The Dynamic Relation between the Oil Price Volatility, Stock Market, Exchange and Interest Rate in GCC Countries: Panel Vector Autoregressive (PVAR) Model

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Abstract:

Purpose: This article examines the relationship between oil price volatility, exchange rate, interest rate, and the stock market in the GCC countries.

Design/Methodology/Approach: We used an annual data set from January 2006 to December 2015. Then, we explore the feedback between this relation by one-step generalized method of moments (GMM) system estimator and panel vector autoregressive (PVAR) model.

Findings: We find that the increased of the interest rates leads to increased oil price, which implies that this result is completely normal since the low-interest rates, decrease in oil prices.

Practical Implications: The study provides a significant contribution as its findings can give policymakers, regulators and investor. Moreover, this study can help import and export oil. In fact, should be reformed energy taxation to encourage households and businesses to protect themselves against future oil price increases and facilitate the transition of energy.

Originality/Value: A harmonized action at the European level would make the reform of energy taxation a virtuous tool to reduce public deficits.

Keywords: Oil price volatility, exchange rate, interest rate, stock market, GCC countries.

JEL Classification: Y20, O15, A14.

Paper type: Research article.

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1. Introduction

The world economic situation following the oil crisis of 1973 showed the importance of energy in the achievement of global economic stability. Thus, the unusual increase of oil prices over the last decade and the continued accumulation of global imbalances require a better understanding of the relationship between the oil, the financial, and the stock markets.

During the last financial crisis, oil prices increased sharply to reach $144 in July 2008. In 2010, the economic recovery was accompanied by the strongest growth of oil demand since 2004, which helped boost the price upward. This tension intensified in the early 2011 with the revolutions in the Arab world and the market fears of repercussions in terms of production capacity (Energy Made Easy, 2015).

On 13 March 2012, Brent oil price reached a new peak at $128, then, it had set itself at a level above $ 100 in 2013. In the summer of 2014, prices collapsed, falling below the $ 50 at the opening of 2015. The main cause is an excess of supply, fueled by the production of shale oil in the United States, even if global consumption continues to grow. Economic theory indicates that oil shocks have a significant effect on the financial and stock market activity (Hakim and Thalassinos, 2023).

Krugman (1983) and Golub (1983) showed that oil price movements can impact the dollar exchange rate. The US currency is the reference currency on the oil market in the sense that the purchases of oil from international companies are made in dollars. In addition, fluctuations in the dollar are likely to generate movements of oil supply and the demand that can affect the price of crude oil itself.

Several authors have examined the impact of oil prices on the exchange rate movements at the empirical level. In fact, Throop (1993), Zhou (1995), Dibooglu (1996), Amano and Van Norden (1998,); and Bénassy-Quéré and Mignon (2005) showed the existence of a positive relationship between the oil price and the dollar, in a sense that an increase in the price of crude oil corresponds to an appreciation of the dollar.

On the other hand, Amano and Van Norden (1998) evaluated the meaning of causality and claimed that it ranges from the price of crude oil to the exchange rate in Germany, the United States and Japan. The authors thus showed that the price of oil is weakly exogenous in the sense that even though it is generally expressed in dollars, movements in the value of the dollar exchange rate do not significantly affect it.

Lescaroux et al (2008) explain this positive link by the saving behavior of the OPEC (Organization of Petroleum Exporting Countries): the increase of the price of a barrel generates an increase of the export earnings, which are not entirely spent, thus creating savings placed on the international capital markets. exporting countries have
a strong preference for dollar-denominated assets, rising oil prices have the effect of increasing global demand for these assets, leading to an appreciation of the US currency (Thalassinos et al., 2013; 2015; 2023).

Furthermore, more recent research studies, such as that of Ding and Vo (2012), Wu et al. (2012), Aloui et al. (2013), and Jammazi et al. (2015) showed that fluctuations in oil prices affect the exchange rate movements. In addition, there is more evidence that indicates that the risk of oil shocks may affect the stock markets and lead to immediate disruption of financial markets and distant disruption of the economic activities (Kilian and Park 2009; Hanias et al., 2020).

