

An Empirical Study on Impact of Crude Oil Price on The Movement of Indian Stock Market – with Special Reference to BSE500 AND NSE500

¹Dr.K.Natarajan, ² Ms.Ulchi Venkata Sumalatha

^{1,2} Assistant Professor – Department of Commerce- St.Peter's Institute of Higher Education and Research

¹ thillaiknatarajan@gmail.com, ²venkatasumalathau@gmail.com

Article Info

Volume 83

Page Number: 8406 - 8412

Publication Issue:

March - April 2020

Abstract

The gift examination has been embraced to analyse the impact of Crude Oil price on the development of Indian economic alternate. At this cause Crude Oil price and lists of BSE500 and NSE500 are taken as elements. Information for the above factors are accumulated for a time of 14 years from 2004 to 2018 on consistent time table with absolute range of perceptions of 3740. The exam utilized enlightening insights, connection, relapse investigation, ADF unit root take a look at, Johansen co-coordination test and Granger causality test for studies. The examination positioned that Crude Oil value and the improvement of Indian economic change have essential excessive satisfactory courting and huge and low splendid impact on improvement of Indian securities trade, because severa variables are responsible for the development of economic trade, Crude Oil cost is one in each of them. Raw petroleum value, BSE500 and NSE500 had unit root during the exam time frame. The exam did not find out any co-turning into a member of connection amongst Crude Oil cost and Indian securities change at some stage in the research time frame. It is moreover verify that Crude Oil price did now not have granger purpose on Indian monetary alternate as a long way as BSE 500 and NSE 500 and Indian securities alternate likewise did no longer have granger motive on Crude Oil price at some point of the examination time body. It is reasoned that modifications in Crude Oil price have noteworthy effect on advertise development in India, but that effect isn't striking.

Keywords; Return, co-combo, unit-root, stationery, securities change.

Article History

Article Received: 24 July 2019

Revised: 12 September 2019

Accepted: 15 February 2020

Publication: 09 April 2020

I. INTRODUCTION

Securities trade is one of the pinnacle desired challenge roads for financial specialists, since it gives reasonable quantifiable profits in value market it. Essential nature of offer marketplace is exchange; financial specialists bring in coins thru vacillation in securities change. Market development may be comprehended with the assistance of document framework. Bombay Stock Exchange (BSE) and National Stock Exchange (NSE) are the precept inventory trades in India with the part of ninety nine.5 percentage of absolute offer trade together inside the country. Sensex of BSE and Nifty of NSE are the mainstream facts and they comprise 30 and

50 businesses one by one. These stock trades hold up expansive based totally files moreover, among them BSE500 and NSE500 are widely recognized and wide primarily based lists with remembering top 500 groups for terms their market capitalisation. Financial exchange is being modified by means of way of exceptional function of numerous reasons. Among one in all a kind motives, whole scale financial factors are assuming a large system in influencing the marketplace development. By and large national complete scale monetary components are influencing the development of securities change, for example, GDP development rate, expansion price, reduce rate charge list, and many

others. After globalization worldwide monetary components are moreover influencing the development of monetary trade, as an instance, Crude Oil fee, silver fee, FII hypothesis, and so on. Among them Crude Oil price is one of the key normal complete scale financial elements that is influencing the improvement of Indian securities exchange. Financial specialists like to region property into cost showcase whilst the market is pick out, else they glide for ware promote it for reasonable income. In ware market it Crude Oil is maximum loved ware by speculators by means of unique function of continuous variance in its price. As an different task avenue for cost display off, it's miles taken into consideration as that Crude Oil price vacillations influence the improvement of Indian monetary exchange. The scientists have contemplated the impact of Crude Oil fee at the development of Indian securities change.

II. SURVEY OF LITERATURE

Balwinder Singh and Kriti Chitkara (2016) surveyed the impact of Crude Oil fee and uncooked petroleum on financial exchange unpredictability in India during 7 years from May 2005 to March 2011 depending on yearly information. The very last results demonstrated that there has been impact of Crude Oil charge and unrefined petroleum rate on Indian stock marketplace. Amalendu Bhunia and Sanjib Pakira (2014) considered the impact of Crude Oil Price and Exchange costs on the development of SENSEX in the course of 23 years from 1991 to 2013 on every year premise. The studies determined that Crude Oil rate and swapping scale affected the improvement of SENSEX. Kumar Saurabh (2012) pondered the impact of Crude Oil fee, WPI, CPI, IIP and FII task on Indian securities exchange inside the course of nine years from 2004 to 2012. The investigation found that Crude Oil rate, unrefined petroleum charge, and FII had noteworthy impact at the earnings of the Indian economic change. Banumathy K and Azhagaiah R (2014) investigated causal connection among stock price and Crude Oil value in India utilizing Granger causality test at

