More on Inference in the Linear Model - Quiz

Bookmark this page

Question 1

1/1 point (graded)

Suppose you are interested in testing hypotheses of the following form:

$$H_0 : R\beta = c$$

$$H_1 : R\beta \neq c$$

Suppose R and c are as follows:

$$R = [0\ 0\ 1\ 1\ 1\ 0], c = 1$$

What hypotheses would this be testing?

a. The set of coefficients $\beta_2 = \beta_3 = \beta_4 = 1, \ \beta_5 = 0$

b. The set of coefficients $\beta_1 = \beta_2 = \beta_3 = 1, \ \beta_4 = 0$

c. $\beta_2 + \beta_3 + \beta_4 = 1$ ✔

d. A subset of the coefficients are all equal.

Explanation

Write out the matrix multiplication:

$$R\beta = [0\ 0\ 1\ 1\ 1\ 0] \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \end{bmatrix} = \beta_2 + \beta_3 + \beta_4 = c = 1$$

Submit

You have used 1 of 2 attempts

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

Correct (1/1 point)

Question 2

1/1 point (graded)

Using the same setup discussed in class, and in the previous questions, suppose we have a model with 5 parameters, and want to test the hypotheses that $\beta_1 = \beta_2, \beta_3 + \beta_4 = 1,$ and $\beta_5 = 10.$ Fill in the missing elements of the matrix of restrictions R and the vector c (Note: the elements to fill in are bolded and underlined below):

$$R\beta = \begin{bmatrix} 0 & 1 & \underline{\mathbf{a}} & 0 & 0 & 0 \\ 0 & 0 & \underline{\mathbf{b}} & \underline{\mathbf{c}} & 1 & 0 \\ 0 & 0 & 0 & 0 & \underline{\mathbf{d}} & \underline{\mathbf{e}} \end{bmatrix} \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \end{bmatrix} = c = \begin{bmatrix} \underline{\mathbf{f}} \\ \underline{\mathbf{g}} \\ \underline{\mathbf{h}} \end{bmatrix}$$

A:

-1

Answer: -1

-1

B:

0

Answer: 0

0

C:

1

Answer: 1

1

D:

0

Answer: 0

0

E:

1

Answer: 1

1

F:

0

Answer: 0

0

G:

1 ✔ **Answer:** 1

1

H:

10 ✔ **Answer:** 10

10

Explanation

$$R\beta = \begin{bmatrix} 0 & 1 & \mathbf{-1} & 0 & 0 & 0 \\ 0 & 0 & \mathbf{0} & \mathbf{1} & 1 & 0 \\ 0 & 0 & 0 & 0 & \mathbf{0} & \mathbf{1} \end{bmatrix} \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \end{bmatrix} = c = \begin{bmatrix} \mathbf{0} \\ \mathbf{1} \\ \mathbf{10} \end{bmatrix}$$

This follows immediately from the matrix multiplication

$$R\beta = \begin{bmatrix} 0 & 1 & -\mathbf{1} & 0 & 0 & 0 \\ 0 & 0 & \mathbf{0} & \mathbf{1} & 1 & 0 \\ 0 & 0 & 0 & 0 & \mathbf{0} & \mathbf{1} \end{bmatrix} \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \end{bmatrix} = \begin{bmatrix} \beta_1 - \beta_2 \\ \beta_3 + \beta_4 \\ \beta_5 \end{bmatrix} = \begin{bmatrix} \mathbf{0} \\ \mathbf{1} \\ \mathbf{10} \end{bmatrix}$$

Submit You have used 1 of 2 attempts

✔ Correct (1/1 point)

Discussion

Topic: Module 9 / More on Inference in the Linear Model - Quiz

Show Discussion