Jammazi (2009)** developed a two regime Markov-switching EGARCH model to the interdependence between crude oil shocks and stock returns. Using data for France, UK and Japan over the period spanning January 1987 to December 2007, findings show that net oil prices play a pivotal role in determining firstly the volatility of real returns and secondly the probability of transition across regimes.
- **Barazande (1997)** examined the impact of mentioned macroeconomic variables on stock prices index. The results showed that the mentioned variables have small participation in the stock price index changes. This result indicates that disruption and volatility of the currency and vehicles markets is not strongly applicable to the stock market. Delavi and colleagues (2008) examined the long-term relationship between oil prices and economic growth with quarterly data in the period 1989 to 2007 in Iran. The results show that in Ira as an exporter of oil, oil shocks effect asymmetrically the economic growth. This means that GDP does not increase significantly by Increasing of oil price.
- **Abrishami and Rahimi (2004)** studied the short-term and long-term factors that determine the actual rate of exchange at three commodities framework. They concluded that in long-term, there was a relationship between imports real exchange rate, the terms of trade, the share of investment, central bank reserves, the degree of openness of the economy, and consumption spending of government
- **Abbasian and Moradpour (2008)** investigated the effect of exchange rate, trade balance, inflation rate, currency, and interest rates on the Tehran Stock Exchange general index using quarterly data for the years 1998 to 2005. In this study, the cointegration method, error correction model, impulse response functions, and variance analysis were used. The results showed a positive impact of exchange rate and trade balance in the long term on stock

exchange and negative impact of inflation rate, liquidity, and interest rate on the stock exchange. Based on the error correction model estimation, 12 percent of imbalance is adjusted in each period.

- **Roll and Ross (1986)** investigated the relationship between some macroeconomic variables and stock market behavior in New York Stock Exchange for the period 1958-1984. In this study, from the perspective of rational expectations and efficient markets theory, the impact of systematic risk on stock market index has been investigated. The results showed that real per capita consumption and oil prices index have not significant impact on stock price indices. Also, inflation in the short term has a negative relationship with stock price and in the long term, it has positive relationship with stock price.
- **Mukherjee and Naka (1995)** examined the dynamic relationship between macroeconomic variables (official exchange rate, money supply, inflation rate, industrial production, long-term government bond rate, and the rate of deposits) and the Japanese stock market price index. This study was estimated using a vector error correction model (VECM) in a system of seven equations for the period 1971-1991. Based on the results, this assumption was confirmed that there is a long-term equilibrium relationship between stock prices and macroeconomic variables.
- **Muradoglu and Matin (1996)** assessed the long-term relationship between stock price index of the Istanbul Stock Exchange and variables including interest rate, exchange rate, inflation rate, and money supply for the period 1986-1993 using the Engle–Granger and Johansen– Juselius approaches. Based on research results, the long-term relationship between these variables over the studied period is verified. The direction of long-run relationship between stock price index and money volume index is positive and among the stock prices index, exchange rates, interest rates, and inflation rates is negative.
- **Syed A. Basher and Perry Sadorsky (2006),** a rise in oil prices will act as inflation tax, which will (1) lead consumers to look for alternative energy sources and (2) increase risk and uncertainty which adversely affect stock prices and reduce wealth. Using an international multi-factor model that allows for both conditional and unconditional risk factors, the authors find

strong evidence that oil price risk impacts stock price returns in emerging markets

- **Isaac J. Miller and Ronald A. Ratti (2009)** examine the long-run relationship between the world price of crude oil and international stock markets over the period January 1971 to March 2008. They find a clear long-run relationship between oil price and real stock prices for six OECD countries. Intuitively, this means that stock market prices increase as the oil price decreases or decrease as the oil price increases, over the long-run. \
- **El I. Sharif et al. (2005)** investigate the relationship between the price of crude oil and equity values in the oil and gas sector using data from the United Kingdom, the largest oil producer in the European Union. Their evidence indicates that the relationship is always positive, often highly significant and reflects the direct impact of volatility in the price of crude oil on share values within the sector.
- **Dhaoui and Khraief (2014**) tested the effect of oil price shocks on stock market returns for 8 international developed countries (US, Switzerland, France, Canada, UK, Japan, Singapore, and Australia) stock market. They used monthly data for the period 1991:1 to 2009:9, and used exponential generalized autoregressive conditional heteroscedasticity (EGARCH) to examine study hypotheses. They found that oil price shocks had a negative significant impact on stock market returns for all selected countries except Singapore where there is no significant impact.

