

Econometrics

MIT (14.32)
Spring 2007

Review Problem Set

This problem set is ungraded but may be handed in for 1 bonus point.

A. Using data for the most recent year available from the Bureau of Labor Statistics, compute or do the following:

1. The joint distribution of race and sex for people in the labor force and the marginal distributions of race and sex.
2. The distribution of employment status for all workers (men and women) conditional on race.
3. Graph the conditional expectation function of earnings given age group, by sex.

B. MIT is planning to subject admitted freshman to “At Home Test Kit for Illicit Drugs”, which has been shown to be fairly reliable, in the sense that 90% of those using drugs test positive, while only 10% of those not using drugs test positive (in your age group). Assume that 20% of the population in your age group actually uses illicit drugs. Alas, you test positive. What is the probability that you are truly and fairly busted?

C. Assume that the probability of conception in any given month among sexually active couples not practicing birth control is constant at .20 per month, independent of the number of months the couple has been active. What is the expected waiting time to first birth?

D. A 1981 social experiment offered tax credit vouchers and direct rebate vouchers to unemployed job seekers on the welfare rolls in Dayton, Ohio. The job seekers were randomly divided into 3 groups. The tax credit voucher group received a voucher that employers could use to reduce their federal tax liability if they hired a someone in this group. The direct rebate voucher group received a voucher that employers could cash in with the program administrator after the job seeker was employed for 3 months. Results of the experiment are reported in Table 1 in Burtless (1985), available on the course web page¹.

1. Construct separate t-tests comparing each of the two treatment groups with the control group. Did the treatments have statistically significant effects? If so, in what direction?
2. Test whether the employment rates in the two treatment groups differ from each other.
3. Construct 95% confidence intervals for the two treatment-control contrasts.
4. Footnote 11 reports a chi-square statistic for independence between group (tax credit, rebate, and control) and job placement. Explain how this was constructed.

E. From Wooldridge: B.3, B.5, B.6, B.10, C.1

¹Gary Burtless, “Are Targeted Wage Subsidies Harmful? Evidence from a Wage Voucher Experiment,” *Industrial and Labor Relations Review* 39 (October 1985), 105-111.