

本试卷适用范围  
农经实验 191

# 南京农业大学试题纸

学年 2020-2021 学期 2 课程类型: 必修 试卷类型: 期中

课程 计量经济学 班级农经实验191 学号 姓名

**特别提醒: 请各位同学严格遵守考试纪律。**

题号	一	二	三	四	五	总分	签名
得分							

**A. Multiple Choices (2 Points Each, 60 Points Together)**

- The term ' $\mu$ ' in an econometric model is usually referred to as the \_\_\_\_\_.
  - hypothesis
  - error term
  - parameter
  - dependent variable
- The parameters of an econometric model \_\_\_\_\_.
  - include all unobserved factors affecting the variable being studied
  - refer to the explanatory variables included in the model
  - refer to the predictions that can be made using the model
  - describe the strength of the relationship between the variable under study and the factors affecting it
- Data on the income of law graduates collected at different times during the same year is \_\_\_\_\_.
  - panel data
  - experimental data
  - time series data
  - cross-sectional data
- Which of the following refers to panel data?
  - Data on the unemployment rate in a country over a 5-year period
  - Data on the income of 5 members of a family on a particular year.
  - Data on the price of a company's share during a year.
  - Data on the birth rate, death rate and population growth rate in 50 developing countries over a 20-year period.
- Which of the following is true?
  - A variable has a causal effect on another variable if both variables increase or decrease simultaneously.
  - Difficulty in inferring causality disappears when studying data at fairly high levels of aggregation.
  - The notion of 'ceteris paribus' plays an important role in causal analysis.

- d The problem of inferring causality arises if experimental data is used for analysis.
8. The explained sum of squares for the regression function,  $y_i = \beta_0 + \beta_1 x_i + u_i$ , is defined as \_\_\_\_.
- $\sum_{i=1}^n (\hat{y}_i - \bar{y})^2$
  - $\sum_{i=1}^n (y_i - \hat{y})^2$
  - $\sum_{i=1}^n \hat{u}_i$
  - $\sum_{i=1}^n (u_i)^2$
- 6 In the regression of  $y$  on  $x$ , the error term exhibits heteroskedasticity if \_\_\_\_.
- it has a constant variance
  - $\text{Var}(y|x)$  is a function of  $x$
  - $x$  is a function of  $y$
  - $y$  is a function of  $x$
- 7 Consider the following regression model:  $y = \beta_0 + \beta_1 x_1 + u$ . Which of the following is a property of Ordinary Least Square (OLS) estimates of this model and their associated statistics?
- The sum, and therefore the sample average of the OLS residuals, is positive.
  - The sum of the OLS residuals is negative.
  - The sample covariance between the regressors and the OLS residuals is positive.
  - The point  $(\bar{x}, \bar{y})$  always lies on the OLS regression line.
- 8 If the explained sum of squares is 45 and the total sum of squares is 69, what is the residual sum of squares?
- 0.652
  - 1.53
  - 24
  - 114
- 9 If the residual sum of squares (SSR) in a regression analysis is 56 and the total sum of squares (SST) is equal to 80, what is the value of  $R^2$ ?
- 0.70
  - 0.55
  - 0.30
  - 1.43
- 10 Which of the following is a nonlinear regression model?
- $y = \beta_0 + \beta_1 x^{1/2} + u$
  - $\log y = \beta_0 + \beta_1 \log x + u$
  - $y = 1 / (\beta_0 + \beta_1 x) + u$
  - $y = \beta_0 + \beta_1 x + u$
- 11 Which of the following is assumed for establishing the unbiasedness of Ordinary Least Square (OLS) estimates?
- The error term has an expected value of 1 given any value of the explanatory variable.

- b The regression equation is linear in the explained and explanatory variables.
  - c The sample outcomes on the explanatory variable are all the same value.
  - d The error term has the same variance given any value of the explanatory variable.
- 12 If an independent variable in a multiple linear regression model is an exact linear combination of other independent variables, the model suffers from the problem of \_\_\_\_.
- a perfect collinearity
  - b homoskedasticity
  - c heteroskedasticity
  - d omitted variable bias
- 13 Suppose the variable  $x_2$  has been omitted from the following regression equation,  $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + u$ .  $\widetilde{\beta}_1$  is the estimator obtained when  $x_2$  is omitted from the equation. The bias in  $\widetilde{\beta}_1$  is positive if \_\_\_\_.
- a  $\beta_2 > 0$  and  $x_1$  and  $x_2$  are positively correlated
  - b  $\beta_2 < 0$  and  $x_1$  and  $x_2$  are positively correlated
  - c  $\beta_2 > 0$  and  $x_1$  and  $x_2$  are negatively correlated
  - d  $\beta_2 = 0$  and  $x_1$  and  $x_2$  are negatively correlated
- 14 Suppose the variable  $x_2$  has been omitted from the following regression equation,  $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + u$ .  $\widetilde{\beta}_1$  is the estimator obtained when  $x_2$  is omitted from the equation. If  $E(\widetilde{\beta}_1) > \beta_1$ ,  $\widetilde{\beta}_1$  is said to \_\_\_\_.
- a have a downward bias
  - b have an upward bias
  - c be unbiased
  - d be biased toward zero
- 15 High (but not perfect) correlation between two or more independent variables is called \_\_\_\_.
- a heteroskedasticity
  - b homoskedasticity
  - c multicollinearity
  - d micronumerosity
- 16 The normality assumption implies that:
- a the population error  $u$  is dependent on the explanatory variables and is normally distributed with mean equal to one and variance  $\sigma^2$ .
  - b the population error  $u$  is independent of the explanatory variables and is normally distributed with mean equal to one and variance  $\sigma$ .
  - c the population error  $u$  is dependent on the explanatory variables and is normally distributed with mean zero and variance  $\sigma$ .
  - d the population error  $u$  is independent of the explanatory variables and is normally distributed with mean zero and variance  $\sigma^2$ .