Studies by Jones and Kaul (1996), Huang et al. (1996) and Sadorsky (1999) well documented the impact of oil prices on the stock market. For example, Park and Ratti (2007) analyzed the respective impacts of oil prices and their volatility on the stock market returns in the United States and in 13 industrialized countries in Europe. They showed that shocks of oil prices have a statistically significant effect on the return on the equity market. More recently, Bouri (2015), Ponka (2016) and Aloui (2016) have showed that changes in oil prices have significant effects on the stock markets.

In this article, our objective is to determine the effect of crude oil price movements on the exchange rate, interest rate, and stock indices of the GCC (Gulf Cooperation Council) countries composed of Saudi Arabia, Bahrain, Oman, as well as Qatar, the United Arab Emirates and Kuwait. In this paper we used three complementary approaches namely OLS, one-step generalized method of moment (GMM) system analysis and panel vector autoregressive (PVAR) framework. In fact, the first method would allow us to explore the relationship between four variables.

The second method would be to explain the effect of the oil price volatility on the stock market, exchange and interest rates. As for the third approach, it would help examine the causal link among the oil price volatility, stock market, exchange and interest rate in our sample GCC countries evaluation of the effect of oil prices on the financial and stock market of GCC countries is important for a number of reasons. The brutal decrease of the oil prices, from 110 USD per barrel at the end of the first semester of 2014 to about 50 USD in 2015, has had consequences in the GCC region markets. In fact, the hydrocarbon sector plays a major role in the performance of financial and stock markets of the GCC countries.

Finally, the evaluation of the relationship between oil price volatility, exchange rates, interest rates, and the stock market in the GCC countries is important for international investors and portfolio managers because the results of our study could reveal promising domains for a regional and global portfolio diversification (Arouri et al., 2011).
The rest of the paper is organized as follows: section 2 presents a literature review, while section 3 discusses the data and the methodologies used. Section 4 illustrates and evaluates the results of the empirical analysis. Finally Section 5 concludes the paper.

2. Literature Review

2.1 Relationship Between Oil Price Exchange Rates and Interest Rates

Several previous studies have dealt with the relationship between oil price, exchange rate, and interest rate. The effect of oil price changes on the exchange rate movements is well explained by Krugman (1983) and Golub (1983). Oil is traded on the world markets in the US dollar. Therefore, movements in oil prices would certainly have an effect on the value of the US dollar.

Hamilton (1983) indicated that seven of the eight financial crises in the United States since the Second World War are preceded by sharp increases of oil prices. Which significantly affects the exchange rate. According to Golub (1983) and Krugman (1983), the effect of oil prices is negative on the exchange rate when these prices increase in the oil-importing countries and vice versa.

Akram (2004) evaluated the relationship between oil prices and the change rates in Norway. He noted that there is a relationship between the oil price and the exchange rate in this country. Similarly, Krichene (2006) examined the relationship between oil prices, monetary policy, exchange rates, and interest rates. He showed that both the exchange and the interest rates influence the oil price market equilibrium. This situation differs according to the type of shock (supply or demand shock). The author added that the interest rates rise when oil prices increase.

However, reverse causality can be seen in the demand shock. In other words, the deterioration of the interest rates leads to higher oil prices. The author noted that a more stable oil market favors global economic growth. Indeed, oil is denominated in the US dollar on international markets. The increase of the interest rate would certainly have an effect on the value of the US dollar on the world markets, and consequently on the oil price.

