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## Article

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## **Oil Prices and Stock Market Returns in Oil Exporting Countries: Evidence from Saudi Arabia**

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### **ABSTRACT**

This study aims at investigating the reaction of Saudi Arabia stock market towards oil price fluctuations a sectoral level in particular. The study covered 4 years from (2012-2015). This time series witnessed historical high and low oil prices. The results of the study added a new evidence for the asymmetric reaction of stock markets towards oil prices that was reported by previous studies. The study used Granger causality and regression tests to explore the dynamics of sectoral responses. Saudi Arabia stock market proved that they faced the current oil drops bravely although certain sectors need to unbind or reduce their relation with oil markets to reduce the consequences of low oil prices on them. Several avenues for future studies are opened to investigate all GCC stock markets and use other methodologies to better understand the dynamics of GCC market sectors towards oil prices fluctuations.

**Keywords:** Saudi Arabia Stock Market, Oil Prices, Granger Causality

**JEL Classifications:** E44, Q21

### **1. INTRODUCTION**

Many international financial agencies forecasted that oil prices will keep going down in 2016 and they expected that oil prices will stay lower for longer. These prices put Gulf Cooperation Council Countries' economies under pressure and the future of its economic policies remains ambiguous under the slow growth of demand and the fast increase in supply due to the political and economic status of the region and the whole world as well.

GCC countries are considered as major international energy market players and their economies are believed to be heavily relying on oil (Aroui et al., 2011). The growth in the non-oil sector is also tied to the growth in the oil sector, however many studies indicated that although GCC countries have many similarities in their economies but they differ in their reliance on oil returns on a country level. GCC stock markets are also believed to be affected by the fluctuations of oil prices in many ways. Many studies focused on investigating the relation between oil prices and stock markets in developed

countries and some emerging markets like the GCC markets as a bloc or on a country level using several methodologies but this study is among the few studies which handled the relation from a different perspective as it is concerned in investigating the effect of oil prices on GCC stock markets on a sector level as this area remains unexplored enough to make a clear image for investors and policy makers in these countries. It is crucial to know the effect of oil prices on the sectors found in GCC financial markets and what are the sectors that are the mostly affected by oil price changes and the sectors that are the least affected ones. In the last decade some GCC countries embraced economic policies that would free the economy from being related directly to oil and would expand their economic base to reach a sustainable economy in the future such as GCC countries are (Qatar, Kuwait, Oman, KSA, Bahrain, UAE) the stock markets in GCC vary in size as the Saudi stock market has the biggest market capitalization followed by the Emirati stock market and at end of list come the Bahraini followed by the Omani stock market. There are few sectors in GCC stock markets and the most common ones are (banks, insurance, petrochemical industries and services).

The remainder of the paper is organized as follows. The next section briefly discusses the previous research and provides background information hypotheses development. Then, research methods are discussed and results presented. The paper ends with a conclusion and limitations of the study.

## 2. LITERATURE REVIEW

There is a great body of research that addressed the relation between oil prices and macroeconomic and financial variables. Many of these studies were conducted in net oil importing countries. Less work has been done in net exporting countries as well as new and emerging economies. Oil prices are believed to affect macroeconomic variables of countries such as (gross domestic product, interest rates, consumer price index, unemployment and industrial production). Moreover, researchers like Jones and Kaul (1996), Sadorsky (1996) and Huang et al. (1996) suggested that oil prices changes are important determinants of stock market returns. From financial and economic point of view, it is known that any asset price can be determined by calculating future or expected discounted cash flows generated from that asset. For example, if oil prices increased, costs would inflate and profits will decrease resulting in undermining of share-holders value causing stock prices decline. This would be the situation in net oil importing companies, however, most studies do not differentiate between oil importing and oil exporting countries. Filis and Chatziantoniou (2014) in their study compared between net oil exporting and net oil importing countries regarding the effects of oil price fluctuations on their financial and monetary policies. They found that the level of inflation is significantly affected by oil prices innovations in both countries and interest rates depend on the monetary policy regime in each country. Elwood (2001) explained the transmission techniques of oil prices fluctuations to stock markets through AD/AS framework. He explained that in a net exporting country, a rise in the oil prices will lead to increase in consumption and investment, eventually stock prices will rise due to the prosperous environment.

