

Econ 4910 Quiz

The REG Procedure
Model: MODEL1
Dependent Variable: libexp

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1.754706E14	8.773532E13	88.06	<.0001
Error	72	7.173566E13	9.963286E11		
Corrected Total	74	2.472063E14			

Root MSE	998163	R-Square	0.7098
Dependent Mean	1571126	Adj R-Sq	0.7018
Coeff Var	63.53167		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-215174	180885	-1.19	0.2381
residents	1	22.714	1.95415	11.62	<.0001
city library	1	881380	240015	3.67	0.0005

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The sample regression equation shown is $\hat{y} = b_0 + b_1x_1 + b_2x_2$ where \hat{y} represents library expenditures (in dollars) by city (in Los Angeles County) in 1999, x_1 is total number of residents (untransformed) by city and $x_2=1$ if the library is city-run, $=0$ if the library is part of the county system. Define the population as all American cities.

(10 points)

Explain what is wrong with the sentence below interpreting the regression output.

1. "If library expenditures increase by \$1, the size of the city will increase by 22.714 residents."

The sample regression equation is shown as $\hat{y} = b_0 + b_1x_1 + b_2x_2$ The corresponding population equation can be expressed as $E(Y|X)=\beta_0 + \beta_1X_1 + \beta_2X_2$

(10 points)

2. Tell me why we don't know for sure that β_1 equals 22.714. Discuss the general relationship between b_1 and β_1 .

(10 points)

3. Identify and interpret R^2 for the model.

(10 points)

4. Holding the other variable constant, use the model to predict the change in library expenditures if a sampled city increased by 1000 residents. Explain how you arrived at your answer.

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(10 points)

5. Holding the number of residents constant, what is the predicted difference in library expenditures between city-run and county-run libraries? Explain how you arrived at your answer.

(10 points)

6. Perform the following hypothesis test, using a 5% level of significance. Be sure to fully express what your test conclusion implies.

$$H_0: \beta_1 = 0 \quad H_1: \beta_1 > 0$$

(10 points)

7. Perform the following hypothesis test, using a 5% level of significance. Be sure to fully express what your test conclusion implies.

$$H_0: \beta_2 = 0 \quad H_1: \beta_2 \neq 0$$