Econometrics Test
2014 - 07 - 09

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1. Say if the following statements are unambiguously true (TRUE), unambiguously false (FALSE) or impossible to classify the way they are stated (CAN'T SAY). Write the motivations to your answers **only** in the space provided. A "CAN'T SAY" answer with no motivations will be considered wrong. **NB: a square matrix H is hemisymmetric if and only if $H = -H'$; a square matrix P is orthogonal if and only of $P' = P^{-1}$.**

   (a) If H is hemisymmetric, then $-H$ is symmetric.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

   (b) If H is hemisymmetric, then $I + H$ is orthogonal.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

   (c) If P is orthogonal, then $(I + P)(I - P')$ is hemisymmetric.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

   (d) A projection matrix cannot be orthogonal.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

   (e) Heteroskedasticity makes the OLS estimator $\hat{\beta}$ inconsistent.
   TRUE ◯ FALSE ◯ CAN'T SAY ◯

2. The model in equation (1) was estimated on a quarterly dataset for the Euro area (source: EABCN), using the following variables:

   - x_t: Real exports of goods and services (in logs)
   - w_t: World gdp (in logs)
   - e_t: Euro per US$ (in logs)
   - c_t: Unit labour costs (in logs)

$$\Delta x_t = k + \gamma_1 \Delta w_t + \gamma_2 \Delta e_t + \gamma_3 \Delta c_t + (\alpha - 1) x_{t-1} + b_1 w_{t-1} + b_2 e_{t-1} + b_3 c_{t-1} + \varepsilon_t \quad (1)$$

OLS, using observations 1971:2–2011:4 ($T = 163$)

	Coefficient	Std. Error	t-ratio
k	0.1357	0.0897	1.5136
γ_1	0.8937	0.2397	3.7278
γ_2	0.0710	0.0319	2.2221
γ_3	−0.5363	0.2234	−2.4011
$\alpha - 1$	−0.0748	0.0272	−2.7477
b_1	0.1791	0.0650	2.7555
b_2	0.0011	0.0102	0.1103
b_3	−0.0227	0.0079	−2.8738

Mean dependent var	0.012613	S.D. dependent var	0.020483
Sum squared resid	0.048739	S.E. of regression	0.017733
R^2	0.282897	Adjusted R^2	0.250512
$F(7, 155)$	8.735369	P-value(F)	4.99e–09
$\hat{\rho}$	−0.022554	Durbin–Watson	2.009323

LM test for autocorrelation up to order 4:

Test statistic: LMF = 1.62917, with p-value = 0.169774

(a) For each explanatory variable in the model, indicate if you expect that variable to have a long-run positive or negative impact on Euro area exports and the reasons (drawn from economic theory) for your answer:

Variable	Expected sign: +	Expected sign: −	Comment
w_t	◯	◯	
e_t	◯	◯	
c_t	◯	◯	

(b) Suppose that the world GDP increases by 2%; what do you expect to happen to the Euro area exports (other things being equal) in the current quarter? Suppose that the increase is permanent. What happens in the long run?

Short-run variation: _____

Long-run variation: _____

(c) Comment on the value of the Durbin-Watson statistic and the results of the Godfrey test.

(d) Imagine a fictional scenario in which politician ABC declared "*A strong currency is bad for the economy. Southern European countries should leave the Euro or have it massively devalued, to enjoy export-driven growth*"; to which politician XYZ replied: "*Devaluation is just a short-term solution. In fact, you may have some short-term gains by competitive devaluations, but in the long run the effect on exports is negliglible*". Whose view do you think your estimates support? Why?