

Economics 421/521
Winter 2009
Final Exam

Answer each of the following eight questions (equally weighted):

1. (a) What is heteroskedasticity? (b) Give an example of how it might arise. (c) Explain how to test the following model for heteroskedasticity using White's test:

$$Y_i = \beta_1 + \beta_2 X_{i2} + \beta_3 X_{i3} + u_i$$

2. (a) What are the consequences of ignoring serial correlation and estimating a regression model with OLS? Why are the test statistics biased? (b) Explain how to conduct a Durbin-Watson test for the presence of serial correlation. Does this test capture higher order serial correlation?

3. (a) What properties must an instrumental variable (IV) have in order to be valid? (b) Show that the use of an instrumental variable eliminates the inconsistency problem that arises when there is correlation between a right-hand side variable and the error term. (c) How are IVs obtained in the first stage of the 2SLS procedure?

4. Consider the following IS-LM model:

$$y_t = a - bi_t + cDef_t + u_t \quad \text{IS curve}$$

$$i_t = f + gy_t - hM_t + kP_t + v_t \quad \text{LM curve}$$

(a) Give graphical, intuitive, and mathematical explanations for why the IS curve is over-identified, and why the LM curve is exactly identified. The endogenous variables are output (y) and the interest rate (i), and the exogenous variables are the constant, the deficit (Def), the money supply (M), and the price level (P). (b) Find the reduced form for i and y .

5. (a) What is the difference between perfect and imperfect multicollinearity? What problems does each cause for OLS estimation? How can the problems be overcome? (b) How can imperfect multicollinearity be detected?

6. (a) What is a linear probability (or binary choice) model? Demonstrate the heteroskedasticity problem inherent in this model, and explain how the problem can be overcome. (b) What is the Logit model? What is attractive about this estimator?

7. (a) Give a brief description of maximum likelihood estimation. (b) What are the properties of maximum likelihood estimates?