



Impact of Oil Prices on Stock Markets: Evidence from Gulf Cooperation Council (GCC) Financial Markets

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Abstract

Being primary exporters and suppliers of oil in the world, and being oil-dependent economies for decades, GCC countries are very likely to be affected by any changes or shocks in oil prices. The effect of oil price turbulences is obvious in stock markets in the long run. Since, there is a correlation between oil price and the stock markets in many oil-producing countries; this study tries to investigate this correlation in GCC countries as major oil producers and exporters. The study aims to evaluate the impact of oil price change in GCC countries in the short and long term, to assess the consequences of the change of stock market prices as a result of oil price change in GCC countries and to examine the influence of stock price change on the local economies of GCC countries. The methodology utilized to achieve the study objectives is the Auto Regressive Distributive Lag Model (ARDL) to analyze monthly stock market and oil price data from November 2006 to February 2015. This study targets all GCC countries: Kuwait Bahrain, Qatar, Oman, KSA and UAE. Unlike all the studies performed on earlier periods, the findings of this study show that there is no evidence for co-integration between oil prices and stock markets in all GCC countries except for Oman where co-integration proved to exist. On the other hand, the results prove that there is a short-run relationship between oil prices and stock market prices.

Keywords: Oil price, Stock Price, ARDL Model, GCC

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Introduction

In spite of developing alternative sources of energy, oil is still the most commonly uses energy source and it still plays an important role in global economic development. Today's economies and industries depend on oil and its distillates. Oil prices fluctuations are hardly predictable and keep changing because they are affected by many different factors including the current supply of oil as set by OPEC, the demand for oil especially by emerging economies.

Perhaps the Gulf region is best known for oil production and many petrol companies around the world had and still race to operate in the Gulf region. Since Arab Gulf countries are major exporters and producers of oil, oil price proved to have significant consequences on those economies and considered one of the most important source of macroeconomic fluctuations (Dibooğlu 2004; Cologni & Manera, 2008).

The Gulf Corporation Council (GCC) was established in 1981 and include Bahrain, Kuwait, Saudi Arabia, Oman, Qatar and the United Arab Emirates. The aim of this council is to affect integration, coordination and inter-connection among the member countries to achieve unity. In order to achieve these goals the necessary steps have been taken toward achieving full economic integration such as free trade area, customs union, common market, monetary and economic union. GCC economies are heavily relying on oil production and export which drive lack of diversification. The GCC countries produce about 20% of all world oil and control 36% of world oil exports. GCC countries also possess 47% of proven world oil reserves. It is observed that the economic indicators in KSA, Kuwait and UAE, the three biggest GCC countries' economies, is positively correlated with oil price (Alhayki 2014).

Most of the previous studies related to this topic focused on industrial countries such as USA, Canada, Japan and UK. This research is significant due to the few studies that focused on studying such relationship in the GCC countries and current period witnessed many changes in the international oil price which made local and international investor worried about their investment in GCC stock markets. This research aims at investigating the short term as well as the long-term relationship between oil price fluctuations and stock market prices in GCC countries. Moreover, this research attempts to measure the impact of oil price on GCC stock markets in both short-run and long-run.

This research consists of five sections following the introduction. Section 2 summarizes a number of studies related to the same topic in different parts in the world. Section 3 is about the methodology being used to perform this study. The Auto Regressive Distributed Lag (ARDL) model was used to determine the relationship between the change in oil prices and the stock market price change in GCC countries. The fourth part includes data analysis and results which lead to the conclusion in part five.

Literature Review

Recently, the impact of oil price fluctuations on the economy as well as the stock market returns has attracted the attention of politician as well as the economist. Early empirical studies on the this relation has proved that oil has a negative impact on these two; i.e. economy and stock market of the country; if the country is oil importing country while it has positive impact should the country is oil exporting country.

Basher and Sadorsky (2006) conducted a study on oil price risk and emerging stock markets. They used the international multi-factor model as well as the international capital asset pricing model (CAPM) to examine the impact of oil price changes on emerging stock market returns during the period 1973-2005. The results of this study show that there is strong evidence that oil price risk affects stock market returns in emerging markets. The special aspect about this study is that it conducts the inherent risks in oil price change on emerging stock markets and the relationship of this risk with other risks such as total and market risks. Onour (2007) investigated the determinant of GCC stock markets' volatility in both the long-term and short-term. GCC countries considered major oil producing in the world so their stock markets are likely to be

linked with change in oil prices. He collected data from 1989-2006 and applied the Garch-M model along with the Generalize Method of Moments (GMM) technique. He found out that short-term stock market return is sensitive to unobservable speculative factors. However, in the long term stock market return is very sensitive to oil price change. Moreover, oil price changes affect major macroeconomic indicators which influence firms' profitability.

