E731 Labor Economics I: Homework #1

Professor James P. Ziliak Fall 2014

This assignment uses data from the Current Population Survey on 84,913 single mothers with dependent children spanning 1979–2001. The next page has a description of the variables. The results should be typed, and should include a copy of your program and final output (it should be stapled). You are encouraged to work in groups of 2 or 3, but no more than 3. If you work in groups you should turn in one assignment with all names on it. All members are given the same grade. I have posted the data on the class website in Stata SE 9 format.

The assignment is due in class on Tuesday **October 14, 2014**.

Create the following variables:

(i) All income variables should be converted to real terms using cpi01
(ii) potential experience, defined as AGE – Number of Years of School – 6
(iii) age squared and experience squared
(iv) nonlabor income, defined as (_faminc - _incwag), and then placed in real terms
(v) year dummies
(vi) cohort dummies
(vii) state dummies

1. Compute sample means and std deviations of the following variables:

Worker, nominal and real average hourly wages, hours, lths, hhs, mths, _child18, nominal and real family income

(a) What fraction of single mom's are workers? How does this vary if you compute weighted means?
(b) Show on a graph trends over time in the fraction workers, and real hourly wage (on separate axis)

2. Estimate via Probit the reduced form probability of work as a function of age, age squared, education (lths, hhs, mths), race (white, black, other), number of children, real nonlabor income, AFDC max benefit (by family size), EITC max subsidy (by number of qualifying children), state unemployment rate, state dummies, year dummies

(a) construct the inverse Mills ratio—this should be programmed by you, not an automatic routine in your stats package. What is the mean, variance, and interquartile range of the IMR?
(b) What is the effect of race on the probability of working? Is it statistically significant?
(c) What is the effect of state unemployment rate on the probability of working? Is it statistically significant?
(d) How do your answers to (b) and (c) change if you use the OPG method (i.e. BHHH in Stata)?
(e) How do your answers to (b) and (c) change if you use Logit? And if you use Linear Probability?

3. Estimate the natural log of the real average hourly wage on the same set of variables in (2), except for nonlabor income and the AFDC and EITC variables.

(i) For workers and nonworkers combined
(ii) For workers only
(iii) For workers only controlling for the inverse Mills ratio—using the IMR you constructed in 2(a)

(a) Is there statistical evidence of nonrandom sample selection bias? Please explain .
(b) Is there economic evidence of selection bias? Please explain.
(c) Are real wages procyclical wrt state unemployment rates?

4. Estimate annual hours of work as a function of log real wage, age, age squared, real nonlabor income, race, education

(i) OLS on workers only
(ii) Tobit on workers and nonworkers
(iii) Two-Step Heckman procedure (Heckit)
(iv) Two-Step IV Tobit (treating wage as endogenous)
(v) Two-Step IV Heckit (treating wage as endogenous)

(a) For each of the models report the uncompensated and the compensated wage elasticities at mean hours, wages, and nonlabor income.
(b) Is labor supply upward sloping or backward bending for each model? Explain
(c) Does Slutsky integrability hold for each model? Explain
(d) How is the two-step Heckman model identified? Is there evidence of nonrandom sample selection? Explain
(e) How are the IV models identified? Explain, and justify with first-stage and overidentifying restrictions tests (as appropriate).

Variables in CPS Data Set

_region

Code:			Recode:
	03-76	67-62	03-62
Northeast	1	0	1
North central/Midwest	2	1	2
South	3	2	3
West	4	3	4
Missing	9		9

_child18: number of kids under age 18
_child6: number of kids under age 6
_faminc: total nominal family income before taxes and in-kind transfers
_fnumper: total size of family unit
famwgt: family sampling weight
_educ: years of school completed through 1991

Code: 91-62
00 = NIU
Elementary
00 = 0 or K
01 = 1
02 = 2
03 = 3
04 = 4
05 = 5
06 = 6
07 = 7
08 = 8
High School
09 = 9
10 = 10
11 = 11
12 = 12
College
13 = 13
14 = 14
15 = 15
16 = 16
17 = 17
18 = 18+