Oil prices are expected to have direct and indirect negative effects on stock market performance. The direct effect is in the risk factor that oil prices form for financial markets (Jones and Kaul, 1996). On the other hand, the indirect effect is in the aforementioned effect of inflation rates on stock market performance. Many studies documented these relations like Filis (2010), Chen (2010) and O'Neill et al. (2008).

Arouri and Rault (2012) found that positive oil price shocks have a positive impact on stock market performance in net oil exporting countries. The results seconded the opinion of Bashar (2006) in his study. However, Al-Fayoumi (2009) found no evidence on that result.

An asymmetric response of stock markets towards oil price shocks has been identified in the literature in many studies like (Lee and Chiou, 2010; Arouri and Nguyen, 2010; Miller and Ratti, 2009; Nandha and Brooks, 2009) this relation suggests that stock markets exhibit greater sensitivity to positive oil price changes. The opposite can be said about net oil exporting countries.

Hamilton (2009a) mentioned that oil price shocks could either originate from the industrialization of countries like China (demand side shock) or lack of quick response to the demand of the market (supply side shock). Kilian and Park (2009) argued that oil price shocks may originate from; aggregate demand side shock, precautionary demand shocks that rise from the uncertainty of future oil supplies based on future oil demands and supply side shocks.

Among the studies that focused on GCC economies come the work of Al-Khazali et al. (2006), Hammoudeh and Aleisa (2004) and Bley and Chen (2006). A study by Hammoudeh and Choi (2006) investigated the short run bilateral causal relationships between GCC weekly stock index returns and oil prices. They found that oil prices do not have a direct impact on these markets, however a study by Maghayreh and Al-Kandari (2007) found that oil prices have a significant impact on stock markets over the long period.

Arouri and a group of other researchers targeted GCC with a group of studies to better understand these economies as they are important oil market players and they form an investment opportunity for international investors who need to understand the dynamics of these markets adequately. Arouri and Fouquau (2009) investigated the relation between GCC stock markets and oil prices using non parametric method. They found that Oman, UAE and Qatar showed asymmetric responses to oil price changes. Arouri and Rault (2012) investigated the sensitivity of GCC stock markets towards oil price changes and they found that oil price fluctuations granger cause stock price changes providing a strong statistical evidence in all GCC countries except Saudi Arabia. They also found that Only in Saudi Arabia there is a causal and bidirectional relationship between oil prices and stock market prices. Moreover, Arouri et al. (2011) provide a further evidence that oil price changes impacts are different in each member country of GCC.

Mohanty et al. (2011) extended that work providing a closer look on the effects of oil price changes on the stock markets using country and industry levels. They found that all GCC stock markets except Kuwait stock market have a positive relation with oil price shocks. One drawback of this study is that it did not take in consideration stock market and oil price returns.

Louis and Balli (2014) investigated the relation between oil prices and GCC stock markets on a country and sector level. They found that investing in tourism and hotels in Bahrain, banks in Kuwait and industry in Oman is better than investing in crude oil market. Investment in UAE industry sector is as good as investing in crude oil market claiming that a portfolio of these stocks would be favorable than any other GCC investment portfolios with the same risk levels.

## 3. EMPIRICAL METHODS

### 3.1. Data, Time Series and Descriptive Analysis

A high frequency data was used in this study (daily data) for 4 years (2012-2015). This time series witnessed high oil prices at its beginning and the deterioration of oil prices at the end of it.

Data of Saudi Arabia sectoral and market returns were collected from TADAWUL database. For crude oil prices, the West Texas Intermediate prices were taken for this study as it is used widely in the world.