In this sense, Kohn (2008) showed that commodity prices rise when the interest rates fall. Reicher et al. (2010) found a strong correlation between the oil price and the interest rates. Shan Wang et al. (2013) explained that the interest rates affect the US dollar, which subsequently influences the international crude oil prices. Many recent studies found that changes in oil prices have a significant effect on the financial market (Brahmasrene et al., 2014; Hakan Berument et al., 2014; and Jammazi et al., 2015).
More recently, Wei et al. (2016) have tested the relationship between the oil price and macroeconomics in China. They argued that oil shocks positively affect production and negatively the interest rate of China. The positive effect of oil price shocks on the output is explained by the effect of these shocks on exports. Jawadi et al. (2016) used the GARCH model to study the interactions between the oil market and the US dollar/euro exchange rate. Moreover, the authors showed the existence of a negative relationship between the US dollar/euro and oil returns. In other words, the increase of the US dollar leads to a decrease of oil prices.

Volkov et al. (2016) applied the GARCH-M model with monthly data from September 1998 to August 2012 to evaluate the impact of oil price shocks on the exchange rate volatility in the United States and the five major oil-exporting countries, Russia, Brazil, Mexico, Canada and Norway. The results showed that oil price shocks lead to the exchange rate volatility on everything in Russia, Brazil, and Mexico. Thus, the Russian and Brazilian exchange rates are the most volatile; however, the Norwegian and Canadian exchange rates are the least volatile. Moreover, the increase of oil prices contributes to the appreciation of the local currency in all the countries. The most volatile financial markets are the least efficient. Hussain et al. (2017) examined the relationship between oil price and the exchange rate of 12 Asian countries by applying detrended cross-correlation analysis (DCCA). They found that there is a weak negative cross-correlation between oil price and the exchange rate for most Asian countries.

2.2 Relationship Between Oil Prices and Stock Market Indices

Many previous studies showed that oil price shocks have implications for the macroeconomic variables and stock market returns. Hamilton (1983) discovered a negative effect on oil prices and the real economy. Jones and Kaul (1996) used quarterly data to check out if the reaction of international stock markets to fluctuations of oil prices can be justified by the change of the expected returns in countries, such as the USA, Japan, and Canada. They discovered a stable and negative relationship between the change in the oil price and the stock index returns. This relationship is dramatic in the case of Japan and weaker in Canada.

Huang et al. (1996) assessed the relationship between the daily return on petrol and the daily stock market returns on the S & P 500 using a VAR model. They found that there is a correlation between the return on oil and the market value of some oil companies; however, there is no relationship between the price of oil and the S & P 500 Composite Index. In this sense, Sadorsky (1999) affirmed that the volatility of oil prices contributes to the explanation of the stock market indices of the United States. He noted that there is an asymmetrical relationship between the change of the oil price and the S & P 500 stock index.
The analysis of the result of the VAR model indicates that positive oil price shocks affect the S & P 500 index; however, the negative shocks have no significant effect.

Follet (2005) and Driesprong et al. (2008) suggested that fluctuations of oil prices help forecast the stock market returns on a global scale. More recently, Arouir et al. (2011) have evaluated the relationship between oil price volatility and stock markets of the GCC countries between 2005 and 2010 using a GARCH model. They showed the existence of substantial return and volatility spillovers between the world oil prices and the GCC stock markets.

In addition, Mohanty et al. (2011) studied the relationship between changes of the crude oil prices and equity returns of the GCC countries with weekly data from June 2005 to December 2009. They showed that fluctuations of oil prices have asymmetric effects on the stock market returns at the national level as well as at the industry level. Oil price shocks have a significant and positive impact on the stock markets of these countries except the Kuwaiti market.

Similarly, Fayyad et al. (2011) examined the relationship between oil prices and stock markets in the GCC countries (Kuwait, Oman, United Arab Emirates, Bahrain, Qatar) and the advanced countries represented by the United Kingdom and United States using the Vector Auto Regression (VAR) and daily data for the period from September 2005 to February 2010. The results indicated that the predictive power of oil prices for the stock returns has strengthened after a rise of oil prices during the global financial crisis. In addition, the impulse response of a shock to oil increased during this period.