- b the group of uneducated people
- c the group of individuals with a high income
- d the group of individuals with a low income

29 Refer to the above model. If  $\beta_1 > 0$ , \_\_\_\_\_.

- a uneducated people have higher savings than those who are educated
- b educated people have higher savings than those who are not educated
- c individuals with lower income have higher savings
- d individual with lower income have higher savings

30 In the following regression equation,  $y$  is a binary variable:

$$y = \beta_0 + \beta_1 x_1 + \dots + \beta_k x_k + u$$

In this case, the estimated slope coefficient,  $\hat{\beta}_1$  measures \_\_\_\_\_.

- a the predicted change in the value of  $y$  when  $x_1$  increases by one unit, everything else remaining constant
- b the predicted change in the value of  $y$  when  $x_1$  decreases by one unit, everything else remaining constant
- c the predicted change in the probability of success when  $x_1$  decreases by one unit, everything else remaining constant
- d the predicted change in the probability of success when  $x_1$  increases by one unit, everything else remaining constant

### B. True or False (2 Points Each, 10 Points Together)

- 1 If a new independent variable is added to a regression equation, the adjusted  $R^2$  increases only if the absolute value of the  $t$  statistic of the new variable is greater than one. T \_\_\_\_\_ F \_\_\_\_\_
- 2  $R^2$  is the ratio of the explained variation compared to the total variation. T \_\_\_\_\_ F \_\_\_\_\_
- 3 A cross-sectional data set consists of observations on a variable or several variables over time. T \_\_\_\_\_ F \_\_\_\_\_
- 4 A time series data is also called a longitudinal data set. T \_\_\_\_\_ F \_\_\_\_\_
- 5 The dummy variable coefficient for a particular group represents the estimated difference in intercepts between that group and the base group. T \_\_\_\_\_ F \_\_\_\_\_

### C. Quantitative Analysis (4 Points Each, 20 Points Together)

- 1 You have obtained measurements of height (*Student<sub>hi</sub>*) in inches of 29 female and 81 male students at your university. A regression of the height on a constant and a binary variable (*BFemme*), which takes a value of one for females and is zero otherwise, yields the following result:

$$\widehat{Student_{hi}} = 171.0 - 8.84 \times BFemme, R^2 = 0.40$$

(10.3) (0.57)

- a What is the interpretation of the intercept? What is the interpretation of the slope? How tall are females, on average?



- b Test the hypothesis that females, on average, are shorter than males, at the 1% level.

- 2 You have collected data for 104 countries to address the difficult questions of the determinants for differences in the standard of living among the countries of the world. You recall from your macroeconomics lectures that the neoclassical growth model suggests that output per worker (per capita income) levels are determined by, among others, the saving rate and population growth rate. To test the predictions of this growth model, you run the following regression:

$$\widehat{RelPersInc} = 0.339 - 12.894 \times n + 1.397 \times S_K, R^2 = 0.621$$

(0.111) (2.321) (0.206)

where  $RelPersInc$  is GDP per worker relative to the United States,  $n$  is the average population growth rate, 1980-1990, and  $S_K$  is the average investment share of GDP from 1960 to 1990 (remember investment equals saving).

- a Interpret the results. Do the signs correspond to what you expected them to be? Explain.

- b You remember that human capital in addition to physical capital also plays a role in determining the standard of living of a country. You therefore collect additional data on the average educational attainment in years for 1985, and add this variable ( $Educ$ ) to the above regression. This results in the modified regression output:

$$\widehat{RelPersInc} = 0.046 - 5.869 \times n + 0.738 \times S_K + 0.055 \times Educ, R^2 = 0.775$$

(0.013) (1.046) (0.225) (0.017)

How has the inclusion of  $Educ$  affected your previous results?

- c Brazil has the following values in your sample:  $RelPersInc = 0.30$ ,  $n = 0.021$ ,  $SK = 0.169$ ,  $Educ = 3.5$ . Does your equation overpredict or underpredict the relative GDP per worker? What would happen to this result if Brazil managed to double the average educational attainment?

**D. Short Answer (5Points Each, 10 Points Together)**

- 1 List the necessary OLS assumptions, which are used to derive the OLS estimators in linear regression models.

- 2 你对本次考试有什么看法和评价，从以下几个角度回答：1) 题目的分析难度； 2) 题目的阅读难度； 3) 你对自己的预测分数； 4) 对考试的一般建议。