Oil Prices and Stock Markets: What Drives what in the Gulf Corporation Council Countries?

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Abstract

In the empirical literature, only few studies have focused on the relationship between oil prices and stock markets in net oil-importing countries. In net oil-exporting countries this relationship has not been widely researched. This paper implements the panel-data approach of Kónya (2006), which is based on SUR systems and Wald tests with country-specific bootstrap critical values to study the sensitivity of stock markets to oil prices in GCC (Gulf Corporation Council) countries. Using two different (weekly and monthly) datasets covering respectively the periods from 7 June 2005 to 21 October 2008, and from January 1996 to December 2007, we show strong statistical evidence that the causal relationship is consistently bi-directional for Saudi Arabia. Stock market price changes in the other GCC member countries do not Granger cause oil price changes, whereas oil price shocks Granger cause stock price changes. Therefore, investors in GCC stock markets should look at the changes in oil prices, whereas investors in oil markets should look at changes in the Saudi stock market.

JEL-Code: G12, F30, Q43.

Keywords: GCC stock markets, oil prices.

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1. Introduction

In theory, the value of stock is equal to the discounted sum of expected future cash-flows. Identifying the factors that affect these cash-flows is of utmost relevance and importance to investors and policy makers. As oil price has changed with sequences of very large increases and decreases over recent years, it is now quite opportune to augment the existing research on its impacts on stock prices. Indeed, corporate cash-flows are affected by macroeconomic events that can be influenced by oil price variations. The aim of this article is to contribute to the literature by investigating the causal links between stock markets and oil prices.

Unlike most previous papers, which focus on the U.S., European and major Asian stock markets, our paper analyses the impact of oil price fluctuations on Gulf Corporation Council (GCC) markets. These markets are interesting for several reasons. First, GCC markets have attracted increasing attention in the last decade. In the wake of high oil prices since 2003, they have known high economic growth rates. They have also become important international investors and trade partners, and play a crucial role in world energy markets. Indeed, most GCC countries are major exporters of oil in global energy markets, so their stock markets may be susceptible to changes in oil prices. However, the transmission mechanisms of oil price shocks to stock returns in GCC markets should be different from those in net oil-importing countries. Indeed, oil price increases positively affect earnings, government budget revenues and expenditures and aggregate demand, and thus positively affect corporate income and stock prices. However, oil price increases are also synonyms of high expected inflation pressure and money supply, which in turn affect the discount rate and therefore negatively affect stock prices in GGC countries. Second, the GCC markets differ from those of developed and from those of major emerging countries in that they are largely segmented from the international markets and are overly sensitive to regional political events. Finally, GCC markets are very promising areas for international portfolio diversification. Studying the

influence of oil price shocks on GCC stock market returns can help investors make necessary investment decisions and for policy-makers regulate stock markets more effectively.

A large body of recent work examines the links between oil prices and macroeconomic variables. This work has underscored the significant effects of oil price fluctuations on economic activity in mature and in emerging markets [Brown and Yücel (2002), Cunado and Perez de Garcia (2005), Balaz and Londarev (2006), Gronwald (2008), Cologni and Manera (2008), Kilian (2008), Lardic and Mignon (2006, 2008), and Lescaroux and Mignon (2008)]. Despite studies showing that oil price shocks have significant effects on the economy, relatively fewer works have looked into the relationship between oil prices and stock markets. Furthermore, most of this research has focused on developed oil importers; very little has looked at emerging markets or exporters. The pioneering paper by Jones and Kaul (1996) tests the reaction of international stock markets (Canada, UK, Japan, and US) to oil price shocks on the basis of the standard cash flow dividend valuation model. They found that for the US and Canada this reaction can be accounted for entirely by the impact of the oil shocks on cash-flows. The results for Japan and the UK were inconclusive. Using an unrestricted vector autoregressive (VAR), Huang *et al.* (1996) show a significant link between some US oil company stock returns and oil price changes. However, they find no evidence of a relationship between oil prices and market indices such as the S&P500. In contrast, Sadorsky (1999) applies an unrestricted VAR with GARCH effects to US monthly data and shows a significant relationship between oil price changes and aggregate stock returns. More recently, El-Sharif et al. (2005) examine the links between oil price changes and stock returns in the UK oil and gas sector. They establish that the relationship between the two variables is significantly positive.