Finally, Qatar, the United Arab Emirates and the United Kingdom showed a more responsiveness to oil shocks than the other markets in the study. Another study by Guesmi et al. (2014) on five oil-importing countries (United States, Italy, Germany, the Netherlands and France) and four oil-exporting countries (United Arab Emirates, Kuwait, Saudi Arabia And Venezuela), by applying a multivariate GJR-DCC-GARCH approach, showed that dynamic correlations do not differ between oil-importing and exporting countries.

Moreover, the results indicate that oil prices are positively correlated with stock markets. On the other hand, oil assets are threatened by market losses in times of financial disruption. Raza et al. (2016) used the nonlinear ARDL approach and monthly data from January 2008 to June 2015 to assess the effect of changes in gold prices and oil prices in the large emerging BRICS economies.

They found that gold prices have a positive effect on the stock market prices of large emerging BRICS economies and a negative effect on the stock markets of Mexico, Malaysia, Thailand, Chile, and Indonesia. The results also showed that oil prices have a negative effect on the stock markets of all the emerging economies. The stock
markets of these countries are more vulnerable to bad news and events that lead to uncertain economic conditions.

Bouri et al. (2016) applied the GARCH model to examine the variance causality between world oil prices and sectoral equity returns in Jordan before and after the Arab Spring, began by the end of 2010. The authors showed that the effect of oil shocks on the equity sectors is heterogeneous. Indeed, the impact of these oil shocks is significant on the returns of financial services and service sectors; however, it is negligible in the industrial sector.

The above discussion has lighted the importance into our work thanks to the existence of important theoretical arguments that show the effect of changes in oil prices, stock market, exchange and interest rate. This theoretical work requires an empirical study to obtain new information on the relationship between these four variables.

Many reasons attract our attention to analyze the GCC region for our study. The most important were GCC region are the most countries in terms of oil production and belong to on the organization of OPEC because all six of the countries are net exporters and producers of oil. In this paper, we examine the four-way linkages between oil prices, stock market, interest and exchange rates.

Our study focuses on the six GCC countries, using three databases including World Economic Outlook database of the International Monetary Fund (IMF), investing.com and Quandl. The sample period runs from 2006 to 2015. This period is interesting, since it is know the outbreak of the supbrime crisis which is sequently transformed into a global crisis. This crisis has effects on the oil price and the financial and stock markets.

3. Methodology

In this paper, we study the relationship between oil price, stock market, exchange and interest rates in six countries, using the following variables:

Dependant variable:
- Oil price:

Oil is the principal indicator of economic growth. It is considered as the motor for all countries, since, it is crucial resource for production, transportation, and almost every other sector. The volatility of oil price contributes to the decrease of economic growth, also to the lower investment, production and inflation. In this context, the fluctuation of oil price affect not only growth economic but also the stock market, the exchange and interest rates.

Several studies have recently shown that there is a relationship between the stock market, the exchange and interest rates and the oil price. Authors like Nikanor I.
Volkov et al. (2015), Hongtao Chen et al. (2016) argue there is a relationship between oil price shocks and exchange rate movements, while others such as Andrea Bastianin et al. (2016) showed there is a relation between stock market and oil price. Similarly, others such as Yu Shan Wang et al. (2013) showed that the interest rates have a negative influence on the future crude oil prices.

Independent variables:
• Exchange rate:
In our research we have chosen the exchange rate such as a principal variable. The exchange rate changes also influence economic policy in all countries. Actually, the relationship between oil price and the exchange rate has received much attention from many economic. According to Muntazir Hussain et al. (2017) show that the weak negative cross-correlation between oil price and exchange rate for most Asian countries. On the other hand, Hongtao Chen et al. (2016) argue that the relationship between oil and the exchange rates is not nonlinear.

