

Exam on Topics from Chapters 2 through 12 (1.5 hours)

Consider the model $Y_t = \mathbf{a} + \mathbf{b} X_t + u_t$ in which Y is a dummy variable that takes the value 1 or 0 only.

1. (10 points)

Explain with full proofs why the OLS estimators of \mathbf{a} and \mathbf{b} are unbiased and consistent but not efficient.

2. (10 points)

Describe how one can apply the least squares procedure to obtain estimators of the parameters that are more efficient than OLS estimators, at least asymptotically.

3. (5 points)

Even though one can obtain more efficient estimators, the method described in (2) is not usually applied. Explain why.

4. (10 points)

Describe the procedure for using the probit model to estimate \mathbf{a} and \mathbf{b} .

5. (10 points)

Suppose Y is not a dummy variable but is a continuous variable with a discrete jump at 0. Describe how you can use the Tobit model to estimate \mathbf{a} and \mathbf{b} .

6. (5 points)

Suppose Y takes values strictly between 0 and 1. Formulate an appropriate logit model that would yield estimators that are BLUE.