Some works have more recently focused on major European, Asian and Latin American emerging markets. In general, these studies show significant short- and long-term

relationships between oil price changes and emerging stock market returns. Using a VAR model, Papapetrou (2001) shows a significant relationship between oil price changes and stock markets in Greece. Basher and Sadorsky (2006) use an international multifactor model and reach the same conclusion for other emerging stock markets. However, less attention has been paid to smaller emerging markets, especially in the GCC countries where share dealing is a relatively recent phenomenon. Using VAR models and cointegration tests, Hammoudeh and Eleisa (2004) show that there is a bidirectional relationship between Saudi stock returns and oil price changes. The findings also suggest that the other GCC markets are not directly linked to oil prices and are less dependent on oil exports and are more influenced by domestic factors. Bashar (2006) uses VAR analysis to study the effect of oil price changes on GCC stock markets and shows that only the Saudi and Omani markets have the power to predict increases in the price of oil. More recently, Hammoudeh and Choi (2006) have examined the long-term relationship among the GCC stock markets in the presence of the US oil market, the S&P500 index and the US Treasury bill rate. They find that the T-bill rate has a direct impact on these markets, while oil and the S&P500 have indirect effects. Finally, Lescaroux and Mignon (2008) have studied the relationships between oil and stock prices for a large panel of developed and emerging countries. They find some evidence of positive causality from oil prices to stock prices in some GCC countries.

As we can see, the findings of the little available work on GCC countries are contradictory. These findings are puzzling because most GCC countries are heavy oil exporters. Furthermore, the GCC economies are oil dependent and are thus sensitive to oil price changes. But previous results are based on country analysis and use time series data from relatively short periods. Our paper differs from previous studies by applying a recent bootstrap panel causality test to examine the relationship between oil and stock markets in

GCC countries. The advantages of panel-data methods in the macro-panel setting include the use of data for which the spans of individual time series data are insufficient for the study of many hypotheses.

In addition, in the specific approach we use in this paper that requires no pre-testing for unit roots and cointegration [as in Phillips (1995)], we allow for cross-country correlation. This question is crucial and responds to the complex nature of the interactions and dependencies that generally exist over time and across the individual units in the panel. For instance, observations of firms, industries, regions and countries tend to be cross-correlated as well as serially dependent. As pointed out by Breitung and Pesaran (2005), the cross-section dependence can arise for a variety of reasons, including spatial spill-over effects, common unobserved shocks, social interactions, or a combination of these factors. For our paper, cross-dependence can mirror cultural similarities, common financial, economic and social policies in GCC countries, high dependency on the revenues generated from oil exports, herding, contagion, and volatility transmission.

Our econometric investigation is based on two different complementary (weekly and monthly) datasets, respectively from 7 June 2005 to 21 October 2008, and from January 1996 to December 2007. There are two main reasons for this. Firstly, we think that weekly data may adequately capture the interaction of oil and stock prices in the region better than any other data frequency. However, our weekly data set, which deals with all the six GCC countries, only includes less than four years of data, which can be considered as too short to test for causality. Indeed, as emphasized by Shiller and Perron (1985) it is not the frequency (number of observations) rather the span (number of years) of the data that is more important to test for random walk hypothesis of economic variables or causal relationships. Secondly, our monthly database which covers twelve years of data only includes four GCC countries out

of six and doesn't permit to draw any conclusion about Qatar and United Arab Emirates which are absent from the database. Consequently, given data availability, using simultaneously the two different datasets can be seen as test of robustness of our econometric results.

The rest of the paper is organized as follows. Section 2 briefly presents the GCC markets and discusses the role of oil. Section 3 presents the data and discusses the results of the empirical analysis, while section 4 provides summary conclusions and policy implications.