Descriptive statistics for the sample of the Saudi Arabia market shown in Table 1 as we obtained the returns for stock indices, the whole market and oil prices. The Saudi stock market consists of 12 sectors and it is the biggest stock exchange in GCC in terms of market capitalization. The sector that achieved the highest returns in the study period was petrochemical industries.

The lowest returns were achieved by Hotel and Tourism sector. A Kurtosis higher than 3 indicates potential heteroscedasticity (Zhang and Cao, 2014).

J-B for all sectors is  $<0.005$  which means that the data of sectors and oil prices are not normally distributed which is normal when obtaining financial data. All sectors were negatively correlated with oil prices except for the hotel and tourism sector. Regardless that, hotel and tourism sector was the only sector that is negatively correlated with the whole market index (Tadawul all share index [TASI]).

### 3.2. Model Design

The current study followed a methodology that have similarities with the methodology of Arouri (2011). The multifactor model of the study can be written as follows:

$$R_{it} = a + b \times R_{oil,t} + c \times GCCM_t^0 + \varepsilon_{it} \quad (1)$$

Where:  $R_{it}$  is the daily stock return in sector  $i$ ,  $R_{oil,t}$  is the oil price return,  $R_{m,t}$  is the market return.

Many researchers reported that oil shocks relation with any economic activity was not found to be entirely linear Hamilton (2003) and Zhang (2008). In net oil importing countries increasing oil prices have stronger effect than decreasing oil prices on these economies. However, in net oil exporting countries like GCC countries, the opposite is true. To test the asymmetric reaction of oil prices on stock markets, we shall first divide the time series of oil prices into two parts (negative and positive) as in Arouri et al. (2011).

## 4. CAUSALITY AND MULTIVARIATE REGRESSION TESTS RESULTS

We pursue a granger causality test to uncover the properties of the time series that we have in our study in order to know the reaction of Saudi Arabia market sectors against oil price changes. This method can reveal some statistical information that would help to predict oil and sectoral stock market dynamics (Zhang and Cao, 2014). To determine the effect of oil prices on sectoral returns we run regression tests for oil prices in general and for the positive and negative prices as well.

The second step in our investigation is pursuing a granger causality test and a regression test to determine if oil prices in general, the

positive and negative prices as well granger cause sectoral returns in the Saudi Arabia. This will lead us to know if there is asymmetric reaction from sectoral returns towards oil price fluctuations. Following that we conduct a regression test to determine if these prices really affect the returns in these markets. The results of the previous tests are shown in Table 2.

From Table 2 we notice the following: The returns of all sectors found in KSA stock market were granger caused by oil prices with different intensities except for Energy and Utilities sector. When decomposing the time series of oil prices into negative and positive time series and conducting a causality test, we find that the negative returns of these sectors are granger caused by negative oil prices, nevertheless, positive sectoral returns are not granger caused by the positive oil prices. The strongest causality between sectoral returns and oil prices was found in Retail sector followed by Cement sector and Banks & financial services sector. The whole market index (TASI) negative returns were also found to be strongly granger caused by the negative oil prices.

Results of the regression test of sectoral returns in Saudi Arabia stock market on oil prices are shown in Table 3. The whole market index (TASI) returns were found to be affected by oil prices with a strong statistical significance. On a sectoral level, a statistically significant effect of oil prices on returns was found in cement sector only. When conducting the test on the negative and positive oil prices, cement sector returns were affected on both sides by oil prices with a statistical significance. Moreover, insurance sector positive returns only, were affected by the positive oil prices with a statistical significance.

## 5. CONCLUSION AND FUTURE RESEARCH

GCC countries are considered major oil market players and their economies are believed to be reliant on oil revenues. At the time being, oil prices have reached a historical low prices and GCC economies are facing a challenging situation putting them under pressure to minimize their reliance on oil revenues and liberalize their economies as well as expand their economic base investing in new horizons to reach a sustainable economy. Nevertheless, GCC countries differ in the level of their reliance on oil revenues and in the last decade many of GCC countries invested largely in other economic spaces like infrastructures, transportations and financial markets. They also opened their markets for foreign investors in order to free their economies. The current oil prices drop opens the appetite of researchers to investigate its effect on GCC economies and to forecast the future of these economies and whether the aforementioned economic policies succeeded in somehow to free the economy in any level from being linked with oil markets. Researchers shall provide opinions and suggestions for policy makers regarding the future movements that should be taken in order to reduce the effect of oil price fluctuations on GCC markets. This study aimed to investigate the effect of oil prices on Saudi Arabia stock market and the sectors found in these market in particular.