Arouri and Rault (2010) conducted a study using linear and nonlinear models to investigate the reactions in Gulf Cooperation Council (GCC) stock markets to oil price changes and shocks over the period 1996 - 2009. High reactions oil price changes were found in KSA, Oman, Qatar and UAE. The study describes the link between oil price and stock markets in the above-mentioned GCC countries as switching and nonlinear. On the other hand, the study has found that oil price changes do not affect stock market returns in Kuwait and Bahrain. Yi-Hao et al (2011) examine the relationship between crude oil and twenty countries' stock market prices for the period from January 1988 and August 2008. They study the asymmetric dependence structure of both oil price and stock price by using the copula method. The study found that an asymmetric dependence exist between crude oil prices and major international stock markets, but the degree of dependence differs in different periods (stable or rise) and also differs in different countries (developing/developed, European/Asian or net exporters/net importers).

Arouri and Rault (2012) examined the long-term relationship between oil price and stock market in GCC using, for the first time for this purpose, the bootstrap panel co-integration techniques and the Seemingly Unrelated regression (SUR) method. They used monthly data over the period from January 1996 to December 2007. They found a strong correlation between oil prices and stock markets in the GCC countries. This indicates that increases in oil prices always have positive impact on stock prices in all GCC countries, except in KSA. Therefore, the study shows that there is a relationship between oil price and stock returns. However, the researchers point out that the long run relationship between oil price and stock markets can be different from one country to another depends on the economic structure. Ready (2012) performed a study using a new simple method to classify the changes in oil prices according to whether they were driven by demand or supply over a long period (1986 - 2011). Ready concludes that demand stocks were positively correlated with market returns and that supply stocks were negatively correlated with market returns. The researcher observes that the supply shocks (changes in oil prices) had strong effects on oil-producing companies. The study also concludes that oil supply shocks have a strong impact on U.S. and world stock prices and hence the world economy. However, he points out that shocks in oil prices mainly affect consumers rather than oil using companies. This study has been useful as it provides a technique for studying oil price shocks and their effects on domestic and world economies, especially in short-period terms.

Hasan and Mahbobi (2013) used the cause-effect relationship to test the impact of oil prices on Canadian stock market during the period from January 1990 to August 2011. The data was gathered from international oil prices and the Toronto Stock Exchange (TSX). The researchers applied Granger causality test, LA-VAR testing and generalized impulse response functions. The results of the study show that the impact of oil prices on the TSX became stronger in recent years than it was in the 18 years ago. The influence of the exchange rate difference between the Canadian and US dollars on the Canadian stock market has declined after the recent North American financial markets slump in late 2008. This has left oil prices as the most influential force on the Canadian stock market. Alhayki (2014) examines the impact of international oil price on the stock market in GCC countries using the wavelet analysis model. The researcher used monthly data for a period from May 2005 to December 2011. The results of the data analysis suggest that not all GCC stock markets respond to oil price in the same way. The relationship between oil price

and the stock market was found to be negative in the cases of Bahrain, UAE and KSA whereas it was positive in the cases of Kuwait, Qatar and Oman. The study also proved that the shorter the period, the lower the correlation between oil price and stock market returns is and that long run results usually indicate that oil price has an influential power over stock market returns. However, correlation was bidirectional in all GCC countries except for Bahrain.

Nwosa (2014) conducted a study to examine the link between international and domestic oil prices and stock market price. He used monthly data from January 1985 to April 2010. The study uses different empirical model such as Vector Error Correction model (VECM) and the Vector Auto Regression model (VAR). He found that short and long term shows different relationship. In the long run, oil price has significant relationship with Nigerian stock market. In the short run, there is no relationship between the oil prices and Nigerian stock market.

Research Methodology

This study applies Autoregressive Distributed Lag (ARDL) approach following the methodology proposed by Pesaran and Shin (1999). Pesaran, Shin, and Smith (2001) developed a version of the autoregressive distributed lag (ARDL) model as an alternative co-integration procedure known as the error correction version. This procedure allows for testing the existence of long-run relationships between variables of interest.

