Exercise Sheet 4

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1. In the EViews file CYNIG.WF1 you will find data on real consumption (CX) and real income (Y) for Nigeria for the years 1961 to 1986. Use this data to estimate the model

$$C_t = \alpha + \beta Y_t + u_t. \tag{M1}$$

   (a) Test for first order autoregressive errors using both the *Durbin-Watson* test and the *LM* test. (The *LM* test can be found on the *EViews* equation window menu by selecting *View |Residual tests |Serial correlation LM test*. Choose lag length 1 for a first order test). Which test do you prefer in this case?

   (b) Obtain plots of the residuals and the sample autocorrelation function of the residuals. Do these plots indicate autocorrelation? (Residual plots can be obtained on the *EViews* equation window menu by selecting *View |Actual–Fitted–Residual |Residual graph* and autocorrelation functions by choosing *View |Residual tests |Correlogram Q tests*).

   (c) Denote the residuals from the regression above as e_t and estimate the regression

$$e_t = \rho e_{t-1} + \varepsilon_t.$$

   Use the estimated $\widehat{\rho}$ from this regression to obtain the transformed variables

$$C_t^* = C_t - \widehat{\rho} C_{t-1}$$

   and

$$Y_t^* = Y_t - \widehat{\rho} Y_{t-1}$$

   and hence obtain the (2-step) Cochrane-Orcutt estimates of α and β. (The residuals can be saved as a variable in the workfile by selecting *Procs |Make residual series* from the *EViews* equation window menu).

2. Using the same data set, estimate the model

$$C_t = \alpha + \beta Y_t + \gamma C_{t-1} + u_t. \tag{M2}$$

Is there any evidence of autocorrelation in this model? What would be an explanation for the original model *M1* in Question 1 having autocorrelated errors but the model *M2* not having autocorrelated errors?