

CONNECTEDNESS BETWEEN CRUDE OIL FUTURES AND EQUITY MARKETS DURING THE PRE-AND POST-FINANCIALIZATION ERAS

Sania Wadud, University of Aberdeen and Curtin University, +44 7514 143774, sania.wadud@abdn.ac.uk

Robert B. Durand, Curtin University, +61 8 9266 9971, Robert.Durand@curtin.edu.au

Marc Gronwald, International Business School Suzhou, Xi'an Jiaotong-Liverpool University, Marc.Gronwald@xjtlu.edu.cn

Overview

Since the implementation of the Commodity Futures Modernization Act (CFMA) of 2000, trading and volatility in many commodity markets increased (although volatility fell during the Global Financial Crisis (GFC) (Domanski and Heath 2007; Dwyer et al. 2011). Positions held by non-commercial traders have also increased and this growing use of commodities as an asset class is commonly referred to as the financialization of commodity markets (Cheng and Xiong 2014). Our paper examines the impact of financialization in crude oil futures and equity markets.

In particular, despite being an important factor in forecasting and pricing, volatility in oil and stock futures, and the interconnectedness of these markets have received less attention until recently. Basak and Pavlova (2016) show that correlations among commodities, and between equities and commodities, have increased after the financialization. This increase in correlation may reduce the diversification benefits of commodities to the detriment of investors. Moreover, the change in correlation between oil and equity market during the pre-and post-financialization periods may lead to change in the equilibrium levels of interconnectedness, which may reflect in price information. As various energy investment are based on oil price information, it is crucial that oil prices reflect fundamental oil price information.

It is well known that commodity prices exhibit unique volatility patterns (seasonality, maturity effects). Stock markets also show seasonal patterns (e.g., the January effect). Ignoring these volatility patterns could lead to plausible spurious conclusions on volatility links and how they have been impacted by financialization. The key contribution of this study is to examine the volatility and interdependencies of volatility between crude oil and equity markets, and how they have been affected by the financialization. We demonstrate the importance of explicitly accounting for seasonalities, Samuelson maturity and correlation effect.

Methods

To examine the effect of financialization, we use two different approaches: (i) sub-sample analysis (pre: 1993-2003, post: 2004-2019) and (ii) financialization-specific measures. Firstly, we focus on whether and how the financialization affects volatility links between the crude oil futures and equity markets employing the Dynamic Conditional Correlation model proposed by Engle (2002). In the first step of the model, we model the mean equation through a vector autoregression (VAR) framework incorporating seasonal effect as an exogenous variable. The individual conditional variances along with seasonal effect (crude oil futures contract for a nearby month, three other crude oil contracts for successive delivery months following the nearby contract, and S&P500 as a proxy for equity market) are specified as univariate Generalised Autoregressive Conditional Heteroscedasticity (GARCH) process. Then, the standard residuals are used to construct the time-varying conditional correlation matrix.

Secondly, we examine whether and how the financialization has altered the volatility dynamics of crude oil futures and equity markets (in particular, their systematic patterns). We use estimated conditional volatility, conditional correlation to examine the Samuelson maturity effect and correlation effect by using the Kolmogorov-Smirnov (KS) test and the Jonckheere-Terptra (JT) test.

For financialization specific analysis, we use the difference between long and short positions held by non-commercial traders relative to total open interest by following Hedegaard (2011) to measure financialization or speculative activity. As financialization has increased the open interests in the futures market that provides liquidity, we also consider using open interest to know the indirect effect of financialization. We use regression analysis to assess the relationship between estimated conditional correlations, volatility, and speculative index and open interests during the pre-and post-financialization period. Moreover, we use Granger causality test to know the causal link between the above mentioned variables.

Finally, we use three types of robustness checks: we assess whether the results are unaffected adopting alternative GARCH models, we check if using a different measure of speculation changes the result and whether detrending open interest series changes the result of the impact of speculation.

Results

We find a few seasonal effects to be significant for both return and volatility. As hypothesized, the seasonal effect in volatility tends to weaken and fade away during the financialization period. Moreover, we find the Samuelson maturity and correlation effect to be existent in the crude oil futures market before and after the financialization period. However, the Samuelson volatility effect is found to be diminishing since the financialization period.

We find that speculative activity does not directly impact the volatility of these markets. Unlike speculative activity, change in open interest affects volatility of crude oil futures market. Moreover, our result indicates that there is substantial evidence of Granger-causality relations between price variability and speculative activities in a unidirectional manner. This suggests that conditional volatility of both equity and crude oil futures market lead speculative activities, therefore change in volatility of these markets may affect decision of trader to take their position, especially after the financialisation period.

Conclusions

In this paper, we empirically investigate the impact of financialization on the volatility and co-movements between crude oil futures and equity markets. In particular, we show the effect of financialization on seasonal patterns of crude oil futures and equities, Samuelson maturity effect and correlation effect.

Overall, our result suggests the existence of higher price volatility and co-movements between crude oil futures and S&P500 since the financialization. Our findings are consistent with the view of the increase in non-commercial investors in the market increases the open interest which provides liquidity and/or increases informational market efficiency and hence dampens the return volatility. Moreover, our findings support the "flight to quality" hypothesis during the periods of negative co-movement between crude oil and equities. Our paper has practical implications for scholars, practitioners, and policymakers in determining investment decisions, creating trading strategies, and pricing option and other financial contracts.

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