



Effects of oil price shocks on the stock market performance: Do nature of shocks and economies matter?



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ABSTRACT

The main focus of this study is to examine how oil price fluctuations influence the performance of stock markets. This study used the causality approach developed by Toda and Yamamoto (1995) to explore the causality between oil prices and stock prices in the long-run and their short-term impact. The generalized impulse response functions were applied to the monthly data in the period from January 1997 to July 2013. In this study, to capture the different characteristics of oil refining, exporting and importing, three Asian economies were examined. The results indicate that the manner in which a market reacts to hikes in oil prices varies between different markets and periods. This depends on differences in the oil characteristics of the economy and the nature of the shock in oil prices.

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1. Introduction

The available literature on energy economics suggests that significant research has recently been conducted, to investigate the relationship between oil and stock markets. One would expect changes in oil prices to be associated with changes in stock market prices, as a result of the importance of oil to the economy (Huang et al., 1996). However, several deficits have been indicated by most of the existing studies, conducted to examine the relationship between oil prices and stock markets. First, the studies mainly concentrated on the developed economies and ignored the under-developed or developing economies. Second, no study has been conducted for oil-refining countries like Singapore. Most studies concentrated on economies that import or export oil. Third, a number of studies have explored the short-term effects of oil price shocks in stock markets but ignored the long-term dynamics. Fourth, most of the current studies did not consider the fact that there could be structural breaks which can result in major variations in the relationships within an extended period. Instead, most of the existing studies draw conclusions by running an entire sample.

This study examines the extent of change in stock market returns that is influenced by fluctuations in oil prices. The aim of this study is to update and improve upon the existing literature on this topic in various ways. First, by examining three different oil economies in terms of oil characteristics, generalizes the possible relationships between oil price shocks and stock markets. The sample used in this study is drawn from three different countries whose GDP is largely influenced by oil. They include Singapore (an oil-refining economy), Malaysia (an oil exporting country) and Japan (an oil importing economy). The three economies are highly susceptible to fluctuations in oil prices. The oil intensity of GDP (in terms of barrels of oil consumed per day over annual GDP)² of the three economies is 0.38, 0.49 and 1.48 in Japan, Malaysia and Singapore, respectively, according to the World Economic Outlook Database of the International Monetary Fund (IMF) as of January 2012. The economy of Japan is highly industrialized and relies heavily on oil as a source of energy. The oil is used to provide 45% of all energy utilized in the economy. However, there are no domestic oil or gas reserves in the country which makes the economy fully reliant on imported oil. Singapore, on the other hand, is an oil-refining economy with a marine bunker and a petrochemical sector. This increases the intensity of oil in the economy's GDP. For Malaysia,

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² See, e.g., Lopez, 2008 and Torre et al, 2010. Alternatively, it could be measured as annual consumption of oil (barrels) to annual GDP.

the great economic growth seen over the years can be attributed to oil. The country has really developed with oil being the major resource. For instance, the government has received RM403.3 billion in total from the national oil company (Petronas) only. Additionally, Japan, Malaysia and Singapore's dependence on imported oil is 97%, –28.8% and 100%, respectively, where the negative number for Malaysia shows that she is a net exporter (BP Statistical Review of World Energy, 2011).

Secondly, when performing the co-integration analysis and unit root tests on the entire period between January 1997 and July 2013, an endogenous structural break may be inevitable. This possibility resulted in the use of a methodological approach in this study. The approach uses the unit root test developed by Zivot and Andrews (1992), as well as the Gregory and Hansen (1996) approach for co-integration analysis, where there are structural changes. The non-causality between the variables of interest in the long-run was tested using the Toda and Yamamoto (1995) approach. The response of the stock returns to a generalized one-standard variance of oil prices globally was tested by the generalized impulse response function (IRF) laid out by Koop et al. (1996) and Pesaran and Shin (1998). Apart from conducting the TY procedure and using the IRF, due to the long period of time, for the study to capture the various natures of shocks that may occur in the oil prices, the entire sample was broken into three sub-samples equivalent to the most significant economic events, as put forth by Le and Chang (2013).

The results of this study are of great significance to various groups of people, particularly the researchers, regulators and other parties that participate in the stock markets. For the regulators or policy makers, they should control the impact of oil price fluctuations on stock markets and economies. For the investors, they can predict the performance of stock markets by looking at the relationship between deviations in oil prices and stock returns.

The remainder of the study is organized into five more sections. Section 2 examines how the shocks in oil prices influence the performance of stock markets. Section 3 discusses the data and principal model used. Section 4 describes the econometric framework. Section 5 discusses the empirical results. It also presents the stability, robustness and policy implications of the results while Section 6 concludes the study.

