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## Oil Price Shocks and Stock Market Behaviour: Theory and Evidence

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### Abstract

*There are considerable literature that examined the oil price shocks and stock market behaviour. This paper reviewed the literature on the relationship between the oil prices and stock return. Fluctuations of oil price in the international market have implications on the stock market return. The theoretical transmission mechanisms between the two variables are identified to include stock valuation, monetary, output, fiscal and uncertainty channels. It is expected that raising oil price lead to lower stock return in oil importing economies. By contrast in oil exporting economies the effects are expected to be positive for the stock market return. Some empirical findings are inconsistent with the theoretical expectations. The results from both oil importing and oil exporting countries have no general consensus on the nature of the relationship between oil price and stock market return. Thus there is the need for a new approach on the study of the relationship between the two variables.*

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**Key words:** Oil price, shocks, stock market, theory, evidence

### INTRODUCTION

Oil prices measured the spot price of various barrels of crude oil most commonly either the West Texas intermediate or the Brent Blend. The OPEC basket oil price and the NYMEX future price are also sometimes quoted (Amadeo, 2010). International oil price is essentially a function of the current and future spare capacity of oil however other important factors must be taken into consideration including above all the expectations market operators who tend to be influenced by both the perceived current and the unreliable data that have played the oil market since its inception. Bottlenecks in the oil refining system may also play an important role in oil price changes (Maugeri, 2009).

Increase in stock market index indicates a growing valuation of the worth of quoted companies, as well as confidence in those sectors in which these companies operate. The assertion is that, if the prices of stocks of quoted firms appreciate business sectors of the economy will boom (Nwokoma, 2006). This is an indication of good performance of the stock market.

In an efficient market the expectation is that oil and stock prices are correlated, they are both highly volatile and their prices are often changing due to the same economic or geopolitical events (Paviova, 2011). There are large gaps in understanding of oil price and stock market relationship (Degiannakis, Filis, 2017 and Aroro) This study reviewed the literature on the relationship between oil prices stock market behaviour. This is motivated by the need to identify the theoretical and empirical evidence on the nature of the relationship between oil market and stock market. The paper is organized in six additional sections which include conceptual review, an overview of crude oil price changes, theoretical issues, and survey of empirical evidence, summary of major findings and conclusion and recommendations.

### CONCEPTUAL REVIEW

**Oil Pricing:** Oil has no fixed price; it is the need or prediction and evaluation of the need, which determines the prices. As the consuming nations work for low prices, key stakeholders such as Organisation of Petroleum Exporting Countries (OPEC) work for a maximum price yield. Market fundamentals affect the price of oil. The global crude oil is indexed to economic, environmental, geographical and socio-political factors. Speculative trading and socio-political unrest in some parts of the world also affected the price (Gbadamosi, Kupolukon and Oliver, 2007)

**Oil Price Shocks:** Rapid changes in crude oil prices are known as oil shocks. These shocks are classified and measured in three ways: linear oil price shocks, nonlinear oil price shocks and asymmetric oil price shocks (Paviova, 2011). The shocks reflect changes in the price of oil due to an unanticipated change in oil market fundamentals (i.e. global demand and supply of oil) (Degiannakis, Filis and Arora)

**Stock Market Return:** Returns that investors generate out of the stock market. The returns could be in the form of profit through trading or in the form of dividends given by the company to its shareholders. They are not fixed ensured returns and are subject to market risks. The returns are not homogeneous; they may be positive or negative (Economy Watch, 2010)

**Stock Market Performance:** The most common approach to measuring firm's stock market performance is to calculate its total returns to shareholders (TRS) which is defined as share price appreciation plus dividend yields. Due to certain limitations to this approach firms employ complimentary measure of stock market performance. One of them is market value added (MVA). It is the difference between the market value of firm's debt and equity and the amount of capital invested. Another related metric is the market -value- to capital- ratio a firm's debt and market equity compared with the amount of capital invested (Dobbs and Koller, 2005)

### An Overview of Crude Oil Price Changes

Oil industry before the year 1945 was still in its infancy. The level of technology and mining capacity were not matured added to that a small proportion of oil consumption in the global

energy consumption structure. Before the Second World War, the international crude oil market was led by several western multinational oil companies in this situation, the oil price kept in this stability to some extent (Yan, 2012). From 1948 to the end of the 1960s oil prices ranged between 2.50 dollars and 3.00 dollar per barrel. The price rose from 2.50 dollar in 1948 to about 3.00 dollar in 1957. From 1958 to 1970 the prices were stable around 3.00 dollars. In 1972 the price was 3.50 dollar. Yom Kippur war started in October 1973 and by the end of 1974, the price quadrupled to more than 12.00 dollar (Williams, 2011).

The Iranian Revolution of 1979 further affected the price. Thus real oil prices nearly doubled from the outbreak of Iranian revolution to the Iran –Iraq war of 1980 to 1988. The OPEC collapse of 1986 marked the first large decrease of Gulf War which started in 1990 and ended in 1991 resulted in a sharp upward spike in oil prices and declined sharply thereafter. The OPEC meeting in 1999 marked a low point for the oil price before it again started rising after the terrorists attack in 2001. Oil price first declined but then rose sharply. The outbreak of the second Gulf War led to an upward trend in oil price that persisted until the year – end 2007 (Sorensen, 2009).