• Interest rate:
The interest rate is the second instrument that affects the economic policies. We used an annual rate from the Central Bank of each country. Yu Shan Wang et al. (2013) suggest that interest rates have a positive influence on the future crude oil prices. Moreover, Vipin Arora et al. (2013) showed that oil prices have become more sensitive to real interest rates over time.

• Stock market:
The stock market is very important factor that influences the economic policy of all countries. In fact, Naveed Raza et al. (2016) found that oil prices have a negative impact on the stock markets of all the emerging economies. However, Andrea Bastianin et al. (2016) show that shocks of demand for oil price has an impact on the volatility of the G7 stock markets.

4. Empirical Results
Table 1 indicates some summary statistics. This table stipulates information about the average level the standard deviation, minimum and maximum of the variables of research for all country in the sample. Peculiarly, the interest rate provided the highest standard deviation and mean compared relative to other variables.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>54</td>
<td>2.86793</td>
<td>1.72661</td>
<td>.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Exchange</td>
<td>54</td>
<td>2.017585</td>
<td>1.686012</td>
<td>.268881</td>
<td>3.750004</td>
</tr>
<tr>
<td>Stock</td>
<td>54</td>
<td>3.704521</td>
<td>.288451</td>
<td>3.04486</td>
<td>4.113023</td>
</tr>
<tr>
<td>Oil</td>
<td>54</td>
<td>.0573242</td>
<td>.0921501</td>
<td>0</td>
<td>.4127951</td>
</tr>
</tbody>
</table>

Source: Own study.
Table 2. The method used is the one of Arellano and Bond (1991) one step GMM difference estimator for panel data with lagged dependent variable (GMM) and the ordinary least squares (OLS).

<table>
<thead>
<tr>
<th>Variables</th>
<th>GMM Coefficient</th>
<th>OLS Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1. interest rate</td>
<td>.3568504**</td>
<td>.0535679*</td>
</tr>
<tr>
<td>exchange rate</td>
<td>-.0335961</td>
<td>-.0090493***</td>
</tr>
<tr>
<td>stock</td>
<td>-.0577075</td>
<td>-.1891289*</td>
</tr>
<tr>
<td>_cons</td>
<td>.2049909</td>
<td>.622605</td>
</tr>
<tr>
<td>Sargan</td>
<td>39.09*</td>
<td></td>
</tr>
<tr>
<td>AR1</td>
<td>-1.67 (0.096)</td>
<td></td>
</tr>
<tr>
<td>AR2</td>
<td>-1.04 (0.298)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own study.

Concerning the OLS methods; we can see that the interest rates have a positive and significant effect on the oil price volatility. This result indicates that the interest rate contributed to increase the oil price volatility. This study is line with studies of Yu Shan Wang et al. (2013), who showed that the interest rate have a positive influence on the future crude oil prices. The increase in the interest rates contributed to increasing exchange rate, which in turn influences international crude oil prices.

Turning now to exchange rate and stock market, we observe that the significant and negative effect of the exchange rates and stock market on the oil price. This result indicates that the exchange rates and stock market contributed to the decrease of the oil price volatility.

On the other hand, the relationship between the exchange rates and oil price volatility, we observed the exchange rate leads to the depreciation of oil price volatility; this work is in line with other studies, such as the study of Lizardo and Mollick, (2010). In fact, the negative effect between these two variables give some perspectives; as the oil price is expressed in the dollar, which leads the decrease of exchange rate contributed to the decrease of oil price.

Also the period of this study in the crisis period, so this result is an attempt. For the negative relationship between stock market and oil price volatility and as a result confirm the observation in the (Killian and Park 2009). That effect attaches by through a demand channel

Focusing next on the GMM method, is used to test the validity of the instruments. In fact, the Sargan test is used to over-identify, the restrictions of the GMM estimation. Results provided in table 2 suggest that the model is valid and does not suffer from over-identifying problems. Moreover, the non-significance of the AR (1) statistics indicates the consistency of the GMM estimates.
On other hand, the coefficient of the lagged dependent variable is positive and statistically significant at 5% level in all the GCC countries. The results presented in Table 2. They show that the interest rates have a positive and significant effect on the oil price volatility. However, the exchange rate and the stock market are negative and have no significant effect on the oil price.

