

# Homework

Econ 5213

November 14, 2005

## Problems

Consider the following model of wages:

$$\ln(\text{wage}_i) = \beta_1 + \beta_2 \text{educ}_i + \beta_3 \text{exper}_i + \beta_4 \text{expersq}_i + \beta_5 \text{female}_i + \beta_6 \text{married}_i + u_i \quad (1)$$

where

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

also included in the data set is:  
married\_i = 1 if married, 0 otherwise

Using the data

use <http://fmwww.bc.edu/ec-p/data/wooldridge/WAGE1>

estimate the model using least squares.

1. Test the hypothesis that marital status has no effect on  $\ln(\text{wages})$  at the 5% level.
2. Create an interaction term between female and married and add it to the model. What does this term measure?

3. Reestimate the model with the interaction term in the model. Test the hypothesis that marital status has no effect on  $\ln(\text{wage})$ .
4. Using White's test for heteroscedasticity, do you find any evidence that the model is heteroscedastic at the 10% level?
5. Reestimate the model using least squares and White's heteroscedasticity consistent standard errors using HC1 (the default using robust) and HC3. What statistical rationale can be used for using HC3 rather than the usual estimator?
6. If your model is in fact heteroscedastic, what can you say about the validity of the hypothesis tests you did in parts (1) and (3)?
7. Test the hypothesis that  $\ln(\text{wages})$  vary either more or less for males than females. Hint: The  $\beta$ s tell you whether the dependent variable varies with  $x$ . Which parameter(s) tell you how much it varies?
8. Test the hypothesis that  $\ln(\text{wages})$  vary either more or less based on experience and tenure.