Impact of Crude Oil Prices on Stock Returns – A Study with Special Reference to OPEC Nations

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Abstract

The present study aims to investigate the impact of crude oil price on OPEC nations' stock market sample indices during the study period. The sample indices of OPEC nations were selected from the official websites of respective stock markets, MSCI website and Investing.com. The study used Descriptive statistics, ADF test, Correlation analysis, Regression analysis and GARCH (1, 1) Model, to find out whether crude oil price affected the OPEC nations' stock market indices during the study period. The studies revealed that QE index is highly volatile compared to other indices. Hence the study advises investors to look into other factors such as the exchange rate, reserves and other macro variables, if they wish to consider investment in OPEC stock markets.

Keywords: OPEC nations, Stock market indices, Correlation Analysis, Regression analysis and GARCH (1, 1) Model.

GEL: F15, F21, F36, G15.

Introduction

Though it is generally believed that oil prices drive the stock market, the empirical evidence on the impact of oil price shocks on stock prices, has been mixed. This study proposes to find out whether the response of aggregate OPEC nations' stock market returns or movement, differs greatly, depending on whether the increase in the price of crude oil is driven by demand or supply shocks in the crude oil market. The conventional wisdom, that higher oil prices necessarily cause lower stock prices, is shown to apply only to oil-market specific demand shocks such as increases in the precautionary demand for crude oil that reflect concerns about future oil supply shortfalls. In contrast, positive shocks, to the global demand for industrial commodities, cause both higher crude oil prices and higher stock prices, which explain the resilience of the Indian stock market to the recent surge in the price of oil. Against this background, the present study entitled, "Impact of crude oil prices on stock returns – A study with special reference to OPEC nations", would help the investors to diversify their investment in OPEC nation, stock markets.

This study would help investors to know the effect of oil price fluctuations and their impact on the OPEC nations' stock market indices. As there is a problem associated with the volatility of stock market, the study can help the investors to take decisions regarding buying and selling of stock and enable the investors to minimize their

risk. The study will also help in understanding the relationship between crude oil prices and their effects on stock returns of OPEC nations, which will be beneficial to both the domestic and international investors who wish to consider their investment in OPEC Stock Markets.

Review of Literature

The following are the selected extant studies, relevant to the present study.

