ECONOMETRICS

Exercises 5:

1. (Wooldridge 3rd ed: 8.4) Consider a linear model to explain monthly beer consumption:

beer =
$$\beta_0 + \beta_1$$
inc + β_2 price + β_3 educ + β_4 female + u

with

 $\mathbb{E}[u|\texttt{inc},\texttt{price},\texttt{educ},\texttt{female}] = 0$

and

 $\operatorname{Var}[u|\operatorname{inc},\operatorname{price},\operatorname{educ},\operatorname{female}] = \sigma^2 \operatorname{inc}^2.$

Write the transformed equation that has a homoscedastic error term.

- 2. (Wooldridge 3rd ed: C8.4) Use the data set vote1 of exercise sheet 2.
 - a) Estimate a model with $vote_A$ as the dependend variable and $prtystr_A$, $democ_A$, $log(expend_A)$, and $log(expend_B)$ as explanatory variables. Obtain the OLS residuals, \hat{u}_i , and regress these on all explanatory variables. Explain why $R^2 = 0$.
 - b) Compute Breuch-Pagan test for heteroscedasticity. Use F statistic and report the p-value. Is there evidence for heteroscedasticity?
 - c) Compute White's test for heteroscedasticity by regressing \hat{u}_i^2 upon the predicted values of vote_A and vote_A^2 . Again using the Fstatistic, how strong is the evidence for heteroscedasticity?
- 3. Use the data set ceosal2 for this exercise. Suppose there are two competing models to explain CEO salary

$$\begin{split} \log(\texttt{salary}) &= & \beta_0 + \beta_1\texttt{sales} + \beta_2\texttt{mktval} \\ &+ \beta_3\texttt{ceoten} + \beta_4\texttt{comten} + u, \end{split}$$

and

$$\begin{split} \log(\texttt{salary}) &= \beta_0 + \beta_1 \log(\texttt{sales}) + \beta_2 \log(\texttt{mktval}) \\ + \beta_3 \texttt{ceoten} + \beta_4 \texttt{comten} + u, \end{split}$$

- a) Estimate the models. Discuss the estimation results.
- b) Construct a comprehensive model and test which one of the models is preferrable.
- c) Use Davidson-MacKinnon test to decide between the alternatives. Is the conclusion the same as in b)?
- d) For the chosen model use RESET test to check the adequacy of the functional form.