With this approach, the short-run and long-run relationships among series of interest are captured simultaneously while pre-testing for unit roots is not needed. The ARDL model has certain econometric advantages. First, the ARDL model does not require pre-testing for unit roots. Secondly, the ARDL model is more statistically significant in small samples such as the GCC country sample. Thirdly, the ARDL model can be used in spite of the stationary nature of the variables in the sample. Fourthly, the ARDL model makes it possible to make inferences on long-run estimates, which is not possible with alternative co-integration models. Finally, the ARDL Model can comprise a greater number of variables as compared to other Vector Autoregressive (VAR) models.

ARDL Model

The long-run relationship between the variables can be represented as follows:

$$\Delta \ln SI_t = \alpha + \sum_{i=1}^q \beta_i \Delta \ln SI_{t-i} + \sum_{i=0}^q \delta_i \Delta \ln Oil_{t-i} + \phi_1 \ln SI_{t-1} + \phi_2 \ln Oil_{t-1} + \varepsilon_t$$

Where Δ denote the difference operator, q is the lag order, ϕ is the long run coefficient, and the coefficient with summation sign (Σ) represent short run coefficient.

Co-integration Test

Two steps were used in the estimation utilized a parsimonious ECM. The first step was applied, following Akinboade et al. (2008), by introducing a lag length of three for the differenced variables. At that point, variables which were non-significant were dropped following Hendry and Ericsson (1991). The second step includes the identification of the presence of a co-integrating relationship by applying bounds-testing. To do that, a joint significance test of lagged regressors the F-statistic was used as follows:

$$\phi_1 \ln SI_{t-1} + \phi_2 \ln Oil_{t-1} = 0$$

Under the bounds test methodology, the null hypothesis of non-co-integration is examined through a joint significance test of the lagged variables $\ln SI_{t-1}, \ln Oil_{t-1}$ based on the Wald or F-statistics is represented as follows:

$$H_0: \varphi_1 = \varphi_2 = 0$$

$$H_1: \varphi_1 \neq \varphi_2 \neq 0$$

Due to the large sample, the two set of Pesaran and Shin (1999) for the critical F-values are used which was represented by upper and lower bound. A conclusive decision can be made regarding the co-integration of the regressors should the computed F-statistic for a chosen level of significance lies outside the critical bounds. The null hypothesis of no co-integration can be rejected only when statistic is higher than the upper bound. Then, the short-run and long-run elasticities may be determined by estimating ARDL ECM.

Data

This study uses monthly data that covers the period from November 2006 to February 2015 for oil price and GCC countries' stock market index (Bahrain, Qatar, Kuwait, Saudi Arabia, United Arab Emirates and Oman). These data are obtained from Bloomberg database.

Empirical Results and Analysis

Prior to the estimation process, the study has applied unit-root tests (PP as well as ADF) to test the stationarity of our variables. The results suggested that there is relationship between stock market and oil price in the long term as all variables are integrated at the first level.

Co-integration Test Results

Following Smith, Shin and Pesaran (2001), the study applied ARDL Model as well as Wald-based F-test in order to test the long term Co-integration relationship between stock market and oil price. The results are shown in Table 1.

The value of the F-statistics being 3.6514 are lower than the upper bound critical values in all GCC countries except Oman. This overall result shows that there is no co-integration between the oil price and the stock market in Bahrain, Qatar, Kuwait, Saudi, and UAE in the long run while there is a long run co-integration between oil price and stock market in Oman.

Table 1: GCC Co-integration Test Results

Country	F-statistic	Lower Bound	Upper Bound	Ecm (-1)	T-Statistic	Inference
Bahrain	3.6514	4.1400	4.9388	-.018133	-1.7369[.086]	No Cointegration
Qatar	1.5161	4.1400	4.9388	.068904	1.5587[.123]	No Cointegration
Kuwait	3.7886	4.1400	4.9388	-.027940	-1.7915[.077]	No Cointegration
Oman	5.9277	4.1400	4.9388	-.071996	-2.2629[.026]	Co-integration
Saudi	.17369	4.1400	4.9388	-.018053	-.42491[.672]	No Cointegration
UAE	.72901	4.1400	4.9388	-.024088	-1.0810[.283]	No Cointegration

On the other hand, to verify the findings of ARDL test the study applied the Error Correction Model (ECM). Similarly, ECM gives the same results with ARDL test. ECM is negative and insignificant at 5 percent level in all GCC countries except Oman. Therefore, there is no co-

integration between oil price and the stock market in the long run in all GCC countries except Oman which show that stock market fluctuations are affected by oil price in the long run.