2. GCC economies, stock markets and the role of oil

The GCC was established in 1981 and it includes six countries, namely, Bahrain, Oman, Kuwait, Qatar, Saudi Arabia and the United Arab Emirates (UAE). GCC countries share several common patterns. In 2007, they produce together about 20% of all world oil, control 36% of world oil exports and possess 47% of proven reserves. Oil exports largely determine earnings, government budget revenues and expenditures and aggregate demand. Table 1 shows some key financial indicators for the GCC economies. The contributions of oil to GDP range from 22% in Bahrain to 44% in Saudi Arabia. Moreover, Table 1 indicates that for the three largest GCC economies—Saudi Arabia, UAE, and Kuwait—the liquidity of the stock market is positively associated with the importance of oil in these economies.

The rationale for using oil price movements as a factor affecting stock valuations is that, in theory, the value of stock equals the discounted sum of expected future cash flows. These cash flows are affected by macroeconomic events that can be influenced by oil shocks. Indeed, oil exports affect the main economic variables in GCC countries: earnings, government budget revenues and expenditures and aggregate demand. So oil price increases

should positively affect corporate output and earnings, and then stock returns in these countries. However, GCC countries are also importers of manufactured goods from developed and emerging countries. Therefore, oil price fluctuations can indirectly impact GCC markets through their influence on the prices of imported products and in this case increases in the price of oil are often indicative of inflationary pressure in the GCC economies, pressure that could indicate the future of interest rates and investment of all types.[3] In short, oil price fluctuations should affect corporate output and earnings, domestic prices and stock market share prices in GCC countries. However, unlike the link, expected to be negative, between oil prices and stock markets in most net-oil importing countries, the link between oil price shocks and stock market returns in GCC countries is ambiguous and the total impact of oil price shocks on stock returns depends on which of the positive and negative effects offset the other.

Table 1- GCC economies, stock markets and oil in 2007

Market	Number of companies*	Market Capitalization ($ billion)	Market Capitalization (% GDP) *	Oil (% GDP)*
Bahrain	50	21.22	158	22
Kuwait	175	193.50	190	35
Oman	119	22.70	40	41
Qatar	40	95.50	222	42
UAE	99	240.80	177	32
S. Arabia	81	522.70	202	44

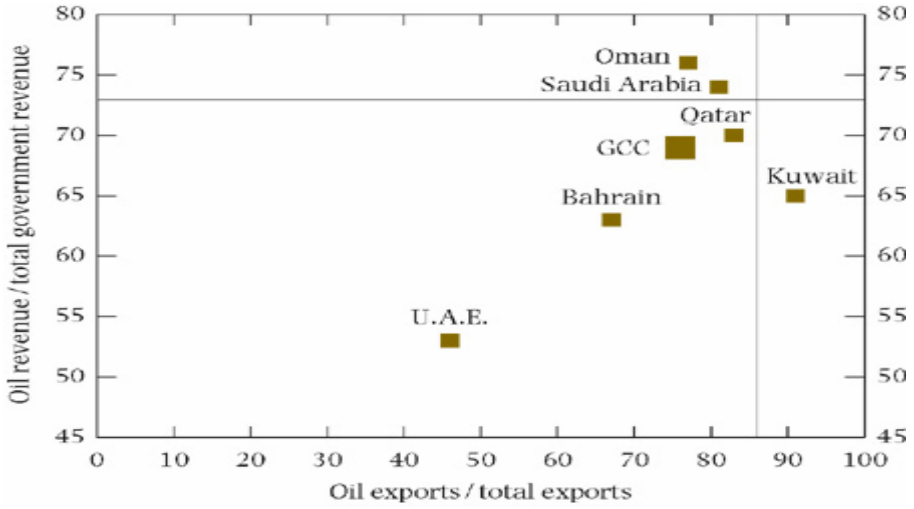
Sources: *Arab Monetary Fund and Emerging Markets Database. * Numbers in 2006.*

