MITx: 14.310x Data Analysis for Social Scientists

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Assumptions of the Linear Model - Quiz

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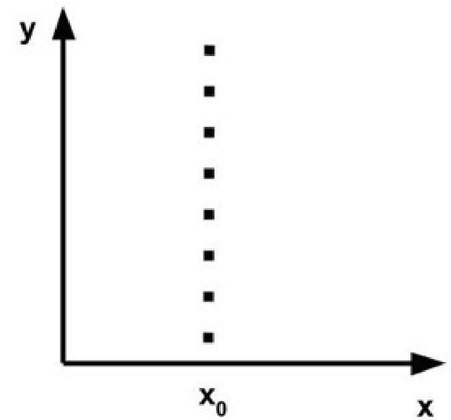
Recall our linear model:

$$Y_i = \beta_0 + \beta_1 x_i + \epsilon \text{ for } i = 1, 2, \ldots, n$$

Question 1

1/1 point (graded)

Which assumption of the linear model does the below scenario violate?



a. X_i, ϵ_i uncorrelated

b. Identification ✔

c. $E[\epsilon_i] = 0$

d. Homoscedasticity. $E[\epsilon_i^2] = \sigma^2$ for all i.

e. No serial correlation. $E[\epsilon_i \epsilon_j] = 0$ for $i \neq j$.

Explanation

In the linear model, we assume that there is some variation in our regressor X. If X were always the exact same value regardless of the value of Y, then we would not be able to predict or learn anything about Y based on X.

Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)

Question 2

The Multivariate Linear Model
due Nov 28, 2016 05:00 IST

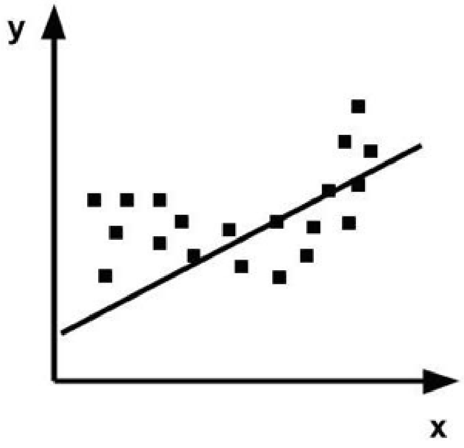
Module 9: Homework
due Nov 21, 2016 05:00 IST

Module 10: Practical Issues in Running Regressions, and Omitted Variable Bias

Exit Survey

1/1 point (graded)

Which assumption of the linear model does the below scenario violate?



a. X_i, ϵ_i uncorrelated

b. Identification

c. $E[\epsilon_i] = 0$

d. Homoscedasticity. $E[\epsilon_i^2] = \sigma^2$ for all i.

e. No serial correlation. $E[\epsilon_i \epsilon_j] = 0$ for $i \neq j$. ✔

Explanation

In the linear model, we assume that there are no areas where errors are mostly positive or other areas where errors are mostly negative.

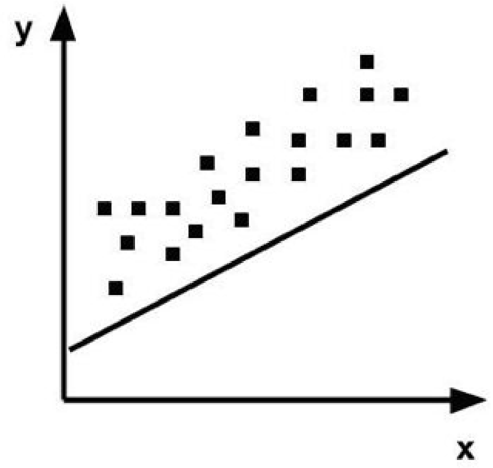
Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)

Question 3

1/1 point (graded)

Which assumption of the linear model does the below scenario violate?



a. X_i, ϵ_i uncorrelated

b. Identification

c. $E[\epsilon_i] = 0$ ✔

d. Homoscedasticity. $E[\epsilon_i^2] = \sigma^2$ for all i.

e. No serial correlation. $E[\epsilon_i \epsilon_j] = 0$ for $i \neq j$.

Explanation

In the linear model, we assume that the expectation of the error is zero. There is no way for us to between a non-zero error mean and a different intercept β_0, so we just assume the error is zero in expectation.

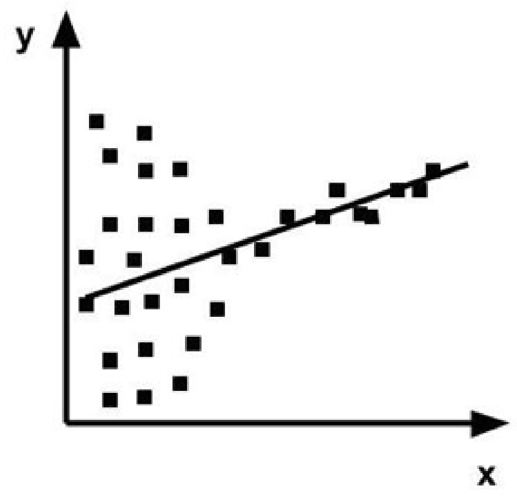
Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)

Question 4

1/1 point (graded)

Which assumption of the linear model does the below scenario violate?



- a. X_i, ϵ_i uncorrelated
- b. Identification
- c. $E[\epsilon_i] = 0$
- d. Homoscedasticity. $E[\epsilon_i^2] = \sigma^2$ for all i. ✔
- e. No serial correlation. $E[\epsilon_i \epsilon_j] = 0$ for $i \neq j$.

Explanation

Explanation: We assume homoscedasticity in the linear model, meaning the error variance should be consistent across all values of x. In the case above, the variance of the error is much higher at lower values of x.

Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)

Discussion

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