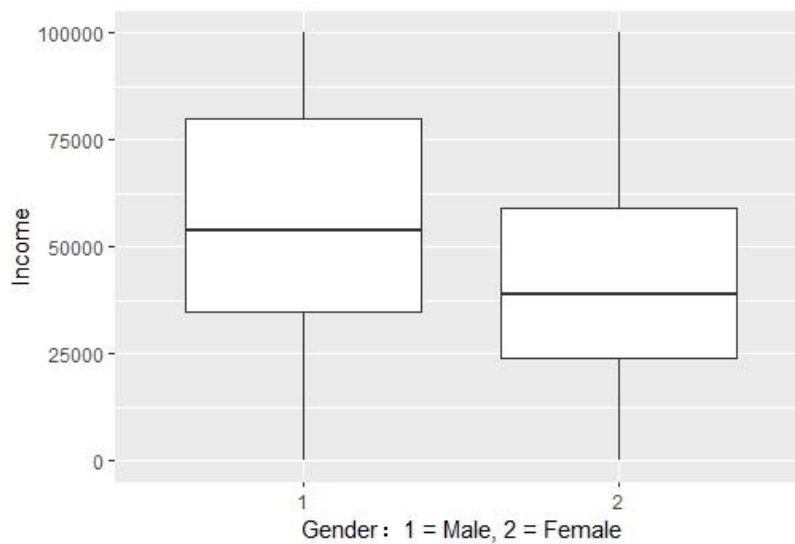
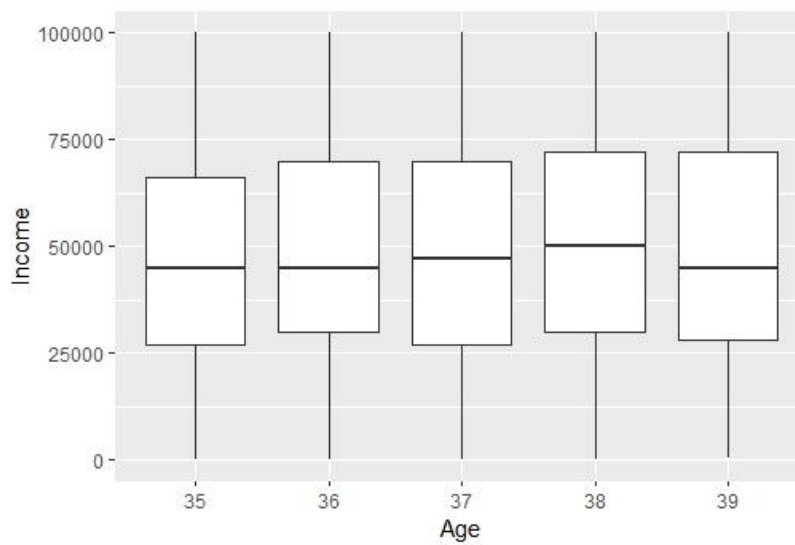


Homework 4

Exercise 1

Provide the following visualizations.

Plot the income data (where income is positive) by i) age groups, ii) gender groups and iii) number of children



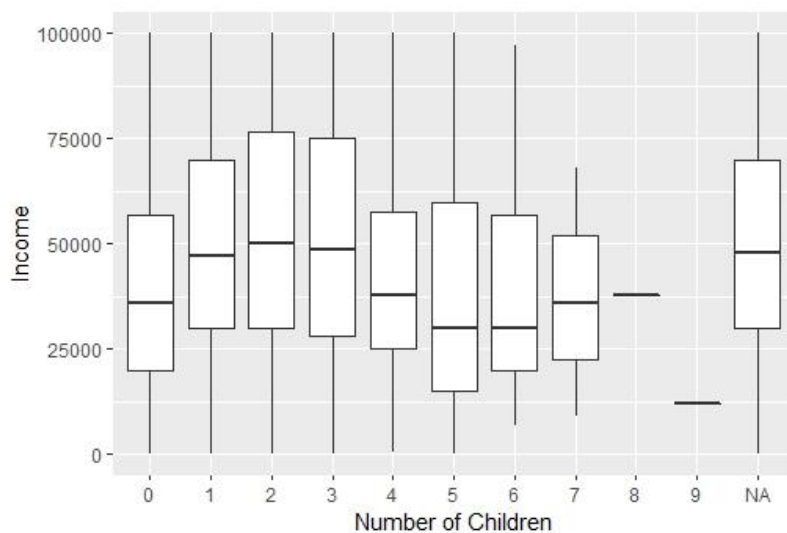


Table the share of "0" in the income data by i) age groups, ii) gender groups, iii)

number of children and marital status

	Share
35	0.009294
36	0.006301
37	0.00542
38	0.008961
39	0.002994

(Age)

	Share
Male	0.0075
Female	0.005743

(Gender)

	Share
0	0.014898
1	0.007847
2	0.005743
3	0.008026
4	0
5	0
6	0
7	0
8	0
9	0

(Number of Children)

	Share
Never-married	0.00565
Married	0.007454
Separated	0.043011
Divorced	0.001538
Widowed	0

(Marital Status)

interpret the visualizations from above

Men have higher income than women.

