Oil prices and stock returns of KSE (Karachi Stock Exchange)

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ABSTRACT

Whether Oil price changes have an impact on the Stocks of KSE (Karachi Stock Exchange) or not? This study examines impact or relationship of Oil prices on stock returns with reference to KSE (Karachi Stock Exchange) Pakistan. Weekly data ranging from January 1998 to October 2010 is included and tested in this paper. This relationship is tested by using Descriptive Statistics and Correlation Matrix. Data Stationary is ensured by Unit Root Test. Evidence from Granger Causality and Impulse Response Test. The Results shows that Oil prices and shares prices in Pakistan has no long term relationship or impact on each other focusing on the data of KSE (Karachi Stock Exchange).

Introduction

Having an understanding of how the oil price has an effect on stock returns is important for the management, shareholders and stakeholders.

Over the last three decades, Oil prices are changed with very huge fluctuations, therefore predicting shifts in the oil price can be difficult, even with a high correlation growth in GDP and growth in industrial output. Countries with higher economic growth are most likely to increase the demand for oil , but oil prices may also cause unwanted inflation pressure on the economy, and thereby affect the stock market. The stock market may also be seen as a place to protect the money from being eaten by inflation.

An oil price factor may impact stock returns as can be stated in the economic report of President 2006:

"*In the long run, households and businesses respond to higher fuel prices by cutting consumption, purchasing products that are more efficient, and switching to alternative energy sources. Higher energy prices also encourage entrepreneurs to invest in the research and development of new energy-conserving technologies and alternative fuels, further expanding the opportunities available to households and business to reduce energy use and switch to low-cost sources*" (Economic Report of the President, 2006 , p. 243)

The oil has been seen as a one of the most important economic activity drivers, and therefore, many previous research papers have confirmed that Oil price changes have great affect on stock market activity. In terms of microeconomics, it is believed that higher oil prices might affect the domestic economy in terms of lower consumer welfare at the cost of higher producer's welfare. It is especially caused by rise in production cost of products and services, and the oil price influence on inflation and consumer confidence.

It seems logical to assume that Prices of Oil and performance of stock market is negatively correlated. More expensive fuel leads to high transportation cost, high production cost, and high heating cost which reduces corporate earnings. Higher fuel prices can also stir up inflation. But booming economy can also be associated with high price crude. Higher fuel prices can show stronger business position and can increase demand for business.

The International Monetary Fund (2000, p. 13) argues that "*changes in the oil price affects economic activity, corporate earnings, inflation and monetary policy which also have implications for asset prices of a company and thereby also the financial markets*".

This study is distributed in four parts. First segment deals with review of previous studies, second phase emphasizes on data and methodology, third part reports results and finally paper is concluded.

Significance

Having an understanding of how the oil prices are associated with stock returns is important for the management, shareholders and stakeholders.

This study will be very helpful for students, teachers, investors, management, shareholders, stakeholders, as well as for the whole businesses holders.

Objective

By using previous literature and different econometrics models that have been conducted in both the global financial markets as well as in individuals markets, this paper will implement some of the same models, and conduct the models on the OIL & KSE Market.

This paper focuses on the association among the prices of oil and KSE (Karachi Stock exchange) returns. This study can be helpful for the prediction of stock market behaviour in future. Objective of this paper is to analyse if an oil price factor affect the KSE in terms of stock returns using weekly data over the time period January 1998 to October 2010. An underlying purpose is therefore to see if the implemented models used can explain if an oil price factor is significant in KSE in terms of stock returns.

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Literature Review

Afshar. Empirically investigated the relationship three measures of Stock market, changing prices of Oil, and real GDP growth. He Uses data from first quarter of 1990 to the second quarter of 2008. Co-integration, error correction, Unit root Test, VAR and Granger Causality Test are applied on data. Examination founded new evidence that increasing oil price do not have an influence on GDP, but decreasing Oil prices have an influence on GDP. Forecast Variance decompositions of GDP suggest that oil prices fluctuation and the stock market are independent significant sources of GDP variability with stock market impact greater than oil price fluctuation.

Aktham (2004). This study examined the association among crude oil prices fluctuation and stock market returns of 22 emerging economies. Data from January 1, 1998 to April 31, 2004 is analyzed. The vector auto regression (VAR) analysis is carried on daily data. Results show that oil price fluctuation does not have important impact on the Stock return of emerging economies. Results also describe that return of stock market in these emerging economies do not rationally indicate shocks in the crude oil market.