To clarify our analysis, we also analyze VDCs which indicates that the percent of importance of each variable in explaining variation in one variable that is present by the shock in another variable. We report the total effect accumulated over 10, 20 and 30 years and we can see almost identical results in Table 3.

Table 3. Variance decompositions for GCC countries

<table>
<thead>
<tr>
<th>Variables</th>
<th>s</th>
<th>INTEREST</th>
<th>EXCHANGE</th>
<th>STOCK</th>
<th>OIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTEREST</td>
<td>10</td>
<td>.68551219</td>
<td>.0627824</td>
<td>.22364688</td>
<td>.02805853</td>
</tr>
<tr>
<td>EXCHANGE</td>
<td>10</td>
<td>.04349496</td>
<td>.95353292</td>
<td>.00179952</td>
<td>.0011726</td>
</tr>
<tr>
<td>STOCK</td>
<td>10</td>
<td>.26287661</td>
<td>.03179265</td>
<td>.66930414</td>
<td>.03602661</td>
</tr>
<tr>
<td>OIL</td>
<td>10</td>
<td>.65760881</td>
<td>.05356239</td>
<td>.20104267</td>
<td>.08778613</td>
</tr>
<tr>
<td>INTEREST</td>
<td>20</td>
<td>.68028627</td>
<td>.06263349</td>
<td>.22685996</td>
<td>.03022028</td>
</tr>
<tr>
<td>EXCHANGE</td>
<td>20</td>
<td>.04349332</td>
<td>.95349162</td>
<td>.00182722</td>
<td>.00118783</td>
</tr>
<tr>
<td>STOCK</td>
<td>20</td>
<td>.26288227</td>
<td>.03179185</td>
<td>.66927605</td>
<td>.03604984</td>
</tr>
<tr>
<td>OIL</td>
<td>20</td>
<td>.65220707</td>
<td>.05349166</td>
<td>.2047958</td>
<td>.08950546</td>
</tr>
<tr>
<td>INTEREST</td>
<td>30</td>
<td>.68027436</td>
<td>.06263296</td>
<td>.22686578</td>
<td>.0302269</td>
</tr>
<tr>
<td>EXCHANGE</td>
<td>30</td>
<td>.04349332</td>
<td>.95349155</td>
<td>.00182727</td>
<td>.00118787</td>
</tr>
<tr>
<td>STOCK</td>
<td>30</td>
<td>.26288221</td>
<td>.03179185</td>
<td>.66927605</td>
<td>.03604989</td>
</tr>
<tr>
<td>OIL</td>
<td>30</td>
<td>.65219362</td>
<td>.05349123</td>
<td>.20480322</td>
<td>.08951193</td>
</tr>
</tbody>
</table>

Source: Own study.

The results further showed the importance of the exchange rates in exploring the variation of oil price. In other words, the exchange rates explain a 5% of oil price forecasting error variance after 30 years. On the other hand, about 0.4% of the variation of the exchange rates is explained by oil price. This result implies that there is causality running from the exchange rate to oil price.

Table 4. Main results of a 4-variables VAR model.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Interest</th>
<th>Exchange</th>
<th>Stock market</th>
<th>Price oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.h_INTEREST</td>
<td>.83928423**</td>
<td>-.00066411</td>
<td>-.04429195</td>
<td>.01689876</td>
</tr>
<tr>
<td>L.h_EXCHANGE</td>
<td>30.678978*</td>
<td>.0329686</td>
<td>2.9023092</td>
<td>1.0239917*</td>
</tr>
<tr>
<td>L.h_STOCK</td>
<td>-2.2334183**</td>
<td>.00091137</td>
<td>.51529959***</td>
<td>-.1184134***</td>
</tr>
<tr>
<td>L.h_OIL</td>
<td>-1.2860904</td>
<td>.00698378</td>
<td>.76379694</td>
<td>.484381</td>
</tr>
</tbody>
</table>

Source: Own study.

