Accounting 2 (2016) 103–108

Contents lists available at GrowingScience

Accounting

homepage: www.GrowingScience.com/ac/ac.html

Oil price shocks and stock market returns

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C H R O N I C L E

Article history:
Received December 5, 2015
Received in revised format
February 16 2016
Accepted February 26 2016
Available online
February 26 2016

Keywords:
Oil price
Volatility
Stock market

A B S T R A C T

During the past few months, there has been a steady downside trend on oil price. From summer, 2015 to winter, 2016, the oil price has declined to the $20 range. Its rate of decline is amazing, having lost $10, one third of its value, in just one month. This paper presents a survey on recently published studies on relationship between oil price and stock market. The study covers several studies on the effects of oil price on China, India, Lebanon, United States and some other G7 stock markets. We also review the effects of oil price volatility on stock market. The results of most studies have indicated some strong relationships between oil price volatility and stock market return.

1. Introduction

During the past few months, there has been a steady downside trend on oil price. From summer, 2015 to winter, 2016, the oil price has declined to the $20 range. Its rate of decline is amazing, having lost $10, one third of its value, in just one month. Despite the fact that the price of a barrel of crude oil has not hit its all-time low, adjusted for inflation, of $12.45 from December 1998, it is very likely to get there in less than a month if the same decline trend continues. The $20 price of a barrel of crude oil is unanimously considered cheap; to put things in perspective crude oil has become inexpensive than the proverbial steel barrel or even mineral water. The $20 range is also a game changer for many perspectives of human life. Undeniably, oil prices maintain a proclivity for uncertainty. The decline on oil price has also influenced on stock market since most major stock market seem to have direct relationships with oil price (See Fig. 1). There are also several studies on relationship between oil price and stock market return and this paper presents a brief review on recent studies between these two items.

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doi: 10.5267/j.ac.2016.2.005

2. Oil price and market return

Angelidis et al. (2015) studied the capability of oil price returns, oil price shocks and oil price volatility to shed light on the state of the US stock market returns and volatility. The disaggregation of oil price shocks based on their origin helped to find out whether they had incremental forecasting power compared with oil price returns. They reported that oil price returns and volatility could help forecast the state of the US stock market returns and volatility. Nevertheless, the full impacts of oil price returns could only be disclosed when the oil price shocks were disentangled and as such they claimed that the oil price shocks had an incremental power in predicting the state of the stock market.

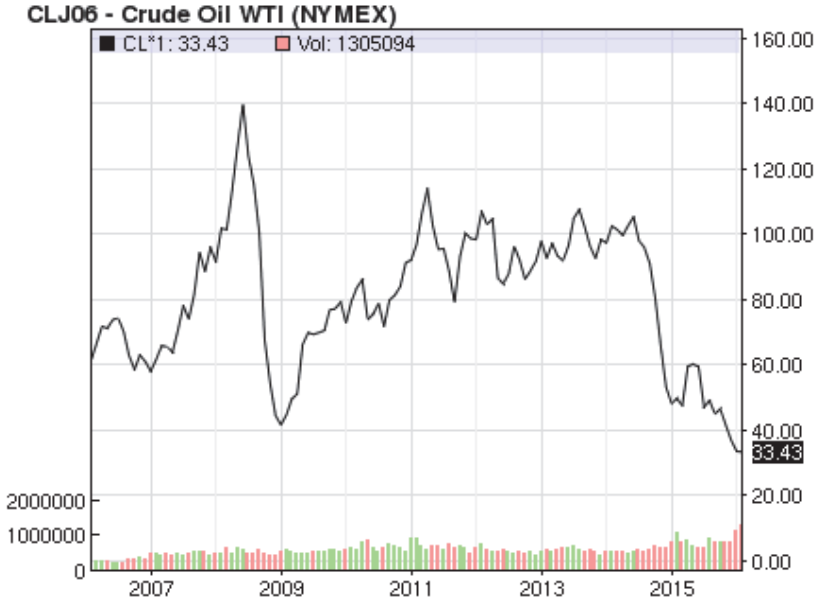

Fig. 1. Trend of oil price

Diaz et al. (2016) investigated the relationship between oil price volatility and stock returns in the G7 economies based on the monthly information over the period 1970-2014. They considered alternative specifications for oil prices in order to measure oil volatility. They predicted a vector autoregressive model by considering interest rates, economic activity, stock returns and oil price volatility by keeping in mind the structural break in the year 1986. They reported a negative response of G7 stock markets to an increase in oil price volatility. They also reported that world oil price volatility was generally more substantial for stock markets than the national oil price volatility was.