2. Literature review

While there are a considerable number of empirical studies on oil and stock markets, less is known about the relationship in the context of oil-importing versus oil-exporting countries (Filis et al., 2011). According to the study of Kilian and Park (2009), the stock market can respond to a rise in oil prices either positively or negatively, mainly depending on the nature of the economy, that is, if it is an oil-importing or an oil-exporting economy. It also depends on the causes of the increase in oil prices, where increase in prices can be due to demand or supply factors in the oil market. This argument is supported by the findings by Wang et al. (2013) that the magnitudes, durations and even directions of response of the stock markets to crude oil price shocks differ greatly, depending on whether the country is an oil-exporting or oil-importing one, and whether the shock is driven by demand or supply. Further, this is also in line with previous results in the literature suggesting that the effect of oil price changes depends on the underlying cause of the change (Lippi and Nobili, 2012; Rapaport, 2013).

While carrying out a hypothesis on why the stock market would respond negatively to shocks in oil prices, it is assumed that stock returns decrease with increase in oil prices. However, oil prices are not affected in any way by stock market returns. The negative response of stock markets to changes in oil prices is explained as follows. Looking at the relationship in a micro-economic dimension, for companies that use oil as a direct or indirect factor of production, their earnings are adversely affected by higher oil prices (Sadorsky, 1999). If the company

is not able to pass that rising cost to their customers, the profits and dividends of the company, which are the main regulators of the stock market, will decline (Al-Fayoumi, 2009). In a macro-economic view, an increase in oil prices affects both producers and consumers, in the same manner as inflation tax (Basher and Sadorsky, 2006). It has two major effects: first, it reduces the disposable income of the consumers that they would have used in purchasing other goods or services. Therefore, they have to find other, cheaper sources of energy. Secondly, volatilities in oil prices negatively affect stock prices due to increased risks and uncertainties. These have to be borne by countries that do not produce oil. These countries also face the rising costs of oil which have a negative impact on stock prices and also lead to a decline in investment and wealth.

An assumption of a converse relationship between the stock markets and changes in oil prices can also be logical in net oil importing countries. A number of research findings (for example, Basher et al., 2012; Park and Ratti, 2008; Sadorsky, 1999) have supported this proposition. Increases in oil prices are said to cause a decline in exchange rates and increase the rates of inflation in these economies. An increase in oil prices generates a negative reaction from the stock markets, since an increase in the rates of inflation leads to a decrease in the discount rate (Huang et al., 1996).

In the research findings that have been discussed so far, it may be concluded that hikes in oil prices do not favor economic growth or stock market returns. Oil is an essential production factor for quite a number of industries. Therefore, one may expect that the negative impacts of increases in oil prices will be suffered by almost all the industries, excluding a few oil-producing industries. However, this hypothesis is not supported by all studies. Hikes in oil prices are said to have a negative impact on stock market returns, only when the increase in oil prices is caused by specific demand shocks in the oil market. For instance, fears on future availability of oil may lead to a rise in precautionary demand, thereby increasing oil prices (Kilian and Park, 2009). Similarly, a supply-induced increase in oil price appears to have a more negative effect on stock returns than a demand-induced increase in oil prices (Cunado and Gracia, 2014).

When hypothesizing a positive reaction of stock market performance to increases in oil prices, rise in oil prices is associated with a flourishing economy where businesses are performing well; this increases the demand for oil. This usually happens when an economy recuperates from a recession. As the global demand starts to pick up, the prices of basic materials also rise. To satisfy the increasing demand, factories have to acquire more resources such as labor and energy fuel. A research study examining the response of stock returns in the US to shocks in oil prices found that when increases in oil prices are caused by an expansion in the global economy, they have a positive influence on the cumulative stock returns (Kilian and Park, 2009).

Wealth and income effects are likely to be experienced in countries that export oil and influence stock markets positively due to the rising price of oil. This is attributed to the increased public expenditure on omega projects, infrastructure and increased revenues from governments (Al-Fayoumi, 2009). The increase in oil prices is a presentation of wealth transfer from net oil importers to net oil exporters. Countries that export oil have vast wealth and capital generated from the sale of oil which is used to enhance other sectors, as well as the local oil industry. Stock market improvement and increased economic activity will be achieved, if the income generated is used to purchase services and goods from the domestic market (Bjørnland, 2009). Through a modeling study conducted in Norway and carried out by Bjørnland (2009) to investigate the impact of rising oil prices, where the structural VAR model was used, it was established that there was a significantly positive influence on stock returns from an increase in prices of oil, and this was consistent with the hypothesis presented at the start of the study. Pertaining to oil-exporting countries, Arouri and Rault (2012) subscribe to the belief that a positive oil price shock has a positive impact on stock market performance. Specifically, the study

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