Homework 10 (4 Points), due at the beginning of class on December 1, 2015

Please use MROZ data for this homework. We want to examine the marginal effect of education on women’s labor participation rate. The explanation of variables is below

<table>
<thead>
<tr>
<th>variable name</th>
<th>type</th>
<th>format</th>
<th>label</th>
</tr>
</thead>
<tbody>
<tr>
<td>inlf</td>
<td>byte</td>
<td>%9.0g</td>
<td>=1 if in labor force, 1975</td>
</tr>
<tr>
<td>hours</td>
<td>int</td>
<td>%9.0g</td>
<td>hours worked, 1975</td>
</tr>
<tr>
<td>kidslt6</td>
<td>byte</td>
<td>%9.0g</td>
<td># kids &lt; 6 years</td>
</tr>
<tr>
<td>kidsge6</td>
<td>byte</td>
<td>%9.0g</td>
<td># kids 6-18</td>
</tr>
<tr>
<td>age</td>
<td>byte</td>
<td>%9.0g</td>
<td>woman’s age in yrs</td>
</tr>
<tr>
<td>educ</td>
<td>byte</td>
<td>%9.0g</td>
<td>years of schooling</td>
</tr>
<tr>
<td>wage</td>
<td>float</td>
<td>%9.0g</td>
<td>est. wage from earn, hrs</td>
</tr>
<tr>
<td>repwage</td>
<td>float</td>
<td>%9.0g</td>
<td>rep. wage at interview in 1976</td>
</tr>
<tr>
<td>hushrs</td>
<td>int</td>
<td>%9.0g</td>
<td>hours worked by husband, 1975</td>
</tr>
<tr>
<td>husage</td>
<td>byte</td>
<td>%9.0g</td>
<td>husband’s age</td>
</tr>
<tr>
<td>huseduc</td>
<td>byte</td>
<td>%9.0g</td>
<td>husband’s years of schooling</td>
</tr>
<tr>
<td>huswage</td>
<td>float</td>
<td>%9.0g</td>
<td>husband’s hourly wage, 1975</td>
</tr>
<tr>
<td>faminc</td>
<td>float</td>
<td>%9.0g</td>
<td>family income, 1975</td>
</tr>
<tr>
<td>mtr</td>
<td>float</td>
<td>%9.0g</td>
<td>fed. marg. tax rte facing woman</td>
</tr>
<tr>
<td>motheduc</td>
<td>byte</td>
<td>%9.0g</td>
<td>mother’s years of schooling</td>
</tr>
<tr>
<td>fatheduc</td>
<td>byte</td>
<td>%9.0g</td>
<td>father’s years of schooling</td>
</tr>
<tr>
<td>unem</td>
<td>float</td>
<td>%9.0g</td>
<td>unem. rate in county of resid.</td>
</tr>
<tr>
<td>city</td>
<td>byte</td>
<td>%9.0g</td>
<td>=1 if live in SMSA</td>
</tr>
<tr>
<td>exper</td>
<td>byte</td>
<td>%9.0g</td>
<td>actual labor mkt exper</td>
</tr>
<tr>
<td>nwifeinc</td>
<td>float</td>
<td>%9.0g</td>
<td>(faminc - wage*hours)/1000</td>
</tr>
<tr>
<td>lwage</td>
<td>float</td>
<td>%9.0g</td>
<td>log(wage)</td>
</tr>
<tr>
<td>expersq</td>
<td>int</td>
<td>%9.0g</td>
<td>exper^2</td>
</tr>
</tbody>
</table>
• Q1 (1 point) Notice that inlf is binary or dummy variable. Please draw the bar graph that compares the means of inlf (fraction of inlf=1) over kidslt6. What is the limitation of using that graph? Report the two-sample t test for the null hypothesis of equal means of kidslt6 over inlf, and draw a conclusion. What is the limitation of the two-sample t test?

• Q2 (1 point) Please interpret the results of following two regressions

\[
\begin{align*}
\text{reg inlf educ} \\
\text{probit inlf educ}
\end{align*}
\]

What are the advantage and disadvantage of each regression? How many fitted values from the LPM model are greater than 1 or less than 0? What does that imply? Based on the probit model results, please find the average partial effect (APE) \( \frac{dP(inlf=1)}{deduc} \).

• Q3 (1 point) Please report the following probit regression

\[
\text{probit inlf kidslt6 age educ huswage}
\]

and find the marginal effect of educ on \( P(inlf = 1) \) using the average values of all regressors. Find the probability of inlf=0 for a women who has 2 kids younger than 6 year old, is 40 year old herself, has got 16 year of education and her husband earns average wage.

• Q4 (1 point) Someone may say educ is endogenous. Can you find one or multiple IVs for educ from this dataset and obtain the IV estimator? (Hint: help ivprobit). How to check whether IV is weak? Without running the Hausman Test, how to tell whether IV estimator is necessary?