Table 1 also shows that Saudi Arabia leads the region in terms of market capitalization. The Saudi stock market represents more than 40% of all GCC markets. However, in comparison to each country's GDP, Qatar is the leader. Stock market capitalization exceeded GDP for all counties except Oman. Kuwait, followed by Oman, has the largest number of listed companies. Overall, GCC stock markets are limited by several structural and regulatory

[3] Note that food prices and the peg of the exchange rate to the US dollar were among the major causes of imported inflation in GCC economies.

weaknesses: relatively small numbers of listed firms, large institutional holdings, low sector diversification, and several other deficiencies. In recent years, however, legal, regulatory, and supervisory changes have increased market transparency. The liquidity of GCC markets has improved and operations were opened to foreign investors. In March 2006 Saudi authorities lifted the restriction that limited foreign residents to dealing only in mutual funds and the other markets have progressively followed suit.[4]

Figure 1: GCC countries and oil dependency



Source: Fasano and Iqbal (2003), International Monetary Fund.

Finally, GCC countries may have much in common, but they depend on oil to differing degrees and are making differing efforts to diversify and liberalize their economies. For example, the UAE and Bahrain are less dependent on oil than Saudi Arabia and Qatar (Figure 1). The comparison of GCC stock markets thus makes for an interesting subject. The panel-data econometric tools we use in this paper take into account these different features.

[4] For interested readers, further information and discussions of the market characteristics and financial sector development of these countries can be found in Neaime (2005) and Naceur and Ghazouani (2007).

3. Panel Granger causality test methodology

The panel-data approach developed by Kónya (2006) is based on the following bivariate (here an oil price index, *oil*; and a stock market index, *stock*) finite-order vector autoregressive model, with the variables taken in level[5]:

$$\begin{cases} oil_{it} = \alpha_{1,i} + \sum_{j=1}^{p_{1i}} \beta_{1,i,j} oil_{i,t-j} + \sum_{j=1}^{p_{2i}} \gamma_{1,i,j} stock_{i,t-j} + \varepsilon_{1,i,t} \quad t = 1,...,T \quad i = 1,...,N \quad (1a) \\ stock_{it} = \alpha_{2,i} + \sum_{j=1}^{p_{1i}} \beta_{2,i,j} oil_{i,t-j} + \sum_{j=1}^{p_{2i}} \gamma_{2,i,j} stock_{i,t-j} + \varepsilon_{2,j,t} \quad t = 1,...,T \quad i = 1,...,N \quad (1b) \end{cases} \tag{1}$$

where the index i $(i = 1,...,N)$ is the country, the index t $(t = 1,...,T)$ the period, j the lag, and p_{1i}, p_{2i} the longest lags in the system. The error terms, $\varepsilon_{1,i,t}$ and $\varepsilon_{2,i,t}$, are supposed to be white-noise and may be correlated with each other for a given country.

The seemingly unrelated regressions (SUR) procedure (since possible links may exist among individual regressions via contemporaneous correlation[6] within equations (1a) and (1b) of system (1) is used to estimate system (1)). Wald tests for Granger causality are then done with country-specific bootstrap critical values generated by simulations.

With respect to system (1), for instance, in country i there is one-way Granger-causality running from stock to oil if in the first equation not all $\gamma_{1,i}$ are zero but in the second all $\beta_{2,i}$ are zero; there is one-way Granger-causality from oil to stock if in the first equation all $\gamma_{1,i}$ are zero but in the second not all $\beta_{2,i}$ are zero; there is two-way Granger-causality between from

[5] Larger models including external factors such as interest rate, inflation, and economic growth have led to very similar results. The estimation results for these models are available upon request from authors.
[6] This assumption is very likely to be relevant for many macroeconomic time series for GCC countries for which strong economic links exist.

oil to stock if neither all $\beta_{2,i}$ nor all $\gamma_{1,i}$ are zero; and there is no Granger-causality between oil to stock if all $\beta_{2,i}$ and $\gamma_{1,i}$ are zero.[7]

