

14.42/14.420: Environmental Economics
Problem Set 4
Due at 3pm, April 29, 2011

This problem set will be due at the beginning of recitation on April 30th. You are welcome to work with your classmates, but please turn in your own set of solutions in your own words. Please attach copies of your do and log files for both of the empirical problems.

1. **Hedonic Regression**

- (a) Download the housing data (house.dta) and the description of the variables in the data set (housevar.pdf). Estimate a hedonic equation of sale prices using only characteristics of the house and lot.
- (b) How do you interpret the estimated coefficient on lot size in the hedonic regression you estimated in (2)?
- (c) How would you expect local park area to affect housing values?
- (d) Add the variable representing the percent of the acreage in the surrounding area that is local parks (pctlprk) and re-estimate your hedonic equation. What do your results say about the value of increasing local parkland? Why might the estimated coefficient be biased?
- (e) Add city dummy variables (campbell, losgatos, paloalto, etc.) to your set of regressors and re-estimate the model. Note that the dummy variable for San Jose is omitted in the dataset, so you can include all 10 of the other city dummies in your regression. What sorts of factors would the city dummy variables control for?
- (f) What happened to the coefficient on pctlprk when you added city fixed effects to your model? Is there any reason why it might not be desirable to control for city when estimating the value of local park area?

2. **Discrete Choice**

Suppose that you have modeled the choice of whether to visit a state park and which park to visit in a given weekend as

Person i visits park j if and only if $u_{ij} > u_{ik}$ for all $k \neq j$

where u_{ij} is the utility that person i gets from visiting park j , and u_{i0} is the utility that the individual gets from staying home. Individual utility is made up of two components:

$$u_{ij} = \gamma_{ij} + \varepsilon_{ij}$$

The deterministic part of utility (γ_{ij}) includes person i 's travel cost of visiting the park (p_{ij}) as well as some known characteristics of the park's quality (δ_j):

$$\gamma_{ij} = \alpha p_{ij} + \delta_j$$

The random part of utility (ε_{ij}) captures idiosyncratic tastes, and is distributed type I extreme value.

Suppose also that you think that δ_j is made up of some linear combination of park features, i.e.

$$\delta_j = \beta_0 + \beta_1(\text{acres}_j) + \beta_2(\text{MaxHeight}_j) + \beta_3(\text{TrailLength}_j)$$

Putting this all together, we can write out an expression for utility

$$u_{ij} = \beta_0 + \alpha(\text{travelcost}_{ij}) + \beta_1(\text{acres}_j) + \beta_2(\text{MaxHeight}_j) + \beta_3(\text{TrailLength}_j) + \varepsilon_{ij}$$

- (a) Even though individual utility is unobserved, we can still estimate the parameters above $(\alpha, \beta_0, \dots, \beta_3)$ with the right kind of data. Using your notes from class and from recitation, write down an equation that we could actually estimate using observable data. (No need to derive this – this should be the easy part!)
- (b) Download the (simulated) park visitation data (`parkvisitors.dta`) and the description of the variables (`parkvars.pdf`). Write a do file to execute the following commands:
 - Import the dataset into Stata and start a log file for your results
 - Summarize the data
 - Construct a variable called `Sj` for the share of people in each town who visited each park.
 - Construct a variable `S0` for the share of people in each town who did not visit any park
 - Construct your left-hand-side variable `lnsj_lns0`:
$$\text{lnsj_lns0} = \ln(\text{Sj}) - \ln(\text{S0})$$
 - Run the regression you suggested in (a). Report your estimates for the coefficients.
- (c) Look at the coefficients on `TravelCost` and `Acres`. What does this imply about how much each person values an additional acre of parkland in a given park? How could you use this information to inform a cost-benefit analysis of a project that would buy land to expand a park?

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