The results of the study showed that the Saudi Arabia stock market exhibit asymmetric reaction towards oil prices

**Table 1: Sampling and descriptive analysis**

KSA Market from 01 January, 2012 to 31 December 2015; No. of observations 992									
Sectors	Descriptive statistics for the rate of return								
	Mean	Max	Min	SD	Skewness	Kurtosis	J-B (Prob.)	Correlation with oil	Correlation with TASI
Hotel and tourism	-0.087	9.089	-9.225	0.018	0.252	7.198	0.000	0.074	-0.646
Banks and financial services	-0.002	6.844	-8.124	0.011	0.126	10.749	0.000	-0.083	0.921
Cement	0.021	9.454	-7.297	0.010	1.014	18.543	0.000	-0.122	0.817
Petrochemical industries	0.047	9.925	-8.864	0.014	0.578	13.959	0.000	-0.090	0.909
Retail	-0.061	8.654	-6.402	0.011	0.908	12.625	0.000	-0.103	0.798
Energy and utilities	-0.001	23.644	-8.960	0.015	3.751	74.277	0.000	-0.030	0.411
Agriculture and food industries	-0.041	8.125	-8.229	0.013	0.326	10.245	0.000	-0.080	0.788
Telecommunication	0.013	8.075	-8.313	0.014	0.443	10.820	0.000	-0.077	0.723
Insurance	-0.001	10.323	-7.739	0.018	1.129	8.414	0.000	-0.047	0.715
Multi-investment	0.017	18.526	-7.889	0.017	2.124	20.559	0.000	-0.062	0.689
Industrial investment	0.000	11.182	-11.099	0.016	0.867	14.044	0.000	-0.041	0.472
Building and construction	0.043	10.068	-8.533	0.014	1.832	15.034	0.000	-0.107	0.876
TASI	-0.002	7.839	-8.192	0.011	0.977	15.756	0.000	-0.095	1.000

SD: Standard deviation, TASI: Tadawul all share index

**Table 2: Granger causality in Saudi Arabia financial market**

Sectors	Oil Price	Positive-oil price	Negative-oil price
Hotel and tourism	4.053** (0.018)	0.352 (0.704)	10.395*** (0.000)
Banks and financial services	6.633*** (0.001)	0.177 (0.838)	6.430*** (0.002)
Cement	7.248*** (0.001)	1.743 (0.177)	10.195*** (0.000)
Petrochemical industries	4.488** (0.012)	0.353 (0.703)	16.474*** (0.000)
Retail	10.176*** (0.000)	0.615 (0.541)	6.711*** (0.001)
Energy and utilities	2.267 (0.104)	0.035 (0.965)	2.188 (0.113)
Agriculture and food industries	6.040*** (0.003)	1.896 (0.152)	3.660** (0.026)
Telecommunication and information technology	3.707** (0.025)	0.829 (0.438)	12.627*** (0.000)
Insurance	4.454** (0.012)	1.807 (0.166)	1.487 (0.227)
Multi-investment	2.418* (0.090)	0.828 (0.438)	4.907*** (0.008)
Industrial investment	2.776* (0.063)	0.185 (0.832)	1.393 (0.249)
Building and construction	5.314*** (0.005)	0.425 (0.654)	13.421*** (0.000)
TASI	7.248*** (0.001)	0.210 (0.810)	11.035*** (0.000)

The null hypothesis: Oil price does not granger cause returns. Above is F-statistic, below if the (Prob.). Significance at: \*10%; \*\*5% and \*\*\*1% levels. TASI: Tadawul all share index

Arabia stock market than positive oil prices. This is consistent with what Hamilton (2003) and Zhang (2008) cleared out that the relation between oil price fluctuations and economic activities is not entirely linear.