This procedure has several advantages. Firstly, it does not assume that the panel is homogenous, so it is possible to test for Granger-causality on each individual panel member separately. However, since contemporaneous correlation is allowed across countries, it makes it possible to exploit the extra information provided by the panel data setting and therefore country-specific bootstrap critical values are generated. Secondly, this panel approach which generalizes the methodology developed by Phillips (1995)[8] that tests for non-causality in levels VARs, in a time series context, does not also require pretesting for unit roots and cointegration, though it still requires the specification of the lag structure (which is determined here using the Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC)). This is an important feature since the unit-root and cointegration tests in general suffer from low power, and different tests often lead to contradictory outcomes. Thirdly, this panel Granger causality approach allows the researcher to detect for how many and for which members of the panel there exists one-way Granger-causality, two-way Granger-causality or no Granger-causality.

4. Econometric investigation

[7] As stressed by Kónya (2006), this definition implies causality for one period ahead.

[8] As it is now well known the issue of testing for non-causality is addressed in a time series setting, in particular by Phillips (1995) in the context of a VAR in levels estimated using the fully modified (FM) estimator, and also by Toda and Yamamoto (1995) who suggest augmenting the VAR by the maximal order of integration for the process being examined. The former method provides some very interesting results as far as asymptotic inference is concerned. The most important one is that statistical inference in this framework can be conducted by means of standard asymptotics; no unit root limit theory is required. Normal and mixed normal limit theory are applied to the stationary and non-stationary components of the VAR respectively. This implies that optimal inference in levels VARs and Wald test for non-causality can be obtained without prior knowledge of the number of unit roots or the order of cointegration rank in the system, and without the use of reduced rank Johansen-type regressions (which are subject to pre-testing bias, as tests for cointegration ranks are extremely sensitive to the values of the nuisance parameters). The approach by Toda and Yamamoto (1995) also results in a standard Wald statistic for non-causality restrictions, although it does require some pre-testing for determining the lag length of the VAR.

First, we present the datasets we use in our empirical investigation of the link between oil prices and stock returns in GCC countries. Then, we discuss the results we obtain at both weekly and monthly frequencies.

4.1 Data

Unlike previous studies, which use low-frequency data (yearly, quarterly or monthly), our study uses both weekly and monthly data for the reasons discussed in the introduction of the paper.

Weekly data are obtained from MSCI and covered the six GCC members. We think that weekly data may more adequately capture the interaction of oil and stock prices in the region than low-frequency data. We do not use daily data in order to avoid time difference problems with international markets. In fact, the equity markets are generally closed on Thursdays and Fridays in GCC countries, while the developed and international oil markets close for trading on Saturdays and Sundays. Furthermore, for the common open days, the GCC markets close just before US stocks and commodity markets open. Accordingly, we opt to use weekly data and choose Tuesday as the weekday for all variables because this day lies in the middle of the three common trading days for all markets. Moreover, the data used in all the analyses predate the end of 2005, so previous studies missed the spectacular evolutions that took place in the GCC and oil markets in the last three years. Therefore, our sample period goes from 7 June 2005 to 21 October 2008 for the six GCC members.

As for our second dataset, we use monthly data obtained from Arab Monetary Fund (AMF) over the period January 1996 – December 2007. Note that stock exchanges in UAE and Qatar are newly established and did not participate in the AMF database when it began in 2002. Thus, the AMF data we use include only four of the six GCC stock markets: Bahrain, Kuwait, Oman and Saudi Arabia.[9]

As for oil, we use the weekly and monthly OPEC spot prices. These prices are weighted by estimated export volume and are obtained from the Energy Information Administration (EIA).[10] All prices are in US dollars.

[9] Data for 2008 are not available in AMF database. Furthermore, weekly data are not available in this database.

[10] Very similar results are obtained with West Texas Intermediate and Brent spot prices. Oil prices are in US dollars per barrel. Note also that GCC currencies have been officially pegged to the U.S. dollar since 2003. However, Kuwait has recently moved back to pegging its currency to a basket currency.

