HOW OIL SHOCKS INFLUENCE OIL RELATED STOCKS IN THE ASIA PACIFIC REGION

WANG Rui. Southwestern University of Finance and Economics, China. *+86* 13688385899. wangr1231@126.com

Overview

This paper contributes to the literature by analyzing the impact of changing oil prices upon energy related stock portfolios. Specifically, within the context of the CAPM incorporating oil price, I demonstrate two channels of oil effects: direct, where oil price effect is additive to market factor; and indirect, where some oil price effect is transmitted through the market risk. Most previous studies only capture the direct effect by including oil price risk factors into asset pricing models. Using daily data from four leading districts in the Asia Pacific Region (India, Japan, Korea and Taiwan), conditioning on GARCH effects and structural instability, I conclude that oil price is an important factor affecting energy related stocks under both direct and indirect effect. Further, I demonstrate that the empirical results are robust to the specification of oil prices: WTI or Brent, and oil returns with other measures such as net oil price increases.

Methods

The following hypotheses are tested:
H1: Oil price changes have a direct affect upon energy related stock returns.
H2: Oil price changes have an indirect affect upon energy related stock returns.
H3: There is always some effect (either direct or indirect) of oil price changes on stock returns.
H4: The 2008 Global financial crisis generated non-ignorable structural instability in the relationship between energy prices and financial markets.
H5: The choice of oil prices (e.g. WTI or Brent) does not affect the conclusions of H1-H4, but may impact on the magnitude of the effect.
H6: The specific measure of oil shocks used does not affect the conclusions of H1-H4, but may impact on the magnitude of the effect.
To examine **H1**, I apply an extended CAPM relating share price exposure to general market risk as well as variability in oil prices.

$$R_{o,t} = C_1 + b_m R_{m,t} + b_o ROil_t + \varepsilon_t$$

To model **H2**, conditional on the relationship between portfolio returns and market returns, it must be demonstrated that there is some effect of oil on the total market.

$$R_{m,t} = C_2 + \beta_o ROil_t + \mu_t$$

With **H1** and **H2** already evaluated, **H3** is easy to prove. For **H3** to be accepted requires one of three scenarios, all of which are empirically possible: **H1** is accepted; or **H2** is accepted; or both **H1** and **H2** are accepted. If the oil price changes can neither affect the oil stocks directly nor indirectly, then **H3** can be rejected.
To test **H4**, I apply Andrews and Ploberger (1994) type tests, which are now fairly widely used.
To examine **H5**, besides WTI, I also use Brent oil prices to do the robust check.
To investigate **H6**, in addition to oil price changes used in models, I also use other two measures that are oil price increases and net oil price increases to do the robust check.

Results

H1: the direct effects are significant in three out of the five markets, namely, TPX and NKY in Japan and SENSEX in India. This implies that WTI price changes do have a direct effect on energy related stocks and thus **H1** cannot be rejected for Japan or India. However, for Korea and Taiwan, the WTI price changes are not statistically significant, thus **H1** is rejected for these markets.
H2: The indirect effects are significantly positive in all five markets. What's more, conditioning on the fact that the market effect upon the specific portfolio is always there, H2 cannot be rejected in any instance. In this regard, the connection between the oil shocks and the portfolios is through the general markets.

H3: From the previous two sections, results demonstrate that in either market of Japan, TPX or NKY , WTI price changes have both direct and indirect effect on energy related stocks, which is the also the case for India. While for Korea and Taiwan, WTI price changes only have an indirect effect. Anyhow, there is always some effect of WTI price changes.

H4: The structural breaks and sub-sample regression suggest that the 2008 global financial crisis generated non-ignorable structural instability and therefore that **H4** cannot be rejected for Japan, India or Korea, but is rejected for Taiwan. The conclusions regarding **H1** are fundamentally unaffected by this structural instability.

H5-H6: The evidence presented suggests that neither hypothesis can be rejected. That is to say, under a range of alternative oil price specifications, the results from **H1-H4** are qualitatively the same, though there are differences in the implied order of magnitude. These differences in magnitude have not been the focus of the paper, but it should be noted that they are not small, and represent a distinct identification problem inasmuch as there is no obvious (non-arbitrary) way to choose one oil price over another.

Conclusions

In this paper, I investigated how oil price changes affect the energy related stock portfolios for five major stock indices in the Asia Pacific region. Owing to conflicting debates in the related literature regarding the existence of any effect, I consider two possible channels of effect, one direct and another indirect. The former is largely represented in existing literature while the latter is usually ignored.

Regarding the direct effect, in the context of the CAPM incorporating oil prices, the results suggest that it is not always present, even for energy specific stock portfolios. In this regard the mixed debate in the literature is understandable, but nonetheless still partial in nature. In drawing such conclusions, previous literature largely fails to recognize the indirect oil-price pass through effect embedded in wider market risk exposure. I demonstrate that this indirect effect is present in each of the markets tested. Moreover, I find that the financial crisis is demonstrated to materially alter the way in which oil affects energy relates stocks. And alterative oil types have some impact on the magnitude of effect, but otherwise do not alter the conclusions from H1-H4. Finally, alternative measures/transformations of oil prices also impact on the magnitude of effect, but do not otherwise alter the conclusions from H1-H4.