Reboredo and Ugolini (2016) studied the effect of quantile and inter-quantile oil price movements on various stock return quantiles by examining the hypothesis of equality in conditional and unconditional quantile distribution functions of stock returns. They measured quantile dependence under various stock market conditions, while considering various types of oil price movements, by measuring unconditional and conditional stock return quantiles using marginal models for stock returns and copula functions for oil-stock dependence. They reported the effect of extreme upward and downward oil price changes on upper and lower stock price quantiles appeared to be negligible before compared to after crisis onset. In addition, the downside spillover impacts were bigger than the upside spillover impacts mostly before crisis onset and for all countries after crisis onset. Moreover, small positive and negative oil price movements had no effect on any stock return quantiles either before or after crisis onset.

Basher and Sadorsky (2016) implemented DCC, ADCC and GO-GARCH to model volatilities and conditional correlations among emerging market stock prices, oil prices, VIX, gold prices and bond prices. They applied a rolling window analysis to build out-of-sample one-step-ahead predicts of

dynamic conditional correlations and optimal hedge ratios and found that, in several cases, oil could be considered as the best asset to hedge emerging market stock prices. Zhu et al. (2016) investigated the relationship between real crude oil price changes and Chinese real industry stock market returns using the monthly data over the period 1994-2014. They applied the issue based on the quantile regression method. They reported that the reaction of market returns to crude oil was significantly heterogeneous across conditional distribution of industry stock returns. They also stated that the relationship was positive and could be detected only in recessions or bearish markets with low expected returns. Ghosh and Kanjilal (2014) studied nonlinear co-integration between international crude oil price and Indian stock market over the period 2003-2011 and reported no meaningful relationship on long-run equilibrium relationship among the variables.

Ewing and Malik (2015) used univariate and bivariate GARCH framework to investigate the volatility of oil prices and US stock market prices based on daily data over the period 1996-2013. They determined structural breaks based on an iterating method and fed this information into GARCH models to predict the volatility dynamics. They reported no volatility spillover between oil prices and US stock market when structural breaks in variance were disregarded. Nevertheless, after considering the structural breaks in the model, they reported strong volatility spillover between the two markets. They also computed optimal portfolio weights and dynamic risk minimizing hedge ratios to shed light into the significance of the results which underscores the important issues of disregarding these structural breaks.

Bouri (2015a) proposed a broadened causality in variance method to evaluate the dynamic risks between crude oil prices and the Jordanian stock market. The results for the pre-crisis period indicated a lack of risk spillovers between global oil and the Jordanian stock market. However, after the crisis, they reported some evidence for one-way risk spillover running from the oil market. Bouri (2015b), in another assignment, investigated the relationship between return and volatility on oil prices and the Lebanese stock market in crisis periods. They reported that while the interrelationship between oil prices and Lebanese stocks increased during the crisis, it eased substantially in the post-crisis period. Their results were important for policymakers involved in shock prevention and for portfolio managers looking for optimal portfolio allocation.

Huang et al. (2015) studied the multiscale dynamic relationships between crude oil price and the stock market in China at the sector level. They reported that there was a strong evidence indicating that there were bidirectional Granger causality relationships between most of the sector stock indices and the crude oil price in the short, medium and long terms, except for those in the health, utility and consumption sectors. In addition, the Brent oil price shocks had a bigger effect on the stock indices of sectors other than the health, optional and utility sectors in the medium and long terms than in the short term. Le and Chang (2015) investigated how oil price fluctuations could impact on the performance of stock markets. This study used the causality approach developed by Toda and Yamamoto (1995) to study the causality between oil prices and stock prices in the long-run and their short-term effect. They used the generalized impulse response functions to the monthly data over the period 1997-2013. They examined three Asian economies to study various characteristics of oil refining, exporting and importing. They reported that the manner in which a market could react to hikes in oil prices differed between various markets and periods.

Chen and Lv (2015) performed an empirical survey on the extreme-value dependence between the crude oil price and Chinese stock markets. They reported that the dependence level appeared to increase substantially during the crisis period. However, the simultaneous booms between these two markets could decrease substantially after the crisis. Tsai (2015) implemented a long time series of daily data for 682 firms over a period 1990-2012 in order to find out how U.S. stock returns respond differently to oil price shocks pre-crisis, within the financial crisis, and post-crisis. He provided some evidence that U.S. stock returns responded positively to the changes in oil prices during and after such a crisis. They also used firm-level data to determine that positive and negative oil price shocks had asymmetric

impacts on stock returns during and after the crisis. They also examined whether the effect of an oil price shock on stock returns differed across oil-intensive industries and reported that big firms were strongly and negatively influenced by an oil price shock prior to the crisis. In addition, an oil price shock in the post-financial crisis period was positively amplified in the case of medium-sized companies.

