Introduction to Econometrics
Fall 2007
Assignment 4

Today’s Date: 10/1
Due Date: 10/10

Please show all of your work and clearly indicate your final response to each question.

1. Consider the linear regression model

\[ y = \beta_0 + \beta_1 x + \varepsilon, \]

where \( x \) is a scalar regressor and \( \varepsilon \) is a disturbance term. The least squares estimator computed from a sample of \( n \) i.i.d. disturbances is given by

\[ \hat{\beta}_n = (X'X)^{-1}X'y, \]

where

\[ X = \begin{bmatrix} 1 & x_1 \\ 1 & x_2 \\ \vdots & \vdots \\ 1 & x_n \end{bmatrix} \]

and

\[ y = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix} \]

Assume that

\[ E(\varepsilon|x) = \exp(-n), \]

and that

\[ \lim_{n \to \infty} \frac{X'X}{n} = Q, \]

where \( Q \) is a positive definite matrix. Is the OLS estimator \( \hat{\beta}_n \) unbiased? Is it consistent?

2. W 4.1
3. W 4.7
4. W 4.8
5. W 5.1