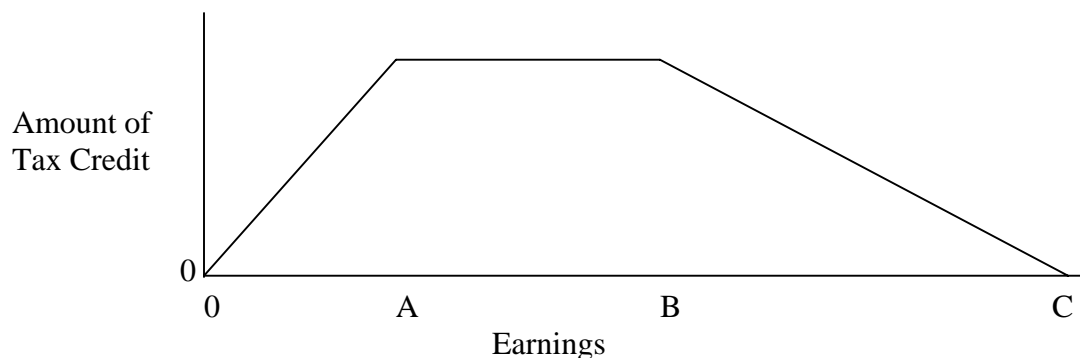


8686 Problem Set #4- Labor Supply: Theory and Estimation

Part I:

- 1) Given Preferences: $U(X,L) = 2\log(X)+\log(L)$
 - a) Find the uncompensated labor supply function.
 - b) Find the Indirect Utility Function.
 - c) Use Roy's Identity to confirm your answer to part a
 - d) Find the Expenditure Function.
 - e) Find the compensated labor supply function.
- 2) Recall the Earned Income Tax Credit (EITC),



as studied in Eissa and Hoynes (JPubE 2004).

- a) Draw a standard budget constraint for an individual's labor supply decision in a static framework. Then show how the EITC program changes the budget constraint. (Ignore other taxes or transfer program).
- b) Using the graph, show how the EITC affects the labor supply decision. Discuss the effect on the participation decision and the hours of work decision. Show that this program can either provide work incentives or work disincentives, depending on the person's preferences and their labor supply decision without the EITC program. (Discuss these effects intuitively, as well).

Part II: hypdata.txt contains a manufactured data set with 2 variables: wage and q. q will act as a (manufactured) exclusion restriction (appearing in the participation, but not hours, equation).

- 1) Create an error term and the following labor force participation equation:

```
gen random=uniform()  
gen mu=invnorm(random)  
gen pstar=-3+2*wage-1.2*q+mu  
gen p=(pstar>0)
```

- 2) Summarize your data:

```
summ  
scatter pstar wage, yline(0)  
scatter p wage
```

3) Estimate a probit:

```
probit p wage q
```

Briefly comment on results.

4) Generate the following hours equation:

```
gen hours= 4*wage+mu
```

```
summ hours
```

```
replace hours=0 if p==0
```

View the data:

```
scatter hours wage
```

5) Estimate:

```
reg hours wage income
```

and:

```
tobit hours wage income, ll(0)
```

Why do these models overestimate the effect of wage?

hint: look back at the scatterplot you created in question #4

6) Estimate:

```
reg hours wage if p==1
```

Why does this model underestimate the effect of wage?

Hint: look back at the first scatter plot you created in question #2.

7) Generate the following descriptive statistics looking again at the scatterplots you created in questions #2 and #4.

```
summ mu if wage<7&p==1
```

```
summ mu if wage<7&p==0
```

```
summ mu p if wage>7
```

Now estimate:

```
Reg hours wage if wage>7
```

Discuss your results.

8) Calculate the inverse mills ratio:

```
probit p wage q
```

```
predict index, xb
```

```
gen top=normd(index)
```

```
gen bottom=normprob(index)
```

```
gen lambda=top/bottom
```

9) Estimate:

```
reg hours wage lambda if p==1
```

Compare result to results in question # 6 above.

10) Estimate:

```
replace hours=. if hours==0
```

heckman hours wage, select (wage q)
Compare to above.

Part III: CPS99.dta contains a 50% sample of the 1999 March Current Population Survey (CPS) data. The CPS is a monthly survey of households by the Census Bureau that is often used in labor supply studies. A list of variables and their means are provided on the next page. A file with the relevant portions of the CPS codebook, which provide descriptions of the variables, is also available on the course web site. Your assignment is to use this data to estimate one or more labor supply equations. Write up a small report that describes the following:

- a) the sample used for your analysis
- b) your model specification (including variable definitions)
- c) your estimation method
- d) your interpretation of your findings

.desc

Contains data from CPS99.dta

obs: 66,162
vars: 19 14 Sep 2006 14:12
size: 2,381,832 (97.7% of memory free)

variable name	storage type	display format	value label	variable label
-				
fam18	byte	%8.0g		num of family members under 18
fam6	byte	%8.0g		num of family members under 6
famern	long	%12.0g		total family earnings
faminc	long	%12.0g		total family income
age	byte	%8.0g		age of person
ernhr	int	%8.0g		earner study-hourly rate
grdatn	byte	%8.0g		educational attainment
metstat	byte	%8.0g	metstat	metropolitan status
hrslyr	byte	%8.0g		hours worked per week last year
incern	long	%12.0g		person's total earnings
income	long	%12.0g		person's total income
marstat	byte	%8.0g		marital status
region	byte	%8.0g		region of the country
race	byte	%8.0g		race
schft	byte	%8.0g	schft	enrolled in school ft or pt
sex	byte	%8.0g	sex	sex
spneth	byte	%8.0g		spanish ethnicity
vet	byte	%8.0g		veteran status
wkslyr	byte	%8.0g		weeks worked last year

. summ

Variable	Obs	Mean	Std. Dev.	Min	Max
fam18	66162	1.185877	1.346646	0	9
fam6	66162	.366449	.7017851	0	6
famern	66162	45250.8	52850.07	-19898	708935
faminc	66162	53598.56	55152.28	-14949	797689
age	66162	35.05487	22.23208	0	90
ernhr	66162	67.0269	304.9964	0	7500
grdatn	66162	30.31985	16.81684	0	46
metstat	66162	1.229467	.4261702	1	3
hrslyr	66162	20.76831	21.48823	0	99
incern	66162	15757.37	30684.59	-9999	492657
income	66162	19592.19	32453.46	-9999	508245
marstat	66162	4.147048	2.794072	1	7
region	66162	2.633022	1.088112	1	4
race	66162	1.232974	.6453785	1	4
schft	66162	.071068	.2778002	0	2
sex	66162	1.516339	.4997368	1	2
spneth	66162	7.270639	1.888073	1	10
vet	66162	4.319761	2.588869	0	6
wkslyr	66162	24.33498	24.66952	0	52