The University of Kansas

Department of Economics

Quiz 5 **Apr/03/2019**
Econ 526 - Introduction to Econometrics **Instructor: Caio Vigo Pereira**

Name:

SECTION A - MULTIPLE CHOICE

[**Same dataset from Quiz 4**] Consider a random sample with the Grade Point Average (GPA) and standardized test scores (ACT), along with the performance in an introductory economics course, for students at a large public university. The variable to be explained is *score*, which is the final score in the course measured as a percentage. The variable *hsgpa* is the high school GPA, *actmth* is the ACT in math and *colgpa* is the college GPA of the student prior to take the economics course.

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                        Dependent variable:
                    ---------------------------
                             log(score)
-----------------------------------------------
hsgpa                         0.0274
                             (0.0204)

log(actmth)                   0.3082***
                             (0.0388)

colgpa                        0.1784***
                             (0.0125)

Constant                      2.7073***
                             (0.1119)

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Observations                    814
R2                            0.3704
Adjusted R2                   0.3681
Residual Std. Error      0.1662 (df = 810)
F Statistic          158.8443*** (df = 3; 810)
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
```

12.5% 1. Based on the above, what is the effect on the dependent variable if *colgpa* increases one unit?

A. $\widehat{log(score)}$ will increase 17.8%
B. $\widehat{log(score)}$ will increase 1.78%
C. $\widehat{score}$ will increase by 0.178 units
D. $\widehat{score}$ will increase 17.8%

12.5% 2. Based on the above, what is the effect on the dependent variable if *actmth* increases 10%?
A. $\widehat{log(score)}$ will increase 3.08%
B. $\widehat{log(score)}$ will increase 30.8%
C. $\widehat{score}$ will increase by 0.308 units
D. $\widehat{score}$ will increase 3.08%

12.5% 3. In order to find the OLS estimators for the true parameters β_0, β_1, β_2 and β_3 for the regression above, how many First Order Conditions do we have?
A. 2
B. 3
C. 4
D. 5

12.5% 4. Assume that *hsgpa* and $log(actmth)$ are uncorrelated with u, but *colgpa* is correlated with u. Then:
A. We say that *colgpa* is an endogenous explanatory variable, therefore $E(u|x_1, x_2, x_3, x_4) = 0$.
B. We say that *colgpa* is an endogenous explanatory variable, therefore $E(u|x_1, x_2, x_3, x_4) \neq 0$.
C. We say that *colgpa* is an exogenous explanatory variable, therefore $E(u|x_1, x_2, x_3, x_4) = 0$.
D. We say that *colgpa* is an exogenous explanatory variable, therefore $E(u|x_1, x_2, x_3, x_4) \neq 0$.

SECTION B - TRUE OR FALSE

Consider a random sample with 1005 observations of house purchases in Kansas. Your dataset consists of the following variables (variable's name and variable description):

house_price	price paid in thousands of dollars
number_bedrs	number of bedrooms
number_fullbaths	number of full bathrooms
number_halfbaths	number of half bathrooms
number_baths	= number_fullbaths + number_halfbaths
crime_rate	crime rate in the neighborhood
lot_size	lot size in square feet

12.5% 1. Consider the following regression model:

$$log(house\_price) = \beta_0 + \beta_1 log(lot\_size) + log(\beta_2) crime\_rate + u$$

where $log()$ represents the natural logarithm. Then this model is linear in parameters.
◯ True ◯ False

12.5% 2. Consider the following regression model:

$$house\_price = \beta_0 + \beta_1 number\_bedrs + \beta_2 number\_baths + \beta_3 number\_fullbaths + \beta_4 number\_halfbaths + u$$

Then this model suffers from perfect collinearity.
◯ True ◯ False

12.5% 3. Consider the following models:

Model 1: $house\_price = \beta_0 + \beta_1 number\_bedrs + \beta_2 number\_baths + u$

Model 2: $house\_price = \beta_0 + \beta_1 number\_bedrs + \beta_2 number\_baths + \beta_3 crime\_rate + u$

Then, $R^2_{model1} > R^2_{model2}$.

◯ True ◯ False

12.5% 4. Consider the following regression model:

$$house\_price = \beta_0 + \beta_1 number\_bedrs + \beta_2 number\_baths + u$$

Knowing that Corr($number\_bedrs, number\_baths$) = 0.98, then the OLS estimator is a biased estimator for the true parameters.

◯ True ◯ False