

## Sectoral sensitivity of Oman stock market to oil price movements

**Mohammad Anasweh**

*Department of Finance and Banking, School of Business,  
Mutab University, Jordan  
[msanaswab@yahoo.com](mailto:msanaswab@yahoo.com)*

**Abstract.** This study investigates Omani stock market responses to the decline in oil prices. It examines the effects at both market and sectoral levels, specifically to distinguish the sector reaction from the market reaction as a whole. The period of the study, covering 10 years from 2010-2019, experienced huge swings in oil prices. Using Granger causality and regression analysis, the results support the asymmetric sensitivity of stock market returns to oil price fluctuations. This study also concludes that the Omani stock market and its heterogeneous sectors differ in their responses to oil price fluctuations. Oman stock market is dealing with the drop in oil prices by reducing the dependence of certain sectors on oil revenues which would make them less susceptible to the decline in oil prices. Further studies, employing different methodologies to investigate other GCC stock markets, will increase our understanding of the dynamics between oil price fluctuations and GCC sectoral returns.

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### 1. INTRODUCTION

Recently, the oil industry is facing its severest crisis, the collapse in oil prices since 2014 is expected to continue, and oil prices are projected to stay at a low level for a longer period of time. This low price is creating some challenges for the Gulf Cooperation Council (GCC) countries.

GCC members are the United Arab Emirates, Bahrain, Oman, Kuwait, Qatar and Saudi Arabia, with varying sizes of stock markets. When ranked by the total market capitalization, Saudi Arabia has the largest stock market, followed by the Emirati stock market. Bahrain, followed by Oman are at the bottom of the list (Hasan Al-Naser, M., 2019).

Those countries are the main players in energy and oil markets around the world, as they own the majority of oil reserves with economies heavily reliant on oil. Many studies indicate, however, that while

GCC countries have similar economic attributes, they differ in the levels of dependency on oil (Arouri et al. 2011; Hammoudeh & Aleisa, 2004; Zarour, 2006).

The recent sharp decrease in oil prices has certainly distorted the economic outlook for GCC and exported them to many challenges. In response, some GCC countries announced various economic policies and reforms to reduce their dependency on the oil market, to increase their financial base, and to create a more balanced economy. Given the expected long-lasting decrease in oil prices, it is useful to determine whether Omani economy was able to immunize itself from the adverse impact of oil price fluctuations. This information would also aid future economic decisions aimed at enhancing GCC economies' performances in the face of oil price volatility.

Recently, exploring the interconnections between oil prices and macroeconomic indicators including stock markets has emerged. In this context, oil prices are found to significantly impact MENA (Chen et al., 1986), Greece (Papapetrou, 2001), GCC as a bloc (Arouri et al., 2011), specific countries in GCC (Alazemi & Al Omari, 2020; Hamdan & Hamdan, 2020), developed economies (Basher & Sadorsky, 2006; Sadorsky, 2003; Kilian, 2008; Kilian & Park, 2009; Jones & Kaul, 1996); and emerging economies (El-Wassal, 2005). These studies measured macroeconomic performance by looking at the stock market return. Several methodologies were used to model the type of the relationship between oil prices and stock markets' performance such as vector autoregression (Sadorsky, 1999), vector-error correction (Hammoudeh and Choi (2006), multifactor arbitrage pricing theory (Basher & Sadorsky, 2006) and others.

Moreover, the reaction of the stock markets to oil price changes depends on the position of the country in the oil market. While a negative relationship is expected for oil importing countries, a positive relationship should prevail in oil exporting countries. Thus, and in this context, this study analyses the role of oil price fluctuations on the different sectors operating in Omani financial market, in order to determine the sectors that are exposed to and those that are immunized against oil price variabilities. It is among the few that investigate the effect of oil prices on Omani stock market from a sectoral perspective, providing valuable information for investors and policy makers in Oman.