some stage in ten years from 2004 to 2013. The research located causal connection among inventory price and Crude Oil rate in Indian securities trade. Mukhopadhyaya (2011) in his exam confirm that American Stock exchange, Crude oil fee, FII and Crude Oil cost didn't effect Indian securities change instability. Sujit and Rajesh Kumar (2011) examined factors relationship among Crude Oil charge, oil rate, swapping scale and securities exchange returns for the length from January 2003 to September 2008. They determined that Crude Oil price, oil charge and conversion trendy had direct impact on sell it returns. Srinivasan (2014) in his research located that Crude Oil fee and swapping scale did not have sway on the development of Indian financial alternate.

III. PROCLAMATION OF THE PROBLEM

Unrefined petroleum is one in every of the goods, this is exchanged all round. By and big monetary professionals need to place resources into numerous assignment roads. They don't located sources into a particular form of speculation constantly, they try to have useful portfolio .A economic specialist could not favor to positioned assets into fee alone in constantly. In the occasion that the charge market it isn't always fine, the economic expert appears for alternative hypothesis roads to be particular wares show off, responsibility, distinctive form of protections, and so forth. In ware display off, severa gadgets are exchanged, of which Crude Oil is assuming pressing activity, thinking about the reality that visit exchange is to be had in Crude Oil value. Along those lines, Investors like to place property into Crude Oil for making affordable go back, every now and then amazing yield. As a international and maximum exchanged product the arena, the rate of Crude Oil in the market can also impact the development of economic exchanges. Subsequently the expert has taken Crude Oil fee as an self reliant variable to bear in mind the impact on the improvement of Indian financial change.

Destinations

The exam has been attempted with the accompanying locations.

- To have a take a look at the connection between and impact of Crude Oil price and development of Indian securities change.
- To evaluate the co-becoming a member of connection amongst Crude Oil fee and Indian securities exchange and
- To look at causal connection among Crude Oil value and Indian securities change.

Procedure

The gift examination manages studying the impact of Crude Oil charge on the development of Indian securities trade. For this cause international Crude Oil price has been taken as free element and Indian securities change regarding expansive based totally totally lists BSE500 of Bombay Stock Exchange (BSE) and NSE500 of National Stock Exchange (NSE) had been taken as needy elements. Raw petroleum charge and records facts have been collected for the for a time of 14 years on ordinary recurring from 1.1.2004 to 31.12.2018. It comes 3740 perceptions for every record and Crude Oil fee. The information of BSE500 modified into collected from legitimate web site of BSE (www.Bseindia.Com) and the statistics of NSE500 was amassed from right net web page of NSE (www.Nseindia.Com). The information of Crude Oil price changed into collected from the budgetary web page of www.In.Investment.Com. The examination has utilized spellbinding measurements, Kurtosis and Skewness test to test the country of conveyance and Jarque-Bera test grow to be carried out to check whether or not the records were often circulated. To check unit basis of chose non mainstream gamers and Crude Oil rate, Augmented Dickey Fuller (ADF) Unit root test come to be executed. This take a look at emerge as made whether the time affiliation records are desk certain or now not. By and massive this check is made earlier than making the studies of co-incorporation test, because the test

may be made on non-desk sure time association information. The specialists have moreover applied Johansen co-aggregate test inside the wake of keeping that the taken into consideration lists had unit root (non-table certain) via utilising ADF unit root take a look at. The test is made to check out co-ordination connection among Indian economic change and Crude Oil fee. It likewise investigates the on account that a long time in the past run stability dating many of the time affiliation elements. On the off danger that factors are co-included, it implies they couldn't glide separated over a few undefined time frame on a everyday. This test gives the results whether factors co-coordinate or now not, so the exam has likewise applied Granger setback test to observe causal connection among double move arrangement information. Right now take a look at has been completed to understand causal connection amongst Indian securities change and Crude Oil fee. This check gives result of which variable causes each different the alternative manner round.

