The University of Kansas

Department of Economics

Quiz 4 **Oct/17/2018**
Econ 526 - Introduction to Econometrics **Instructor: Caio Vigo Pereira**

Name:

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 econometric model is:

$$log(score) = \beta_0 + \beta_1 hsgpa + \beta_2 log(actmth) + \beta_3 colgpa + u$$

where *hsgpa* is the high school GPA, *log(actmth)* is the natural logarithm of the ACT in math and *colgpa* is the college GPA of the student prior to take the economics course.
The *R* output is:

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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
```

SECTION A - MULTIPLE CHOICE

1. Based on the regression 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 by 0.178
   C. $\widehat{score}$ will increase by 0.178 units
   D. $\widehat{score}$ will increase 17.8%

2. Based on the regression 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%

3. The variable *colgpa* is a number from 0 to 4. Consider the case that you would like to transform the college GPA to a scale from 0 to 100. Thus, you create a new variable: *colgpa_scaled*, such that $colgpa\_scaled = 25 \cdot colpga$. Then you run the same regression again, only replacing *colgpa* by *colgpa_scaled*. What is the new $\hat{\beta}_3$?

   A. $25 \cdot 0.1784$

   B. $\frac{1}{25} \cdot 0.1784$

   C. $\frac{100}{25} \cdot 0.1784$

   D. $0.25 \cdot 0.1784$

4. In order to find the estimators for $\hat{\beta}_0$, $\hat{\beta}_1$, $\hat{\beta}_2$ and $\hat{\beta}_3$ for the regression above, how many First Order Conditions do we have?
   A. 2
   B. 3
   C. 4
   D. 5

SECTION B - TRUE OR FALSE

1. Consider the following regression model: $log(score) = \beta_0 + \beta_1 hsgpa^2 + u$. Then this model is linear in parameters.
   ◯ True ◯ False

2. The following regression model: $log(score) = \beta_0 + \beta_1 log(hsgpa) + u$ is also known as constant percentage model.
   ◯ True ◯ False

3. The following regression model: $log(score) = \beta_0 + \beta_1 hsgpa + u$ is also known as constant elasticity model.
   ◯ True ◯ False

4. In the following regression model: $log(score) = \beta_0 + \beta_1 hsgpa + u$, $(100 \cdot \beta_1)$ is the semi-elasticity of *score* with respect to *hsgpa*.
   ◯ True ◯ False

5. In the following regression model: $log(score) = \beta_0 + \beta_1 log(hsgpa) + u$, β_1 is the elasticity of *score* with respect to *hsgpa*.
   ◯ True ◯ False