_race:

Code:					Recode:
	03	02-96	95-88B	88-63	62 03-62
White only	1	1	1	1	0 1

Black only	2	2	2	2	1	2
Amer Indian, Alaskan Native only	3	3	3			3
Asian only	4					3
Hawaiian/Pacific Islander only	5					3
Asian/Pacific Islander		4	4			3
Other			5	3	2	3
White-Black	6					3
White-AI	7					3
White-Asian	8					3
White-Hawaiian	9					3
Black-AI	10					3
Black-Asian	11					3
Black-Hawaiian	12					3
AI-Asian	13					3
Asian-Hawaiian	14					3
W-B-AI	15					3
W-B-A	16					3
W-AI-A	17					3
W-A-HP	18					3
W-B-AI-A	19					3
2 or 3 races	20					3
4 or 5 races	21					3

AI American Indian and Alaskan Native
HP Hawaiian or Pacific Islander

In 1994 forward this is an edited variable with additional possible values of: -1 (blank) -2 (don't know) -3 (refused) -9 (no response)

_incwag: nominal earnings from wages and salary
year: year spanning 1979-2001
pov: equals 1 if poor
grdatn: years of school after 1991

Code:

	03-92
Children	00
Less than 1st grade	31
1st, 2nd, 3rd or 4th grade	32
5th or 6th grade	33
7th or 8th grade	34
9th grade	35
10th grade	36
11th grade	37
12th grade or no diploma	38
High school graduate - High school diploma or equivalent	39
Some college but no degree	40
Associate's degree in college - occupational/vocational	41
Associate's degree in college - academic	42
Bachelor's degree (e.g., BA, BS, AB)	43
Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)	44
Professional school degree (e.g.: MD, DDS, DVM, LLB, JD)	45
Doctorate degree (e.g., PhD, EdD)	46

In 1994 forward this is an edited variable with additional possible values of: -1 (blank) -2 (don't know) -3 (refused) -9 (no response)

state: ID for state

1 Alabama

```
 2   Alaska
 3   Arizona
 4   Arkansas
 5   California
 6   Colorado
 7   Connecticut
 8   Delaware
 9   District of Columbia
10    Florida
11    Georgia
12    Hawaii
13    Idaho
14    Illinois
15    Indiana
16    Iowa
17    Kansas
18    Kentucky
19    Louisiana
20    Maine
21    Maryland
22    Massachusetts
23    Michigan
24    Minnesota
25    Mississippi
26    Missouri
27    Montana
28    Nebraska
29    Nevada
30    New Hampshire
31    New Jersey
32    New Mexico
33    New York
34    North Carolina
35    North Dakota
36    Ohio
37    Oklahoma
38    Oregon
39    Pennsylvania
40    Rhode Island
41    South Carolina
42    South Dakota
43    Tennessee
44    Texas
45    Utah
46    Vermont
47    Virginia
48    Washington
49    West Virginia
50    Wisconsin
51    Wyoming
```

pop: state population
urate: state unemployment rate
empl: state level of employment
shdem: fraction of state house that is Democrat
govd: equals 1 if Governor is a Democrat
ssdem: fraction of state senate that is Democrat
waiver: equals 1 the year a state waiver from AFDC rules was implemented
eetax: state earned income tax rate for AFDC program
eutax: state unearned income tax rate for AFDC program
afdc2: nominal AFDC max benefit for 2 person unit
afdc3: nominal AFDC max benefit for 3 person unit