The correlation model used for the study is,

$$r = \frac{1}{N} \sum \left[\frac{(x_i - \bar{x})}{SD_x} \cdot \frac{(y_i - \bar{y})}{SD_y} \right] \dots\dots\dots (1)$$

Where, N indicates number of observations, x indicates return on Crude Oil price and y indicates return on Indian stock market (BSE500/NSE500).The regression model used for analysing the impact of Crude Oil price on the movement of Indian stock market is

$$IM_i = \alpha + \beta GP_i + \epsilon_t \dots\dots\dots (2)$$

Where, IM indicates Indian stock market, α represents intercept, GP represents return on Crude Oil price and ϵ indicates error term.

For the purposes of correlation and regression analysis, return on Indian stock market indices are calculated as follows.

$$MR_c = \frac{IM_{ct} - IM_{ct-1}}{IM_{ct}} \times 100 \quad \dots\dots\dots(3)$$

Where, MR indicates market return, IM indicates Indian stock market, c indicates index (BSE500/NSE500), t represents current year and t-1 represents previous year.

Return on Crude Oil price was calculated as follows,

$$GPR_c = \frac{GP_t - GP_{t-1}}{GP_t} \times 100 \quad \dots\dots\dots(4)$$

Where, GPR indicates return on Crude Oil price, GP indicates Crude Oil price, t represents current year and t-1 represents previous year.

The model used to calculate ADF Unit root test is presented below (Gujarati, 2003).

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta y_{t-1} + \sum_{i=1}^m a_i \Delta y_{t-i} + \varepsilon_t \quad \dots\dots\dots (5)$$

Where ε_t is error term, Y_t is a random walk with drift around a stock trend, 't' is current day, 't-1' is previous day, 'm' is the lag order of the first difference autoregressive process, β is the coefficient on a time trend, The model used to calculate Johansen co-integration test between Indian stock market and Crude Oil price is as follows.

$$\lambda \text{ trace } (r) = -T \sum_{i=r+1}^n \log(1 - \lambda_i) \quad \dots\dots\dots (6)$$

$$\lambda \text{ trace } (r) = -T \log(1 - \lambda_{r+1}) \quad \dots\dots\dots (7)$$

r = number of separate series

T = number of usable observations

λ = estimated Eigen values

The models used to calculate Granger causality test is presented below.

$$IM_t = \sum_{i=1}^n a_i GP_{t-i} + \sum_{j=1}^n \beta_j IM_{t-j} + u_{1t} \quad \dots\dots\dots (8)$$

$$GP_t = \sum_{i=1}^n \lambda_i GP_{t-i} + \sum_{j=1}^n \delta_j IM_{t-j} + u_{2t} \quad \dots\dots\dots (9)$$

Where, IM is Indian market, GP is Crude Oil Price, u_{1t} and u_{2t} are error term and assumed that they are uncorrelated, 'n' is the maximum number of lagged observations and λ are the parameters to be estimated.

IV. RESULTS AND DISCUSSION

Table 1 presents descriptive statistics of indices BSE 500, NSE 500 and Crude Oil price for the study period of 14 years from 2004 to 2018. It gives mean, median, maximum and minimum values, standard deviation, skewness, kurtosis, Jarque-Bera test and its P value. In order to know normal distribution of data a null hypotheses that the selected indices and Crude Oil price are not normally distributed the hypothesis has been tested using Jarque-Bera test.

Table 1: Descriptive Statistics of Crude Oil Price and Indian Stock Market

	BSE500	NSE500	CRUDE OIL
Mean	5889.91	3712.44	67.03
Median	6386.89	3970.55	65.39
Maximum	12074.35	9436.95	145.31
Minimum	1002.93	671.55	18.02
Std. Dev.	3069.01	1919.75	26.87
Skewness	0.09	0.13	0.17
Kurtosis	2.08	2.14	2.08
Jarque-Bera	137.54	126.36	151.09
Probability	0.00	0.00	0.00
Observations	3740	3740	3740

Source: Computed from Secondary Data

Table 1 shows that advise estimation of the lists BSE 500 and NSE 500 remained at 5889.91 and 3712.44 one by one and the advocate estimation of Crude Oil cost is 67.03 US\$ consistent with ounce. Standard deviation of the selected documents and Crude Oil value display that there was slight degree of deviation inside the records and Crude Oil cost from their imply qualities. The files of BSE500, NSE 500 and Crude Oil price are broadly speakme appropriated at a few degree in the exam time frame, for the motive that determined estimations of Skewness are nearly zero. It is moreover seen that each the lists and Crude Oil are emphatically

slanted; consequently there are a bigger quantity of chances for powerful returns than terrible returns. The determined estimations of speculation of BSE 500, NSE 500 and Crude Oil cost are 2.08, 2.14 and 2.08 separately, they're underneath three, ultimately each the documents and Crude Oil fee are less topped than ordinary dispersion. The results of Jarque-Bera trial of BSE500, NSE500 and Crude Oil price remained at 137.54, 126.36 and 151.09 one at a time, they may be measurably essential at 1% level, thus the invalid concept is dismissed and therefore the statistics of BSE500, NSE500 and Crude Oil rate are often disseminated at a few level in the research time frame.