  Derivative contracts on indexes, in the US market, were a result of the transformation from delivery based to cash based settlement. Ever since the introduction of derivative contracts on indexes in the early eighties, there have been a number of studies that examined its impact on the spot prices. Most of these studies found that introduction of futures had led to a reduction in spot market volatility or have no discernible impact. Ever since the introduction of index futures in the Indian markets, there have been a lot of studies that have analysed the impact of futures trading on the volatility of spot prices. A few important studies are that of Tenmozhi (2002), Nath (2003), Shenbagaraman (2003) and Bandivadekar and Ghosh (2003). Tenmozhi (2002) analyses the volume of spot market volatility before and after the introduction of stock index futures and also studies the lead-lag

relation between the futures and the spot returns. Since, the data analysed is only for two years, the author assumes that heteroskedasticity is not important and hence she measures volatility by computing the standard deviation of daily returns. Further, in order to account for market pervasive factors that influence spot volatility, she uses the nifty junior index. The results of her study indicate a decrease in spot market volatility in the post futures period. The study attributes the fall in spot volatility to the increased trading in cash markets, due to faster dissemination of information. Finally, the study found that futures market tends to lead the spot market by one day and services as the primary market for price discovery.

Chapter –III

Research Methodology

Sources of data

The study is based on secondary data obtained from various appropriate data sources including BSE and NSE database, World crude oil council database etc. Besides, the facts, figures and findings advanced in similar earlier studies and the government publications are also used to supplement the secondary data.

To study the market movement to collect the secondary data from various sources. The present study have taken the last three year (2012-2014) NSE monthly wise closing data from the NSE. And the monthly wise crude oil closing data and the monthly wise crude oil price from the energy information administration year (2012-2014)and to taken the of GDP, inflation and remittances inflow in India data movement from RBI. And the past event the stock market and crude oil information has been taken from various news bulletins, magazines, journal, and websites.

Method

To study NSE as dependent variable and crude oil price as independent variable. To find out the relation between dependent variable and independent variable, to find the correlation between dependent variable and independent variable, regression analysis is used, by using these statistical tools it proves whether all the independent variable impact the dependent variable or not.

Research design

To measure daily data encompassing the closing indexes of both Bombay Stock Exchange (SENSEX) and National Stock Exchange (NIFTY) and the closing domestic crude oil price index using the sample period extents from January 1, 2012 to December 31, 2014;however, there are 1599 observations for Sensex & Nifty and 1692 for crude oil price.

Tools used for analysis

In the course of analysis in the present study,**descriptive statistics,** is used to find out the causal relationship between domestic crude oil price and NSE and crude oil price and BSE ,**correlation statistics**,is used to examine the relationship among macroeconomic variables and Indian stock market,**ADF and PP unit root test and Granger causality test** have been used to analyse the impact macroeconomic variables on Indian Stock market.The uses of all these tools at different places have been made in the light of requirement analysis.

Analysis and interpretation

Chapter-IV

Analysis and Interpretation

This chapter presents the analysis of the data and discuss the results for each objective set for the study.The results are collected based on the secondary data collected from stock price indices of BSE and NSE for the year 2012-2014.The collected data are analysed by using tabulated and appropriated statistical tools mentioned in this study.

The researcher has adopted the descriptive statistics to find out the Mean,standard deviation and coefficient of variance,which forms the base for further observation to analysis.Also to validate the findings and strength the discussion,the researcher has adopted statistical tool such as

a) Correlation statistics
b) Multiple Regression Test
c) Unit root test Result
d) Pairwise Granger Causality Test Results

The analysis and interpretation is dealt under the following headsbased on the framed objectives

- ✓ Analysis of crude oil price from 1st January 2012 to 31st December 2014 collected on daily basis
- ✓ Causal Relationship between domestic crude oil price and NSE and crude oil price and BSE
- ✓ Relationship between macroeconomic variables and Indian stock market
- ✓ Impact of macroeconomic variables on Indian stock market

Table 1, Table 2 and Table 3 depicts the analysis of crude oil price with stock price indices BSE and NSE for three financial years(2012-2014).The tabulation predicts the data on daily basis which is aggregated to monthly basis from January to December.The data contains 1692 observations for crude oil price and 1599 observations for BSE and NSE.

Analysis of crude oil price

Table-1

Month	2012(‘00,000)	2013(‘00,000)	2014(‘00,000)
January	5,685.73	6,133.59	6,683.88
February	5,884.89	6,258.96	6,777.17
March	6,286.85	5,941.33	6,548.46
April	6,246.96	5,594.17	6,508.72
May	6,005.33	5,670.09	6,680.05
June	5,355.91	6,014.26	6,425.62
July	5,727.00	6,439.44	6,206.44
August	6,297.12	7,013.65	5,926.41
September	6,185.85	7,108.99	6,206.44
October	5,929.75	6,747.38	6,508.72
November	6,003.32	6,777.54	5,353.84
December	5,988.13	6,853.31	5672.44
Total	71,596.84	76,552.71	75,498.19

Source: Secondary data

Table 1 reveals the analysis of crude oil price for the year 2012-2014.It is viewed that the aggregate value of the crude oil price for the year 2012 is much lower compared to the next two financial years.whereas the aggregate value of the crude oil price for the year 2013 has shown greater increase in prices and crude oil price for the year 2014 has shown similar changes in prices.Graphical representation of the crude oil price is given below.

