

Harvard University, fall 2015  
Exercises for Economics 980z - Empirical Research  
on Economic Inequality

This worksheet allows you to review some of the methods for empirical research on economic inequality which we have discussed throughout the semester. In these exercises, you have to calculate various objects by hand which you would usually compute using a statistical software package such as Stata. The hope is that this helps you gain intuition for the mechanics of the methods we discussed. You are encouraged to collaborate, and to ask me any questions while you solve these exercises.

**1. Estimating the Pareto parameter**

- (a) Suppose a data-set contains the following observations on the wealth of 8 random rich individuals (in thousands):  
100, 120, 130, 150, 190, 230, 280, 380.  
Calculate an estimate of the Pareto parameter  $\alpha$ , and of  $E[Y|Y > 100]$ .
- (b) Now suppose that you just observe that the number of people in the tax bracket  $[100, 200]$  equals 400, and the number of people with wealth above 200 equals 200.  
Calculate an estimate of the Pareto parameter  $\alpha$ , and of  $E[Y|Y > 100]$ .

**2. Testing whether there is a causal effect**

Suppose you have the following data-set from an experiment on the effect of gender (as implied by the name on an applicant's CV) on her likelihood to be invited for a job interview:

Gender	Invitation
F	0
F	0
F	0
F	1
F	1
M	0
M	1
M	1
M	1

Calculate a test for the null hypothesis that gender does not affect the likelihood to be invited for an interview.

### 3. Distributional decomposition

Suppose you have the following data-set on education (dropout, high school, college), immigrant status (migrant, native), and wages per hour.

Education	Migrant	Wage
D	M	4
D	M	5
D	N	6
HS	M	5
HS	M	8
HS	N	6
HS	N	7
HS	N	10
C	M	14
C	N	12
C	N	18

- What is the mean wage of migrants, and of natives? What is the median wage of either group?
- Suppose migrants were to have the same educational distribution as natives. What would be their mean wage? Their median wage?

### 4. Equivalent variation

Suppose you have the following data-set on net consumption of rice and beans (in pounds) of several households, as well as their income.

Rice	Beans	Income
3	1	100
4	3	140
3	4	190
5	6	220
4	6	280

Suppose a trade liberalization would raise the price of rice by 50 cents, and lower the price of beans by 1\$.

- (a) For each household, calculate the equivalent variation of this price change.
- (b) Calculate the 2-nearest-neighbor estimate of the conditional expectation of equivalent variation given income, for the income levels 100, 150, 200, 250.