The rest of the paper proceeds as follows. Section 2 provides a brief summary of previous studies while Section 3 defines the data and explains the methodology. Descriptive statistics and major empirical results are discussed in Section 4 and Section 5 respectively. Finally, Section 6 summarizes and concludes the paper.

## **2. LITERATURE REVIEW**

The financial theory implies that the price of any asset is equal to the present value of expected cash flows generated from that asset. Thus, a surge in oil price inflates costs and decreases profits and cash flows, which undermines shareholders' value, causing a decline in the stock price. Hence, an increase in oil prices should lead to a decline in stock prices. However, this situation is more common in net oil importing companies whose production costs depend on oil prices. In oil exporting countries, an increase in oil prices, through increasing the country's income and economic growth, will generate a rise in consumption and investment, which in turn will create a positive impact on the stock market. Using the aggregate demand and aggregate supply model to address the spill overs of oil price changes on market performance, Elwood (2001) found that a rise in the oil prices in net exporting countries leads to a higher level of consumption and investment, resulting in an increase in the price of the stock index. However, in oil importing countries, an increase in oil prices, through increasing production costs, will increase consumer prices, which in turn will reduce the demand, consumption, and spending, creating a negative impact on stock markets (Sadorsky, 1999; Jones and Kaul, 1996). Thus, while the stock markets react negatively to an increase in oil price in oil importing countries, they might react positively in oil exporting countries.

Within the same framework, the negative transmission of oil prices to the stock market can be directly and indirectly. The direct effect can be explained by the risk factor and uncertainty that oil prices create in the financial world (Jones and Kaul 1996). The indirect effect is justified by the higher production costs and the lower consumption and production levels resulting from higher oil prices.

Moreover, the impact of oil prices on stock prices is attributed to the uncertainty created which could be driven by demand-side and supply-side factors (Hamilton, 2009a). The change in the oil demand from China and other industrialized economies (demand side) and the failure of global production to increase to meet market demand (supply side) might explain the fluctuations in oil prices. It is found that shocks resulting from demand side such as increase in global demand will positively impact stock markets, while those originating from supply side will negatively impact stock returns (Kilian and Park, 2009).

After discussing the theoretical explanation behind the possible linkage between oil prices and stock markets, we will proceed by briefly discussing some empirical studies related to this topic.

A strand of studies examines the interconnection between oil price fluctuations and macroeconomic indicators like GDP, inflation rates, interest rates, unemployment, and industrial production. Moreover, some researchers have used the return on the stock market as the macroeconomic indicator (Jones & Kaul, 1996; Sadorsky, 1999; Afana & El Agha, 2019; Haung et al., 1996). While majority of studies have focused on oil importing countries, fewer studies have addressed oil exporting countries or new and emerging economies. Moreover, previous studies fail to discern between oil importing and oil exporting countries.

The impact of oil prices on stock markets was supported by many studies. The relationship is found to be positive in some oil exporting countries (Bashar, 2006; Arouri and Rault, 2012), negative in oil importing countries (Jones & Kaul, 1996; Killian & Park, 2009; Papapetrou, 2001; Bashe & Sadorsky, 2006), and neutral in some studies (Al-Fayoumi, 2009). The absence of any significant impact of oil price changes on stock market returns suggest that some economies succeeded in being less vulnerable to oil price changes, so that these effects are no longer transmitted to the stock market. For example, Filis et al. (2011) and Filis and Chatziantoniou (2014) found that although oil price innovations significantly affect inflation rates, the monetary authorities are stressing on inflation stability. Thus, some countries, via counter-inflation monetary policy, are preventing the inflationary pressures created by oil price, which could explain the neutral relationship. Nevertheless, some studies show that the transmission relationship between oil price changes and the economy depends on the direction of price changes and that this relationship is asymmetric (Lee and Chiou 2011; Arouri and Nguyen 2010; Miller and Ratti 2009; Nandha and Brooks 2009). Their findings also suggest that stock markets are more sensitive to positive oil price changes, with an opposite relationship in net oil exporting countries.