Table 4 displays the estimation results of the system GMM coefficients of the baseline PVAR.
**Figure 1.** Impulse Response Functions to shocks, PVAR Baseline Model with for variables: price oil, stock market, exchange and interest rate

| Source: Own study. |

The effect of a shock on oil price to interest rate is negative and large in magnitude. The peak response of the interest rates to a shock in oil price is initially negative and takes place after 2 years while it converges towards the equilibrium thereafter. In this context the increase oil price leads to drop of the interest rates.

The nexus between oil price and the interest rates can be explained in terms of the interest rate represent the opportunity cost of oil extraction and storage. So, the lower of interest rate contribute to reduce of production and the rise of storage of oil Frankel (2006).

The response of oil price to a shock in the interest rates is positive for first period, while it returns toward the equilibrium thereafter. Consequently, the increase of the interest rate enhances price oil in the first 2 years. Here, an increased of the interest rates leads to increased of oil price, which implies that this result is completely normal since the low interest rates, decrease in oil prices, but this result is contrary to other studies as that of Akram (2009) who found that the rise of the interest rates leads to the fall of oil prices and in the short (3 months or less) and long-term.
Turning now to the response of the exchange rate to a shock in price oil. Figure 1 shows a close to zero effect of the response of oil price on the exchange rates for the whole study period. On the other hand, the impact of the exchange rate to a shock in oil price is initially positive, and then it converges to the equilibrium afterwards. In other words, the increase of oil price leads to the increase the exchange rate. Clearly, the effect of the shock in the exchange rate on the oil price is positive. It is likely that an increase of exchange rate contributed to increase of the oil price in short term.

This result as summarized by Hongtao Chen et al. (2016) who argue that the relationship between oil price and the exchange rates is not linear. Focusing next on the immediate response of stock market to price oil shock is positive. The effect of a shock on the stock mark is positive and takes place after 2 years while it converges towards the equilibrium thereafter. The increase of oil price leads to the rise of the stock market.

Regarding the response of oil price to the shock market is negative for the first period and takes place after 2 years while it converges towards the equilibrium thereafter. Here the increased of the stock market contributes to the decrease of oil prices. Usually, oil prices could affect the stock prices in several ways.

The price of a stock in a country and in each period corresponds to the present value of the current expenses and future costs (Huang-Masoulys and Stahl, 2010). Oil prices could directly influence the stock prices by affecting cash flow or indirectly through its effect on the interest rates used to reduce the present value of payments and future costs.

5. Conclusion

The objective of this paper is to empirically analyze the effect of the stock market returns, the exchange and interest rates on oil price. We analyzed 6 emerging economies in the (GCC region) using a panel dataset of 6 countries over the 2007–2015 period.

There are no several studies on the relationship between the stock index, the exchange rate and interest rates and oil prices of net exporting countries. Our first result indicates that there is relationship between the four variables in our analyses has long run equilibrium. This result shows that the system is stable throughout the entire analyzed period, which implies that the financial crisis did not affect the stability of the GCC countries.

To explain the degree of effect of the stock market returns, the exchange and interest rates on the oil price we used three complementary methods: OLS analysis, one-step GMM analysis as well as panel vector autoregressive framework. The results from OLS indicate that not only the exchange and interest rates affect oil price, but also the stock market has a negative and significant effect on the price oil.
On the other hand, the negative effect of stock market help oil price. The results from one-step GMM indicate that the interest rates significantly and positively react only to oil price volatility in the GCC economies. It should be noted that the interest rates contributed to the increase of oil price volatility, the exchange rate and the stock market. The results also revealed that the exchange rates and stock market have a negative but no significant effect on oil price volatility.

