

Practice 7: Tobit Estimation

1. Married Women's Hours of Work

This exercise uses the 1975 *Panel Study of Income Dynamics* (PSID) data from T.A. Mroz (1987)'s paper "The Sensitivity of an Empirical Model of Married Women's Hours of Work to Economic and Statistical Assumptions" published in *Econometrica*. The data contains information on annual hours of work for 753 married women in 1975 (*hours*), non-wife household income (*nwifeinc*), the woman's years of schooling (*educ*), actual labour market experience in years (*exper*), *age*, number of kids smaller than 6 years of age (*kidslt6*), and number of kids greater than 6 years of age (*kidsge6*).

Consider the model:

$$hours = \beta_0 + \beta_1 nwifeinc + \beta_2 educ + \beta_3 exper + \beta_4 exper^2 + \beta_5 age + \beta_6 kidslt6 + \beta_7 kidsge6 + u.$$

- (a) Estimate the model using OLS with the full sample and also for the sample such that $hours > 0$. According to both models, how does having another small child affect worked hours for the average women (i.e., a woman with average values in controls)? How does actual labor market experience affect her expected hours worked?
- (b) Tobit Model: Estimate using command `tobit` the model:

$$hours^* = \beta_0 + \beta_1 nwifeinc + \beta_2 educ + \beta_3 exper + \beta_4 exper^2 + \beta_5 age + \beta_6 kidslt6 + \beta_7 kidsge6 + u$$

where $hours^*$ is a censored variable which is only observed if $hours^* > 0$. Consider the average woman. How does having another small child affect the number of desired hours to work? and how about the hours worked? Comment the results and compare them with OLS results.

- (c) Taking into account that $\frac{\partial E[y|x]}{\partial x_j} = \beta_j \Phi(x\beta/\sigma)$ compute the average effect on hours worked of an infinitesimal increase in experience (note that when *exper* increases, also $exper^2$ increases). Is this a good approximation of a one year increase of experience? And for an increase of one week (assume that a year has 52 weeks)?
- (d) Suppose that in your data, all women who work longer than 40 hours report 40 hours of work. Write down the likelihood function. Estimate the model using Stata and compare the results from those obtained in part (b) [Hint: first you must right-censor those observations for which $hours > 0$].