

Economics 468

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Assignment 1

The file located at the URL

<https://russell-davidson.arts.mcgill.ca/e468/e468.as1.dat>

contains 113 observations on two variables, C_t , $t = 1, \dots, 113$, consumption expenditure, and Y_t , disposable income, in that order. Construct the variables c_t , the logarithm of consumption, and y_t , the logarithm of income. Use them to estimate the following **autoregressive distributed lag** model:

$$c_t = \alpha + \beta c_{t-1} + \gamma_0 y_t + \gamma_1 y_{t-1} + u_t, \quad t = 2, \dots, 113. \quad (1)$$

Such models are often expressed in first-difference form, that is, as

$$\Delta c_t = \delta + \phi c_{t-1} + \theta \Delta y_t + \psi y_{t-1} + u_t, \quad (2)$$

where the first-difference operator Δ is defined so that $\Delta c_t = c_t - c_{t-1}$. Estimate the first-difference model (2), and then, without using the results of (1), rederive the estimates of α , β , γ_0 , and γ_1 solely on the basis of your results from (2).

Simulate model (1), using your estimates of α , β , γ_0 , γ_1 , and the variance σ^2 of the disturbances. Perform the simulation conditional on the income series and the first observation c_1 of log-consumption. Plot the residuals from running (1) on the simulated data, and compare the plot with that of the residuals from the real data. Comments?