Quiz 1

ECON312 Time Series Analysis

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Student ______________________ ______________________________

first name last name

Grade _____ / 10

Instructions

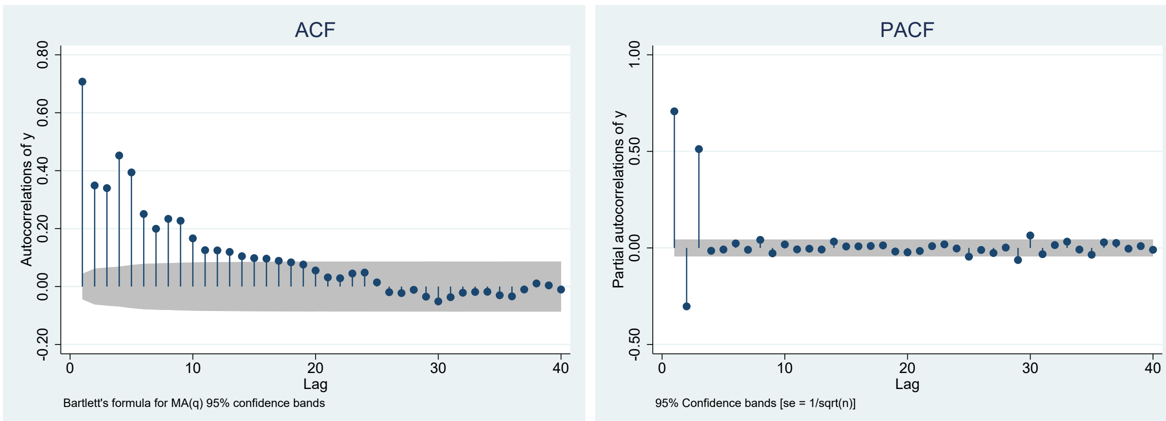
- The quiz is closed-book.
- No electronic devices are allowed.
- Write your answers in a clear and unambiguous way.

  Good luck!

Question 1 (2 pts.)

Suppose the you have time series data on some variable y_t, and you want to determine whether the series is $AR(p)$ or $MA(q)$ along with the order of the process p or q.

The figures below show the ACF and PACF of the series. Based on the information provided in the figure determine the type of the process, i.e. AR or MA, and the order of the process p or q.



Explain your answer.

Question 2 (4 pts.)

Consider the following $AR(1)$ process:

$$y_t = \phi y_{t-1} + e_t \qquad e_t \sim WN(0, \sigma^2)$$

with $\phi = 0.6$ and $\sigma^2 = 1$.

Evaluate the following expressions:

- $\text{Cov}\left(e_t, e_{t-1}\right) =$

- $\text{Cov}\left(e_t, y_{t-1}\right) =$

- $\text{Corr}\left(y_t, y_{t-1}\right) =$

- $\text{Corr}\left(y_t, y_{t-2}\right) =$

Question 3 (4 pts.)

Consider the following process:

$$y_t = c + e_t + \theta_1 e_{t-1} + \theta_2 e_{t-2} \qquad e_t \sim WN(0, \sigma^2)$$

Evaluate the following expressions:

- $\text{Var}\left(y_t\right) =$

- $\text{Cov}\left(y_t, y_{t-1}\right) =$

- $\text{Cov}\left(y_t, e_{t-2}\right) =$

- $\text{Cov}\left(y_t, e_{t-3}\right) =$