

Multiple Choice

1. You estimate a simple linear regression model using a sample of 62 observations and obtain the following results (estimated standard errors in parentheses below coefficient estimates):

$$y = 97.25 + 33.74 * x$$

(3.86) (9.42)

What are the endpoints of the interval estimator for β_2 with a 95% interval estimate?

- a.) (14.90, 52.58)
- b.) (24.32, 43.16)
- c.) (-3.58, 3.58)
- d.) (30.16, 37.32)

Ans: a

2. You estimate a simple linear regression model using a sample of 25 observations and obtain the following results (estimated standard errors in parentheses below coefficient estimates):

$$y = 97.25 + 19.74 * x$$

(3.86) (3.42)

What are the endpoints of the interval estimator for β_2 with a 98% interval estimate?

- a.) (-5.77, 25.51)
- b.) (16.32 , 23.16)
- c.) (11.19, 28.29)
- d.) (12.90, 26.58)

Ans: c

3. You estimate a simple linear regression model using a sample of 62 observations and obtain the following results (estimated standard errors in parentheses below coefficient estimates):

$$y = 97.25 + 33.74 * x$$

(3.86) (9.42)

You want to test the following hypothesis: **H₀: $\beta_2 = 12$, H₁: $\beta_2 \neq 12$** . If you choose to reject the null hypothesis based on these results, what is the probability you have committed a Type I error?

- a.) between .05 and .10
- b.) between .01 and .025
- c.) between .02 and .05
- d.) It is impossible to determine without knowing the true value of β_2

Ans: c

4. You estimate a simple linear regression model using a sample of 62 observations and obtain the following results (estimated standard errors in parentheses below coefficient estimates):

$$y = 97.25 + 33.74x$$

(3.86) (9.42)

You want to test the following hypothesis: $H_0: \beta_2 = 12$, $H_1: \beta_2 \neq 12$. If you choose to reject the null hypothesis based on these results, what is the probability you have committed a Type II error?

- a.) between .05 and .10
- b.) between .01 and .025
- c.) between .02 and .05
- d.) It is impossible to determine without knowing the true value of β_2

Ans: d

5. You estimate a simple linear regression model using a sample of 25 observations and obtain the following results (estimated standard errors in parentheses below coefficient estimates):

$$y = 97.25 + 19.74x$$

(3.86) (3.42)

You want to test the following hypothesis: $H_0: \beta_2 = 1$, $H_1: \beta_2 > 1$. If you choose to reject the null hypothesis based on these results, what is the probability you have committed a Type I error?

- a.) between .01 and .02
- b.) between .02 and .05
- c.) less than .005
- d.) It is impossible to determine without knowing the true value of β_2

Ans: c

6. Which of the following is not a component of a hypothesis test?

- a.) null hypothesis
- b.) goodness-of-fit
- c.) test statistic
- d.) rejection region

Ans: b

7.) Which of the following cannot be an alternative hypothesis?

- a.) $\beta_k = 0$
- b.) $\beta_k \neq 0$
- c.) $\beta_k > 0$
- d.) $\beta_k < 0$

Ans: a

8.) Rejecting a true null hypothesis

- a.) is a Type I error.
- b.) is a Type II error.
- c.) should not happen if a valid statistical test is used.
- d.) depends on the size of the estimation sample.

Ans: a

9.) For which alternative hypothesis do you reject H_0 if $t \leq t_{(\alpha, N-2)}$?

- a.) $\beta_k = c$
- b.) $\beta_k \neq c$
- c.) $\beta_k > c$
- d.) $\beta_k < c$

Ans: d

10.) For which alternative hypothesis do you reject H_0 if $|t| \geq t_{(1-\alpha/2, N-2)}$?

- a.) $\beta_k = c$
- b.) $\beta_k \neq c$
- c.) $\beta_k > c$
- d.) $\beta_k < c$

Ans: b

11.) How do you reduce the probability of committing a Type I error?

- a.) reduce α
- b.) increase α
- c.) use a two-tailed test
- d.) increase the rejection region

Ans: a

12.) In which case would testing the null hypothesis involve a two-tailed statistical test?

- a.) H_1 : Incentive pay for teachers does affect student achievement
- b.) H_1 : Higher sales tax rates does not reduce state tax revenues
- c.) H_1 : Extending the duration of unemployment benefits does not increase the length of joblessness
- d.) H_1 : Smoking does not reduce life expectancy

Ans: a

13.) In testing $H_0: \beta_2 = c$ using a .05 probability of a Type I error, you find a p-value of .38. What should you conclude?

- a.) H_0 is true, $\beta_2 = c$.

- b.) H_0 should be rejected and is unlikely to be true since the p-value < .50.
- c.) It is impossible to know for sure, but there is a .38 probability that $\beta_2 = c$.
- d.) There is not sufficient evidence to reject H_0 , so we accept the hypothesis by default.

Ans: d

14. What does a p-value NOT tell you?

- a.) The size of the largest rejection region that would not contain the observed test statistic
- b.) The probability that the null hypothesis is true and you would observe a test statistic more extreme than the one observed
- c.) The highest value of α for which you cannot reject the null hypothesis based on the data
- d.) The probability that the null hypothesis is true

Ans: d

15. You want to test the hypothesis

$$H_0: (c_1 \beta_1 + c_2 \beta_2) - c_0 = 0 \quad \text{and} \quad H_1: (c_1 \beta_1 + c_2 \beta_2) - c_0 \neq 0$$

What test statistic should you use for the test?

- a.) $t = \frac{\left(\frac{c_1 b_1}{1} + \frac{c_2 b_2}{2} \right) - c_0}{se(c_1 b_1 + c_2 b_2)}$
- b.) $t = \frac{(c_1 b_1 + c_2 b_2)}{se(c_1 b_1 + c_2 b_2)}$
- c.) $t = \frac{(b_1 + b_2)}{se(b_1) + se(b_2)}$
- d.) $\chi^2 = (\beta_1 - \beta_2) / se(\beta_1 + \beta_2)$

Ans: a

16. You want to test the hypothesis

$$H_0: (c_1 \beta_1 + c_2 \beta_2) - c_0 = 0 \quad \text{and} \quad H_1: (c_1 \beta_1 + c_2 \beta_2) - c_0 \neq 0$$

If the null hypothesis is true, how will the test statistic be distributed?

- a.) $t_{(\alpha/2)}$
- b.) $N(0,1)$
- c.) $t_{(N-2)}$
- d.) $\chi^2_{(3, N-2)}$

Ans: c

17. If you are performing a two-tailed test of significance and you find that the area to the left of $|t|$ is .975, what is the p-value?

- a.) .025
- b.) .050
- c.) .975

d.) .950

Ans: b

18. If you are performing a left-tailed significance test and find the area to the left of $|t|$ is .99, what is the p-value?

- a.) .01
- b.) .99
- c.) .02
- d.) .05

Ans: a or b

19. When should a left-tailed significance test be used?

- a.) When economic theory suggests the coefficient should be positive
- b.) When it allows you to reject the null hypothesis at a lower p-value
- c.) When economic theory suggests the coefficient should be negative
- d.) When you know the true value of β_2 is positive.

Ans: c