During the period spanning 2007 to 2008, the oil price increased from 60 dollars to cross the threshold of 100 dollars reaching the record of 147 dollars in July. The prices showed a decreased by August to reach only 115 dollars. The price dropped back four month later to be traded at 45 dollars at the end of 2008 (Dhaovi and Kharaef 2014). A few years later in 2014 and 2015, the prices lost nearly 75% of their value within a few months (Degiannakis, Filis and Arora, 2017). This is attributed to strong production in the Russia and United States. OPEC decision to maintain output further damages the oil market heading into 2015 (MacGuire, 2015).

Oil prices were almost triple 13 – year low of 26.55 dollars in January 2016. Six months before that, prices had been 60 dollars. A year earlier in June 2014 they had been 100.26 dollars. Global oil price is expected to average 71 dollars in 2018 and 68 dollars in 2019. In May 2018 oil prices reached 80 dollars. This is attributed to the believe that Iran’s oil supply will dwindle once US sanctions are reimposed (Amadeo, 2018). Future oil prices are expected to depend on the interaction between demand and supply for oil on global markets. Among the most important supply side factors weighing on price expectations are OPEC oil supply, US crude oil stocks, US shale oil, production and oil supply from Russia (Gusev, 2018)

## THEORETICAL ISSUES

Oil price is subject of a vast theoretical literature. Three main approaches explain oil price fluctuations in the literature. There is first, Exhaustible Resource Approach which is based on Hotellings Rule. Second explain the oil price using market based supply and demand framework. Third, explain price behaviour in a more informed way and focus on issues such as OPEC power and the role of speculation (Gronwald, 2009).

Degiannakis, Filis and Aroro (2017) identified some theoretical mechanisms by which oil prices can alter the behaviour of stock markets. They categorized the channels in the following different ways:

**Stock market valuation channel:** Stock return is impacted by factors that can change the expected cash flows and or discount rate including crude oil price. Impact of the oil price depends on whether a firm is an oil-user (oil consumer) or oil producer; for the oil – producer,

rising oil price will result in increased profit margins and thus increased expected cash flows. It is expected that oil users will exhibit bearish behaviour during period of increasing oil price

**Monetary channel:** Oil prices affect the expected discount rates of future cash flows. According to Mohanty and Nandha as cited by Deagenkris, Filis and Arora (2017) the discount rate is at least partially composed of expected real interest rates and inflation. Thus, another mechanism by which oil prices impact stock market return is through interest rates and inflation

**Output channel:** Positive oil price changes are expected to have both a production cost and income effect which is expected to lead to changes in aggregate output. The effect will depend on whether an economy is oil exporting or oil importing.

**Fiscal channel:** This is primarily concerned with oil exporting economies, which are financing physical and social infrastructure using oil revenue. This has positive effect on the stock return. In contrast, if consumption and government purchases are regarded as substitutes then stock market will respond negatively due to crowding out effect

**Uncertainty channel:** Benanke and Pindyk as cited by Degiannakis, Filis and Arora (2017) noted that the uncertainty caused by rising oil price will reduce firm's demand for irreversible investments which in turn reduce their consumption of durable goods. This can affect stock return.

Stock prices are discounted values; of expected future cash flows (Narayan and Narayan 2009). Since oil price changes influence stock price through affecting expected cash flows and or discount rates. Oil prices fluctuations can affect corporate cash flow since oil is an input in production and because oil price can influence the demand levels. Oil price changes can affect the discount at industry and national levels. Oil prices can affect the discount rate for cash flow by influencing the expected rate of inflation and expected real interest (Miller and Ratti 2009). Narayan and Narayan 2009) cited Huang, Muslims and Stroll explaining that for an importer of oil, an oil price increase will put downward pressure on the country's foreign exchange rate and upward pressure on the expected inflation rate in the country. A higher expected inflation raises the discount rate, which has a negative effect on stock prices. With regard to oil exporter stock prices will be affected by the price of oil, through the cash flow of oil related firms (Bjornland 2008). This is expected to have positive effect on the stock market return.

### Survey of Empirical Evidence

Since Hamilton (1983) seminal paper on the impact of oil prices on real output in the US, additional studies were conducted in various countries. Maghyereh (2004) opined that if oil prices play an important role in an economy, one would expect changes in oil prices to be correlated with changes in stock prices. Several studies on the relationship between of oil prices on stock market performance have been conducted in various countries. Degiannakis, Filis and Arora (2017) review on the literature indicated that majority of the empirical studies which use aggregate stock market indices suggested that positive oil price changes lead to negative stock market returns for oil importing nations. Stock markets in oil exporting countries tend to respond positively.

Apergis and Miller (2009), in their cross country empirical study attempted to establish the relationship between crude oil price and international stock markets over 1971:1 - 2008:3. They

found a clear long run relationship between real stock prices for six OECD countries and international real oil price from January 1988 and September 1999 with positive statistically significant co integrating coefficient for real stock market prices and real oil price. Between May 1980 and February 1988, the relationship was no longer significant.