Analysis of crude oil price for three Financial years

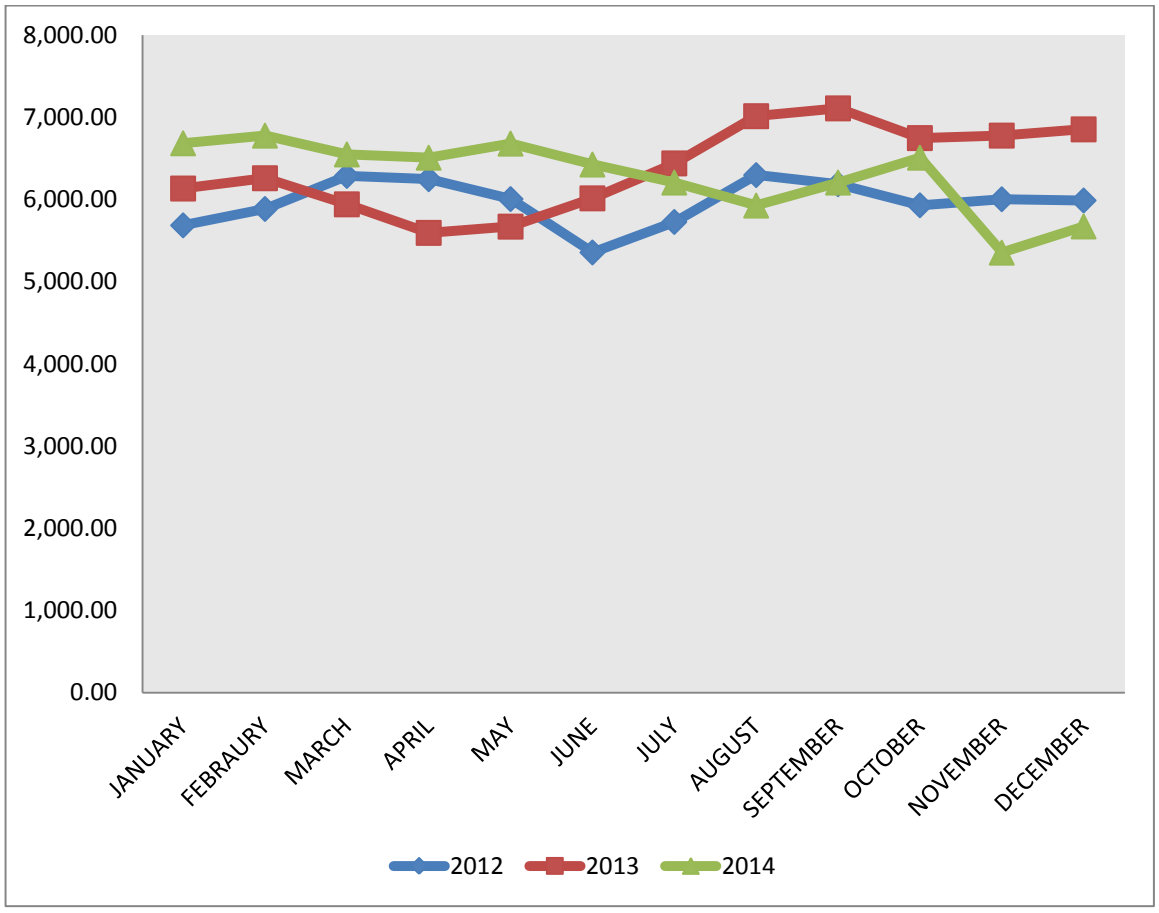

Figure-1

Analysis of crude oil price with BSE

Table-2

Month	2012(‘00,000)	2013(‘00,000)	2014(‘00,000)
January	5,685.73	6,683.88	6,014.26
February	5,884.89	6,777.17	6,439.44
March	6,286.85	6,548.46	7,013.65
April	6,246.96	6,508.72	7,108.99
May	6,005.33	6,680.05	6,747.38
June	5,355.91	6,425.62	6,777.54
July	5,727.00	6,206.44	6,853.31
August	6,297.12	5,926.41	6,133.59
September	6,185.85	6,206.44	6,258.96
October	5,929.75	6,508.72	5,941.33
November	6,003.32	5,353.84	5,594.17
December	5,988.13	5,672.44	5,670.09
Total	71,322.68	75,525.61	74,980.91

Source: Secondary data

Table 2 reveals the analysis of crude oil price in comparison with stock price indices BSE for the year 2012-2014.It is viewed that the aggregate value of the crude oil price with BSE for the year 2012 is much lower compared to the next two financial years.whereas the aggregate value of the crude oil price with BSE for the year 2013 has shown increase in prices and crude oil prices with BSE for the year 2014 has shown similarchanges in prices.Graphical representations of the crude oil prices withBSEare given below.

