

TSP Exercise Session - Problem Set 11

Heteroskedasticity

Problem 1 Which of the following are consequences of heteroskedasticity?

- (i) The OLS estimators are biased.
- (ii) The usual t and F statistics have no longer t and F distributions.
- (iii) The OLS estimators are no longer BLUE.

Problem 2 If the variance of the disturbance is proportional to x_1 we should run a regression with all data divided by x_1 . True or false?

Problem 3 Suppose

$$y = \beta_1 x_1 + u, \tag{1}$$

where the assumptions of the classical linear model hold except that the variance of the error term u is a constant σ^2 times x_1^2 . Then the BLUE is the average of the y values divided by the average of the x_1 values. True or false?

Problem 4. The Munich Rent Index

Please create a new folder for this exercise session with your name in directory T:. Then go to L:\Intermediate Econometrics\PC4 and copy the files into your folder.

The data set in “hpm.dat” contains information on housing prices in Munich from the Munich Rent Index. We will analyze how the net rent depends on the following variables:

<i>nm</i>	net rent in EUROS
<i>wfl</i>	living space in m^2
<i>badextra</i>	specialy equipped bathroom (1=yes, 0=no)
<i>zh</i>	central heating available (1=yes, 0=no)

(a) Estimate the following model:

$$nm = \beta_0 + \beta_1 \cdot zh + \beta_2 \cdot wfl + \beta_3 \cdot wfl^2 + \beta_4 \cdot badextra + \beta_5 \cdot wfl \cdot bad + u$$

How does the net rent depend on the living space and on the existence of a specially equipped bathroom? Are those effects statistically significant?

- (b) Create a plot placing living space in m^2 on the x-axis and the residuals from the estimation in subquestion (a) on the y-axis. How do you interpret the plot?
- (c) Can you detect further indication of the above-mentioned problem in the TSP output of your estimation? If there existed such a problem, would your results from subquestion (a) still be valid? Which solutions could you think of?
- (d) Repeat the estimation from subquestion (a) for the **logarithmic** net rent. How does the interpretation of the estimated coefficients change? What about the above-mentioned problem?