

Principles of Econometrics 5th edition Hill Test Bank

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Multiple Choice

1. Consider the probability density function of a random variable that is normally distributed. The center of this distribution is called the ____ and the measure of the dispersion of this random variable is called the ____.
- a. sample mean; sample variance
 - b. conditional mean; conditional variance
 - c. sample variance; sample mean
 - d. conditional variance; conditional mean

Ans: b

Level: Easy – Knowledge

AACSB: Reflective Thinking

Section: 2.1

2. In an economic model that uses income to predict monthly expenditures on entertainment, ____ would be the dependent variable.
- a. income
 - b. monthly expenditures on entertainment
 - c. income elasticity
 - d. demand for entertainment

Ans: b

Level: Easy – Comprehension

AACSB: Reflective Thinking

Section: 2.1

3. In an economic model that uses income to predict monthly expenditures on entertainment, ____ would be the independent or explanatory variable.
- a. income
 - b. monthly expenditures on entertainment
 - c. income elasticity
 - d. demand for entertainment

Ans: a

Level: Easy – Comprehension

AACSB: Reflective Thinking

Section: 2.1

4. If a randomly selected data pair (y_i, x_i) for $i = 1, \dots, n$ are assumed to follow the same joint probability density function, then we say that the data pairs are ____.
- a. random variables
 - b. statistical inferences
 - c. identically distributed
 - d. statistically independent

Ans: c

Level: Easy – Knowledge

AACSB: Reflective Thinking

Section: 2.2

5. Let e_i be a random error term and x_i be an independent random variable. If we can say that x is strictly exogenous, then which of the following must hold?
- a. $E(e_i | x_i) = 0$
 - b. $E(e_i | x_i) \neq 0$
 - c. $\text{cov}(e_i, x_i) = 0$
 - d. $\text{cov}(e_i, x_i) \neq 0$

Ans: a

Level: Easy – Comprehension

AACSB: Reflective Thinking

Section: 2.2

6. If the conditional variation of the random errors is not constant (i.e., $\text{var}(e_i | x_i) \neq \sigma^2$), then we say that random errors are ____.
- a. homoscedastic
 - b. exogenous
 - c. heteroskedastic
 - d. serially correlated

Ans: c

Level: Easy – Knowledge

AACSB: Reflective Thinking

Section: 2.2

7. The OLS estimators for β_1 and β_2 are formulas derived by minimizing ____.
- a. the sum of the error terms or residuals
 - b. the sum of the squared residuals
 - c. the slope of the regression line
 - d. the fit of the regression line to the observed data

Ans: b

Level: Easy – Knowledge

AACSB: Reflective Thinking

Section: 2.3

8. Suppose you have the following estimated regression equation: $\hat{y} = 3.41 + 12.89x$. What would the forecast value be when the independent variable is 15.00?
- a. 196.76
 - b. 16.30
 - c. 244.50
 - d. 32.19

Ans: a

Level: Medium – Application

AACSB: Analytic

Section: 2.3

9. Suppose you have estimated a simple linear demand equation for single-game tickets for a minor league baseball team. The estimated equation is $\hat{q} = 4.58 - 0.51p$ where q is the number of tickets sold measured in thousands and p is the dollar price of a ticket. Further assume that the point of the means is $(\bar{p}, \bar{q}) = (10.25, 3.19)$. Given this information and everything else held constant, the estimate of the price elasticity of demand for tickets is ____.
- a. -0.16
 - b. 1.64
 - c. 0.16
 - d. -1.64

Ans: d

Level: Medium – Application

AACSB: Analytic

Section: 2.3

10. In the OLS model, what happens to $\text{var}(b_1)$ as the sample size, N , increases?

- a. it also increases
- b. it decreases
- c. it does not change
- d. cannot be determined without more information

Ans: b

Level: Easy – Knowledge

AACSB: Reflective Thinking

Section: 2.4

11. If b_1 is an estimator for β_1 such that $E(b_1) = \beta_1$, then it must be the case that b_1 is ____.

- a. an efficient estimator
- b. an unbiased estimator
- c. a linear estimator
- d. a preferred estimator

Ans: b

Level: Easy – Comprehension

AACSB: Reflective Thinking

Section: 2.5

12. Under the Gauss-Markov Theorem when the first five assumptions of the Simple Linear Regression Model are met, what estimators of β_1 and β_2 may have smaller variances than b_1 and b_2 ?