Analysis of crude oil price with BSE for three Financial years

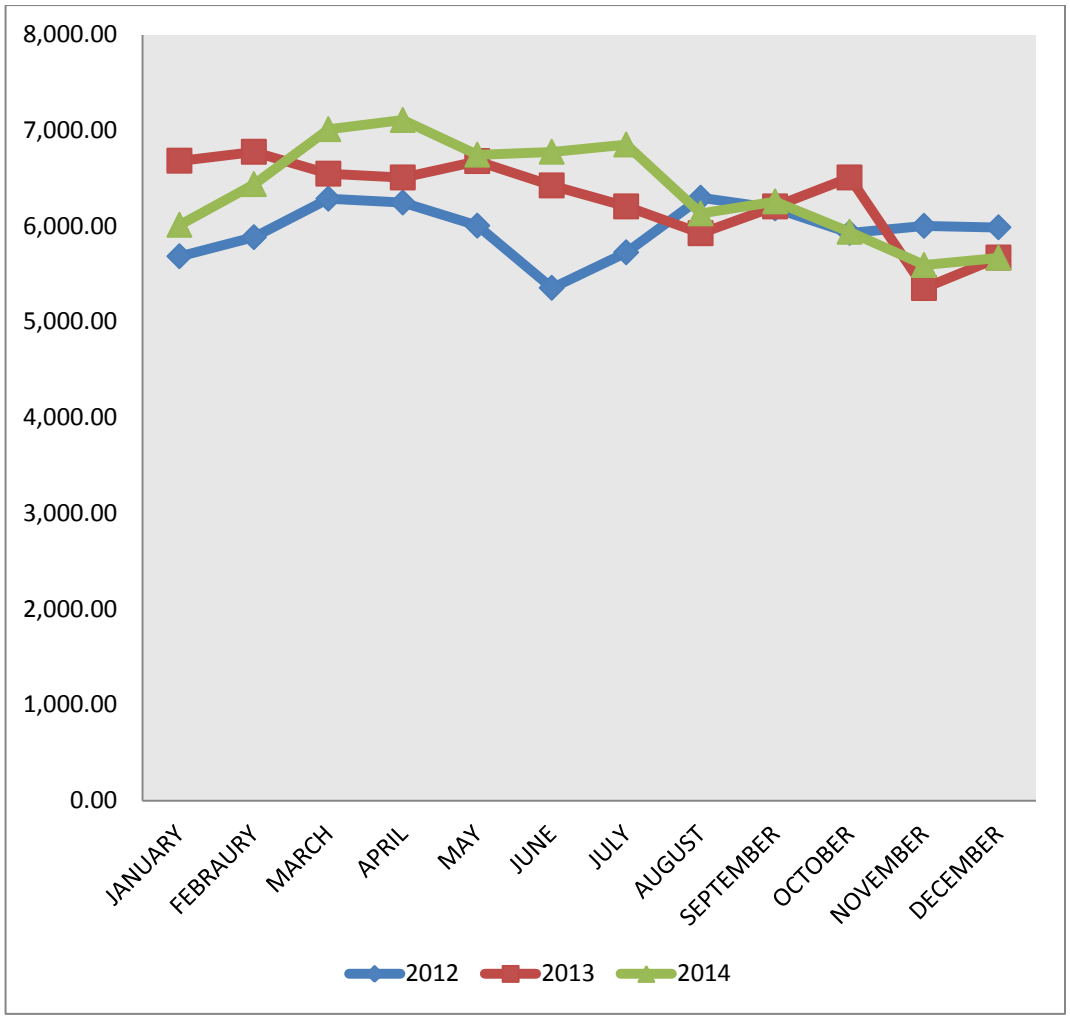

Figure-2

Analysis of crude oil price with NSE

Table-3

Month	2012(‘00,000)	2013(‘00,000)	2014(‘00,000)
January	5,727.00	6,206.44	6,133.59
February	6,297.12	5,926.41	6,258.96
March	6,185.85	6,206.44	5,941.33
April	5,929.75	6,508.72	5,594.17
May	6,003.32	5,353.84	5,670.09
June	5,988.13	5672.44	6,014.26
July	5,685.73	6,683.88	6,439.44
August	5,884.89	6,777.17	7,013.65
September	6,286.85	6,548.46	7,108.99
October	6,246.96	6,508.72	6,747.38
November	6,005.33	6,680.05	6,777.54
December	5,355.91	6,425.62	6,853.31
Total	71,311.12	75,121.34	74,960.91

Source: Secondary data

Table 3 reveals the analysis of crude oil price in comparison with stock price indices NSE for the year 2012-2014.It is viewed that the aggregate value of the crude oil price with NSE for the year 2012 is lower compared to the next two financial years.whereas the aggregate value of the crude oil price with NSE for the year 2013 has shown increase in prices and crude oil prices with NSE for the year 2014 has shown similar changes in prices.Graphical representations of the crude oil prices with NSEare given below.

