Economics 140B
Individual Assignment 1

Due in class 01/31/2018

Some of these questions are from Stock and Watson and from Wooldridge

Question 1 (12 points):

Earnings functions attempt to find the determinants of earnings, using both continuous and binary variables. One of the central questions analyzed in this relationship is the returns to education.

(a) Collecting data from 253 individuals, you estimate the following relationship

\[
\ln(\hat{\text{Earn}}) = 0.53 + 0.097 \times \text{Educ}, \quad R^2 = 0.14, \quad \text{SER} = 0.228
\]

where \(\ln\) denotes the natural log, \(\text{Earn}\) is average hourly earnings, and \(\text{Educ}\) is years of education.

What is the effect of an additional year of schooling? If you had a strong belief that years of high school education were different from college education, how would you modify the equation? What if your theory suggested that there was a “diploma effect”?

(b) In Econ 150B, you learned that there should also be returns to on-the-job training. To approximate on-the-job training, researchers often use potential experience variable, which is defined as \(\text{Exper} = \text{Age} - \text{Educ} - 6\). Explain the reasoning behind this approximation. Is it likely to resemble years of employment for various sub-groups of the labor force?

(c) You incorporate the potential experience variable into your original regression

\[
\ln(\hat{\text{Earn}}) = -0.02 + 0.121 \times \text{Educ} + 0.034 \times \text{Exper} - 0.0005 \times \text{Exper}^2,
\]

\[
(0.13) \quad (0.032) \quad (0.007) \quad (0.0002)
\]

\(R^2 = 0.34, \quad \text{SER} = 0.405\)

What is the effect of an additional year of experience for a person who is 45 years old and had 12 years of education? What about for a person who is 62 years old with the same education background?
(d) Test for the significance of each of the coefficients of the added variables. Why has the coefficient on education changed so little? Sketch the age-(log)earnings profile for workers with 8 years of education and 16 years of education.

(e) You want to find the effect of introducing two variables, gender and marital status. Accordingly you specify a binary variable that takes on the value of one for females and is zero otherwise (Female), and another binary variable that is one if the worker is married but is zero otherwise (Married). Adding these variables to the regressors results in:

\[
\ln(\hat{E}_{arn}) = 0.22 + 0.093 \times \text{Educ} + 0.032 \times \text{Exper} - 0.0004 \times \text{Exper}^2 \\
- 0.289 \times \text{Female} + 0.062 \times \text{Married},
\]

\[
R^2 = 0.43, \; \text{SER} = 0.378
\]

Are the coefficients of the two added binary variables individually statistically significant? Are they economically important? In percentage terms, how much less do females earn per hour, controlling for education and experience? How much more do married people make? What is the percentage difference in earnings between a single male and a married female? What is the marriage differential between males and females?

(f) In your final specification, you allow for the binary variables to interact. The results are as follows:

\[
\ln(\hat{E}_{arn}) = 0.14 + 0.092 \times \text{Educ} + 0.033 \times \text{Exper} - 0.0005 \times \text{Exper}^2 \\
- 0.158 \times \text{Female} + 0.183 \times \text{Married} - 0.218 \times (\text{Female} \times \text{Married}),
\]

\[
R^2 = 0.44, \; \text{SER} = 0.375
\]

Repeat the exercise in (e) of calculating the various percentage differences between gender and marital status.
Question 2 (8 points):

Use the STATA data file “TeachingRatings.dta” (and also the documentation for the data file, TeachingRatings.pdf) to answer the following questions:

(a) Estimate a regression of \texttt{Course Eval} on \texttt{Beauty}, \texttt{Intro}, \texttt{OneCredit}, \texttt{Female}, \texttt{Minority}, and \texttt{NNEnglish}. Does it appear that \texttt{OneCredit} courses have higher \texttt{Course Eval}, on average?

\textit{Because \texttt{OneCredit} courses may be fundamentally different, exclude them from the rest of the analysis.}

(b) Add \texttt{Age} and \texttt{Age^2} to the regression. Is there evidence that \texttt{Age} has a nonlinear effect on \texttt{Course Eval}? Is there evidence that \texttt{Age} has any effect on \texttt{Course Eval}?

(c) Modify the regression in (a) so that the effect of \texttt{Beauty} on \texttt{Course Eval} is different for men and women. Is the male-female difference in the effect of \texttt{Beauty} statistically significant?

(d) Professor Smith is a man. He has cosmetic surgery that increases his beauty index from one standard deviation below the average to one standard deviation above the average. What is his value of \texttt{Beauty} before the surgery? After the surgery? Using the regression in (c), construct a 95\% confidence for the increase in his course evaluation