4.2 Empirical results

Using the AIC and SIC criteria and a maximal lag parameters of 4, a VAR(1) model is found to describe adequately the dynamics of the series under consideration for the two databases, the misspecification tests indicating no departure from the underlying assumptions. We then carry out the Breusch and Pagan (1980) test to investigate whether the variance-covariance matrix of the errors is diagonal, and the null hypothesis of no contemporaneous correlation within the different systems can always be rejected at the five percent significance level. This justifies the application of the SUR estimators which is here more efficient than the OLS estimators.

We report in Tables 2a, 2b and 3a, 3b the results for the Granger causality tests (associated respectively to our weekly and monthly datasets), using a bivariate model, from stock markets to oil prices, and from to oil prices to stock markets for GCC countries[11].

Table 2a – Granger causality tests from stock markets to oil prices for the Gulf Corporation Countries panel (weekly dataset from 7 June 2005 to 21 October 2008 on the 6 GCC countries), bivariate (OIL, STOCK) model

Country	**Estimated**	**Test Statistic**	**Bootstrap critical values**		
	coefficient		1%	5%	10%
Bahrain	0.02811	2.08482	5.66717	4.03923	3.17804
Kuwait	-0.01252	-.620305	6.39197	5.00073	3.62678
Oman	0.01638	0.73068	6.4651	4.37293	3.67639
Saudi Arabia	-0.09361	-3.79621**	5.6690	3.08229	2.00697
Qatar	0.00759	0.44267	52.2202	3.70653	2.62674
United Arab Emirates	0.01327	1.09262	5.0565	3.02775	2.84203

Notes: a) ***, ** and * denote significance at the 1%, 5% and 10% levels.
b) H_0: STOCK does not cause OIL.
OIL – oil prices, and STOCK – stock market indices (taken in logarithms).

Tables 2a and 2b show the existence of one-way direct Granger causality from the Saudi stock markets to oil prices. In fact, the null hypothesis of absence of causality is strongly rejected

[11] Note that a sensitivity analysis reveals that the Granger causality results reported in Tables 2a, 2b and 3a, 3b are actually not very sensitive to the number of lags included in the estimated VARs. Indeed, the specifications of VARs incorporating 2 or 3 lags instead of 1, lead to the same test outcomes about non-causality.

based on both weekly and monthly data. For the other GCC countries, changes in national stock indices do not significantly cause changes in oil prices.

Table 2b – Granger causality tests from stock markets to oil prices for the Gulf Corporation Countries panel (monthly dataset from January 1996 to December 2007 on 4 GCC countries), bivariate (OIL, STOCK) model

Country	**Estimated** coefficient	**Test Statistic**	**Bootstrap critical values** 1%	5%	10%
Bahrain	0.000038	0.393636	9.68393	4.68711	3.03222
Kuwait	0.000603	0.205246	0.80760	0.48910	0.30363
Oman	-0.00024	0.150259	0.69011	0.476602	024491
Saudi Arabia	-0.000010	1.343260***	0.88615	0.577966	0.23960

Notes: a) ***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively.
b) H_0: STOCK does not cause OIL.
OIL – oil prices, and STOCK – stock market indices (taken in logarithms).

Our findings are not totally unexpected for at least two reasons. First, the Saudi market is the biggest stock market in the region: it makes up more than 40% of all GCC markets and one-third of all Arab markets. Second, Saudi Arabia plays a leading role in worldwide energy markets. Indeed, estimates show that Saudi Arabia has about 260 billion barrels of oil reserves, some 24% of the world's proven total. Hence, Saudi Arabia is the world's largest exporter of total petroleum liquids and is currently the world's second largest crude oil producer behind Russia. In 2007, International Monetary Fund statistics showed that oil export revenues accounted for around 90% of total Saudi export earnings and state revenues and more than 40% of the country's GDP. Our empirical results suggest that changes in the Saudi stock markets, which should reflect changes in the Saudi economy, significantly cause changes in OPEC oil prices.

