

# The (time-varying) Importance of Oil Prices to U.S. Stock Returns: A Tale of Two Beauty-Contests

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## a) The motivations underlying the research

There is a rich evidence base on the impact of oil prices, their changes, or some transformation/decomposition to obtain a measure of 'oil price shocks', to stock market returns. Despite this, most prior research focuses either on aggregate stock market indices or selected industrial sectors.

The existing literature has paid relatively little attention to examining the relationships using firm-level data. Moreover, among the existing studies using firm-level data, only limited consideration has been given to the time-varying patterns of association between oil prices and stock markets.

## b) A short account of the research performed;

Two widely used oil price measures are considered, one based on raw oil price changes and another based on disentangling the source of oil price changes due to supply-side or demand-side effects. As far as we know our dataset, which comprises 10,118 stock price series with up to 25,372,588 observations between 1995-2018, is the most comprehensive used for this purpose. We develop two 'beauty-contests' in which we estimate multi-factor models separately for individual stocks, for each of the two oil price measures.

Against this backdrop we contribute to the literature by:

- (i) implementing a 'beauty contest' of sorts, sequentially analyzing a large sample of individual stocks; and more importantly
- (ii) placing special emphasis in testing for time-varying effects and relationships, placing our work in a unique position relative to the existing literature.

For this purpose we employ a multi-factor empirical asset pricing framework in which the excess returns of a given stock i.e. the returns over and above the risk-free rate of return, are regressed against a number of price determining factors, including different measures of oil price change/uncertainty (i.e. to capture for example asymmetric or symmetric responses to oil price changes).

Estimation is done using the dynamic model averaging (DMA) framework which allows us to obtain time varying probabilities that oil price changes are among the set of indicators that govern excess stock return movements in any given period, as well as time-varying coefficients. In this paper, we place special emphasis on the interpretation of these probabilities.

## c) The main conclusions

Our findings offer convincing evidence that US stocks generally do not contain a systematic premium due to oil price changes (symmetric, asymmetric) or shocks (demand or supply

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driven). We therefore lay challenge to the prevailing wisdom that oil-prices/shocks are important in determining the excess returns of listed firms in the US stock markets. We offer a generally more humbling appraisal of the topic, which supports the view that oil price fluctuations are not a 'frequent' determinant of excess returns. This result is strongest when using daily frequency data, where, on average, stocks tend to price oil related information for around 2-3% of the sample period. For the monthly frequency data there is stronger evidence of the importance of oil price shocks, yet still the average stock is only significantly affected for 33% of the sample period, according to the results of our analyses.

Reconciling our conclusions against the current consensus (that oil prices have wide reaching impacts over stock prices) we note that around 50-100% of stocks, depending on the use of daily or monthly frequency data, show a significant reaction to oil-price related information, at least once over the sample period. Regarding the hypothesized asymmetries, the evidence suggests for the daily data, the responses of excess stock returns to asymmetric oil price changes are more frequent compared to the symmetric changes.

The picture is less clear for the monthly data, where excess stock returns seem to respond more frequently to different oil price shocks, depending on the time period. We should note, though, that this response is also at a fraction of the time over the sample period. Thus, in summary the primary conclusion is that oil price shocks, though not negligible, are not a core determinant of excess stock returns.

#### **d) Potential benefits, applications and policy implications of the work.**

This topic is important for at least four reasons. First, given the recent shifts in international oil prices during 2014-2015, the sustained stagnancy at below-expected price levels through to the early part of 2016 and continuing into 2017, as well as, the upward movements since then, there is a valid question as to whether the role of oil prices to stock market performance has been altered.

Second, it would be valuable to gauge how financial markets might react to the oil price recovery, which appears to be emerging towards the end of 2018 and generally continuing into the early part of 2019.

Third, the majority of previous studies focus on aggregate or industrial indices and/or low frequency data, whereas in this study daily firm-level data are used, which provide richer information, in the sense that heterogeneous effects are not masked by the very nature of the indices construction.

Fourth, the majority of the studies concentrate on static econometric frameworks rather than time-varying frameworks. Hence, despite the wealth of literature, the question on how and whether oil prices impact stock market returns still remains open.