- a. none
- b. a non-linear estimator
- c. a normally distributed estimator
- d. an estimator derived from economic theory

Ans: b

Level: Hard – Synthesis

AACSB: Analytic

Section: 2.5

13. If we use $\frac{\sum \hat{e}_i^2}{N}$ as an estimator of σ^2 it is ____, but it can be corrected by ____.

- a. biased; changing the numerator to $\sum e_i^2$
- b. non-linear; changing the denominator to $N - 2$
- c. biased; changing the denominator to $N-2$
- d. non-linear; taking the log of each term

Ans: c

Level: Easy – Comprehension

AACSB: Reflective Thinking

Section: 2.7

14. Which of the following non-linear adjustments CANNOT be accommodated using OLS?

- a. Including an independent variable that has been raised to a power.
- b. Taking a logarithmic transformation of the dependent variable.
- c. Including a binary indicator variable.
- d. Raising parameters to a power.

Ans: d

Level: Hard – Synthesis

AACSB: Analytic

Section: 2.8

15. Suppose you have the equation $\ln(ENT_EXP) = \gamma_1 + \gamma_2(INCOME) + e$ where *INCOME* is annual household income (in thousands) and *ENT_EXP* is annual entertainment expenses. How do you interpret the estimated value of γ_1 ?

- a. The income elasticity of entertainment.
- b. When multiplied by 100, it is the percentage increase in entertainment expenses associated with an additional \$1000 in income.
- c. The increase in entertainment expenses associated with a 1% increase in income.
- d. The average of the logarithm of entertainment expenses for a household with zero income.

Ans: d

Level: Medium – Application

AACSB: Analytic

Section: 2.8

16. Suppose you have the equation $\ln(ENT_EXP) = \gamma_1 + \gamma_2(INCOME) + e$ where *INCOME* is annual household income (in thousands) and *ENT_EXP* is annual entertainment expenses. How do you interpret the estimated value of γ_2 ?
- a. The income elasticity of entertainment.
 - b. When multiplied by 100, it is the percentage increase in entertainment expenses associated with an additional \$1000 in income.
 - c. The increase in entertainment expenses associated with a 1% increase in income.
 - d. The average of the logarithm of entertainment expenses for a household with zero income.

Ans: b

Level: Medium – Application

AACSB: Analytic

Section: 2.8

17. Suppose you have estimated the equation $\hat{y} = 33.75 + 1.45(MALE)$ where *y* is annual income in thousands and *MALE* is an indicator variable such that it takes the value of 1 for males and the value of 0 for females. According to this model, the average income for females is ____.
- a. \$33,750
 - b. \$35,200
 - c. \$32,300
 - d. undetermined

Ans: a

Level: Medium – Comprehension

AACSB: Analytic

Section: 2.9

18. Suppose you have estimated the equation $\hat{y} = 33.75 + 1.45(MALE)$ where *y* is annual income in thousands and *MALE* is an indicator variable such that it takes the value of 1 for males and the value of 0 for females. According to this model, the average income for males is ____.
- a. \$33,750
 - b. \$35,200
 - c. \$32,300
 - d. undetermined

Ans: b

Level: Medium – Comprehension

AACSB: Analytic

Section: 2.9

Short Answer/Essay

19. Suppose you obtain N randomly selected data pairs from a population. Let (y_i, x_i) denote the i^{th} pair, $i = 1, \dots, N$. Briefly explain what each of the following terms mean.

- a. random variable
- b. statistically independent
- c. identically distributed
- d. random sample

Ans:

- a. The values y_i and x_i are not known until they are observed.
- b. Each (y_i, x_i) pair are not related to all other (y_j, x_j) pairs, $i \neq j$, since each pair is randomly selected.
- c. Since each (y_i, x_i) pair is selected from the same population, it is assumed that each pair have the same joint probability density function.
- d. all (y_i, x_i) data pairs are identically distributed.

Level: Easy – Knowledge
AACSB: Reflective Thinking
Section 2.2

20. Briefly summarize the six assumptions of the Simple Linear Regression Model.

Ans:

- 1. **Econometric Model:** All data pairs (y_i, x_i) collected from a population satisfy the relationship $y_i = \beta_1 + \beta_2 x_i + e_i$, $i = 1, \dots, N$.
- 2. **Strict Exogeneity:** The conditional expected value of the random error, e_i , is zero. That is, $E(e_i | \vec{x}) = 0$ where $\vec{x} = (x_1, x_2, \dots, x_n)$.
- 3. **Conditional Homoscedasticity:** conditional variance of the error is constant. That is, $\text{Var}(e_i | \vec{x}) = \sigma^2$.
- 4. **Conditionally Uncorrelated Errors:** the conditional covariance of random errors is zero. That is, $\text{cov}(e_i, e_j | \vec{x}) = 0$ for $i \neq j$.
- 5. **Explanatory Variables Must Vary:** x_i must take at least two different values.
- 6. **(Optional) Error Normality:** conditional distribution of the random error is normally distributed. That is, $e_i | \vec{x} \sim N(0, \sigma^2)$.

Level: Easy – Knowledge
AACSB: Reflective Thinking
Section 2.2