Homework

Econ 5243

November 7, 2005

Problems

Consider the following model of wages:

$$\ln\left(wage_i\right) = \beta_1 + \beta_2 educ_i + \beta_3 exper_i + \beta_4 expersq_i + \beta_5 female_i + u_i \qquad (1)$$

where

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wage_i = wages of the ith individual
educ_i = years of schooling for individual i
exper_i = years of experience for individual i
expersq_i = years of experience squared for individual i
female_i = 1 if female, 0 otherwise
lwage_i = ln(wage)

also included in the data set is:
married_i = 1 if married, 0 otherwise
nonwhite_1 = 1 if nonwhite
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1. Using the wages1.csv data available by link from my website estimate the model using least squares.
   (a) Is the regression significant at the 5% level?
   (b) What is R^2?
   (c) What does inclusion of *exper* and *expersq* accomplish? Do these have the anticipated signs?
   (d) What effect does an additional year of schooling have on wages?

(e) Using equation (1), perform the RESET test at the 5% level. Is there evidence that the model is misspecified? Create a new variable, *educsq* as the square of *educ*. Augment the model by including this variable and repeat the RESET test. Does this improve things?

(f) Jethro Bodean of Beverly Hill, California has a 6^{th} grade education. What is the estimated impact of this on his log wage? Using the model that includes *educsq*, is there any incentive for Jethro to finish the 7^{th} grade?

(g) What is the estimated return to another year of schooling for someone who has finished high school ($educ = 12^{th}$) and college ($educ = 16^{th}$). Find the estimated standard error of this quantity.

(h) Is there evidence of gender discrimination in the model?

(i) Test the following joint hypothesis as the 5% level.

$$Ho : 5\beta_2 = \beta_3; \beta_5 = 0 \quad Ha : \text{not Ho:} \tag{2}$$

(j) Using IML, confirm that for the joint hypothesis above the the test statistics obtained using the statistics $\lambda_1 = \lambda_2$ are equivalent. Recall, $\lambda_1 = (R\hat{\beta} - r)^T [R(X^T X)^{-1} R^T]^{-1} (R\hat{\beta} - r)/J\hat{\sigma}^2$ and $\lambda_2 = (SSE_r - SSE_u)/J\hat{\sigma}^2$.