Econometrics

Date: February 4th, 2016.

Student	

Group	

1	a	b	c	d		**11**	a	b	c	d	
2	a	b	c	d		**12**	a	b	c	d	
3	a	b	c	d		**13**	a	b	c	d	
4	a	b	c	d		**14**	a	b	c	d	
5	a	b	c	d							
6	a	b	c	d							
7	a	b	c	d							
8	a	b	c	d							
9	a	b	c	d							
10	a	b	c	d							

Rules of the exam

1. 1. To answer the questions in Part I, please mark with a circle the correct answer (only one). In case you need to correct it, please use a cross. Following corrections, the chosen answer should be clearly visible, writing the corresponding valid response in the box on the right, if it is necessary. For example, if the response is marked A, but subsequently it is believed that C is the correct answer:

5	a	b	c	d	c

   The answer which cannot be clearly interpreted, it will be considered incorrect.

2. Each incorrect answer in Part I will be valued with -1/3.

3. Please, answer briefly the questions of part III. These will be valued with 1/0 points.

Part I. The production function of a set of firms is studied. To that end, a double-log model is estimated for a sample of 200 firms, by using information of their production (Output), their number of workers (labor) and their total capital (Capital).

Model 1: OLS, using observations 1-200
Dependent variable: l_OUTPUT

	Coefficient	*t-ratio*	*p-value*	
const	−10.30	−17.15	<0.0001	***
l_CAPITAL	0.80	33.04	<0.0001	***
l_LABOR	0.20	2.00	0.0466	**

R-squared	0.85	Adjusted R-squared	0.846698
F(2, 197)	550.54	P-value(F)	2.21e-81

White's test for heteroskedasticity : Test statistic = 4.25933 with p-value = 0.512714
Breusch-Pagan test for heteroskedasticity - Test statistic = 1.27528 with p-value = 0.528538

With this information, please reply to the following questions (all of them related to model 1):

1. The number of workers is a variable:
A) Relevant to explain the evolution of the output
B) That cannot help us to explain the evolution of the output
C) Significantly different from 0 (the parameter is 0 or not)
D) None of the previous is true

2. The t-ratio column reflects:
A) The ratio between the estimation of the parameter and the standard deviation of the perturbation
B) The value of a statistic that goes asymptotical towards a Normal distribution
C) The sample variability of each explanatory variable
D) None of the previous is true

3. The value of the analysis of the variance is equal to:
A) 326.42
B) 1052.22
C) 550.54
D) None of the previous is true

4. The R-squared
A) Measures the lineal correlation between each explanatory variable and the dependent variable.
B) Gives us information on the goodness-of-fit of the model.
C) Always takes values in the (0,1) interval.
D) None of the previous is true

5. The White statistic tests for the null hypothesis of:
A) Independence of the residuals
B) Heteroskedasticity of the residuals.
C) Homoskedasticity of the residuals.
D) None of the previous is true
Please note that the White statitistic analyzes the behavior of the perturbation.

6. The Breusch-Pagan statistic:
A) Follows a normal distribution
B) Follows a chi-squared distribution of 2 degrees of freedom
C) Follows a chi-squared distribution of 6 degrees of freedom
D) None of the previous is true
Please note that the Breusch-Pagan goes asymptotically towards a chi-squared distribution.

7. The estimated production function is:
A) Intensive in labor
B) Intensive in capital
C) Cannot help us to determine which is the most important input factor
D) None of the previous is true

The labor elasticity is lower than the capital elasticity.

8. The previous model:
A) Cannot be improved
B) Can be easily improved by including some appropriate restrictions
C) Has not relation to any theoretical production function
D) None of the previous is true

The sum of the two elasticities is equal to 1, then we can impose constant returns to scale into the model

Part II. Let us consider that we want to study the aggregated consumption of a particular economy. To that end, we obtain information on Consumption and the gross domestic product (GDP) of this economy for a sample that covers the 1971:1-2015:4 period. Using this information, the following model is estimated:

Model 2: OLS, using observations 1971:2-2015:4 (T = 179)
Dependent variable: CONSUMPTION

	Coefficient	*t-ratio*	*p-value*	
const	9.75	2.65	0.0088	***
GDP	0.68	16.96	<0.0001	***
GDP_1	−0.37	−6.14	<0.0001	***
CONSUMPTION_1	0.60	10.32	<0.0001	***

R-squared	0.93	Adjusted R-squared	0.928
F(3, 175)	775.26	P-value(F)	8.8e-101

rho	−0.014	Durbin's h	−0.307

Breusch-Godfrey test (order 1). Test statistic:0.09 with p-value 0.77

Using this information, please reply to the following questions, all of them related to model 2.

9. The null hypothesis of the Breusch-Godfrey statistic is that:

A) the first coefficient of the autocorrelation function of the residuals is 0.

B) There exists first order autocorrelation

C) There exists general autocorrelation

D) None of the previous is true

This statistic analyzes the presence of first order autocorrelation in the perturbation by testing for the null of absence of autocorrelation.

10. The Breusch-Godfrey statistic in model 2:

A) rejects the null hypothesis

B) asymptotically follows a normal distribution

C) All the previous are true

D) None of the previous is true.

11. The estimated value of the parameter rho takes the value of -0.014. This result implies that:

A) there exists negative correlation between the residuals

B) there exists negative correlation between the residuals

C) it is so small that we cannot observe any misspecification problem.

D) None of the previous is true

12. The vector of estimators of the parameters of the model is:

A) Biased, but consistent

B) Unbiased but inconsistent

C) Unbiased and consistent

D) None of the previous is true

This is a dynamic model, then the OLS estimators are biased, but consistent (assuming that the rest of the classical assumptions holds)

13. Assuming that we know that Consumption(2015:4) = 0.8 and GDP(2015:4)= GDP(2016:1)=1, then which is the prediction of the Consumption for 2016:1?

A) 200.20

B) 150.37

C) 10.54

D) None of the previous is true

14. If we consider that the sum of the squared total is equal to 1000, which would be the value of the OLS estimator of the variance of the perturbation?

A) 10

B) 200

C) 0.4

D) None of the previous is true

SSR = (1- R2) SST = 70

OLS estimator of the variance of the perturbation= SSR/(T-k) = 70/(179-4) = 0.4

Part III.

1. Durbin-Watson statistic. Define it, write the null hypothesis that this statistic tests for and the distribution that follows under the null hypothesis. (1 point)

See pgs 5-7 of http://personal.unizar.es/amontane/ade_eco/aut.PDF

2. Economic interpretation of model 2. (1 punto)

It is a Cobb-Douglas production function, intensive in capital, which holds the constant returns to scale restriction. Capital elasticity is 4 times labor elasticity.
If we increase 1% capital, output increases 0.8%.
If we increase 1% both inputs, output increases 1%.

3. Is it true the following affirmation: “The maximization of the R-squared is the best econometric strategy for selecting the best possible model”? (1 point)

It is false. The greater the number of explanatory variables, the greater the value of the R2. Then we should include a new variables only if helps to reduce the SSR significantly, otherwise it is not sensible to add it.