Connection Analysis

So as to understand connection between Crude Oil fee and Indian securities alternate, relationship examination has been made among Crude Oil price and marketplace intermediaries of BSE500, NSE500. Aside from connection examination relapse investigation additionally achieved and the consequences are added consequently.

Table 2: Correlation between Crude Oil Price and Indian Stock Market

Variables	BSE500	NSE500	Crude Oil Price
BSE500 pearson correlation Sig.2 tailed N	1	0.851 (0.000)	0.160 0.000 3739
NSE500 pearson correlation Sig.2 tailed N	0.851 (0.000)	1	0.146 0.000 3739
Crude Oil Price pearson correlation Sig.2 tailed N	0.076 (0.000)	0.071 (0.000)	1 3739
No. of Observations	3739		

Source: Computed from Secondary Data

Table 2 indicates that the connection among's BSE 500 and NSE 500 is high and awesome (0.851), it's miles likewise essential. It suggests that each the employer sectors BSE and NSE are transferring all the even as in the path of the research time frame. Connection among's Crude Oil and BSE 500 is

zero. One hundred sixty and between Crude Oil price and NSE 500 is zero.146, each the results are factually critical at 1 percent diploma. Subsequently Indian monetary exchange and Crude Oil price have important super courting, however the quantum of dating is tremendously low.

Relapse Analysis

Relapse examination has likewise been made between Crude Oil value and Indian securities alternate to recognise the quantum of effect of Crude Oil fee changes on the improvement of Indian economic alternate. For this purpose go back on BSE 500 and NSE 500 are determined for 3739 changing days and profit for Crude Oil charge is furthermore decided. Raw petroleum cost has been taken as self sufficient variable and market intermediaries of the files BSE500 and NSE500 are taken as reliant elements. Table 3 gives ANOVA outcomes and relapse consequences for Crude Oil charge and development of Indian securities trade as far as earnings for BSE500 and NSE500.

Table 3: Regression Analysis of Crude Oil Price and Indian Stock Market

BSE500						
Model		Unstandardize d Coefficients		Standardize d Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.07	0.02		3.00	0.00
	Crude Oil Price	0.09	0.01	0.16	9.93	0.00
	Adj. R ²	0.03				
NSE500						
Model		Unstandardize d Coefficients		Standardize d Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.07	0.03		2.59	0.01
	Crude Oil Price	0.10	0.01	0.15	9.05	0.00
	Adj. R ²	0.02				

ADF Unit Root Test

The above outcomes show the idea of relationship and quantum of effect of Crude Oil cost on financial exchange of India. In the perspective on examining profoundly, the scientist has applied Johansson co-reconciliation test to know whether Crude Oil cost and Indian financial exchange are moving together, this investigation is proper just when the time arrangement information are non-stationary, to test stationary of the factors. Expanded Unit Root test has been applied. The analyst has additionally applied Granger causality test to know ADF, which variable impact another are and the other way around. Table 4 gives the consequences of ADF Unit pull test at the factors Crude Oil cost, the files of BSE500 and NSE500. For this reason the accompanying invalid theory is confined.

Ho1: Crude Oil value, BSE500 and NSE500 are non-stationary.

Table 4: Unit Root Test

Variable	ADF Statistics	P-Value	Critical Value	Hypothesis
Crude Oil Price	-2.15	0.23	1% -3.4319 5% -2.8621 10% -2.5671	Accepted
BSE500	-0.82	0.81	1% -3.4319 5% -2.8621 10% -2.5671	Accepted
NSE500	-0.81	0.81	1% -3.4319 5% -2.8621 10% -2.5671	Accepted

It is seen from desk 4 that the determined estimation of ADF insights of Crude Oil fee, BSE500 and NSE500 are - 2.15, - 0.Eighty and - 0.Eighty one for my part, They are not measurably noteworthy as regarded by the aftereffects of P esteem, Since they may be no longer precisely the table worth. Henceforth the invalid hypothesis is acknowledged and along these strains the factors Crude Oil value, BSE500 and NSE500 have unit root and they're uncommon. At the give up of the day, the time arrangement information of those elements aren't table sure and they're in shape for added research, as an example, co-coordination and causality check.