Those having 1-3 children have higher income.

Men are more likely to have 0 income.

Those having no child are more likely to have 0 income.

Separated people are more likely to have 0 income.

Exercise 2

Specify and estimate an OLS model to explain the income variable (where income is positive).

Interpret the estimation results

One more year of work experience leads to an increase of 1029 in predicted income.

One more year of education leads to an increase of 1980 in predicted income.

Dads' education has greater impact on income than moms' education.

Explain why there might be a selection problem when estimating an OLS this way

Only the incomes of those in the labor market are observed.

Maybe someone with 0 income was offered a low-income job and rejected it.

The missingness isn't random, which leads to sample selection bias.

Explain why the Heckman model can deal with the selection problem.

The Heckman model estimates a Probit model for missingness and calculates the

inverse Mills ratio, which is then included in the linear regression as an additional control variable to eliminate sample selection bias.

Estimate a Heckman selection model. Interpret the results from the Heckman selection model and compare the results to OLS results. Why does there exist a difference?

One more year of work experience leads to an increase of 795 in predicted income.

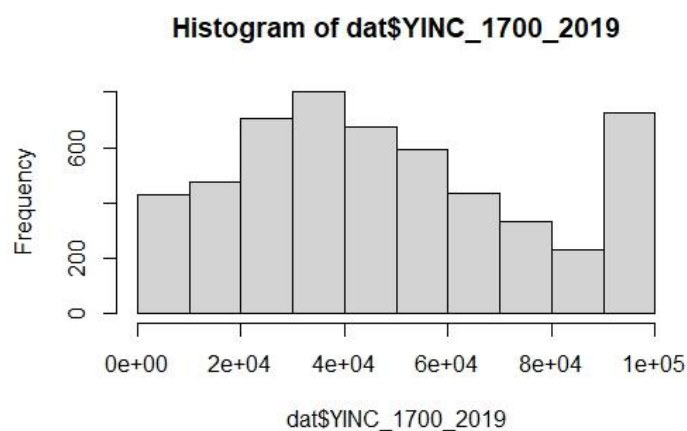
One more year of education leads to an increase of 1648 in predicted income.

The coefficients are smaller than those estimated by OLS.

OLS overestimates the coefficients due to sample selection bias (those who could have low income are missing but not taken into account).

Exercise 3

Plot a histogram to check whether the distribution of the income variable. What might be the censored value here?



The censored value is 100,000.

Propose a model to deal with the censoring problem.

The Tobit model.

Interpret the results above and compare to those when not correcting for the censored data

One more year of work experience leads to an increase of 1097 in predicted income.

One more year of education leads to an increase of 2174 in predicted income.

The coefficients are greater than those estimated by OLS.

High wages have been decreased to 100,000 in the censored data.

When censoring isn't corrected, the regression is flattened and the coefficients underestimated.

Exercise 4

Explain the potential ability bias when trying to explain to understand the determinants of wages

Those who acquire more education may just be talented, so that they could have high income even without that much education.

Likewise, talented people may be more likely to have more work experience and get married.

Interpret the results from each model and explain why different models yield different parameter estimates

Within Estimator:

One more year of work experience leads to an increase of 2296 in predicted income.

One more year of education leads to an increase of 1055 in predicted income.

Being married increases predicted income by 19825.

Being separated increases predicted income by 15896.

Being divorced increases predicted income by 20217.

Being widowed increases predicted income by 12570.

Between Estimator:

One more year of work experience leads to an increase of 2805 in predicted income.

One more year of education leads to an increase of 1067 in predicted income.

Being married increases predicted income by 6940.

First Difference Estimator:

One more year of work experience leads to an increase of 502 in predicted income.

One more year of education leads to a decrease of 71 in predicted income.

Being married increases predicted income by 979.

Being divorced increases predicted income by 2034.

The estimates are different because the within estimator ignores the individual variation and the between estimator ignores the time variation.