Homework 2

Exercise 1

Calculate the correlation between Y and X: 0.1435

Calculate the coefficients on this regression: intercept: 14141.2, age: 231.0

Calculate the standard errors of β

Using the standard formulas of the OLS: intercept: 645.2, age: 14.9

Using bootstrap with 49 and 499 replications respectively. Comment on the difference between the two strategies.

49: intercept: 658.1, age: 15.2

499: intercept: 658.7, age: 15.2

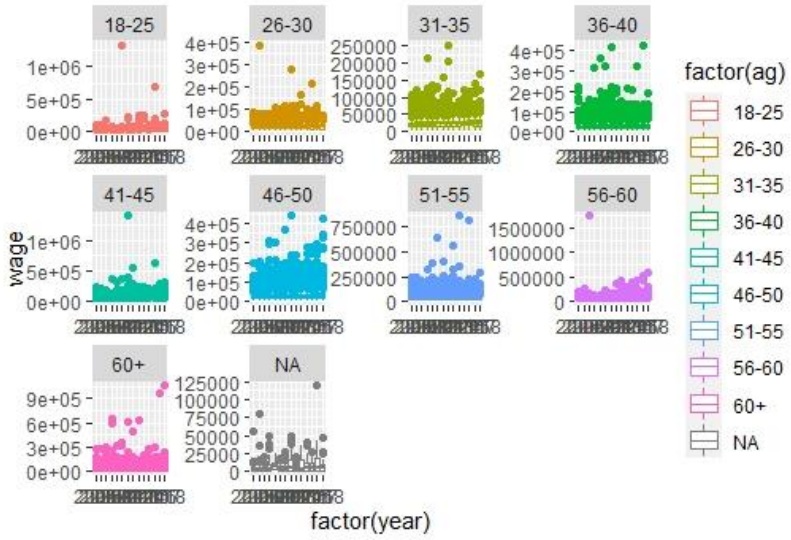
The first strategy is based on one sample, while the second strategy is based on samples of the sample.

Exercise 2

Create a categorical variable ag, which bins the age variables into the following groups: “18-25”, “26-30”, “31-35”, “36-40”,“41-45”, “46-50”,“51-55”, “56-60”, and “60+”.

Plot the wage of each age group across years. Is there a trend?

The wages have been increasing.



Consider Yit = βXit + γt + eit. After including a time fixed effect, how do the estimated coefficients change?

Intercept: 9529.1, age: 306.0

Compared to Exercise 1, the coefficient of intercept is smaller, and the coefficient of age is bigger.

Exercise 3

Exclude all individuals who are inactive.

Write a function that returns the likelihood of the probit of being employed.

Optimize the model and interpret the coefficients.
Intercept: 1.042, age: 0.007
Age has a significantly positive effect on labor market participation.
An increase in age leads to an increase in the predicted probability of being employed.

Can you estimate the same model including wages as a determinant of labor market participation? Explain.
Yes, as long as wage=0 is deleted.
Intercept: -2.681, age: 0.0045, wage: 0.00066
Age and wage both have a positive effect on labor market participation. Only wage is significant.
An increase in age/wage leads to an increase in the predicted probability of being employed.

Exercise 4
Exclude all individuals who are inactive.

Write and optimize the probit, logit, and the linear probability models.
Probit: intercept: -2.14, age: -0.00865
Logit: intercept: -5.52, age: 0.0121
LPM: intercept: 4.37, age: 0.00233

Interpret and compare the estimated coefficients. How significant are they?
Probit: An increase in age leads to a decrease in the predicted probability of being employed.
Logit: An increase in age leads to an increase in the predicted probability of being employed.
LPM: An increase of 1 in age leads to an increase of 0.00233 in the predicted probability of being employed.
The coefficient of age is negative according to probit, while positive according to logit or LPM.
All the coefficients are significant.

Exercise 5
Compute the marginal effect of the previous probit and logit models.
Probit: -0.00149
Logit: 0.0011

Construct the standard errors of the marginal effects.
Probit: 0.00019

Logit: 0.00012