P.A Donwa, C.O.Mgbame and O.R.Aigboduwa (2015) theoretically examined the effects of oil price volatility on stock returns of oil and gas companies around the world. The study examined the determinants of oil price volatility, which included flow demand shocks, flow supply shock, the role of expectation in the physical market of crude oil, financial expectations in the oil futures markets and the role of OPEC. The results indicated that an upward trend in oil prices led to higher stock returns of oil and gas companies, operating in the upstream sector but there existed a negative relationship between oil price volatility and stock returns of oil and gas companies, operating in the downstream sector and many other industries outside the oil and gas sector. The rate of information flow and volatility in oil prices lead to volatility in other markets. Anna Creti, Zied Ftiti, and Khaled Guesmi (2014) studied the impact of oil prices on stock markets of the four major OPEC countries, namely, Emirate Arab United, Kuwait, Saudi Arabia and Venezuela, over the period spanning from 2000 to 2010 and found that co-movements between oil and stock markets can be either positive or negative. Oil price shocks, in periods of world turmoil or during fluctuations of the global business cycle (downturn or expansion, as for instance the 2008 financial crisis), recorded significant impact on the relationship between oil and stock market prices in oil-exporting countries. Robert C. Ready (2014) examined the changes in oil price on the basis of supply or demand driven and found that demand shocks were identified as returns to an index of oil producing firms which were orthogonal to unexpected changes in the VIX index whereas supply shocks were driven by oil price changes which were orthogonal to demand shocks and changes in the VIX. Bettina Lis Christian Nebler (2012) tested the impact of oil prices on the overall market and automotive companies, using stock return data of US, German and Japanese car companies, employing OLS and EGARCH (1, 1) and concluded that the sample stock market to crude oil price increases while Japanese companies did not show any excess sensitivity at all. Istemi Berk, Berna Aydogan (2012) analyzed the impact of crude oil price variations on the Turkish Stock Market Returns, using Vector Auto Regression (VAR) model of daily observations of Brent Crude Oil Prices and Istanbul Stock Exchange National Index (ISE-100) (CBOE) and S&P 500 market volatility index (VIX). Variance decomposition test results indicated that crude oil price shocks could be rationally evaluated in the Turkish stock market. J. K. M. Kuwornu (2012) analyzed the effect of macroeconomic variables on the Ghanaian stock market returns, using monthly data over the period January 1992 to December, 2008. The selected macroeconomic variables were inflation rate, crude oil price, exchange rate, interest rate and 91 day Treasury bill rate of Ghana. It was found that in both the short run and the long run results, inflation rate appeared to be the most influential macroeconomic variable which affected stock market returns of Ghana. Samuel Imarhiagebe (2010) studied the impact of oil prices on stock prices of selected major oil producing and consuming countries, with nominal rate as the additional determinant. Daily stock prices, oil prices and exchanges rates for six countries (Mexico, Russia, Saudi Arabia, India, china, and the U.S) from January 26, 2000 to January 22, 2010, were considered as a co integrated system in the vector autoregressive analysis. Andreas Ektor lake (2009) analyzed the effects of oil price returns and oil price volatility on the Greek, the US, the UK and the German stock markets. The volatility of the indices was quantified by applying EGARCH models and the relationship between the variables was examined by means of Structural Equation Models (SEM). Although the effects of oil price returns were common, in both the US and the Greece, the investment community in Greece did not use the futures market, to hedge its positions against oil prices. Anthony Schmitz (2009) used CAPM-GARCH Multi-factor Market Model to investigate the relationship between oil prices and alternative energy indices. It was found that abnormal returns, was related to the potential for rapid growth in the alternative energy sector and the future projected. Ramazan Sari (2006) investigated the impact of oil price shocks on the macro economy of a developing country, namely, Turkey. The results indicated that the oil price changed in relation to the variation in GDP, inflation, employment, and real stock returns. David C. Broadstock & George Filis (2003) analyzed the time-varying correlations between oil prices shocks of different types and stock market returns, using a Scalar-BEKK model. The stock market indices from two countries, namely, China and the US, were considered for the analysis. In addition to the whole market, the market returns of key industrial sectors, namely, Metals & Mining, Oil & Gas, Retail, Technology and Banking, were considered and it was found that oil shocks of different types showed substantial variation in their impact upon stock market returns.

Materials/ Methodology of the Study

Objectives of the Study

- To test the stationarity in the daily index returns of sample countries.
- To examine the relationship between index returns and crude oil prices of OPEC nations'.

- To analyze the impact of crude oil prices on the index returns of OPEC nations' stock indices.
- To find the volatility of sample OPEC nations, stock indices.

Sample selection

For the purpose of analysis, crude oil spot prices traded at MCX, were selected for the analysis. The study selected four major indices from eleven stock markets of OPEC nations and the sample OPEC nations' stock market indices, selected from the official website of respective stock markets and investingonline.com, are presented in Table – 1

Table - 1 List of Selected Sample OPEC Nations and Indices

S.NO	STOCK EXCHANGE	INDEX	COUNTRIES
1	Kuwait Stock Exchange	KWSE	Kuwait
2	Qatar Stock Exchange	QE	Qatar
3	Saudi Stock Exchange	TASI	Saudi Arabia
4	Jakarta Stock Exchange	JSX	Indonesia

Source: Official website of respective stock market and investingonline.com.

Methods of Data Collection

The study mainly depended upon secondary data. The data, related to daily crude oil prices and stock returns of OPEC nations, were collected from the websites, namely, www.mcx.com,www.yahoofinance.com and www.investing.com. The other relevant data for this study were collected from journals and other websites. For analyzing the effects of daily crude oil prices on OPEC stock returns of sample countries, a period of 01.01.2009 to 31.12.2015 was considered for the analysis.