Table 3a – Granger causality tests from oil prices to stock markets for the Gulf Corporation Countries panel (weekly dataset from 7 June 2005 to 21 October 2008 on the 6 GCC countries), bivariate (OIL, STOCK) model

Country	**Estimated**	**Test Statistic**	**Bootstrap critical values**

	coefficient		1%	5%	10%
Bahrain	0.00191	0.14211*	0.29211	0.14789	0.00911
Kuwait	0.00231	0.13652**	0.30546	0.12611	0.07768
Oman	0.00155	0.09968**	0.16304	0.08177	0.05540
Saudi Arabia	-0.0400	1.14244***	0.46554	0.24260	0.17622
Qatar	0.00003	0.10445*	0.26374	0.11511	0.07641
United Arab Emirates	0.00022	0.34326**	0.38124	0.22056	0.16416

Notes: a) ***, ** and * denote significance at the 1%, 5% and 10% levels.
b) H_0: OIL does not cause STOCK.

Tables 3a and 3b show that oil price significantly affect stock prices in all GCC countries. These results are robust and highly significant at both weekly and monthly data frequencies. These findings are not surprising given the role played by oil revenues in all GCC economies (cf. Figure 1). In fact, oil price increases raise national and corporate revenues; stock market prices are affected.

Table 3b – Granger causality tests from oil prices to stock markets for the Gulf Corporation Countries panel (monthly dataset from January 1996 to December 2007 on 4 GCC countries), bivariate (OIL, STOCK) model

Country	**Estimated**	**Test Statistic**	**Bootstrap critical values**		
	coefficient		1%	5%	10%
Bahrain	1.32582	8.362054***	7.31205	4.06357	2.56081
Kuwait	0.20590	3.425624**	5.06262	3.05210	2.93863
Oman	0.08286	0.8525599**	1.4490	0.84143	0.15531
Saudi Arabia	0.35612	5.189276***	3.84234	2.72987	1.19159

Notes: a) ***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively.
b) H_0: OIL does not cause STOCK.

In short, there is strong bi-directional Granger causality between oil prices and Saudi stock market prices. The Saudi market has a close link to the price of oil and can predict it. In other words, oil prices affect stock prices in Saudi Arabia and political and economic shocks that influence Saudi Arabia can have an impact on oil prices. For the other GCC countries, significant Granger causalities are obtained from oil price changes to stock market returns, results that suggest that oil price changes affect stock markets in these countries but that changes in these markets do not significantly affect oil prices. In conclusion, traders in the

GCC stock markets should look at the changes in oil prices, whereas investors in oil markets should look at changes in the Saudi stock market and economy.

5. Conclusion

This paper studied the relationship between oil prices and stock markets in GCC countries. Most GCC members are major net oil-exporters and important OPEC members and their economies are excessively dependent on oil prices. Thus, their actions as decision makers in OPEC may take into account their impact on GCC stock markets and economic activities.

Using the panel-data approach of Kónya (2006), which is based on SUR systems and Wald tests with country-specific bootstrap critical values, and two different (weekly and monthly) datasets covering respectively the periods from 7 June 2005 to 21October 2008, and from January 1996 to December 2007, we show strong statistical evidence that the causal relationship is consistently bi-directional for Saudi Arabia. In the other GCC countries, stock market price changes do not Granger cause oil price changes, whereas oil price shocks Granger cause stock price changes. Therefore, investors and policy makers in the GCC stock markets should keep an eye on changes in oil prices because these changes significantly affect stock returns. On the other hand, investors in world oil markets should look at changes in the Saudi stock market because these changes significantly affect oil prices.

Our findings offer several avenues for future research on the linkages between energy product prices and stock markets. First, the link between oil and stock markets in GCC countries can be expected to vary across different economic sectors. A sectoral analysis of this link would be informative. Second, exploring empirically the channels through which high oil prices affect the stock markets would offer some contribution to the existing literature. Finally, the methodology applied in this article could be used to examine the effects of other energy products such as gaz.

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