

## Multiple regression

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### MULTIPLE CHOICE

1. The mathematical equation relating the expected value of the dependent variable to the value of the independent variables, which has the form of  $E(y) = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_px_p$  is
- a simple linear regression model
  - a multiple nonlinear regression model
  - an estimated multiple regression equation
  - a multiple regression equation

ANS: D

PTS: 1

TOP: Multiple Regression

2. The mathematical equation that explains how the dependent variable  $y$  is related to several independent variables  $x_1, x_2, \dots, x_p$  and the error term  $\varepsilon$  is
- a simple nonlinear regression model
  - a multiple regression model
  - an estimated multiple regression equation
  - a multiple regression equation

ANS: B

PTS: 1

TOP: Multiple Regression

3. A multiple regression model has
- only one independent variable
  - more than one dependent variable
  - more than one independent variable
  - at least 2 dependent variables

ANS: C

PTS: 1

TOP: Multiple Regression

4. A regression model in which more than one independent variable is used to predict the dependent variable is called
- a simple linear regression model
  - a multiple regression model
  - an independent model
  - None of these alternatives is correct.

ANS: B

PTS: 1

TOP: Multiple Regression

5. A multiple regression model has the form

$$\hat{Y} = 5 + 6X + 7W$$

As  $X$  increases by 1 unit (holding  $W$  constant),  $Y$  is expected to

- increase by 11 units
- decrease by 11 units
- increase by 6 units
- decrease by 6 units

ANS: C

PTS: 1

TOP: Multiple Regression

**Exhibit 15-4**

- a.  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$
- b.  $E(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$
- c.  $\hat{Y} = b_0 + b_1 X_1 + b_2 X_2$
- d.  $E(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2$

6. Which equation gives the estimated regression line?
- a. Equation A
  - b. Equation B
  - c. Equation C
  - d. Equation D

ANS: C                      PTS: 1                      TOP: Multiple Regression

7. A measure of goodness of fit for the estimated regression equation is the
- a. multiple coefficient of determination
  - b. mean square due to error
  - c. mean square due to regression
  - d. sample size

ANS: A                      PTS: 1                      TOP: Multiple Regression

8. The adjusted multiple coefficient of determination is adjusted for
- a. the number of dependent variables
  - b. the number of independent variables
  - c. the number of equations
  - d. detrimental situations

ANS: B                      PTS: 1                      TOP: Multiple Regression

9. In a multiple regression analysis involving 15 independent variables and 200 observations,  $SST = 800$  and  $SSE = 240$ . The coefficient of determination is
- a. 0.300
  - b. 0.192
  - c. 0.500
  - d. 0.700

ANS: D                      PTS: 1                      TOP: Multiple Regression

10. The correct relationship between SST, SSR, and SSE is given by
- a.  $SSR = SST + SSE$
  - b.  $SSR = SST - SSE$
  - c.  $SSE = SSR - SST$
  - d. None of these alternatives is correct.

ANS: B                      PTS: 1                      TOP: Multiple Regression

11. In a multiple regression analysis involving 10 independent variables and 81 observations,  $SST = 120$  and  $SSE = 42$ . The coefficient of determination is
- 0.81
  - 0.11
  - 0.35
  - 0.65

ANS: D                      PTS: 1                      TOP: Multiple Regression

12. In a multiple regression analysis involving 5 independent variables and 30 observations,  $SSR = 360$  and  $SSE = 40$ . The coefficient of determination is
- 0.80
  - 0.90
  - 0.25
  - 0.15

ANS: B                      PTS: 1                      TOP: Multiple Regression

13. In a multiple regression model, the error term  $\varepsilon$  is assumed to be a random variable with a mean of
- zero
  - 1
  - 1
  - any value

ANS: A                      PTS: 1                      TOP: Multiple Regression

14. In a multiple regression model, the values of the error term  $\varepsilon$ , are assumed to be
- zero
  - dependent on each other
  - independent of each other
  - always negative

ANS: C                      PTS: 1                      TOP: Multiple Regression

15. In order to test for the significance of a regression model involving 3 independent variables and 47 observations, the numerator and denominator degrees of freedom (respectively) for the critical value of F are
- 47 and 3
  - 3 and 47
  - 2 and 43
  - 3 and 43

ANS: D                      PTS: 1                      TOP: Multiple Regression

16. A term used to describe the case when the independent variables in a multiple regression model are correlated is
- regression
  - correlation
  - multicollinearity
  - None of the above answers is correct.

ANS: C                      PTS: 1                      TOP: Multiple Regression