Econometrics Test

2010 - 09 - 22

Name: _____

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.

   (a) In order to use a statistic as a test statistic, it is essential to know its distribution under the null hypothesis.

   TRUE ◯ FALSE ◯ CAN'T SAY ◯

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   _____

   (b) The Central Limit Theorem for iid observations has stricter requirements than the Law of Large Numbers.

   TRUE ◯ FALSE ◯ CAN'T SAY ◯

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   (c) The R^2 index can never be larger than one.

   TRUE ◯ FALSE ◯ CAN'T SAY ◯

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   (d) The Gauss-Markov theorem is asymptotic and may not hold in small samples.

   TRUE ◯ FALSE ◯ CAN'T SAY ◯

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   (e) The Chow test can only be performed with time-series data.

   TRUE ◯ FALSE ◯ CAN'T SAY ◯

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2. Suppose you have a sample of 400 observations from an iid Poisson distribution, that is

$$P(x_i) = e^{-\lambda}\frac{\lambda^{x_i}}{x_i!};$$

for $i = 1 \dots 400$; suppose also that the average $\bar{X}$ equals 1.05.

   (a) Compute the ML estimate of λ;

   (b) Test the hypothesis $\lambda = 1$ via an LR test *(hint:* $\log(1.05) = 0.0488$)

   (c) define the variable y_i as

$$y_i = \begin{cases} 0 & \text{se} \quad x_i = 0 \\ 1 & \text{se} \quad x_i > 0 \end{cases}$$

   and prove that $\tilde{\lambda} = -\log(1 - \bar{Y})$ is a consistent estimator of λ.

3. Table 1 reports the estimates for a model of the number of foreigners in Italian provinces; the variables used are:

l_fore	logarithm of the number of foreigners
l_n	logarithm of the total population
l_gdp	logarithm of the per capita GDP
north	dummy variable, 1 if province is in the North
south	dummy variable, 1 if province is in the South

   Answer these questions:

   (a) Is it correct to say that in the North the number of foreigners is higher than in the Center?

   (b) Is it correct to say that in the South the number of foreigners is higher than in the Center?

   (c) What is the interpretation of the fact that $\beta_{l\_gdp} > 0$?

   (d) Is the hypothesis that $\beta_{l\_n} = 1$ consistent with the data?

   (e) What would the interpretation of the above hypothesis be?

Model 1: OLS, using observations 1–103
Dependent variable: l_fore

	Coefficient	Std. Error	t-ratio	p-value
const	−9.22084	0.967570	−9.5299	0.0000
l_n	0.957706	0.0526677	18.1840	0.0000
l_gdp	2.04878	0.239931	8.5390	0.0000
north	−0.166158	0.108817	−1.5270	0.1300
south	−0.401171	0.125227	−3.2035	0.0018

Mean dependent var	9.249894	S.D. dependent var	1.070631
Sum squared resid	13.84901	S.E. of regression	0.375921
R^2	0.881549	Adjusted R^2	0.876714
$F(4, 98)$	182.3364	P-value(F)	1.77e–44

Table 1: Number of foreigners by province