Analysis of crude oil price with NSE for three Financial years

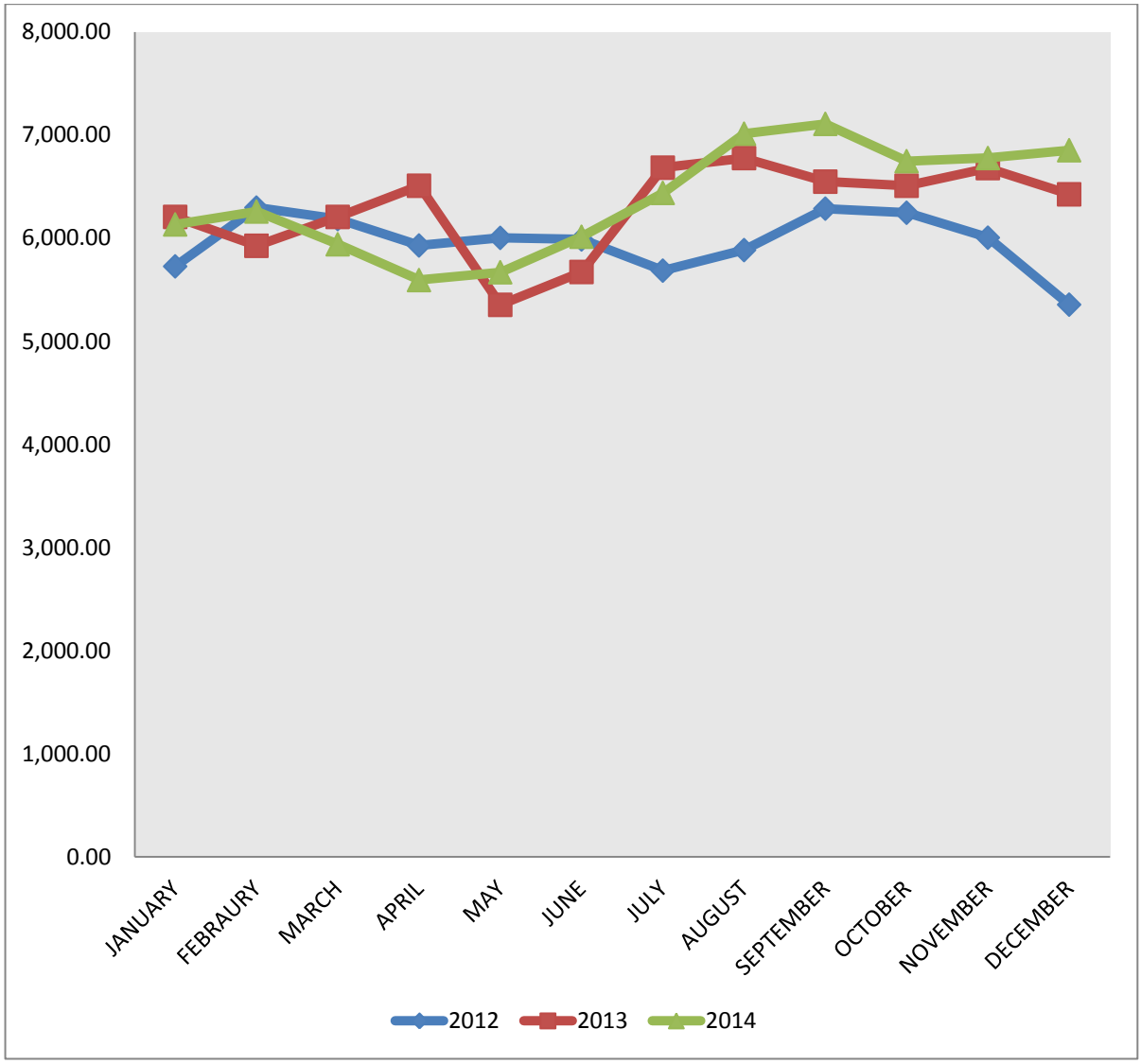

Figure-3

Causal relationship between domestic crude oil price and BSE and crude oil price and NSE

A summary of the descriptive statistics of the dependent variables of crude oil price for a period of three years 2014-2014 is explained below.This table includes Mean,Standard deviation number of observation.co-efficient of variation for the selected independent variablesTable-4

Descriptive Statistics	Crude oil price	NSE	BSE
Mean	2.641893	2.232459	2.594497
Median	2.547783	2.151577	2.509725
Maximum	3.113472	2.625083	2.985754
Minimum	2.330514	1.717291	2.058861
Standard deviation	0.193934	0.218497	0.220572
Skewness	0.278746	0.100025	0.099151
Kurtosis	0.8199402	0.596548	0.595476
Observation	1692	1599	1599

Source: Secondary data

Table 4 reveals that descriptive statistics contain the portrait of Mean,Median,Standard deviation,Kurtosis,Skewness with daily stock price(BSE and NSE)indices of two stock exchanges and daily crude oil price are exposed to Table 4.It is viewed that Mean and Standard deviation of the particular series have highest mean.positive skewness and kurtosis designates that all the selected series are less paked than normal distribution.Graphical representation of descriptive statistics are given below.