The Saudi market exhibited the strongest reaction towards negative oil prices and almost all the sectors reacted negatively to the negative oil prices with different intensities. Retail sector, cement sector and Financial and Banks sector negative returns were granger caused by negative oil prices. Moreover, the whole Saudi stock market was affected by oil prices with a statistical significance and cement sector was the only sector to be affected by oil prices with statistical significance. The Saudi retail sector is a large sector in the market and the negative reaction may be perhaps of the atmosphere that negative oil prices may create among the Saudi public leading them to reduce their expenses in purchasing goods affecting retail sector stocks. Cement sector in Saudi Arabia is also a very important sector in the Saudi market and oil serves as an input for this industry. Arouri, (2011) mentioned that a sector's sensitivity to oil prices depends whether oil serves as its input or output. This sector receives a high subsidy from the Saudi government and cement prices in Saudi Arabia are from the lowest prices among the world. Perhaps the Saudi government may consider lowering this subsidy or cancel it or study other options. Other markets and exportation may be opened for this industry to enhance its performance and reduce its reliance on international oil prices. Investors may also diversify their portfolios taking in consideration the Saudi stock market sectors shares rather than the whole market share.

Regardless of all the previous results, the Saudi market is promising ones and succeeded in somehow to reduce the heavy reliance on oil but need further efforts and brave legislations to strengthen them in order to face the current situation or any future disturbances in the oil market.

fluctuations as found by Arouri and Fouquau (2009). This means that negative oil prices tend to have a greater effect on Saudi

Several avenues for future research are opened. Other GCC countries may be studied in the same way and other methodologies

**Table 3: Estimation regression of sectoral returns on oil price in Saudi Arabia market**

Sectors	OLS models					
	Oil price		Positive-oil price		Negative-oil price	
	$\beta$	t-statistic (Prob.)	$\beta$	t-statistic (Prob.)	$\beta$	t-statistic (Prob.)
Hotel and tourism	0.185	0.523 (0.601)	-1.871	-0.314 (0.754)	-0.016	-0.039 (0.969)
Banks and financial services	0.043	0.364 (0.716)	-2.698	-1.529 (0.128)	0.048	0.332 (0.740)
Cement	-0.135	-2.435** (0.015)	-2.504	-2.451** (0.015)	-0.143	-2.288** (0.022)
Petrochemical Industries	-0.016	-0.301 (0.763)	-0.891	-1.349 (0.179)	-0.030	-0.455 (0.649)
Retail	-0.192	-1.437 (0.151)	-0.897	-0.442 (0.659)	-0.178	-1.080 (0.280)
Energy and utilities	0.036	0.303 (0.762)	-0.280	-0.265 (0.791)	0.047	0.299 (0.765)
Agriculture and food industries	-0.031	-0.265 (0.791)	2.064	1.354 (0.177)	-0.088	-0.592 (0.554)
Telecommunication	-0.010	-0.363 (0.717)	0.163	0.413 (0.680)	-0.016	-0.445 (0.656)
Insurance	0.023	0.947 (0.344)	0.719	2.151** (0.032)	0.023	0.751 (0.453)
Multi-investment	0.011	0.168 (0.867)	1.193	1.314 (0.190)	0.023	0.276 (0.782)
Industrial investment	0.022	0.152 (0.879)	0.465	0.261 (0.794)	0.174	0.915 (0.361)
Building and construction	-0.050	-1.559 (0.119)	0.646	1.257 (0.210)	-0.034	-0.870 (0.384)
TASI	-0.394	-3.009*** (0.003)	0.319	0.240 (0.810)	-0.342	-1.961* (0.050)

Above is t-statistic, below if the (Prob.). Significance at: \*10%; \*\*5% and \*\*\*1% levels. TASI: Tadawal all share index

may be applicable to investigate the dynamics of GCC sectors on the short run and the long run as well.

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