**Word limit:**

The maximum word count for this exercise is **2000 words** that includes everything between the start and completion of the answer, excluding tables, figures, foot - and endnotes, and appendices, but including any in-text citations.

**References and additional material:**

In answering the questions below, you must consult the relevant chapters of the recommended book **Introductory Econometrics for Finance** by Chris Brooks and my lecture handouts, my Eviews based lab sheets and the help option in Eviews

**Data:**

Will be provided.

In answering the questions below, you may wish to consult the option in Eviews.

1. For your series, in Eviews use the **Genr** option to calculate (i) the log of the price series, e.g. e=log (Adj Close), and (ii) the daily log returns (e.g. **r=log(**Adj Close**)-log(**Adj Close**(-1))**).
   * 1. Examine the descriptive statistics for both e and r. What do you conclude about the distributions of e and r? Is e normally distributed? Is r normally distributed? Explain why/why not?
     2. Obtain the correlograms, and examine the autocorrelations and partial autocorrelations for both e and r. What do you conclude about the behaviour of e and r? Are they stationary/non-stationary?
     3. Are your conclusions about stationary/non-stationary of e and r confirmed by appropriate unit root tests?
2. Estimate and select an appropriate ARMA (p,q) model for e. In selecting your preferred model, use the information provided by:
   * 1. The estimated coefficients (and their t-statistics or p values)
     2. Serial correlation in the residuals
     3. Information criteria.

Produce a summary table similar to this.



(standard errors are in parenthesis)

* + 1. Carry out forecasts (Ex-post Out of sample) of the e series for the last 30 observations (fixed forecasting horizon) for the competing models (i.e. AR(1), AR(2) …. MA(1), …., ARMA(1,1), ….) and choose the best model using the following criterions.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***AIC*** | ***SBC*** | ***LM(12)*** | ***RMSE*** | ***MAE*** | ***MAPE*** | ***THEIL*** |

* + 1. Carry out forecasts (Ex-post Out of sample) of the e series for the 30 observations (t+10, t+20 and t+30) using the chosen model from part 2(iv) [pay attention to the forecast summary statistics] and comment on your results.

|  |  |  |  |
| --- | --- | --- | --- |
| **Out of Sample Horizon** | **10 observations** | **20 observations** | **30 observations** |