File: Ch08, Chapter 8, Heteroskedasticity

Multiple Choice

1. Heteroskedasticity is a violation of which assumption of the MR model?
a.) The values of each x_{ik} are not random and are not exact linear functions of the other explanatory variables
b.) $\text{var}(y_i) = \text{var}(e_i) = \sigma^2$
c.) $E(y_i) = \beta_1 + \beta_2 x_{i2} + \beta_3 x_{i3} + \ldots\ldots + \beta_k x_{ik}, \iff E(e_i) = 0$
d.) $\text{cov}(y_i, y_j) = \text{cov}(e_i, e_j) = 0; \quad (i \neq j)$

2. What are the consequences of using least squares when heteroskedasticity is present?
a.) no consequences, coefficient estimates are still unbiased
b.) confidence intervals and hypothesis testing are inaccurate due to incorrect standard errors
c.) all coefficient estimates are biased for variables correlated with the error term
d.) it requires very large sample sizes to get efficient estimates

3. If heteroskedasticity is suspected, all of the following could be used to test for it EXCEPT
a.) Lagrange Multiplier test
b.) Jarque-Bera test
c.) Breusch-Pagan test
d.) White test

4. The LM (Lagrange Multiplier) test generates a test statistic $N \times R^2 \sim \chi^2_{(S-1)}$. Where is the R^2 in the test statistic measured?
a.) the original econometric model when estimated using the White correction technique
b.) the average from all the auxiliary regressions estimated with each explanatory variable as a function of the other explanatory variables
c.) the original econometric model before any test of heteroskedasticity has been performed
d.) the auxiliary regression of residuals as a function of the explanatory variables generating the heteroskedasticity

5. The LM (Lagrange Multiplier) test generates a test statistic $N \times R^2 \sim \chi^2_{(S-1)}$. To what does the S in this distribution refer?
a.) the number of explanatory variables in the auxiliary regression
b.) the number of explanatory variables in the initial model
c.) N-K—the degrees of freedom in econometric model of interest
d.) the statistical significance level chosen for the LM test

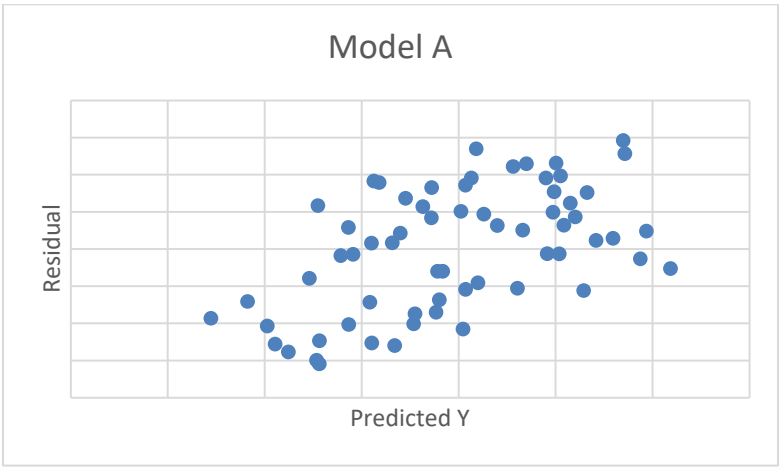
6. If you run a LM test for heteroskedasiticity and reject the null hypothesis, what should you conclude?
a.) at least one coefficients in the auxiliary regression is significantly different from zero, the assumption $\text{var}(y_i) = \text{var}(e_i) = \sigma^2$ is unlikely to be true
b.) there is no evidence of heteroskedasticity, the assumption $\text{var}(y_i) = \text{var}(e_i) = \sigma^2$ is most likely true
c.) there is heteroskedasticity present and it is correctly specified as tested
d.) there is heteroskedasticity, but it is not linear in the explanatory variables

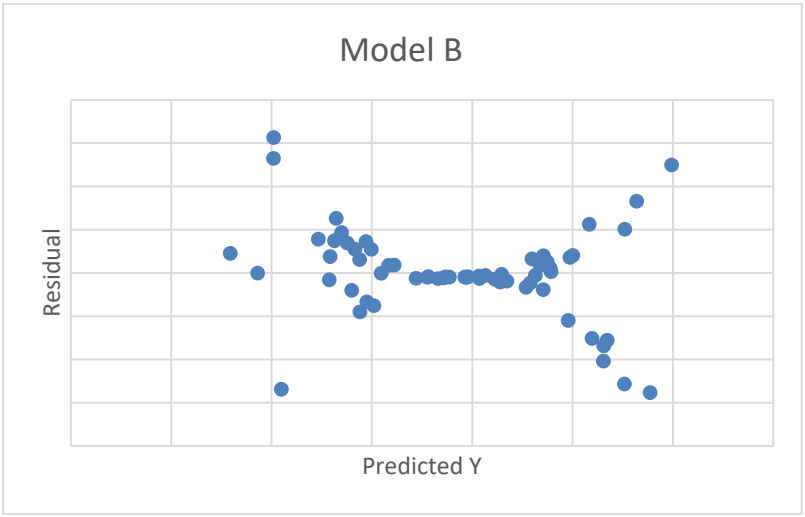
7. If you model has heteroskedastic error terms, but you do not know the functional form of the variance equation, what should be done?
a.) use White's Robust Estimator
b.) use weighted least squares
c.) try different functional forms for the variance until the Lagrange Multiplier falls 10%
d.) add observations to the dataset and estimate again