Caporale et al. (2015) studied the time-varying effect of oil price uncertainty on stock prices in China using weekly data on ten sectoral indices over the period 1997–2014. They reported that the effect of oil price uncertainty was insignificant during periods with precautionary demand shocks. Sim and Zhou (2015) tested the relationship between oil prices and US equities using a quantile-on-quantile (QQ) method to build estimates of the impact that the quantiles of oil price shocks had on the quantiles of the US stock return. They reported that, large, negative oil price shocks could influence on US equities positively when the US market was performing well (i.e. at high US return quantiles). In addition, while negative oil price shocks could influence on the US stock market, the effect of positive oil price shocks was weak, which implies that the relationship between oil prices on the US equities was asymmetric. Salisu and Oloko (2015) reported a positive return spillover from US stock market to oil market and bi-directional shock spillovers between the two markets. Moreover, there was a substantial own asymmetric shock impact in both markets in their survey while volatility spillover from oil market to stock market became pronounced after the break which coincides with the period of global economic slowdown.

Lin et al. (2015) investigated the valuation impacts of corporate name changes involving oil-related terms in the U.S. and Canadian stock markets. They demonstrated that relatively more U.S. firms add oil-related terms to their corporate names compared with Canadian ones. Investors in the U.S. market appeared to react more positively towards companies experiencing oil-related name changes when the oil prices increase. Moreover, the oil-related name change effects seemed to be transitory in the Canadian market. Balcilar et al. (2015) investigated the relationship between US crude oil and stock market prices using a dataset over the period 1859-2013. They estimated a two-regime model, which divides the sample into high- and low-volatility regimes according to the variance–covariance matrix of the oil and stock prices. They reported that the high-volatility regime more frequently persisted prior to the Great Depression and after the 1973 oil price shock caused by the Organization of Petroleum Exporting Countries. The low-volatility regime, however, happened more frequently when the oil markets fell largely under the control of the major international oil firm from the end of the Great Depression to the first oil price shock in 1973.

Pradhan et al. (2015) investigated the relationship among economic growth, depth in the stock market, oil prices and three other key macroeconomic indicators; namely inflation rate, real effective exchange rate and real rate of interest. They used a panel vector autoregressive model to test Granger causality for the G-20 countries from 1961 to 2012 and clearly described the long-run and short-run relationships between the economic variables. Their survey also explained a robust long-run economic relationship between economic growth, stock market depth, oil prices, real effective exchange rate, real rate of interest and inflation rate. In their survey, the real economic growth was detected to respond to any deviation in the long-run equilibrium relationship in the long run, which indicated a relationship between various measures of stock market depth, oil prices, and the other macroeconomic variables. In the short run they reported a complex network of causal relationships between the variables. Narayan and Gupta (2015) discussed the role of oil prices in predicting stock returns. They reported some key findings: oil price estimates US stock returns and both positive and negative oil price changes were essential predictors of US stock returns, with negative changes relatively more important. Phan et al. (2015) studied how differently stock returns of oil producers and oil consumers were influenced from oil price changes. They reported that stock returns of oil producers were influenced positively by oil price changes whether oil price was increasing/decreasing. They also reported that oil price returns had an asymmetric impact on stock returns for most sub-sectors. Kang et al. (2015) studied the effect of

structural oil price shocks on the covariance of U.S. stock market return and stock market volatility. In their survey, oil supply disruptions were related to positive impacts on the covariance of return and volatility.

3. Discussion and conclusion

The survey has concluded that oil price could significantly influence on stock market from Asian stock market to US stock market. The study has also indicated that there was a strong evidence indicating that there were bidirectional Granger causality relationships between most of the sector stock indices and the crude oil price in the short, medium and long terms, except for those in the health, utility and consumption sectors. The survey has also reported that while the interrelationship between oil prices and Lebanese stocks increased during the crisis, it eased substantially in the post-crisis period. Among G7 countries, the survey has found a negative response of G7 stock markets to an increase in oil price volatility. In other words, world oil price volatility was generally more substantial for stock markets than the national oil price volatility was. In our survey, while negative oil price shocks could influence on the US stock market, the effect of positive oil price shocks was weak, which implies that the relationship between oil prices on the US equities was asymmetric. We hope this survey could help other interested researchers contribute more on the relationship between oil prices and stock market.

Acknowledgement

The authors would like to thank the anonymous referees for constructive comments on earlier version of this paper.

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