

Problem Set 2

Probit and Tobit

Read in the data set motherswork.raw into TSP from the L-drive. It contains selected variables of the German Socio-Economic Panel (G-SOEP) for German mothers for the year 2004. We will study mothers' labor supply: participation and hours worked. The data set contains the following variables in the given order:

Variable name	Variable description
ifwork	Dummy=1 if mother working
hours	Working hours (0 if not working)
manearn	Partner's labor earnings
married	Dummy=1 if married
kids	Number of children

Exercise 1. Probit model for labor force participation

a) Probit estimation

Estimate the influence of partner's earnings, marriage and the number of children on the probability of working. In order to do so use a probit model with labor force participation as the dependent variable.

Hint: TSP command: probit <dependent variable> <independent variables> ;

b) Marginal effect at the mean for a continuous variable:

What is the marginal effect of partner's earnings on the probability of working for an average individual?

c) Marginal effect at the mean for a dummy variable:

What is the marginal effect of marriage on the probability of working for an average individual?

d) Average marginal effect of a continuous variable:

What is the average marginal effect of partner's earnings on the probability of working?

e) Average marginal effect of a dummy variable:

What is the average marginal effect of marriage on the probability of working? Keep in mind that a dummy variable only takes on values 0 and 1.

f) Additional exercise: Marginal effect of a discrete variable:

What is the marginal effect of the number of children on the probability of working? Differentiate between the marginal effect at the mean and the average marginal effect. Estimate the effects in analogy to the procedure for a dummy variable.

Exercise 2: Tobit model for working hours

a) Tobit Estimation

Estimate the influence of partner's earnings, marriage and the number of children on working hours. Keep in mind that working hours – the dependent variable – are restricted in that they never turn negative. Instead, non-working mothers display zero working hours. For this reason use a tobit model.

Hint: TSP command: `tobit <dependent variable> <independent variables> ;`

Hint: Save the estimated sigma for the next exercises: `set sigma=@coef(5);`

b) Marginal effect on latent variable:

Interpret the coefficients as effects on the latent variable. What meaning do they have?

c) Marginal effect on actual variable:

What is the marginal effect of partner's earnings on the actual variable of working hours, i.e. unconditional of whether a mother works or not? Estimate this marginal effect for this continuous variable.

d) Marginal effect on positive observations:

What is the marginal effect of partner's earnings on positive observations, i.e. uncensored observations? What is the meaning of this marginal effect? I. e. to which individuals does this effect apply?

e) Marginal effect on the probability of being uncensored:

What is the marginal effect on the probability of working?