Agren (2006) presented an empirical study of volatility spillover from oil prices to stock markets in five developed economics Japan Norway, Sweden, UK and the US strong evidence of volatility spill over was found for all the stock markets but Swedish one where only weak evidence was found. Kilian and Park (2007) findings on the US indicated that oil supply shocks had no significant effect on stock returns. Oil demand and supply shocks combined account for 22% of the long-run variation in US real stock returns

In his study on emerging economies Maghyereh (2004) examined the dynamic linkages between oil price shocks and stocks markets returns in 22 emerging economics. Using Vector Autoregression (VAR) model on daily data for the period January 1, 1988 to April 31, 2004, the author's findings implied that oil shocks had no significant impact on stock market returns in emerging economics. The results also suggested that stock market returns in these economies did not rationally signal shocks in the crude oil market.

In another study on the emerging economics, Fang (2010) investigated how explicit structural shocks that characterized the endogenous character of oil price changes affected three BRIC'S stock market returns. His findings indicated mixed results. He found that oil shocks had no significant impact on Indian stock returns. The results showed significantly positive impacts on Russian stock returns. However, in China only oil specified demand shock had significant positive effects, but both global supply and demand shocks has significant impacts on china stock return.

Hall and Kanjagaliyev (2009) attempted to find the effect of oil price changes on the stock of oil companies in emerging markets. Using China and Russia as a case study, their results of both parametric and non parametric tests suggested that the fluctuations of oil prices had an effect on the stock prices. However the response of stocks of Chinese and Russian oil companies were considerably different from the shares of their western counterparts.

Some studies on oil price effect on stock markets distinguished between oil exporting importing countries. Al-fayoumi (2009) examined that relationship between changes in oil prices and stock market returns in three oil importing countries namely Turkey, Tunisia and Jordan. Using Vector Error Correction model (VECM), His empirical results did not support the hypothesis that oil prices lead to charges in stock market returns in these countries. In another study on oil importing country, Narayan and Narayan (2009) analyzed the impact of oil prices on Vietnam's stock prices. Their results showed that oil price had positive and statistically significant impact on stock prices.

Park (2008) analyzed the relationship between oil price shocks and stock market for the US and 13 European countries. Three countries among 13 European countries are oil exporting countries using unrestricted Multivariate Vector Autoregression (VAR) model, his findings indicated that in most oil importing countries oil price shocks had significantly positive response of real stock returns to oil price shocks, while among oil exporting countries only Norway showed a significantly positive response of real stock returns to oil price shocks.

In a study on an oil exporting country, Adebeyi, Adenuga Abeng and Omanukwe (2009) estimated the effects of oil price shocks on the real stock returns in Nigeria. Using Multivariate VAR model, their findings showed an immediate and significant negative real stock returns to oil price shock in the country, the Granger causality test indicated that causation run from oil price shocks to stock return

### **SUMMARY OF MAJOR FINDINGS**

The main findings that emanate from this study are as follows. Increasing oil prices lead to higher stock returns for stock markets in oil exporting nations. The reverse is the case in oil importing nations. Apergis and Miller (2009) found the existence of the long run relationship between oil prices and stock return in six OECD countries; Hall and Kanjagaliev (2009) results indicated that the oil price fluctuations had an effect on stock prices of oil companies in Russia and China. Some empirical findings reported results which are inconsistent with the theoretical expectations; for instance, Al-fayoumi (2009) results did not support the hypothesis that oil prices lead to changes on stock market return in Turkey, Tunisia and Jordan. Narayan and Narayan (2009) found positive relationship on their study on Vietnam an oil importing country. Park (2008) found among the three European oil exporting countries (Denmark, Norway and the UK) only Norway showed a significantly positive response of real stock returns to oil price changes. There is no consensus about general nature of the relationship between oil prices and stock market performance.

### **CONCLUSION AND RECOMMENDATIONS**

The goal of this study was to review the literature on the relationship between oil price shocks and stock market behaviour. Fluctuations of oil price indicate both upward and downward movements. This is attributed to many factors which include demand and supply imbalances, exhaustible nature of the oil, OPEC power and the role of speculators. Theoretical transmission mechanisms by which oil prices alter the stock market performance are categorized into five channels: stock valuation, monetary, output, fiscal and uncertainty channels. (Degiannakis, Filis and Aroro 2017). It is expected that the relationship between the two variables is negative for oil importing economies and positive for oil exporting economies. Empirical findings across countries generate mixed views and have no general consensus about the nature of the relationship between oil prices and stock market performance. Some studies are inconsistent with the theoretical expectations (see Maghyreh 2004, Park 2008, Al-fayoumi 2009, Narayan and Narayan 2009).

Considering the findings, the study recommends that further research is required in the future to explain why the results – which are inconsistent with the theoretical expectations – behave differently. Thus there is a need for a new approach on the study of the relationship between the oil prices and stock returns. Moreover, additional information on the variables could bring theoretically justified results

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