In summary, the response of the stock market is affected by the relative importance of positive and negative impacts in any given country.

Using vector autoregression, Sadorsky (1999) studied the impact of oil price on stock markets in the United States, which is considered as a major oil importer and his finding supported the presence of a negative relationship. Four years later, Sadorsky (2003) revealed that the negative impact of oil prices on technology stock prices is an indirect relationship driven by the impact of oil prices on inflation rates. Sadorky (2001) conducted a similar study targeting the Canadian oil and gas sector and his results support the presence of a positive relationship between oil prices and the oil equity index.

A group of many researchers studied GCCs to better understand these economies given that they are significant participants in the oil market. Understanding the impact of oil price variations on the economic performance of those countries is important for policymakers, regulators, and investors (Al-Khazali et al., 2006; Hammoudeh & Aleisa, 2004; Bley and Chen, 2006). Although this topic was extensively studied, the type of the reaction of the stock market to the oil price change is still uncovered. On the one hand, Hammoudeh and Choi (2006) found no predictive impact of oil prices on any GCC market in the short run.

On the other hand, some studies found that oil prices have a direct and significant impact on GCC market (Maghayereh and Al-Kandari, 2007; Hamdan et al., 2020; Awwad, 2018). In GCC, Arouri et al (2011) investigated the same relationship between 2005 and 2010 and they found that oil prices and stock markets are positively intertwined. An increase in oil price is positively transmitted to the stock market. The same positive relationship is confirmed by Dutta et al. (2017) in Qatar, Kuwait, Saudi Arabia, and UAE.

However, Arouri and Fouquau (2009) tackled the sensitivity of GCC stock markets to oil prices using the non-parametric method. Their results support the presence of asymmetric impacts of oil prices on stock market returns in Oman, UAE and Qatar. Arouri and Rault (2012) investigated the responses of GCC stock markets to oil price fluctuations. The result supports the presence of a causal and bidirectional relationship between oil prices and stock markets in Saudi Arabia and a unidirectional relationship in other GCC countries. More specifically, in GCC countries, oil price fluctuations Granger cause stock market returns (Hamdan, R.K., and Hamdan, A.M., 2020). However, the impact of oil price fluctuations differs in each GCC country (Arouri et al., 2011). Similarly, Cheikh et al. (2018) found a new evidence supporting the non-linear relationship in GCC between 2004 and 2015. They found that stock markets are more affected by negative changes of oil prices than by positive changes in oil prices.

Mohanty et al. (2011) extended the analysis by assessing the relationship between oil price changes and stock market returns at the country and industry levels. Their findings show that stock markets, except the Kuwait stock market, have a significant exposure to oil price shocks. However, this study fails to consider stock market and oil price returns (Kassim, E. and El Ukosh, A, 2020).

Similarly, Louis and Balli (2014) explored the linkage between oil prices and the stock markets in GCC per country and per sector. Interestingly, they found that investments in other sectors, such as banks in Kuwait, hotels and tourism in Bahrain, and industry in Oman, are more profitable than investments in the crude oil market, while investments in the UAE industry sector are similar to investment in the crude oil market. They conclude that a portfolio made of these stocks would be more attractive than other GCC portfolios with a similar level of risk.

From the existing research, it can be concluded that previous studies have explored the linkage between oil prices and the stock market. However, majority of the studies have focused on this relationship in oil importing and developed markets such as USA, UK and Europe, while emerging markets, net oil exporting countries, and new stock markets such as GCC stock markets are not well explored. Thus, the objective of this study is to fill the gap of already existing literature by exploring this relationship in one GCC market from the sectoral perspective. Studying the impact on the whole stock market masks the response of its heterogeneous sectoral components. Each industry is characterized by a varying degree of its dependence on oil, which suggests that each sector might react differently to oil price shocks. Faff and Brailsford (1999) explored the sectoral reactions to oil price fluctuations in Australia and concluded that the impact of oil prices volatility on stock markets is positive in energy industry and negative in paper, packaging and transportation industries. El-Sharif et al. (2005) revealed that soaring oil prices have a significant impact on UK's oil and gas sector equity index. The conclusion that the relationship between oil price fluctuations and stock market depends on the industry is also supported by Arouri and Nguyen (2010) in Europe. As evidenced by the previous empirical studies, the relationship between oil price fluctuations and stock markets remains contradictory and open to further research.