Figure 4

Series: **Crude oil price** Sample 1 1692 Observation 1692	
Mean	2.641893
Median	2.547783
Maximum	3.113472
Minimum	2.330514
Standard deviation	0.193934
Skewness	0.278746
Kurtosis	0.8199402

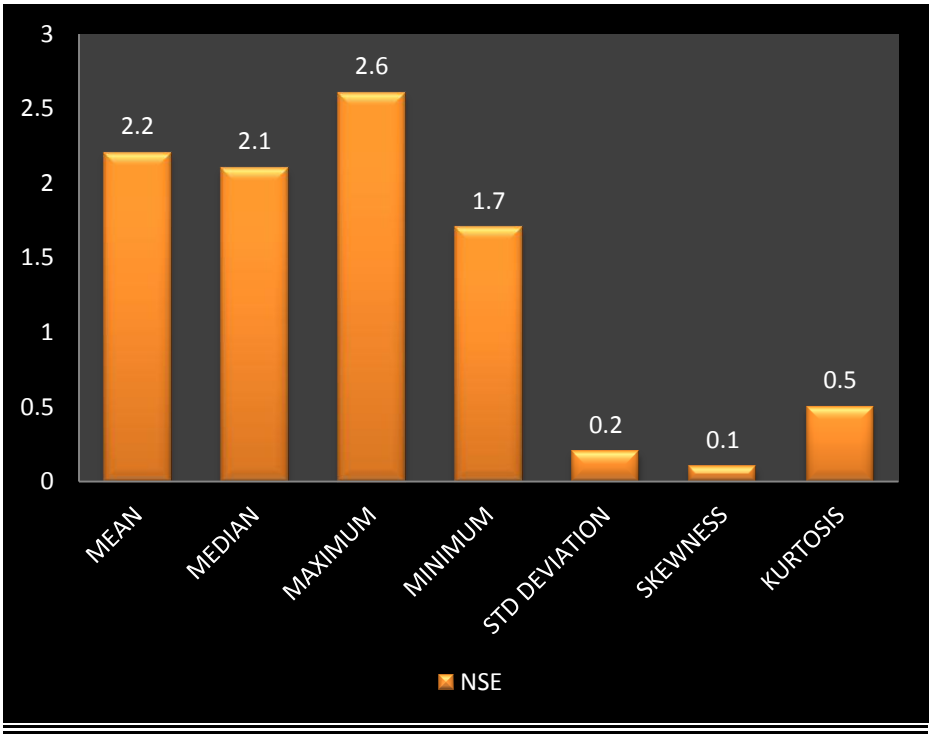

Figure 5

Series:**NSE** Sample 1 1692 Observation 1599	
Mean	2.232459
Median	2.151577
Maximum	2.625083
Minimum	1.717291
Standard deviation	0.218497
Skewness	0.100025
Kurtosis	0.596548

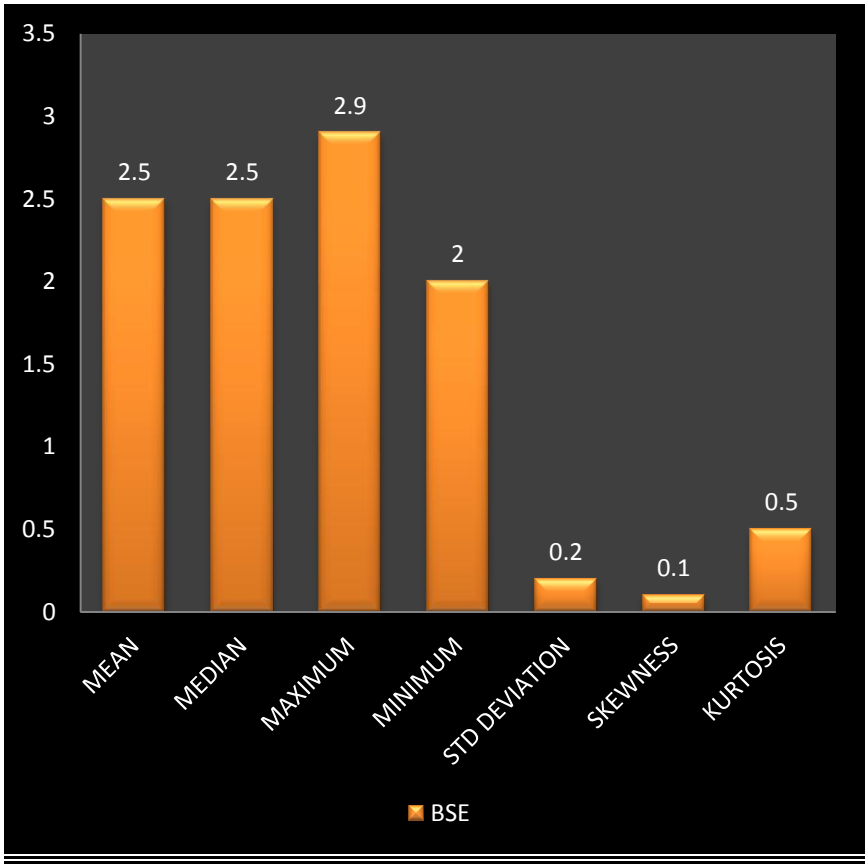

Figure 6

Series:**BSE** Sample 1 1692 Observation 1599	
Mean	2.594497
Median	2.509725
Maximum	2.985754
Minimum	2.058861
Standard deviation	0.220572
Skewness	0.099151
Kurtosis	0.595476

