

Econometrics I
G31.2100 (Part I)
Fall 2006

Assignment 2

Today's Date: September 12

Due Date: September 19

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

1. 3.6
2. 3.10
3. 3.15
4. 3.22
5. Show that the OLS estimates of the regression coefficients

$$\hat{\beta} = (X'X)^{-1}X'y,$$

are uncorrelated with the residuals

$$e = y - X\hat{\beta}.$$

6. Say that you wanted to model the labor supply decisions of individuals within a neoclassical framework. Assume that the agent's utility function is given by

$$U(x, l) = \alpha \ln(x) + (1 - \alpha) \ln(l),$$

where α is an unknown parameter that takes values in $(0, 1)$, x is consumption of a market good that has price 1, and l is the amount of leisure consumed by the individual. The individual can sell leisure time to the market at a price of w (her wage), has an endowment of T units of leisure, and has no nonlabor income.

- (a) Write down the agent's demand for leisure, or equivalently her labor supply function ($h = T - l$), in terms of α , w , and T .
- (b) Imagine that you have access to a random sample of N individuals (all with no nonlabor income), and have observations on $\{h_i, w_i\}_{i=1}^N$. Discuss how you would "operationalize" your labor supply model so that the data would be consistent with the model and the parameters of the model would be estimable.
- (c) Provide explicit estimators of the parameters of your model where possible, or at least discuss the estimation strategy that you would employ to estimate them.