

## Exercise 6

### Problem 1

The file *stockton96.gdt* contains 940 observations on home sales in Stockton, CA in 1996.

- a) Use least squares to estimate a linear equation that relates house price *PRICE* to the size of the house in square feet *SQFT* and the age of the house in years *AGE*. Interpret all the estimates.
- b) Suppose that you own two houses. One has 1400 square feet; the other has 1800 square feet. Both are 20 years old. What price do you estimate you will get for each house?
- c) Test the hypothesis that the size and the age of the house are important determinants of its price (separately as well as jointly)
- d) Using the Breusch-Pagan test for heteroscedasticity, test whether the model satisfies the homoscedasticity assumption by using the command for the BP test in Gretl.
- e) Use the White test to test for heteroskedasticity.
- f) What do you conclude regarding the heteroskedasticity? Does your conclusion depend on the choosing a specific test? Discuss also drawbacks of the BP and White tests.
- g) Test the hypothesis that the size and the age of the house are important determinants of its price (separately as well as jointly). Hint: choose appropriate standard errors. Does your conclusion differ from part (c)?

### Problem 2

Using the data in *cps4\_small.gdt* estimate the following wage equation with least squares and heteroskedasticity-robust standard errors:

$$\ln(WAGE) = \beta_1 + \beta_2 EDUC + \beta_3 EXPER + \beta_4 EXPER^2 + \beta_5 (EXPER \times EDUC) + e$$

Report the results.

- (b) Add MARRIED to the equation and re-estimate. Holding education and experience constant, do married workers get higher wages? Using a 5% significance level, test a null hypothesis that wages of married workers are less than or equal to those of unmarried workers against the alternative that wages of married workers are higher.
- (c) Plot the residuals from part (a) against the two values of MARRIED. Is there evidence of heteroskedasticity?
- (d) Plot the least squares residuals against EDUC and against EXPER. What do they suggest?
- (e) Test for heteroskedasticity using a Breusch-Pagan test where the variance depends on EDUC, EXPER and MARRIED. What do you conclude at a 5% significance level?