Crude oil price.NSE.BSE

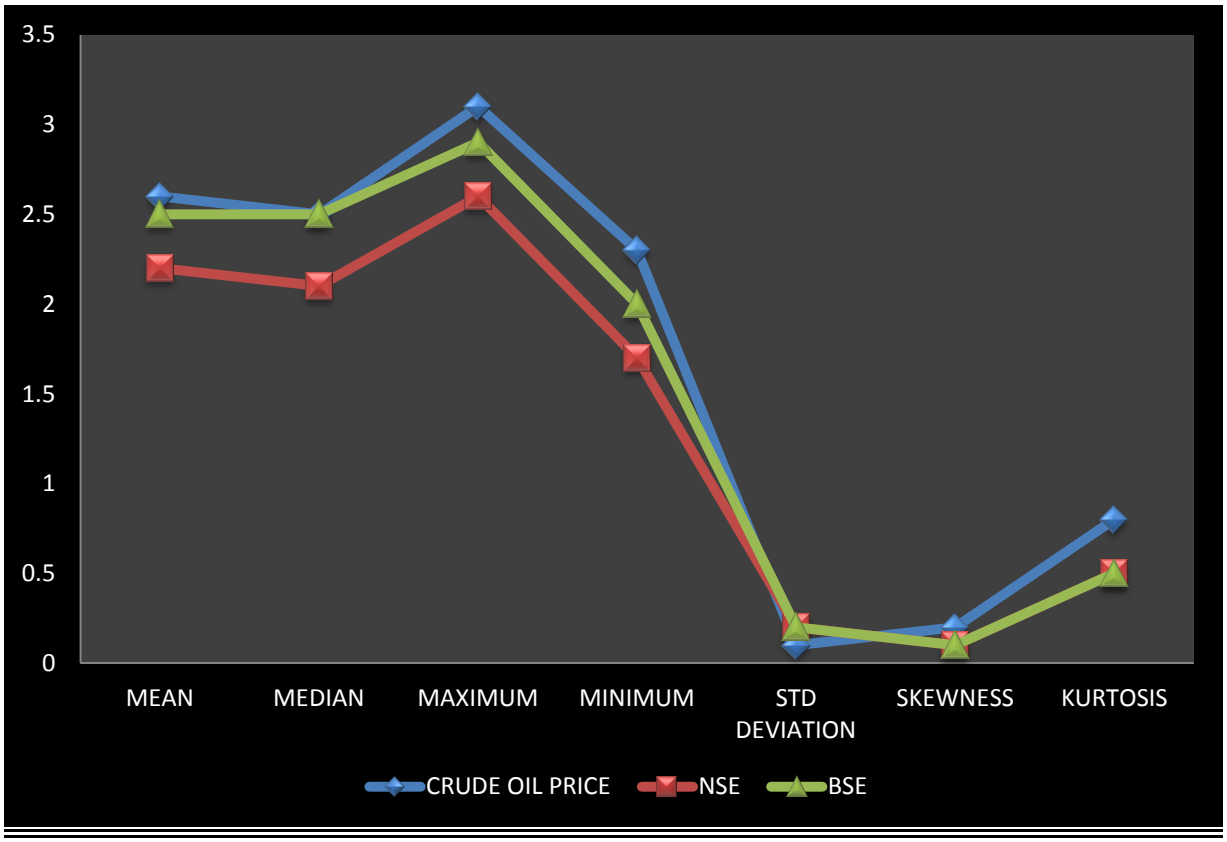

Figure 7

Impact of macroeconomic variables on Indian stock market

The correlation is the study of finding the relationship between the variable.If there are only two variables in the study of correlation then it is called simple correlation otherwise the study is either partial for multiple correlation in tnis study the interrelationship ids studied using the karl pearson's co-efficient of correlation. The result is presented in the form of correlation matrix for the stock price indices with suitable interpretation.

	Crude oil price	NSE	BSE
Crude oil price	1.000000		
NSE	0.932312	1.000000	
BSE	0.928865	0.992889	1.000000

Source: Secondary data

Correlation statistics in table 5 point out that BSE and NSE are positively correlated with crude oil prices.As it is sturdy it does not talk about the grounds and shock.Inorder to make out an unequivocal delineation of the shock,it is obligatory to execute Multiple regression test between the selected variables.