Research Tools

Statistical tools like Descriptive Statistics, Augmented Dickey – Fuller Test, Correlation, Regression Analysis and GARCH (1, 1) Model were used, for analyzing the impact of daily crude oil prices on stock market returns of OPEC nations.

Null Hypotheses of the Study

H01: There is no stationarity in the daily index returns of sample countries and crude oil prices.

H02: There is no relationship between OPEC Nations stock index returns and crude oil prices.

H03: There is no impact of crude oil prices on OPEC nations' stock markets.

H04: There is no volatility in the daily index returns of sample OPEC nations' stock markets.

Limitations of the Study

The study is confined only to the selected indices. It could not be generalized. The period of study was chosen based on the availability of data. All the limitations associated with the statistical/econometric methods apply to this study also. Further studies can consider the limitations of the present study and may adopt different methodology to get better results.

Results and Discussions

The results of descriptive statistics for daily returns of crude oil and sample indices of OPEC nations' are presented in Table – 2. All the OPEC nations' stock market indices and crude oil prices recorded negative return because the mean value of all the sample indices was negative. QE and JSX index examined the high Standard deviation (risk), with negative return, compared to the other indices. With respect to skewness, none of the sample indices witnessed positive skewness. The daily crude oil prices and the daily returns of all sample indices recorded Leptokurtic distribution.

Table – 2 Results of Descriptive Statistics for Crude Oil prices and OPEC nations sample stock market indices return.

INDEX	Mean	Std. Deviation	Skewness	Kurtosis
Crude Oil	-0.9993	0.01224	-0.68421	4.1597
KWSE	-1.00019	0.006659	-0.7045	4.2186
QE	-0.99976	0.01218	-0.369104	9.76546
TASI	-0.9998	0.01171	-0.6944	9.8935
JSX	-0.9993	0.01224	-0.3822	4.51798

Source: Data collected from yahoofinance.com and computed by using SPSS

Table – 3 displays the results of Augmented Dickey-Fuller Test, for analyzing the stationarity of crude oil and sample indices of OPEC nations' sample indices daily returns. T – Statistics value of Augmented Dickey-Fuller Test for Crude Oil (-36.19385) and OPEC nations' stock market indices – KWSE (-34.69695), QE (-36.66145), TASI (-38.89354), JSX (-25.973), were less than the test critical value. It implied that all the sample indices and crude oil prices attained stationarity at level difference. Therefore, the null hypothesis H01 "There is no stationarity in daily returns of sample indices and crude oil price", is rejected.

Table – 3 Results of Augmented Dickey-Fuller test for Crude Oil price and OPEC nations sample stock market indices return.

INDEX	Augmented Dickey-Fuller test statistic (T-statistics)	Test critical values:		
		1% level	5% level	10% level
Crude Oil	-36.19385	-3.432971	-2.86258	-2.5674
KWSE	-34.69695	-3.433846	-2.86297	-2.5676
QE	-36.66145	-3.433852	-2.86297	-2.5676
TASI	-38.89354	-3.43385	-2.86297	-2.5676
JSX	-25.973	-3.434	-2.863	-2.5676

Source: Data collected from yahoofinance.com and computed by using E views

Correlation Analysis of crude oil and OPEC nations' stock market indices is displayed in the Table – 4. The Pearson Correlation values of crude oil and KWSE (-0.023), QE (-0.016), TASI (-0.042), JSX (-0.045) were negative. This implied that all the sample indices of OPEC nations' stock market indices were negatively correlated with crude oil price. Hence accept the Null hypothesis H02 "There is no relationship between OPEC Nations Stock Index returns and Crude Oil prices".

Table – 4 Results of Correlation for Crude Oil price and OPEC nations Sample stock market indices return.

	Crude Oil Prices and			
	KWSE	**QE**	**TASI**	**JSX**
Pearson Correlation	-0.023	-0.016	-0.042	-0.045
Sig. (2-tailed)	0.342	0.511	0.079	0.061

Source: Data collected from yahoofinance.com and computed by using SPSS

The results of simple regression analysis, for crude oil and sample indices of OPEC nations' stock market indices, during the study period 01.01.2009 to 31.12.2015, are exhibited in Table – 5. The significant values of all the sample indices were less than the critical value of 0.05. This indicated that crude oil prices did not influence the stock market indices of OPEC nations. Hence accept the Null hypothesis H03 "There is no impact of Crude Oil prices on OPEC Nations Stock Markets".

