

Chulalongkorn University: MABE
Quantitative Methods in Economic Analysis

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Homework 2

Due: Saturday, October 24, 2015, 9:30 hours to our staff. Late homework will not be accepted.

Instruction: Answer all questions. Homework must be handwritten. Nevertheless, when asking to use Eviews, you have to answer by copying results from Eviews and pasting in Word from which you get a computer print-out. Credit will not be given to photocopying or duplication of files.

I. Evaluate the effect on housing price, *price*. Data of 88 observations are given in hw2_hprice_excel. The variables can be defined as follows.

<i>price</i>	is housing price in thousands of dollars
<i>sqft</i>	is size of house in square feet
<i>bdrms</i>	is the number of bedrooms.
<i>lotsize</i>	is the size of the lot in square feet
<i>assess</i>	is the assessed value of houses in thousands of dollars.
<i>Colonial</i> = 1	if home is colonial style

The econometric model of our interest can be written as

$$(I.1) \quad price = \beta_0 + \beta_1 sqft + \beta_2 bdrms + u$$

1. Use Eviews to find the estimation output of population equation (I.1) and write out the results in equation form. (Hint: before using Eviews, check the excel file for the *start and end observations*, *upper-left data all*, and *number of series*)
2. Use Eviews to obtain the minimum, maximum, and average values for *price*. Which observations contain these values?
3. What is the interpretation of the value of the slope coefficient on *sqft*?
4. What is the estimated increase in price for a house with an additional bedroom that is 140 square feet in size? Compare this to your answer in question 3.
5. What percentage of the variation in price is explained by square footage and number of bedrooms?
6. The first house in the sample has *sqft* = 2,438 and *bdrms* = 4. Find the predicted selling price for this house from the OLS regression line.
7. The actual selling price of the first house in the sample was \$300,000. Find the residual for this house. Does it suggest that the buyer underpaid or overpaid for the house?

II. Using the same data set, consider the following model,

$$(II.1) \quad price = \beta_0 + \beta_1 assess + u$$

1. Use Eviews to obtain the estimation output and write out the results in equation form.

2. Choose the 5% significance level. Test the hypothesis that $H_0: \beta_0=0$ against the two-sided alternative. What do you conclude?
3. Choose the 5% significance level. Test the hypothesis that $H_0: \beta_1=1$ against the two-sided alternative. What do you conclude?
4. Choose the 5% significance level. Test the joint hypothesis that $\beta_0=0$ and $\beta_1=1$. Write out the equations of the sum of squared residuals (SSR) of the unrestricted and restricted models. Use Eviews to find the values of SSR_{UR} and SSR_R . Carry out the F-test for the joint hypothesis. What do you conclude?
5. Use Eviews to find F-statistic and p-value to test the joint hypothesis that $\beta_0=0$ and $\beta_1=1$. (Hint: in the estimation output derived in question 1, Choose **View/Coefficient Tests/Wald-Coefficient Restrictions**. Then in the “*Wald Test*” box, type in **c(1)=0, c(2)=1**. Note that in Eviews, the estimation equation is written as $PRICE = C(1) + C(2)*ASSESS$.)

III. Using the same data set, consider the model in which the log of the housing price is used as the dependent variable,

$$(III.1) \log(price) = \beta_0 + \beta_1sqrft + \beta_2bdrms + u$$

1. Use Eviews to obtain the estimation output and write the results in equation form.
2. You are interested in estimating and obtaining a confidence interval for the percentage change in price when a 150-square-foot bedroom is added to a house. That is, $\theta_1=150\beta_1+ \beta_2$. Use the results in question 1 to estimate θ_1 . What is the interpretation of θ_1 ?
3. Show algebraically how to find the standard error of θ_1 that can be found in Eviews. (Hint: write β_2 in terms of θ_1 and β_1 and plug this into the log(price) equation.)
4. Use Eviews to find the standard error of θ_1 and use this standard error to construct a 95% confidence interval.

IV. Using the same data set to estimate the following model

$$(IV.1) price = \beta_0 + \beta_1sqrft + \beta_2bdrms + \beta_3lotsize + \beta_4assess + u$$

1. Suppose we want to test whether $\beta_1=0$, $\beta_2=0$ and $\beta_3=0$. Use Eviews to find estimation outputs for obtaining R-squared for the restricted and unrestricted models. Write the results from two estimation outputs in equation form.
2. Choose 5 % significance level. Test whether $\beta_1=0$, $\beta_2=0$ and $\beta_3=0$ by finding the F-statistic using R-squared in question 1. What can you conclude?
3. Use two methods of Eviews, to find the F-statistic and p-value to test the joint hypothesis that $\beta_1=0$, $\beta_2=0$, and $\beta_3=0$. The first method is called the Wald Test (see question III, #5). The second method is called the redundant-variables test. (choose **View/Coefficient Tests/Redundant Variables-Likelihood Ratio**)
4. If the variance of *price* changes with *sqrft*, *lotsize*, or *bdrms*, what can you say about the F-test from question 2?