

BT2101 Problem-set 4: OLS with Multiple Variables

Problem 1: Use Python to solve the problem1

The CEO learns that salary depends on two important factors: profits and age through market research. Structure the multiple linear regression model to measure the associations of profits and salary and age and salary. Can we say that there is a positive relationship between profit and salary? If so, why? Can we say that the impact of is a positive relation between age and salary? If so, why? (Note. Because of data collection limitation, do not consider the CLT here)



Problem 2: Use Python to solve the problem2

While a group of researchers argues that tenure does not have an association with wages, we are interested in showing an association between tenure and wages. From the previous market search, level of education and experience are associated with wage. Structure the hypotheses to show the positive association between tenure on wages. To test this hypothesis, structure the regression model. Then, using the regression model results, make an argument with statistical evidence to persuade a group of researchers who argue that tenure does have an association with wages (Notes. For data, use `woe.dataWoo(wage1)` from Woodridge package).

Problem 3: Use Python to solve the problem3

A group of media implies that the GPA of MBA students is determined by prior salary, number of study hours, and number of activities they are involved in research projects. Using the data Univ, make a statistical and logical decision to the following arguments.

- (1) Prior salary, number of study hours, and number of activities are linearly related to GPA. Use visual aid for your argument.
- (2) Average hour spending relates to GPA score even after controlling other factors chosen in the first question. Structure the hypothesis and use statistical evidence for your argument.
- (3) The number of activities relates with the GPA score even after controlling other factors chosen in the first question. Structure the hypothesis and use statistical evidence for your argument.
- (4) Can we say that prior salary, number of study hours, and number of activities have good explainability for predicting the GPA of MBA students?