AROURI and FOUQUAU (2009). Investigated the presence of long-term interactions among prices of Oil and GCC Stock market by using Arab Monetary Fund(AMD) monthly data for the period from January 1996 to December 2007 by using Linear co-integration, asymmetric co-integration, Unit root tests, Traditional co-integration tests. His empirical analysis results describe that oil price fluctuation indeed effect GCC Countries Stock returns in an asymmetric fashion.

AROURI et al (2010). Investigated the reaction of GCC countries stock markets to oil price changes by using data ranging from 7 June 2005 to 21 October 2008. They used linear Model and Non-Linear techniques. Their investigated Results shows that in Qatar, Oman, Saudi Arabia and UAE stock market returns importantly react to oil price changes. Results also guide that association among Oil prices and stock markets of these countries is non-linear and changing according to Oil prices value. They also find that Oil prices changes don't Impact on stock market returns of Bahrain, and Kuwait.

Chiou et al (2008). Examined the interaction among Oil market and stock using data from January 1992 to November 2006. He used co-integration testing, Granger - Causality tests, threshold error - correction model. Results shows co-integration relationship among the prices of Oil and S&P 500 and a unidirectional relationship among oil prices and the S&P 500.

Donoso (April, 2009). Studied the integration among oil prices and the Stock markets of the United States, Japan and the United Kingdom by covering the January 1986 to August 2008 period. Unit root test; Philip-Perron , Test for Co-integration using Johansen procedure, GARCH (1, 1) Model Estimates, VAR model, Impulse Response Function, Wald test of symmetry are used on data. U.S Stock market has been observed most sensitive among these three countries, (In U.S Stock market variance is effected by 9.51% due to changes in Oil prices, 7.51% in the U.K., and 4.4% in Japan). Negative price changes affect more to U.S and U.K than positive Oil price changes, where the case for Japan is different.

Driesprong et al (September 2004). Founded that investors in stock markets under react to oil price fluctuation in the short run. As a consequence fluctuation in oil prices estimate future returns of stock market, he describe that increase in oil prices lowers the future stock market returns. He used data over the period

October 1973 to April 2003.He Used Regression Techniques, Robustness tests. His results evidence that fluctuation in oil prices estimates future stock market returns. He shows that this prediction is less stronger for Oil related sector. Conclusively the prediction of stock returns using prices of Oil is substantial.

Hasan and Ratti (2012). This paper analyzes the impact of oil prices fluctuation on return and volatility in the sectors of Australian stock market from 31 March 2000 to 31 December 2010. Markov Switching GARCH Model, ARCH model, Unit root Test Statistics, ADF and PP tests are applied on data. He found that for the overall market index, an increasing oil price return significantly reduces return, and an increasing oil price return volatility significantly reduces volatility.

Negi et al (2011). The presence of long-term association oil prices and stock market prices of two big emerging countries of Asia, India and China has been observed in this paper, because India and China are two most Oil consuming countries and their stock are susceptible to Oil prices fluctuation. Data from January 2000 to May 2011 has been tested by using (ADF) Augmented Dickey Fuller Test, and existence of Co-integration was also tested. Vector Error Correction Model (VECM) was employed to trace the dependence of long-term integration among the variables. The results of the co integration analysis depicted long-term association oil prices and stock market prices for both the countries. The trace and maximum Eigen value tests results also confirmed the existence of unique co integrating vectors among tested variables. This provided evidence on the existence of at least one co integrating vector in the model and therefore it is concluded that the variables exhibit a long-term association among them.

Ravichandran et al (2010) Examined impact of oil Prices on (GCC) Gulf Cooperation Council stock markets using data for the period of 3 years, from March 2008 to April 2010. Standard deviation statistic, Phillips-Perron unit root tests, Jarque-Bera test, error correction model (ECM), Multivariate approach of Johansen and Juselius (JJ), Co-integration analysis techniques are used on data. The results confirmed that Oil price has an influence on returns of GCC Stock market in the Long-term.

Sadorsky (1999). Observe the association among Oil price fluctuation and activity of stock market, the association among economic activity and prices of Oil also examined. The used data was monthly and period covered was 1947:1-1996:4 and industry production, interest rate, stock returns and oil prices are the variables that were included in the model. Unit root tests, vector auto regression (VAR) model, Empirical analysis, GARCH model. Oil prices and oil price volatility both play important roles in affecting economic activity . Results explain that variation in Oil prices effect economical activities but variation in economical activities has not much effect on Oil prices. Further Result also explain that positive Oil price variation has greater effect on the stock returns rather than negative price variation. He found asymmetric impact among stock returns and Oil prices volatilities.