Johansen co-mixture Test

Johansen co-combo test examinations whether or not Crude Oil value and Indian securities alternate are transferring collectively or not. At the surrender of the day, it checks whether or not or no longer the ones factors are have co-incorporation relationship or no longer. For this cause an invalid idea has been surrounded as follows and the results are introduced in desk five.

Ho: Crude Oil cost and Indian securities exchange as a ways as BSE500 and NSE500 do not have co-joining relationship.

Table 5: Johansen Co-Integration Test

Unrestricted Co-integration Rank Test (Trace) at 5%							
Hypothesized No. of CE(s)	Eigen Value		Trace Statistic		Critical Value	Prob.**	
	BSE500	NSE500	BSE500	NSE500		BSE500	NSE500
None	0.0013	0.0013	5.0838	5.0241	15.4974	0.7998	0.8062
At most 1	0.0000	0.0000	0.1351	0.1505	3.8415	0.7132	0.6980
Unrestricted Co-integration Rank Test (Maximum Eigen Value) at 5%							
Hypothesized No. of CE(s)	Eigen Value		Trace Statistic		Critical Value	Prob.**	
	BSE500	NSE500	BSE500	NSE500		BSE500	NSE500
None	0.001	0.00	4.948	4.87	14.2646	0.74	0.757
	3	13	8	36		83	7
At most 1	0.000	0.00	0.135	0.15	3.8415	0.71	0.698
	0	00	1	05		32	0

Source: Computed from Secondary Data

V. CONCLUSION

The examination predicted to anlyase the effect of Crude Oil fee at the improvement of Indian securities exchange. It has been finished with put it on the market intermediaries of expansive based totally records of BSE500 and NSE500. The connection exam uncovers that, Crude Oil price and the improvement of Indian financial change have large effective courting and relapse investigation display that changes in Crude Oil price have noteworthy effective impact on the development of Indian securities change, however the quantum of impact is low, when you consider that severa variables are answerable for the improvement of securities exchange, Crude Oil value is one in every

of them. Unrefined petroleum cost, BSE500 and NSE500 had unit root at some point of the examination time frame, so those elements are non-stationery. It is observed from the aftereffects of Johansen co-mixture test that Crude Oil price and Indian securities change regarding each BSE500 and NSE500 are not transferring collectively and they will be shifting autonomously their personal way, considering that they don't have co-becoming a member of relationship inside the direction of the exam time body. It is also show that Crude Oil fee did not have granger motive on Indian financial alternate as a protracted manner as BSE 500 and NSE 500 and Indian securities trade moreover did now not have granger cause on Crude Oil value at some stage in the examination time frame. It is presumed that variances in Crude Oil charge have massive impact on exhibit improvement in India, however that effect is not striking.

REFERENCES

- [1]. Amalendu Bhunia and Sanjib Pakira. (2014). Examining the Impact of Crude Oil Price and Exchange Rates on SENSEX: An Evidence of Indian. European diary of Accounting, fund and commercial agency, 2(1), 1-nine.
- [2]. Kumar Saurabh. (2012). Variables Affecting Behavior of Indian Stock Market. Universal Journal of Research in Commerce and Management, 3(9), 116-118.
- [3]. Banumathy K and Azhagaiah R. (2014). Causal Relationship among Stock Price and Crude Oil Price in India: A Granger Causality Test Approach. Worldwide Journal of Research in Management Science and Technology, 2(2), 22-27.
- [4]. Mukhopadhyaya. (2011). An Analytical Study of Indian Stock Market Volatility and its Linkages with Crude Oil Price and Crude Oil Price. Worldwide Journal of Business Management, Economics and Information Technology, 3 (1), 91-106.
- [5]. Sujit and Rajesh Kumar. (2011). Study on Dynamics Relationship among Crude Oil Price, Oil Price, Exchange Rate and Stock Market Returns. Universal Journal of Applied Business and Economics Research, nine (2), a hundred 45-160.
- [6]. Srinivasan. (2014). Raw petroleum Price, Stock Price and Exchange Rate Nexus: The Case Study of India. The Romanian Economic Journal, 17(52), seventy seven-91.
- [7]. Balwinder Singh and Kriti Chitkara. (2016). Effect of Crude Oil Price and Crude Oil on Stock Market Volatility in India. Asian Journal of Research in Banking and Finance, 6(2), 1-sixteen.
- [8]. www.bseindia.com
- [9]. www.nseindia.com
- [10]. www.in.investment.com