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The purpose of this session is to introduce you to the heteroscedastic error term and different tests for heteroscedasticity.

Heteroscedasticity

Use the Wooldridge dataset `hprice1` to obtain the usual OLS and heteroskedastic-robust standard errors for the following model of house prices,

$$price = \beta_0 + \beta_1\, lotsize + \beta_2\, sqtft + \beta_3\, bdrms + u \tag{1}$$

a) Discuss any important differences between the usual OLS and heteroskedastic-robust standard errors.

b) Repeat part (a) for the following model,

$$\log(price) = \beta_0 + \beta_1 \log(lotsize) + \beta_2 \log(sqtft) + \beta_3\, bdrms + u \tag{2}$$

c) What does this example suggest about the heteroskedasticity present in model (1) and the transformation used for the dependent variable.

d) Consider model (1). Conduct a Breusch-Pagan test, a White test, and the special case of the White test using both the LM and F forms of the appropriate test statistics. Complete the following table,

Test	Observed test statistic		Critical value for 5% test		p-value		Reject(Y/N)	
	F	LM	F	LM	F	LM	F	LM
BP								
White								
White (Special)								

Hint: Generate and save the residuals using the `resid` commands. Also generate new variables for the squared values and interaction terms, then run the required regressions to obtain the necessary test statistics. The following command, `qchisq(x,df)` will provide the p-value for the χ^2 distribution with df degrees of freedom and an observed test statistic of x.