Table – 5 Results of Simple Regression Analysis for Crude Oil price and OPEC nations sample stock market indices return.

	Constant	'p' value
KWSE	463.032	0.34191
QE	2738.06	0.511
TASI	273.226	0.079
JSX	314.834	0.06115

Source: Data collected from yahoofinance.com and computed by using SPSS

Table – 6 presents the results of GARCH (1, 1) Model, for analyzing the volatility of Crude oil price and OPEC nations' stock market indices return. Sum of Alpha and Beta values' for all the sample indices, was close to one. It implied that all the sample indices were volatile and the QE index was highly volatile, compared to other indices, during the study period. Hence reject the null hypothesis, H04 "There is volatility in the daily index returns of sample OPEC Nations Stock Markets".

Table – 6 Results of GARCH (1, 1) Model for Crude Oil price and OPEC nations Sample stock market indices return.

INDEX	α	β	α + β
Crude Oil	0.6403	-0.07648	0.56382
KWSE	0.16793	0.803186	0.97112
QE	0.19781	0.801668	0.99947
TASI	0.14739	0.839057	0.98644
JSX	0.10531	0.875633	0.98095

Source: Data collected from yahoofinance.com and Computed using SPSS

Summary and Conclusion

To conclude, the volatility in the crude oil prices had no impact on stock returns of OPEC nations'. Though other countries might have witnessed significant impact, no evidence of such impact was observed in domestic nations (OPEC). Hence investors are advised to look into other factors such as the exchange rate, reserves and other macro variables, if they wish to consider investment in OPEC stock markets.

References

Berk, I., & Aydogan, B. (2012). Crude oil price shocks and stock returns: Evidence from Turkish stock market under global liquidity conditions (No. 12/15). EWI Working Paper, Institute of Energy Economics at the University of Cologne.

Broadstock, D. C., & Filis, G. (2014). Oil price shocks and stock market returns: New Evidence from the United States and China. Journal of International Financial Markets, Institutions and Money, 33, 417-433.

Creti, A., Ftiti, Z., & Guesmi, K. (2014). Oil price and Financial Markets in the main OPEC countries. Energy Studies Review, 20(3), 18-35

Donwa P.A, C.O.Mgbame, O.R.Aigboduwa (2015). Review of oil price volatility and stock returns of oil and gas companies. International Journal of Multidisciplinary Research and Development, 2(8), 296-303

Imarhiagbe, S. (2010). Impact of oil prices on stock markets: Empirical evidence from selected major oil producing and consuming countries. Global Journal of Finance and Banking Issues, 4(4), 15.

Kuwornu, J. K. (2012). Effect of macroeconomic variables on the ghanaian stock market returns: A co-integration analysis. Agris on-line Papers in Economics and Informatics, 4(2), 15.

Lake, A. E., & Katrakilidis, C. (2009). The Effects of the Increasing Oil Price Returns and its Volatility on Four Emerged Stock Markets. European Research Studies, 12(1), 149.

Lis, B., Nessler, C., & Retzmann, J. (2012). Oil and Cars: the impact of crude oil prices on the stock returns of automotive companies. International Journal of Economics and Financial Issues, 2(2), 190.

Ready, Robert C., Oil Prices and the Stock Market (June 13, 2014). Available at SSRN: https://ssrn.com/abstract=2140034 or http://dx.doi.org/10.2139/ssrn.2140034

Sari, R., & Soytas, U. (2006). The relationship between stock returns, crude oil prices, interest rates, and output: Evidence from a developing economy. The Empirical Economics Letters, 5(4), 205-220.

Schmitz, A. (2009). Effect of oil prices on returns to alternative energy investments (Doctoral dissertation, Georgia Institute of Technology).