

Example 2: Estimations of the panel logit models explaining women's labor supply using a fictitious dataset

The definitions of variables are inherited from those in the manuals “dfelrtna.pdf” and “dfelrtnb.pdf”.

### Dataset

$wls_{it}$ : wls1986 - wls1993 (woman's labor supply: 1=supply; 0=no supply, from 1986 to 1993)

$psinc_{it}$ : psinc1986 - psinc1993 (log of permanent spouse income, from 1986 to 1993)

$tsinc_{it}$ : tsinc1986 - tsinc1993 (log of temporary spouse income, from 1986 to 1993)

(Number of individuals  $N = 100000$ )

The model when using the program “dfelrtnb.tsp” described later is appropriate for this dataset. True values of parameters generating this dataset are

$$\gamma = \gamma_{fls(-1)} = 0.5$$

$$TD_{1986} = 0.5$$

$$TD_{1987} = 1.0$$

$$TD_{1988} = -0.5$$

$$TD_{1989} = 0.0$$

$$TD_{1990} = -0.5$$

$$TD_{1991} = 0.5$$

$$TD_{1992} = 0.0$$

$$TD_{1993} = -1.0$$

and accordingly,

$$\Delta TD_{1988} = -1.5$$

$$\Delta TD_{1989} = 0.5$$

$$\Delta TD_{1990} = -0.5$$

$$\Delta TD_{1991} = 1.0 .$$

When using the program “dfelrtna.tsp” described later, we will estimate

$$\beta_{(1)} = \beta_{psinc} = 0 \text{ and } \beta_{(2)} = \beta_{tsinc} = 0 .$$

Since  $N=100000$ , we must read the “csv” files instead of “xls” files to carry out the estimations using the files “dfelrtna.tsp” and “dfelrtnb.tsp”. Therefore, we must write the statements in the files “datra.tsp” and “datrb.tsp”.

For the purpose of reading the big dataset with  $N=100000$ , we must increase the allocated memory size, by writing the statement such as “memory = 512” in the file “login.tsp”.

Model, Moment conditions, and parameters to be estimated when using the program “dfelrtna.tsp”

### Model

$$y_{it} = \frac{\exp(\eta_i + TD_t + \gamma y_{i,t-1} + \beta_{(1)}x_{(1)it} + \beta_{(2)}x_{(2)it})}{1 + \exp(\eta_i + TD_t + \gamma y_{i,t-1} + \beta_{(1)}x_{(1)it} + \beta_{(2)}x_{(2)it})} + v_{it}, \quad \text{for } t = 1987, \dots, 1991.$$

$$y_{it} = wls_{it}$$

$$x_{(1)it} = psinc_{it}$$

$$x_{(2)it} = tsinc_{it}$$

### Moment conditions

Used moment conditions based on g-form

$$E[\hbar U_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } t = 1988, \dots, 1990,$$

$$E[y_{is} \hbar U_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } s = t-2; t = 1988, \dots, 1990,$$

$$E[\Delta x_{(1)is} \hbar U_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } s = t-1, t, t+1; t = 1988, \dots, 1990,$$

$$E[\Delta x_{(2)is} \hbar U_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } s = t-1, t, t+1; t = 1988, \dots, 1990.$$

Used moment conditions based on h-form

$$E[\hbar Y_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } t = 1988, \dots, 1990,$$

$$E[y_{is} \hbar Y_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } s = t-2; t = 1988, \dots, 1990,$$

$$E[\Delta x_{(1)is} \hbar Y_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } s = t-1, t, t+1; t = 1988, \dots, 1990,$$

$$E[\Delta x_{(2)is} \hbar Y_{it}^+(\gamma, \beta_{(1)}, \beta_{(2)}, \Delta TD_t, \Delta TD_{t+1})] = 0, \quad \text{for } s = t-1, t, t+1; t = 1988, \dots, 1990.$$

### Parameters to be estimated

$$\gamma = \gamma_{wls(-1)} : g\_wls\_lag1$$

$$\beta_{(1)} = \beta_{psinc} : b\_psinc$$

$$\beta_{(2)} = \beta_{tsinc} : b\_tsinc$$

$$\Delta TD_{1988} : dtd1988$$

$$\Delta TD_{1989} : dtd1989$$

$$\Delta TD_{1990} : dtd1990$$

$$\Delta TD_{1991} : dtd1991$$

Model, Moment conditions, and parameters to be estimated when using the program “dfelrtnb.tsp”

### Model

$$y_{it} = \frac{\exp(\eta_i + TD_t + \gamma y_{i,t-1})}{1 + \exp(\eta_i + TD_t + \gamma y_{i,t-1})} + v_{it}, \quad \text{for } t = 1987, \dots, 1991.$$

$$y_{it} = wls_{it}$$

### Moment conditions

Used moment conditions based on g-form

$$\begin{aligned} E[hU_{it}^-(\gamma, \Delta TD_t, \Delta TD_{t+1})] &= 0, \quad \text{for } t = 1988, \dots, 1990, \\ E[y_{is} hU_{it}^-(\gamma, \Delta TD_t, \Delta TD_{t+1})] &= 0, \quad \text{for } s = t-2; t = 1988, \dots, 1990. \end{aligned}$$

Used moment conditions based on h-form

$$\begin{aligned} E[hY_{it}^-(\gamma, \Delta TD_t, \Delta TD_{t+1})] &= 0, \quad \text{for } t = 1988, \dots, 1990, \\ E[y_{is} hY_{it}^-(\gamma, \Delta TD_t, \Delta TD_{t+1})] &= 0, \quad \text{for } s = t-2; t = 1988, \dots, 1990. \end{aligned}$$

### Parameters to be estimated

$$\gamma = \gamma_{wls(-1)} : \text{g\_wls\_lag1}$$

$$\Delta TD_{1988} : \text{dtd1988}$$

$$\Delta TD_{1989} : \text{dtd1989}$$

$$\Delta TD_{1990} : \text{dtd1990}$$

$$\Delta TD_{1991} : \text{dtd1991}$$