Assignment 14

ARIMA & GARCH Models

From the data set `assign_timeseries.dta`:

Part I

1. Estimate Autoregressive Integrated Moving Average (ARIMA(p,d,q)) model for spot and future – determine the most appropriated order for p, d, and q using SBIC given the maximum lag equals 4.
2. Make dynamic forecast for period time = 796 to 800.

Part II

The following GARCH model:

Mean Equation: $$rfuture_t = \alpha + \beta rspot_t + \varepsilon_t \quad (1)$$

Variance Equation: $$\sigma_t^2 = \alpha_0 + \sum_{j=1}^{p} \delta_j \sigma_{t-j}^2 + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 \quad (2)$$

3. Estimate model (1) using OLS by employing future return (rfuture) as dependent variable and spot return (rspot) as explanatory variable, and determine whether ARCH-effect significantly occurs.
4. Estimate GARCH(p,q) for future return (rfuture) using spot return (rspot) as explanatory variable for mean equation (model (1) and (2)) – determine the most appropriated order p and q for variance equation using SBIC given the maximum lag equals to 2.
5. From (6), predict the variance of future return (rfuture).