

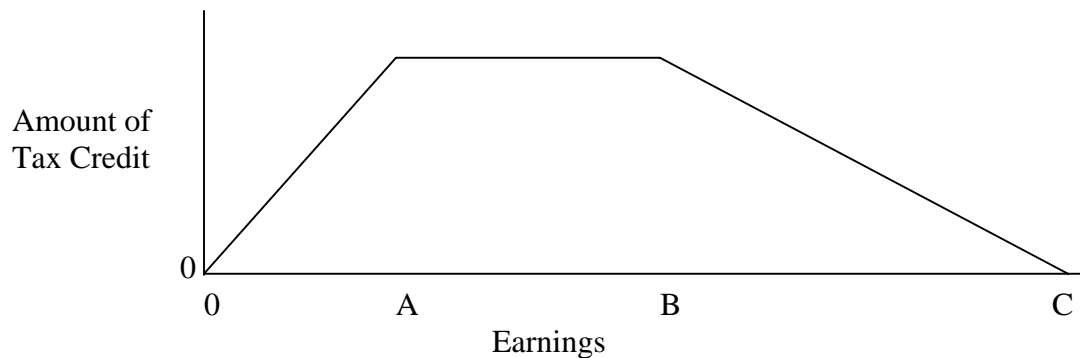
8686 Problem Set #4- Labor Supply, Estimation with Limited Dependent Variables

Part I:

1) Given Preferences: $U(X,L) = 2\log(X)+\log(L)$

- Find the uncompensated labor supply function.
- Find the Indirect Utility Function.
- Use Roy's Identity to confirm your answer to part a
- Find the Expenditure Function.
- Find the compensated labor supply function.

2) Recall the Earned Income Tax Credit (EITC),



as studied in Eissa and Hoynes (JPubE 2004).

- 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).
- 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:

The divorce data set contains a sample of first marriages for women born 1958-65.

divorce: 0/1, =1 if marriage ends in divorce by 2000.

agemar: age married

highgr: highest grade completed for wife

highgrsp: highest grade completed for husband

protest: 0/1, =1 if raised Protestant

cathol: 0/1, =1 if raised Catholic

otherrelig: 0/1, =1 if raised in another religion (omitted category is no religion)

parentsep14: 0/1 variable, =1 if respondent's parents were separated by the time the respondent was age 14.

1)
reg divorce agemar highgr highgrsp parentsep14 protest cathol otherrelig
predict divorce_hat.
Estimate a logit model using the same variables.
logit divorce agemar highgr highgrsp parentsep14 protest cathol otherrelig
predict divorce_lhat
Then use the command
scatter divorce_hat agemar || scatter divorce_lhat agemar
Discuss what you see in the graph

2) Generate the variable *agemar_der*, which equals the marginal effect of *agemar* for each individual in the sample. Calculate the mean of *agemar_der*. Compare this result to the coefficient on *agemar* in your LPM results.

3) Use the commands:
tab agemar
tabstat agemar_der, by(agemar).
Based on the logit model, compare marginal effect of a delay in age of marriage on divorce at the ages of 19, 25 and 40. Based on the LPM, what are the marginal effects for these same ages?

4) Use the commands:
mfx, at(mean)
mfx, at(median)
How were these marginal effects for *agemar* generated? How do they compare to each other and to the average derivative?

Part III: 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.