Multiple regression test

Table -6

Dependent variable: Crude oil price

Sample:1692 Method:Least squares

Variable	coefficient	Std Error	t-statistic	VIF
NSE	0.152046	0.0090102	5.062533	17.851
BSE	0.047706	0.0089253	1.6034997	17.851

Source: Secondary data

Table 6 gives an idea about Multiple regression test results.Multiple regression test has been assessed with non-stationary data and residuals,at that moment the regression result turns into forged.since VIF value substantiates that there is an existence of serial correlation or multi-collinearity between the independent variables.At the same time,Durbin-watson statistics authenticates that the residuals are independent.

Impact of macro economic variables on stock market

Unit root test ca be used to determine if trending data should be first differenced or regressed on deterministic functions of time to render the data stationary unit root tests can be used to determine which pairs of assests appear to exhibit mean-reverting behaviour

Phillips and Perron(1988)developed a number of unit root tests that have become popular in the analysis of financial time series.The Phillips and Perron(pp)unit root test differ from the ADF tests mainly in how they deal with serial correlation,the pp test ignore any serial correlation in the test regression

The deficiency of Granger causality by estimating the VAR model. Granger causality is between the two variables, null hypothesis is rejected if alpha is more than probability value(0.05)

Unit Root test results

Table -7

ADF		
	at level	at 1st difference
Crude oil price	0.784469	-77.16061
NSE	-1.6699151	-50.62846
BSE	-1.8443263	-65.98076
Critical values		
1%	-3.431425	-3.431330
5%	-2.861900	-2.861858
10%	-2.567004	-2.566982
PP		
	at level	at 1st difference
Crude oil price	0.830414	-77.14896
NSE	-1.702241	-65.42885
BSE	-1.810382	-65.95544

Source: Secondary data

Table 7 illustrates the results of unit root test.It divulges that time series are not stationary at levels.Neverthless,table illustrates that the crude oil price and BSE and NSE stock price indices are stationary at 1st difference. Augmented Dickey Fuller unit root analysis test discloses that errors have constant variance and are statistically independent.At the same time Phillip-Perron unit root test is used to ensure the stationary of the data series.This test tolerates the error variance to be heterogeneously distributed and less dependent.It proves that the selected series are stationary at 1st difference .Therefore,Granger causal test can be applied on these variables.

Pairwise Granger causality Test results

Table-8

Null Hypothesis	Obs	F-stastistic	prob	Decision	Type of causality
Nifty▲Crude oil price	1597	0.67598	0.5087	DNR Ho	**No causality**
Crude oil price ▲ Nifty		3.87787	0.0208	Reject Ho	**Bi-directional causality**
Sensex▲ Crude oil price	1597	4.14253	0.0159	Reject Ho	**Bi-directional causality**
Crude oil price ▲ Sensex		2.30010	0.1004	DNR Ho	**No causality**
Sensex ▲Nifty	1597	123.853	3.E-53	Reject Ho	**Bi-directional causality**
Nifty ▲ Sensex		1.61115	0.1998	DNR Ho	**No causality**

Note: Decision rule Ho if P-value<0.05,DNR=Do not reject;▲=does not Granger cause

Table 8 exposes that no causality and bi-directional causality subsists between crude oil price and stock price indices under the study.No causality exists between i)Nifty and crude oil price,ii)crude oil price and sensex iii)Nifty and sensex.Bi-directional causality exists between i)crude oil price and Nifty ii)sensex and crude oil price and iii)sensex and Nifty.It is crucial that the outcome of causality between the particular indicators does not mean that moment in one indicator essentially causes movements in another indicator.To a great coverage,causality essentially leads to the movements of the time series.

Summary and conclusion

Chapter-V

Summary and conclusion

The study examines the impact of domestic crude oil price on stock price indices in India. The principal finale of the empirical results is that the preferred time series demonstrate non-stationary and that's why afford signal of Granger causality test.

- Descriptive statistics illustrate that all the particular series are more peaked than normal distribution.
- Correlation statistics indicates that BSE and NSE are positively associated with domestic crude oil prices in the period of study. Multiple regression test results are spurious and there is an existence of serial correlation as well as multicollinearity.
- Unit root test result reveals that the crude oil price and BSE and NSE stock price indices arestationary at 1st difference [1(1)].
- Granger causality test illustrates that no causality and bi-directional causality subsists between crude oil price and stock price indices under the study. No causality exists between (i) Nifty and crude oil price, (ii) crude oil price andSensex and (iii) Nifty and Sensex. Bidirectional causality exists in(Olushina Olawale Awe, 2012).

Conclusion

The assessment of the impact of crude oil price on Indian stock price indices utilized in this study is based on the financial market indicators. There is a need to widen this definition including macro and other market indicators(such as Gold price, exchange rate, interest rate,inflation) relevant to the impact to facilitate reach our destination at more robust empirical analysis. This could be a possible area for future research in India (Mishraand Mohan, 2012).

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