Data and Methodology

"This study includes weekly stock prices indexes over the period of January 1998 to October 2010 for KSE 100 Index and Oil. The continuous Compounded rate of return is calculated by using following Model:

Return = R_t = ln (P_t / P_{t-1}),

where

R_t = Return for Given Period 't'.

P_t = Price at closing time

P_{t-1} = Price at the opening time

ln = Natural Log

Hypothesis of the study is confirmed by applying the above explained methodologies.

Hypothesis:

H_1: Oil prices have long-run relationship with KSE stock returns.

H_0: Oil prices have no long-run relationship with KSE stock returns."

Results

Table 1. Descriptive Statistics

	OIL	KSE
Mean	0.002631	0.002447
Median	0.007035	0.006321
Maximum	0.251247	0.131714
Minimum	-0.19234	-0.1738
Std. Dev.	0.0469	0.037608
Skewness	-0.38234	-0.4112
Kurtosis	5.727724	4.961695
Jarque-Bera	221.362	124.8032
Probability	0	0
Sum	1.741606	1.620158
Sum Sq. Dev.	1.45397	0.93489
Observations	662	662

Descriptive Statistics is used to analyze the behavior of the returns. Descriptive statistics employed on the returns showed that KSE has an average return of 0.24 percent and with standard deviation of 3.7 percent. OIL has highest returns than KSE with standard deviation of 4.6 percent and average return of 0.26 percent.

Table 2. Correlations

	OIL	KSE
OIL	1	0.079397
KSE	0.079397	1

From results obtained through correlation it is evident that there is very weak or negligible correlation among oil prices and stock returns.

Table 3. VAR Statistics

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-672.975	NA	0.026589	2.048483	2.062112	2.053766
1	2320.669	5960.032	3.05E-06	-7.02479	-6.983905*	-7.00894
2	2328.993	16.52283	3.01E-06	-7.03792	-6.969771	-7.011501*
3	2335.183	12.24784	2.99E-06	-7.04456	-6.949159	-7.00758
4	2342.669	14.76680*	2.96e-06*	-7.055140*	-6.93248	-7.00759

SER 01 (OIL)   SER 02 (KSE)

"* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Lag selection is Pre-requisite in order to employ Co-integration test. To estimate Johansen and Julius, VAR is estimated. Schwarz criterion is found minimum at one lag. So one week lag is appropriate lag length.

To run co-integration test it is necessary for the data to be stationary of same order. Above tests ensure that this data is non-stationary at level but becomes level at First Difference. Data stationary is tested through Augmented Dickey Fuller and Phillip Perron Tests as the later is not that much strict in nature as is ADF test and both tests confirmed similar results (Dickey & Fuller ,1981). Data is stationary of same order so we can test Co-integration among OIL and KSE.

Table 4. Unit root Test Statistics

	ADF Level	ADF First Diff.	PP Level	PP First Diff.
SER 01	-1.49314	-18.7377	-1.35163	-22.6635
SER 02	-0.22438	-16.2216	-0.1556	-25.0269
Critical Values				
1%	-3.44001	-3.44003	-3.44	-3.44001
5%	-2.8657	-2.8657	-2.86569	-2.8657
10%	-2.56904	-2.56904	-2.56904	-2.56904

SER 01 (OIL)   SER 02 (KSE)

Table 5. Co-integration Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.*
None	0.015922	10.80981	15.49471	0.2235
At most 1	0.000304	0.200784	3.841466	0.6541

Co-integration is used to analyze the long-term integration different series. Results of Table 5 show that there exists no long-term integration among share prices and oil prices in Pakistan.

Table 5.1. Unrestricted Co-integration Test (Maximum Eigen values)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.015922	10.60903	14.2646	0.1749
At most 1	0.000304	0.200784	3.841466	0.6541

Results of Table 5.1 confirm the results reported by Trace Statistics that there exists no long-term integration among share Prices and Stock returns.

