TYBA SEMESTER 6

Tracing Wholesale Crude Oil Prices through an ARIMA Model

Econometrics A.Eco.6.08

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Abstract:

This project attempts to trace the trend in the wholesale crude oil prices over 48 months, between January, 2013 and December, 2016. The analysis is based on data from the Wholesale Price Index, published monthly by the Office of the Economic Adviser, under the Ministry of Commerce and Industry. Critically analysing this trend is necessary, as crude oil prices are often indicative of the overall health of the economy. This article uses the framework of a time series-based Autoregressive Integrated Moving Average Process (ARIMA) model to study changes in crude oil prices.

Introduction:

A time

Literature Review

WPI is an important measure to monitor the dynamic movement of prices at the wholesale level. In a dynamic world, prices keep on changing. WPI is used as a deflator of various nominal macroeconomic variables including Gross Domestic Product (GDP). The WPI based inflation estimates also serve as an important determinant, in formulation of trade, fiscal and other economic policies by the Government. Currently India observes the base year for WPI calculation as 2011-12. (Office of the Economic Adviser Department of Industrial Policy & Promotion Ministry of Commerce & Industry Government of India, 2013)

Crude oil is one of the most necessitated commodities in the world and India imports around 100 million tons of crude oil and other petroleum products. This in turn, results in spending huge amount of foreign exchange. The increasing quantum of import of petroleum products has a significant impact on Indian economy. (Wani et al, 2015) According to a RBI Report (2005), for every unit of Dollar increases in crude oil price, wholesale price (WPI) inflation rises by 30 basis points (Kaushik Bhattacharya et al, 2005). In February 1999, from an all time low of 11 US$ per Barrel, the price increased to peak at $35 per barrel in the first week of September 2000. Due to this all importing countries faced the threat of oil shock. India, being a major oil importer was directly affected by the price rise. According to Bruno (1982), oil price shocks lead to increases in wages and prices and decrease in real output.

To observe the impact of crude oil prices on the Wholesale Price Index in India, the paper analyses time series data from 2013 to 2016. The econometric model used for the time series data analysis is ARIMA. ARIMA stands for Auto-Regressive Integrated Moving Average. ARIMA model incorporates a regression component, an integrative component achieved by differencing the time series, and a moving average component. ARIMA does not use the independent variables like the other econometric methods, instead it uses the times series as the input to build a model. (Natranjan et al, 2018)

References

Wani, Firdoos & Kirmani, Mudasir & Andrabi, Syed Mohsin. (2015). Impact of Crude oil on Indian Economy. International Journal of Modern Management Sciences. 4. 11-26.

Manual on Wholesale Price Index. (2013) Office of the Economic Adviser Department of Industrial Policy & Promotion Ministry of Commerce & Industry Government of India .

Natarajan, Ganapathy & Ashok, Aishwarya. (2018). Multivariate Forecasting of Crude Oil Spot Prices using Neural Networks.