ISEG – Lisbon School of Economics and Management
ECONOMETRICS
First Semester 2016/2017
Problem Set IV – Time Series (I)

Question:	**1**	**2**	**3**	**4**	**5**	Total
Points:	4	4	4	4	34	50

Justify all your answers (except for multiple choice questions). You are required to show your work on each problem (except for multiple choice questions) and to include the output of EVIEWS used to solve the empirical questions. **Organize your work**. Work scattered all over the page will receive very little credit. A correct answer in a multiple choice question worths 4 points; an incorrect one worths -1 point. **Delivery date: 12th of December**.

(4) **1.** Consider the model $\widehat{\log(y_t)} = -0.05 + 0.12\log(x_t) - 0.06\log(x_{t-1}) + 0.05\log(x_{t-2})$. Then,

- ◯ The estimated long-run elasticity is 11% and the estimated short-run elasticity is 12%.
- ◯ The estimated long-run elasticity is $\exp(0.05)$ and the estimated short-run elasticity is $\exp(0.12)$.
- ◯ The estimated long-run elasticity is 0.06% and the estimated short-run elasticity is 0.12%.
- ◯ The estimated long-run elasticity is 0.11% and the estimated short-run elasticity is 0.12%.

(4) **2.** Consider the following FDL model: $y_t = \alpha + \delta_0 x_t + \delta_1 x_{t-1} + \delta_2 x_{t-2} + u_t$. It is known that

- The estimated immediate (contemporaneous) change in y due to the one-unit temporary change in x at time t is 0.5;
- The estimated change in y one period after the one-unit temporary change in x at time t is 0.2;
- The long-run effect is 0.8.

Then, one can conclude that,

- ◯ if $\hat{\alpha} = 0.05$ then $\hat{\delta}_0 = 0.5$, $\hat{\delta}_1 = 0.2$ and $\hat{\delta}_2 = 0.05$.
- ◯ $\hat{\delta}_0 = 0.5$, $\hat{\delta}_1 = 0.2$ and $\hat{\delta}_2 = 0.8$.
- ◯ $\hat{\delta}_0 = 0.5$, $\hat{\delta}_1 = 0.2$ and $\hat{\delta}_2 = 0.1$.
- ◯ None of the above.

(4) **3**. Consider the model $y_t = \beta_0 + \beta_1 x_{t-1} + \beta_2 x_{t-2} + u_t$. Then,

- ◯ The condition for contemporaneous exogeneity is $\mathrm{E}\left(u_t|x_t\right) = 0$.
- ◯ The condition for strict exogeneity is $\mathrm{E}\left(u_t|x_t\right) = 0$.
- ◯ Assuming contemporaneous exogeneity it is possible that $corr\left(u_t, x_{t-2}\right) \neq 0$.
- ◯ None of the above.

(4) **4**. Consider the model $y_t = \beta_0 + \beta_1 z_t + \beta_2 z_{t-1} + u_t$, with $E(u_t) = 0$. If $z_t = t^2$ where t is a time trend then it is true that,

- ◯ OLS is not unbiased because the assumption TS.3 is not verified.
- ◯ OLS is BLUE because the assumption TS.3 is verified.
- ◯ In this model having $E(u_t) = 0$ is sufficient to verify strict exogeneity.
- ◯ None of the above.

5. Use the data in T4.WF1 to regress the monthly industrial production index of cement in percentage, $ipcm_t$, on the price production index for cement in percentage, $price_t$, the aggregate index of industrial production in percentage, ip_t, controlling for a linear trend and seasonality.

(8) (a) Explain how do you have controlled for seasonality in the regression.

(8) (b) Interpret the estimated coefficient of the time trend.

(8) (c) Choose one estimate of a seasonal effect and interpret it.

(10) (d) Is there evidence of seasonality on the monthly industrial production index of cement?