

Economics 421/521
Winter 2006
Final Exam

Answer each of the following questions (they are weighted equally):

1. Define the following terms:

- (a) In the term BLUE, what does it mean for an estimator to be best?
- (b) In the term BLUE, what does it mean for an estimator to be linear?
- (c) What are the reasons for an error term in a regression model?
- (d) State the two uses of regression models.

2. Given

$$\hat{y}_i = 11.3 + 3.7D_i - 1.5X_i + .25X_iD_i \quad N = 25$$

(2.0) (1.6) (1.0) (.05)

where y_i is sales, X_i is the temperature, and the dummy, D_i , is one if it is a weekend and zero otherwise. (a) Are the slope and intercept statistically different on weekends? The critical values for the tests are attached at the end of the exam. (b) What is the slope on weekdays and on weekends? What is the intercept on weekdays and weekends?

3. Give a step-by-step description of the Cochrane-Orcutt procedure.

4. (a) What is heteroskedasticity? What problems does it cause? (b) Suppose that

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + u_i$$

and heteroskedasticity of the form

$$\sigma_i^2 = \alpha_1 + \alpha_2 X_{2i} + \alpha_3 X_{3i}$$

is suspected. To test for heteroskedasticity, you estimate the first equation, save the residuals, then estimate the auxiliary regression as

$$\hat{\sigma}_i^2 = 4.0 + 2.5X_{2i} - 6.0X_{3i}, \quad R^2 = .15, \quad N = 100$$

(1.5) (.5) (1.0)

What is the Chi-Square test statistic to test for heteroskedasticity using the LM test? What are the degrees of freedom for the test? If the critical value for the test is 5.99, what do you conclude?

5. Given that

$$Y_t = a + bR_t + cG_t + dA_t + u_t$$

$$R_t = g + hY_t + kP_t + v_t$$

where Y and R are endogenous, and the constant, G , A , and P are exogenous, answer the following. (a) Is each equation under, exactly, or over identified? (b) Find the reduced form.

6. Given

$$Y_t = \alpha X_t + u_t$$

$$X_t = \beta Y_t + v_t$$

show that the OLS estimator for α is biased and explain the bias intuitively. Under what condition(s) would the estimator be unbiased?

7. What are the steps to performing (a) ILS and (b) 2SLS. (c) When should each be used?

8. Explain the following terms:

- (a) Endogenous, exogenous, and predetermined.
- (b) Structural and reduced form models.
- (c) Dummy variable trap.
- (d) Semi-log model.
- (e) Restricted and unrestricted models.