afdc4: nominal AFDC max benefit for 4 person unit
stminwage: nominal state minimum wage
eitc1kid: EITC maximum $ subsidy for 1 child family
eitc2kid: EITC maximum $ subsidy for 2 or more child family
lths: equals 1 if less than high school education
hhs: equals 1 if high school education
mths: equals 1 if more than high school education
cpi01: personal consumption expenditure deflator with 2001 base year
cohed: dummy variable for 5-year by 3-education level cohort:

```
g cohed=0

replace cohed=1 if birthyr >=1979 & birthyr <=1983 & lths==1
replace cohed=2 if birthyr >=1979 & birthyr <=1983 & hhs==1
replace cohed=3 if birthyr >=1979 & birthyr <=1983 & mths==1
replace cohed=4 if birthyr >=1974 & birthyr <=1978 & lths==1
replace cohed=5 if birthyr >=1974 & birthyr <=1978 & hhs==1
replace cohed=6 if birthyr >=1974 & birthyr <=1978 & mths==1
replace cohed=7 if birthyr >=1969 & birthyr <=1973 & lths==1
replace cohed=8 if birthyr >=1969 & birthyr <=1973 & hhs==1
replace cohed=9 if birthyr >=1969 & birthyr <=1973 & mths==1
replace cohed=10 if birthyr >=1964 & birthyr <=1968 & lths==1
replace cohed=11 if birthyr >=1964 & birthyr <=1968 & hhs==1
replace cohed=12 if birthyr >=1964 & birthyr <=1968 & mths==1
replace cohed=13 if birthyr >=1959 & birthyr <=1963 & lths==1
replace cohed=14 if birthyr >=1959 & birthyr <=1963 & hhs==1
replace cohed=15 if birthyr >=1959 & birthyr <=1963 & mths==1
replace cohed=16 if birthyr >=1954 & birthyr <=1958 & lths==1
replace cohed=17 if birthyr >=1954 & birthyr <=1958 & hhs==1
replace cohed=18 if birthyr >=1954 & birthyr <=1958 & mths==1
replace cohed=19 if birthyr >=1949 & birthyr <=1953 & lths==1
replace cohed=20 if birthyr >=1949 & birthyr <=1953 & hhs==1
replace cohed=21 if birthyr >=1949 & birthyr <=1953 & mths==1
replace cohed=22 if birthyr >=1944 & birthyr <=1948 & lths==1
replace cohed=23 if birthyr >=1944 & birthyr <=1948 & hhs==1
replace cohed=24 if birthyr >=1944 & birthyr <=1948 & mths==1
replace cohed=25 if birthyr >=1939 & birthyr <=1943 & lths==1
replace cohed=26 if birthyr >=1939 & birthyr <=1943 & hhs==1
replace cohed=27 if birthyr >=1939 & birthyr <=1943 & mths==1
replace cohed=28 if birthyr >=1934 & birthyr <=1938 & lths==1
replace cohed=29 if birthyr >=1934 & birthyr <=1938 & hhs==1
replace cohed=30 if birthyr >=1934 & birthyr <=1938 & mths==1
replace cohed=31 if birthyr >=1929 & birthyr <=1933 & lths==1
replace cohed=32 if birthyr >=1929 & birthyr <=1933 & hhs==1
replace cohed=33 if birthyr >=1929 & birthyr <=1933 & mths==1
replace cohed=34 if birthyr >=1924 & birthyr <=1928 & lths==1
replace cohed=35 if birthyr >=1924 & birthyr <=1928 & hhs==1
replace cohed=36 if birthyr >=1924 & birthyr <=1928 & mths==1
replace cohed=37 if birthyr >=1919 & birthyr <=1923 & lths==1
replace cohed=38 if birthyr >=1919 & birthyr <=1923 & hhs==1
replace cohed=39 if birthyr >=1919 & birthyr <=1923 & mths==1
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worker: equals 1 if worked for pay
wage: nominal average hourly wage rate
allocate: equals 1 if earnings are imputed by Census Bureau
tottax: total tax payments from NBER TAXSIM (federal/state/fica)
hours: annual hours of work
pafdc: equals 1 if participate in AFDC/TANF