Table 6. Granger Causality

Null Hypothesis:	Obs.	F-Statistic	Prob.
Oil dose not Granger cause KSE	661	3.46037	0.0633
KSE does not Granger cause Oil		1.85306	0.1739

Granger Causality test is statistical hypothesis test used to determine whether one time series can be used to predict another. Granger causality test reports that the KSE granger causes the OIL. Similarly OIL granger causes KSE. It shows that no flow of information or relationship exists OIL and KSE (Karachi stock Exchange).

Impulse Response Function

Impulse Response Function shows that one standard deviation change in one market brings what standard deviation change in another market. Results from impulse response function show that Karachi Stock Exchange exerts pressure on Karachi Stock Exchange and Oil exert pressure on oil while KSE and Oil don't exert pressure on each other. Impulse response function shows that KSE is affected by KSE itself and OIL is affected by Oil itself, While OIL and KSE has no effect on each other.

Variance Decomposition shows the decomposition of variance. It was found that most the changes in KSE are explained by its own market Innovations and OIL has no or very little effect on it. Variance Decomposition of OIL shows that variance in OIL returns are caused by its own market innovations and due to changes in KSE.

Response to Cholesky One S.D. Innovations ±2 S.E.
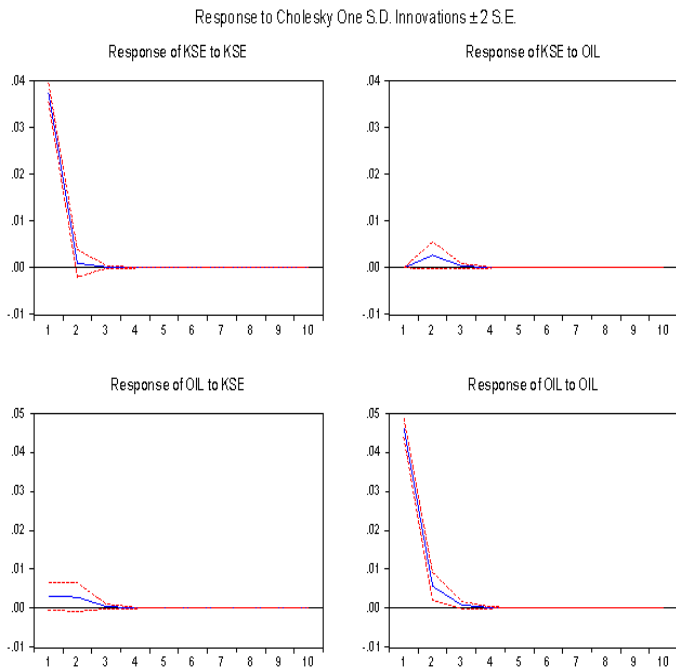
Table 7. Variance Decomposition of KSE

Period	S.E.	KSE	OIL
1	0.037521	100	0
2	0.03763	99.48707	0.512934
3	0.037633	99.47674	0.523263
4	0.037633	99.4765	0.5235
5	0.037633	99.47649	0.523506
6	0.037633	99.47649	0.523506
7	0.037633	99.47649	0.523506
8	0.037633	99.47649	0.523506
9	0.037633	99.47649	0.523506
10	0.037633	99.47649	0.523506

Table 8. Variance Decomposition of Oil:

Period	S.E.	KSE	OIL
1	0.04651	0.452271	99.54773
2	0.04694	0.811712	99.18829
3	0.04695	0.818973	99.18103
4	0.04695	0.819139	99.18086
5	0.04695	0.819143	99.18086
6	0.04695	0.819143	99.18086
7	0.04695	0.819143	99.18086
8	0.04695	0.819143	99.18086
9	0.04695	0.819143	99.18086
10	0.04695	0.819143	99.18086

Conclusion

This paper focuses on the effect of Oil prices on Stock returns with reference to KSE (Karachi Stock Exchange) Pakistan. Descriptive statistics employed on the returns showed that OIL has highest returns than KSE. From results obtained through correlation it is evident that there is very weak or negligible correlation among oil prices and stock returns. Through VAR statistics it is found that one week is appropriate lag length. Co-integration results shows that there exists no long-term integration share prices and oil prices in Pakistan. Impulse response function shows that KSE is affected by KSE itself and OIL is affected by Oil itself, While OIL and KSE has no effect on each other. Variance Decomposition explained that KSE is affected by its own market performance and variance in OIL are caused by its own market innovations and due to changes in KSE. Conclusively all results shows that Oil prices and shares prices has no long term relationship or impact on each other in Pakistan focusing on the data of KSE (Karachi Stock Exchange).

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