Through estimating panel VAR model, this paper revealed that the response of the exchange rates to a shock in the stock market, the interest rate and oil price is positive. Besides the main conclusion of our research is the response of price oil to shock market is negative. On the other hand, the impact of the exchange rates to a shock in oil price is initially positive, and then it converges to the equilibrium afterward. For minimize the negative react of the oil price on the stock market, it is necessary to enhance the relationship between oil-importing and exporting countries.

Noteworthy, this study provides a significant contribution as its findings can give policymakers, regulators and investor. Moreover, this study can help import and export oil. In fact, should be reformed energy taxation to encourage households and businesses to protect themselves against future oil price increases and facilitate the transition of energy. A harmonized action at the European level would also make the reform of energy taxation a virtuous tool to reduce public deficits.

The decline of oil intensity of this growth - notably in China - had a negative impact on oil demand, while oil supply continued to grow considerably. The vertiginous development of shale oil extraction in the United States is certainly one of the main causes, which mate Saudi Arabia decide not to reduce its production. The short-term favorable effects of the fall in oil prices should not, however, lead to a shift away from long-term energy challenges:

Control of demand, climate change, dependence on hydrocarbons, etc. A medium-term rise in oil prices - notably as a result of an adjustment in production - combined with the deterioration in the euro / dollar parity could propel oil prices to unprecedented levels. Public action must resolutely take advantage of this favorable situation to prepare for the future in a responsible way, by encouraging the continuation of the energy transition.

References:


Hussain, M., Zebende, G.F., Bashir, U., Donghong, D. 2017. Oil price and exchange rate co-
movements in Asian countries: Detrended cross-correlation approach. Physica A:
In: International Symposium of the Banque de France.
Krichene, M.N. 2006. Recent dynamics of crude oil prices (No. 6-299). IMF.
Krugman, P. 1983. Oil shocks and exchange rate dynamics. In: Exchange rates and
Lescaroux, F., Mignon, V. 2008. On the influence of oil prices on economic activity and
other macroeconomic and financial variables. OPEC Energy Review, 32(4), 343-
380.
rates. Energy Economics, 32(2), 399-408.
Love, I., Zicchino, L. 2006. Financial development and dynamic investment behavior:
Evidence from panel VAR. The Quarterly Review of Economics and Finance, 46(2),
190-210.
Mohanty, S.K., Nandha, M., Turkistani, A.Q., Alaitani, M.Y. 2011. Oil price movements and
stock market returns: Evidence from Gulf Cooperation Council (GCC)
Pönkä, H. 2016). Real oil prices and the international sign predictability of stock
prices and their volatilities on stock prices of emerging markets. Resources
Policy, 49, 290-301.
449-469.
Thalassinos, I.E., Hanias, P.M., Curtis, G.P., Thalassinos, E.J. 2013. Forecasting financial
indices: The Baltic Dry Indices. Marine Navigation and Safety of Sea
Transportation: STCW, Maritime Education and Training (MET). Human Resources
and Crew Manning, Maritime Policy, Logistics and Economic Matters, 283-290.
Thalassinos, I.E., Venediktova, B., Zampeta, V. 2015. Applications of GARCH Model for
the Selection of Securities of Banks Investment Portfolio. Applied Economics and
65.
Throop, A.W. 1993. A generalized uncovered interest parity model of exchange
Wang, Y.S., Chueh, Y.L. 2013. Dynamic transmission effects between the interest rate, the
US dollar, and gold and crude oil prices. Economic Modelling, 30, 792-798.
Wu, C.C., Chung, H., Chang, Y.H. 2012. The economic value of co-movement between oil
price and exchange rate using copula-based GARCH models. Energy
Zhou, S. 1995. The response of real exchange rates to various economic shocks. Southern
Economic Journal, 936-954.