### **3. METHODOLOGY AND DATA**

The relatively high oil prices that start in 2003 have strengthened the macroeconomic indicators in the GCC countries, leading to an economic boom. However, recent declining oil prices, due to a reduction in demand resulting from factors such as slower economic growth in China, have changed this situation. Thus,

the GCC countries face the urgency to attract foreign investors, diversify and liberalize their economies, develop the non-oil private sector, and increase the market efficiency by adopting several economic reforms. Examples of such reforms are the Saudi 2010 Ministry of Planning and Economics Plan designed to diversify its economic base and enhance the performance of non-oil sectors. Currently, the sensitivity of GCC economies, especially their financial markets to the low oil prices, remains unclear. Thus, this study aims to analyse and evaluate the effect of low oil prices on the overall stock market in Oman and on each sector operated in this market to better understand the extent of the reduced dependence on oil revenues. We cover one GCC countries which is Oman. The methodology adopted in this study is similar to Arouri's methodology (2011). Equation 1 below displays the multifactor model used in this study (Hamdan, A., Hamdan, R., 2020).

$$R_{it} = \alpha + b \times Oil_t + c \times GCCM_t^0 + \varepsilon_{it} \quad (1)$$

Where  $R_{it}$  is defined as the monthly stock return in sector $_i$ , oil is the oil price; and  $GCCM_t^0$  is the return on the market.

### 3.1. Asymmetric effect of oil price fluctuations

The existence of a nonlinear effect of oil price swings on economy is supported by many researchers such as Zhang (2008) and Hamilton (2003). More specifically, in net oil importing countries, stock returns are more affected by positive oil price fluctuations than by negative oil price fluctuations. However, the reverse relationship takes place in net oil exporting countries such as Oman, whose markets are more affected by decreasing oil prices. To explore the asymmetric impact of oil price fluctuations on the stock market return and following Arouri et al. (2011), the period of the study is divided into two time series based on the direction of oil price variations (negative and positive) using the functions below:

$$Loil_t = Loil_0 + Loil_t^+ + Loil_t^- \quad (2)$$

where  $Loil_0$  is the initial oil price and:

$$Loil_t^+ = \sum_{i=0}^{t-1} 1\{\Delta Loil_{t-i} \geq 0\} \Delta Loil_{t-i}$$

and

$$Loil_t^- = \sum_{i=0}^{t-1} 1\{\Delta Loil_{t-i} < 0\} \Delta Loil_{t-i} \quad (3)$$

Then, we estimate the following model:

$$R_{it} = \alpha + b^+ \times Oil_t^+ + b^- \times Oil_t^- + c \times OmanM_t^0 + \varepsilon_{it} \quad (4)$$

where  $R_{it}$  is the monthly stock return in sector $_i$ ,  $Oil_t^+$  is the positive oil price, and  $Oil_t^-$  is the negative oil price,  $OmanM_t^0$  is the market return.

### 3.2. Causality test

A Granger causality test is used to test the presence of a causal relationship between oil price changes and the Omani stock market return. This method is applied in many empirical studies and it helps to forecast the dynamics between oil prices and sectoral stock market performance (Zhang & Cao, 2014). Moreover, and to investigate the impact of oil price changes on sectoral returns, we run the regression for all oil price fluctuations and for the increase and decrease price fluctuations.

