Session 9: Review Exercises

AY2025/26 Term 1

Question 1: Show that the following two models are **not** equivalent:

i. $Y_t = \alpha + \delta X_t + u_t\,,\; u_t = \rho u_{t-1} + \epsilon_t\,,\; |\rho| < 1\,,\; \epsilon \overset{iid}{\sim} (0, \sigma^2)$

ii. $Y_t = \beta_0 + \beta_1 X_t + \beta_2 Y_{t-1} + \epsilon_t\,,\; |\beta_2| < 1\,,\; \epsilon \overset{iid}{\sim} (0, \sigma^2)$

Question 2: Show that the following two models are equivalent:

i. $Y_t = \alpha_0 + \beta_0 X_t + \beta_1 X_{t-1} + \cdots + \beta_q X_{t-q} + u_t$

ii. $Y_t = \alpha_0 + \delta_0 \Delta X_t + \delta_1 \Delta X_{t-1} + \cdots + \delta_{q-1} \Delta X_{t-q+1} + \delta_q X_{t-q} + u_t$

How would you use model (ii) to test hypotheses regarding the long-run cumulative dynamic multiplier in model (i)?