Diagnostic Test Results

After establishing Co-integration among variables, the study applies ECM on our variables. The estimation starts by identifying the length of optimum lag to test our variable lag structures. According to the existing literature reviews, four essential models (the Hannan-Quinn Criterion, the Schwarz Bayesian (SBC), the adjusted-R Squared Criterion, and Akaike Information Criterion, (AIC)) used to choose length of optimum lag. In this vein, Kara (2002) found that no unique model and different models give different results. We select the number of lags based on AIC and SBC criteria. Moreover, the study tests for serial correlation, heteroscedasticity, functional form, structural stability and normality.

According to Lagrange Multiplier (LM) test there is no serial correlation among the residuals in our error correction models. Next, the study applies Ramsey RESET test to check the model misspecification. The RESET value is less than the critical value of 3.84 at 5% level which gives no evidence to reject the null hypothesis of no misspecification.

Both cumulative sum of squares (CUSUM of squares) and cumulative sum (CUSUM) applied against time to test model structural stability. At 5% significant level, the results are represented by two straight lines. Therefore, the study fails to reject the null hypothesis regarding correct specification of our model because the CUSUM lies within the two straight lines.

Table 2: Diagnostic Test Results

Country	Serial Correlation	Functional Form	Normality	Heteroscedasticity
Bahrain	12.591	1.140	1.961	2.281
Qatar	9.156	1.238	3.579	2.600
Kuwait	14.005	2.297	3.339	1.808
Oman	11.039	0.656	1.939	0.971
Saudi	6.272	1.727	1.299	1.613
UAE	13.427	1.676	2.653	1.386

Long-Run Model Results. As stated in the methodology section about the estimation of long run coefficients of stock market functions, in this section the estimated long run coefficients are reported and briefly discussed. In this connection, the study addresses the basic question of this section: how stock market response to oil price fluctuations in the long-run period?

Table 3: Long Run Coefficient Result

Country	Intercept		Oil	
Bahrain	4808.300	(1.926)*	-38.488	(-1.316)
Qatar	-3015.000	(-0.512)	119.497	(1.516)
Kuwait	21325.000	(1.845)*	-159.146	(-1.173)
Oman	10494.400	(2.608)**	43.720	(2.150)**
Saudi	-1177.500	(-0.061)	114.026	(0.465)
UAE	4126.600	(0.561)	-15.752	(-0.188)

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Parentheses are t-statistics.

The results of long run coefficients are reported in Table 3. The long run coefficients are the steady state which can be extracted by driving all changes in short run to zero. The oil price is insignificant at 10 percent level in all countries except in Oman. The result indicates that the oil price play no role in determining stock market price in the long run. Therefore, the study fails to reject the null hypothesis which states that there is no relationship between oil price and the stock market in the long run.

Short-Run Model Results. In the previous section, impact of oil price on stock market in the long run is measured. This section estimates the short run coefficients which also show the speed of adjustment toward long run equilibrium. The results of short run coefficients are reported in Table 4. The higher the short run coefficients imply faster adjustment.

Table 4: Short Run Coefficient Result

Country	Oil							
	0		1		2		3	
Bahrain	2.036	(2.075)**	1.408	(1.413)				
Qatar	40.261	(3.815)**	28.695	(2.467)**	8.618	(0.789)	18.080	(1.770)*
Kuwait	17.908	(2.551)***	5.428	(0.747)	11.355	(1.628)		
Oman	15.446	(2.479)***						
Saudi	23.629	(2.828)***	13.127	(1.450)	17.084	(1.825)*		
UAE	14.455	(2.789)***	10.073	(1.9293)*				

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. Parentheses are t-statistics.

The result of short-run coefficients estimate is shown in Table 4. The oil price coefficient is positive and significant at 5 percent in all countries. The result indicates that there is a significant relationship between oil price and the stock market in the short run. This suggests that oil price fluctuation in the short run affect Bahrain stock market.

Conclusion

The aim of this research is to determine whether a relationship exists between oil prices and the GCC stock markets price in both short run as well as long run. This research applies the ARDL model to investigate the relationship between oil prices and the stock market price in GCC for period of 2006-2015. The data are gathered from Bloomberg database on a monthly basis from November 2006 to February 2015. It is concluded that there is no long run co-integration between oil prices and the stock markets in all GCC countries except Oman. This result suggests that in the long run stock market price is not sensitive to oil price fluctuations in GCC countries while it is sensitive in Oman. In the short run model, it is found that there is a relationship between oil prices fluctuation and stock market prices in all GCC countries. Oil price has a positive and significant impact on stock market but the degree of impact vary from one country to another. These results suggest that oil price fluctuations play an important role in determining the stock market prices in GCC countries in the short run.

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