MACROECONOMETRÍA

Segundo Cuatrimestre (curso 2006/07), Depto. de Economía, UC3M

Excercise set 4

Question 1. The EViews code below estimates a possible cointegration relation $y_t = \alpha_0 + \alpha_1 x_t + u_t$ and stores the disequilibrium estimates $\hat{u}_t$ in a series called *eqct*, which is short for "equilibrium correction term". Run the code on two variables y_t and x_t of your choice and then test for cointegration by testing whether there is a unit-root in the estimates $\hat{u}_t$. The EViews code:

```
'clear residual series:
resid = na

'estimate possible cointegration relation:
equation coint01.ls(h) y c x

'generate disequilibrium estimates:
series eqct = resid
```

Question 2. The EViews code below estimates an equation using the sample 1980:1 - 1994:4, and generates 1-step "out-of-sample" forecasts of dcons (relative household consumption growth) 1995:1 to 1996:4 (8 forecasts). Run the same code on an equation of your choice estimated on data of your choice. The EViews code:

```
'set estimation sample:
smpl 1980:1 1994:4

'estimate equation:
equation myequation.ls(h) dcons c dcons(-4) dinc eqct(-1) @seas(2)

'set forecast sample (8 observations):
smpl 1995:1 1996:4

'generate 1-step forecasts and save them in dcons_f:
myequation.fit(f=na) dcons_f
```

Question 3. Let $y_t \sim I(1)$, $x_t \sim I(1)$ and consider the specification

$$\begin{aligned} y_t &= 0.2 + 0.6x_t + u_t \\ u_t &\sim WN(0, \sigma^2) \end{aligned} \tag{1}$$

a) Explain why (1) is a cointegration relation. For which values of y_t does equilibrium occur? Suggest a definition of y_t being "close" to equilibrium.

b) According to the Granger representation theorem the relation (1) can be represented as an Equilibrium Correction Model (EqCM).[1] Give the EqCM, and specifically give the short term dynamics, the long-term solution and the value of the long-term adjustment coefficient.

c) Suppose now that $u_t = 0.1u_{t-1} + \epsilon_t$ in (1), where $\epsilon_t \sim WN(0, \sigma^2)$. Recompute the EqCM representation, the short term dynamics, the long-term solution and the value of the long-term adjustment coefficient. The value of the adjustment coefficient is now smaller in absolute value, what does this mean?

Question 4. Consider the EqCM

$$\Delta c_t = 0.2 + 0.4\Delta c_{t-1} + 0.5\Delta x_t - 0.8(c_{t-1} - 0.4 - 0.9x_{t-1}) + \epsilon_t \tag{2}$$

where $c_t \sim I(1)$, $x_t \sim I(1)$ and $\epsilon_t \sim WN(0, \sigma^2)$.

Rewrite (2) as an ARDL(p, q) model. What are the orders of p and q? Compute the conditional forecasts $E(c_{100+K}|I_{100+K})$ for $K = 1, 2, 4$, where $I_t = \{x_t, c_{t-1}, \epsilon_{t-1}, x_{t-1}, y_{t-2}, \epsilon_{t-2}, \ldots\}$, and where $c_{99} = 1$, $c_{100} = 1$, $x_{100} = 0.5$, $x_{101} = 0.6$, $x_{102} = 0.7$, $x_{103} = 0.8$ and $x_{104} = 0.9$.

[1] These type of models is sometimes referred to as Error-Correction Models (ECMs)