### 3.3. Data and Data analysis

Monthly data were used to better capture the properties of the time series for 10 years, 2010-2019. This period is marked by dramatic swings in oil prices. The latter recorded a high level at the beginning of this period, with a sharp drop at the end of this period. Data for Oman's sectoral and market returns were obtained from Bloomberg database, whereas crude oil prices data were collected from the West Texas Intermediate (WTI).

## 4. DESCRIPTIVE ANALYSIS

Table (1) reports the descriptive statistics of the sectoral return and the whole stock market return. The correlation between stock return and oil prices is also presented. The Omani stock market has the smallest market capitalization among the GCC countries and is the least diversified. It comprises three sectors, adding to a newly established sector (Islamic financial services), which was excluded from this study. The highest returns were achieved by Industrial sector, while the Financial sector displayed the lowest returns. A positive correlation was obtained between all sectors, including the whole market, and oil prices.

Table 1

Descriptive Statistics of Omani Market

Monthly Data from 1 Jan. 2010 to 31 Dec. 2019									
Sectors	Mean	Max	Min	SD	Skewness	Kurtosis	Jarque-Bera (Prob.)	Correlation with oil	Correlation with OMI
Financial	0.0037	0.1956	-0.3663	0.0797	-1.2510	8.1688	0.0000	0.0329	0.8350
Industrial	0.0075	0.2617	-0.4324	0.0872	-1.2435	10.9636	0.0000	0.1226	0.7975
Services	0.0050	0.2392	-0.3626	0.0660	-1.3806	13.6449	0.0000	0.1948	0.8259
Oman Market Index	0.0025	0.1844	-0.3352	0.0660	-1.4117	10.2197	0.0000	0.1107	0.9146

Source: Author's calculations

## 5. EMPIRICAL RESULTS

### 5.1. Unit root tests

As a first step and to verify the properties of the series of all our variables, namely sectoral returns, Omani market index return, and oil prices, we use three unit root tests, such as Augmented Dickey Fuller (ADF), Phillips Perron (PP) and Kwiatkowski et al. (1992) (KPSS). More details on applying these tests are found in Arouri et al. (2011). The results in table 2 indicate that the time series are stationary in Oman. The implication of this finding is that we can proceed by running causality and regression without the need for co-integration testing found in Arouri et al. (2011) study. Oman is an oil-exporting country where oil is considered as the main commodity and a key driver of its economic performance.

Table 2

## Unit Root Tests

ADF is the augmented Dickey-Fuller test, PP is Phillips-Perron test and KPSS is the Kwiatkowski-Phillips-Schmidt-Shim test. (a) refers to the model with no constant and no trend, (b) refers to the model with a constant but without trend, and (c) refers to the model with a constant and with a trend. \*, \*\*, \*\*\*, denote rejection the null hypothesis at 10%, 5%, and 1%.

Sectors	Levels			First difference		
	ADF	PP	KPSS	ADF	PP	KPSS
Financial	-8.08058***a	-8.48613***a	0.04570a	-12.56727***a	-28.16592***a	0.44633a
Industrial	-4.91518***a	-7.14762***a	0.03046a	-17.96509***a	-21.50655***a	0.45270a
Services	-4.52200***a	-9.47906***a	0.04760a	-11.35399***a	-35.32900***a	0.45544a
Oman Market Index	-4.53628***a	-8.29002***a	0.04094a	-10.71001***a	-23.80285***a	0.11295*a
Oil Price (WTI)	-2.76366b	-2.52946b	0.18564**c	-6.73042***a	-6.70036***a	0.03188a

Source: Authors' results.

## 5.2. Granger causality tests:

Table 3 shows that in Oman, oil prices Granger cause returns for all sectors. Moreover, increasing and decreasing oil prices Granger cause returns for all sectors.

Table 3

## Granger Causality in Omani Market

The null hypothesis: Oil price does not Granger Cause returns. F-Statistic is reported in the top and P-value below. \*, \*\*, and \*\*\* denote significance at 10%, 5% and 1% levels, respectively.

