Econometrics Homework 4

1.1. Download EAEF data set and regress the following model,

$$S = \beta_1 + \beta_2 ASVABC + \beta_3 SM + \beta_4 SF$$

where S is years of schooling (highest grade completed) of the respondent, $ASVABC$ is composite score (unit: points) on the cognitive tests in the Armed Services Vocational Aptitude Battery, SM and SF are years of schooling (highest grade completed) of the respondent's mother and father respectively.

1.2. Give an interpretation of the regression coefficients in exercise 1.1.

1.3. Perform t tests on the coefficients of the variables in exercise 1.1:

- The years of schooling of the respondent's mother does not affect the years of schooling of the respondent.

- Increasing 1 point of ASVABC can increase the years of schooling of the respondent by 0.2 year.

1.4. A researcher investigating the determinants of the demand for public transport in a certain city has the following data for 100 residents for the previous calendar year: expenditure on public transport, E, measured in dollars; number of days worked, W; and number of days not worked, NW. By definition NW is equal to 365-W. He attempts to fit the following model

$$E = \beta_1 + \beta_2 W + \beta_3 NW.$$

Explain why he is unable to fit this equation. (Give both intuitive and technical explanations.) How might he resolve the problem?

2. A researcher estimates the following equation $wage_i = \beta_1 + \beta_2 edu_i + \beta_3 gender_i + u_i$

and get the following result

Dependent Variable: Hourly Wage in US Dollar

Variable	Coef.	Std. Error	Prob.
C	-6.179485	2.779965	0.0285
EDU	0.978369	0.152694	0.0000
GENDER	0.434424	0.059621	0.0445

Note that gender = 1 for males and gender = 0 for females.

a) Test the following hypothesis: For a man and a woman with the same education level. The man gets more wage than the woman about 0.4 dollars. (Use 1.96 as the critical value)

b) For a woman, on average how many years of education she has to pursue in order to get a positive wage. Use the estimate to answer this question.

3. Suppose all the following assumptions are true.

A0: X is non-random

A1: $Y_i = \beta_1 + \beta_2 X_i + u_i$

A2: Some Xi's are different.

A3: $E(u_i) = X_i + 1$ (This assumption is non-standard).

A4: $Var(u_i) = \sigma_u^2$

A5: $Cov(u_i, u_j) = 0$ for $i \neq j$

A6: u_i is normally distributed.

Explain how would you estimate β_1 and β_2.