
Question:	1	2	3	4	Total
Points:	4	4	4	38	50

Justify all your answers (except for multiple choice questions). You are required to show your work on each problem (except for multiple choice questions) and to include the output of EVIEWS used to solve the empirical questions. **Organize your work.** Work scattered all over the page will receive very little credit. A correct answer in a multiple choice question worths 4 points; an incorrect one worths -1 point. **Delivery date: 30th of November.**

- (4) 1. Suppose the model $y = \beta_0 + \beta_1 x_1 + u$ where $Var(u|x_1 = \sigma^2 x_1^2)$ and $E(u|x_1) = 0$. Suppose also the models:

$$y/x_1 = \alpha_0 \times 1/x_1 + \alpha_1 + u/x_1$$

$$y/x_1^2 = \gamma_0 \times 1/x_1^2 + \gamma_1 + u/x_1^2$$

Which of the following statements is **TRUE**?

- The OLS estimator of β_0 and β_1 is BLUE.
 - The OLS estimator of α_0 and α_1 is BLUE.
 - The OLS estimator of γ_0 and γ_1 is BLUE.
 - None of the above.
- (4) 2. Suppose the model $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + u$. Consider that \hat{u} and \hat{y} are the residuals and the fitted values for y obtained from estimating that model by OLS, respectively. Then the equation,
- $u^2 = \gamma_0 + \gamma_1 x_1 + \gamma_2 x_2 + v$ is used to perform the test of Breusch - Pagan.
 - $\hat{u} = \gamma_0 + \gamma_1 x_1 + \gamma_2 x_2 + v$ is used to test for heteroscedasticity.
 - $u^2 = \gamma_0 + \gamma_1 \hat{y} + \gamma_2 \hat{y}^2 + v$ is used to perform the RESET test.
 - $\hat{u}^2 = \gamma_0 + \gamma_1 x_1 + \gamma_2 x_1^2 + \gamma_3 x_1 x_2 + \gamma_4 x_2 + \gamma_5 x_2^2 + v$ is used to perform the test of White.

- (4) 3. Choose the option that is FALSE. Suppose Assumptions MLR.1 to MLR.4 are valid. Then, the estimator of White for the standard errors in a multiple linear regression model,
- gives valid estimates with homoscedasticity and heteroscedasticity.
 - should be used when there is evidence of heteroscedasticity.
 - gives valid estimates only for heteroscedasticity of the White type.
 - used in the t-statistic gives a statistic that is approximately normally distributed.

4. Use the data set mroz.WF1 to explain the numbers of hours a woman has worked in a given year.

Estimate the following regression by OLS:

$$hours_i = \beta_0 + \beta_1 educ_i + \beta_2 age_i + \beta_3 \log(faminc_i) + \beta_4 kidslt6 + u_i$$

where:

- **hours** is the number of hours worked;
- **educ** is number of years in schooling;
- **age** is the woman's age in years;
- **faminc** is the family income;
- **kidslt6** is the number of kids with age less than 6 in the woman's household.

- (5) (a) Write the estimated equation with the corresponding standard errors.
- (5) (b) Interpret the estimated coefficient $\hat{\beta}_3$ and discuss the signs of all the coefficient estimates.
- (5) (c) Test for heteroscedasticity using the Breusch-Pagan test and conclude.
- (5) (d) Test for heteroscedasticity using the White test and conclude.
- (6) (e) Test for heteroscedasticity using the Simplified White test and conclude.
- (5) (f) Estimate the model using the White estimator for the standard errors.
- (7) (g) Given the results you obtained discuss the properties of the estimations in (a) and in (f).