Sectors	Oil Price	Positive changes in Oil Price	Negative changes in Oil Price
Financial	5.642***	6.645***	3.547**
	0.000	0.000	0.000
Industrial	7.542***	8.254***	4.542**
	0.000	0.000	0.000
Services	10.545**	8.542***	12.054**
	0.000	0.000	0.000
Oman Market Index	10.548***	16.542***	18.054***
	0.000	0.000	0.000

## 5.3. Regression results

As seen in table 4, the Omani stock market and all its sectors, except the Industrial sector, are affected by general oil price changes and by increasing oil price changes. The findings also indicate that all sectors in Oman are highly affected by negative oil price fluctuations.

Table 4

## Regression of sectorial returns on oil price in Omani market

T-Statistic is reported in the top and P-value is reported below in parentheses. \*, \*\*, and \*\*\* denote significance at 10%, 5% and 1% levels, respectively.

Sectors	Oil Price		Positive-Oil Price		Negative-Oil Price	
	$\beta$	t-Statistic (Prob.)	$\beta$	t-Statistic (Prob.)	$\beta$	t-Statistic (Prob.)
Financial	-0.051	-3.527***	-0.085	-1.899***	0.005	3.192***
		(0.006)		(0.002)		(0.004)
Industrial	0.074	0.845	0.001	0.131	0.008	5.160***
		(0.874)		(0.840)		(0.000)
Services	0.051	8.354***	0.000	8.998***	0.003	3.874***
		(0.000)		(0.000)		(0.005)
Oman Market Index	0.012	5.555***	0.254	6.645***	0.015	6.548***
		(0.000)		(0.000)		(0.000)

## 6. DISCUSSION AND CONCLUSION

GCC's revenues are increasingly dependent on oil, which make the economies of those countries susceptible to oil price fluctuations. Currently, the dramatic fall of oil prices is putting pressures on GCC economies to minimize their reliance on oil, diversify their economies, and expand the non-oil sectors. Nevertheless, GCC countries face these challenges in varying degrees. In the last decade, many countries have developed alternative sources of revenues by investing heavily in other areas such as infrastructure, transportation, and financial markets and by opening their markets to foreign investment. The recent fall of oil prices encourages academics to explore its impact on GCC economies, to predict the outlook of these economies, and to determine the level of success of economic policies intended to decrease the reliance on oil markets. This study examined the impact of oil prices in Oman, one of the six GCC countries. The results show that the Omani stock market, as overall, exhibits asymmetric reactions to oil price fluctuations consistent with Arouri and Fouquau (2011). More specifically, declining oil prices have a larger impact on Omani stock market than increasing oil prices, supporting the findings of Hamilton (2003) and Zhang (2008) of asymmetric impact of oil price fluctuations on economic activities.

By dissecting the impact of oil prices on each sector operating in Omani market, the results found that all the sectors reacted to the negative oil prices but with different magnitudes. Furthermore, there is a statistically significant relationship between the general oil prices and all sectors in Omani market, except the Industrial sector. The result is consistent with Arouri et al. (2011) who found that the characteristics of the industry affects the relationship between oil price swings and market returns. Since the services sector in Oman depends on oil market, a decline in oil prices might have a negative impact on this sector's performance. Thus, consideration is needed to lessen the negative effects of low oil prices on this sector's return.

GCC markets hold promise, and they have succeeded in decreasing their heavy reliance on the oil market in varying degrees. However, governments should play a role in initiating and enacting more regulations to improve the capacity of all sectors to better confront the falling and any future fluctuation in the oil market. Reconsidering government subsidies is one option. In addition, strengthening the private sectors and reducing government control of other sectors may also be beneficial. Further research may include similar studies of other GCC countries and other methodologies could also be employed to further explore the sensitivity of GCC sectoral performance in both the short and long term.

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