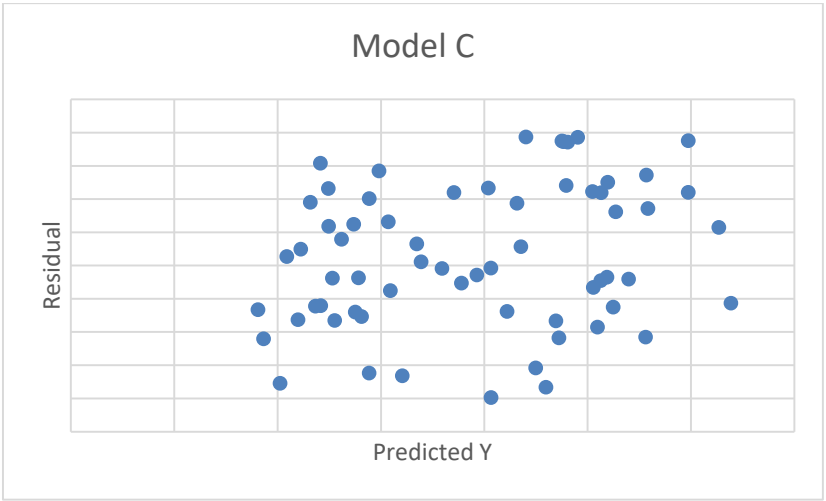
8. How should you estimate a model with heteroskedasticity when you are confident the error variance is a function of one continuous variable?
a.) WLS or GLS
b.) White Robust
c.) FGLS
d.) Quasi-Least Squares

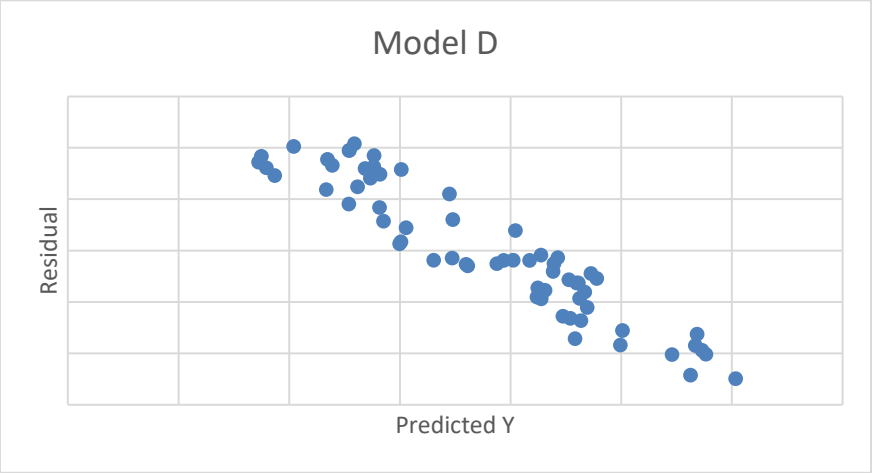
9. When using WLS to correct for heteroskedasticity, what weight should be used?
a.) whatever weight scales all variables and creates a homoskedastic error variance
b.) the inverse of the error variance at $\bar{x}$
c.) whatever weight is determined by the Goldfeld-Quandt test
d.) the residuals from the initial regression model

10. What is the tradeoff researchers face when deciding how to deal with heteroskedasticity?
a.) Goldfeld-Quandt overstates heteroskedasticity but LM leads to more Type I errors
b.) White's robust estimator should be used for hypothesis testing, but GLS is better for interval estimation
c.) GLS gives minimum variance, but results are more difficult to interpret
d.) White's robust estimator requires no assumptions about the structure of the variance, but it is not as efficient as GLS estimates when the right structure is imposed on the variance


Model A
Residual
Predicted Y


Model B
Residual
Predicted Y


Model C
Residual
Predicted Y



11. (See graphs of Model A – D) The scatterplots show the estimated residuals plotted against predicted values of the dependent variable. Which model is LEAST likely to have violated the assumption var(y_i) = var(e_i) = σ^2?
a.) Model A
b.) Model B
c.) Model C
d.) Model D

12. (See graphs of Model A – D) The scatterplots show the estimated residuals plotted against predicted values of the dependent variable. Which model is MOST likely to have violated the assumption var(y_i) = var(e_i) = σ^2?
a.) Model A
b.) Model B
c.) Model C
d.) Model D

13. (See graphs of Model A – D) The scatterplots show the estimated residuals plotted against predicted values of the dependent variable. In which model is WLS LEAST likely to be an effective solution for the heteroskedasticity?
a.) Model A
b.) Model B
c.) Model C
d.) Model D