Oil Prices and the Stock Markets: Evidence from High Frequency Data

By Sajjadur Rahman[1] and Apostolos Serletis[2]

Executive summary

The relationship between the price of crude oil and the stock markets has gained considerable attention among researchers in recent years, as cashflows generated by firms in different industries greatly depend on crude oil prices. They primarily use monthly data and apply empirical models that range from simple linear regressions to structural vector autoregressions, which are identified mostly through exclusion restrictions. Their findings suggest that oil price shocks in general have significant negative effects on stock returns.

In this study, we focus on the relationship between crude oil prices and stock market returns using the highest frequency data that have ever been studied. This is of critical importance, since in making their investment decisions investors frequently update their information set after considering the content as well as variations of the high frequency data points. We utilize these variations in a structural model in order to identify the shocks to the price of crude oil.

We use daily data that span the period from January, 1987 to October, 2016 on the changes in the spot price of West Texas Intermediate (WTI) crude oil and S&P 500 market returns. We apply a bivariate structural VAR that is identified through heteroscedasticity of our high frequency dataset, as detailed in Rigobon and Sack (2003) and Wright (2012). Based on our estimated model, we produce responses of U.S. market returns to a one standard deviation shock to the price of crude oil and find empirical evidence that unanticipated increases in the price of crude oil have negative effects on U.S. market returns.

We extend our analysis by replacing the S&P 500 market returns with U.S. industry returns, returns on the GICS energy sector, and returns of major energy companies. We also examine the cross-county evidence on the effects of oil price shocks on the stock market by including returns data of selected emerging and industrialized countries. Finally, we check the robustness of our results by including aggregate and disaggregate U.S. excess returns. All of these empirical results support our main finding that the stock market responds negatively to oil price shocks.

Keywords: Oil price shocks; Heteroscedasticity; VAR model.

1 Department of Accounting and Finance, Texas A and M – San Antonio, USA.

2 Corresponding author. Department of Economics, University of Calgary, Canada. Email: serletis@ucalgary.ca