

Problem Set 1

a) Multiple choice questions

1. If the total sum of squares (SST) in a regression equation is 81, and the residual sum of squares (SSR) is 25, what is the explained sum of squares (SSE)?
 - a. 64
 - b. 56**
 - c. 32
 - d. 18

2. If the residual sum of squares (SSR) in a regression analysis is 66 and the total sum of squares (SST) is equal to 90, what is the value of the R-squared?
 - a. 0.73
 - b. 0.55
 - c. 0.27**
 - d. 1.2

3. The significance level of a test is:
 - a. the probability of rejecting the null hypothesis when it is false.
 - b. one minus the probability of rejecting the null hypothesis when it is false.
 - c. the probability of rejecting the null hypothesis when it is true.**
 - d. one minus the probability of rejecting the null hypothesis when it is true.

4. Which of the following is true of heteroskedasticity?
 - a. Heteroskedasticity causes inconsistency in the Ordinary Least Squares estimators.
 - b. Population R^2 is affected by the presence of heteroskedasticity.
 - c. The Ordinary Least Square estimators are not the best linear unbiased estimators if heteroskedasticity is present.**
 - d. It is not possible to obtain F statistics that are robust to heteroskedasticity of an unknown form.

5. Which of the following tests helps in the detection of heteroskedasticity?
 - a. The Breusch-Pagan test**
 - b. The Breusch-Godfrey test
 - c. The Durbin-Watson test
 - d. The Chow test

6. The OLS residuals in the multiple regression model

- a. cannot be calculated because there is more than one explanatory variable.
- b. can be calculated by subtracting the fitted values from the actual values.**
- c. are zero because the predicted values are another name for forecasted values.
- d. are typically the same as the population regression function errors.

7. To decide whether the slope coefficient is large or small,

- a. you should analyze the economic importance of a given increase in X.**
- b. the slope coefficient must be larger than one.
- c. the slope coefficient must be statistically significant.
- d. you should change the scale of the X variable if the coefficient appears to be too small.

8. An estimator $\hat{\mu}_Y$ of the population value μ_Y is more efficient when compared to another estimator $\bar{\mu}_Y$, if:

- a. $E(\hat{\mu}_Y) > E(\bar{\mu}_Y)$.
- b. it has a smaller variance.
- c. its c.d.f. is flatter than that of the other estimator.
- d. both estimators are unbiased, and $\text{var}(\hat{\mu}_Y) < \text{var}(\bar{\mu}_Y)$.**

9. Which of the following is true of the OLS t statistics?

- a. The heteroskedasticity-robust t statistics are justified only if the sample size is large.**
- b. The heteroskedasticity-robust t statistics are justified only if the sample size is small.
- c. The usual t statistics do not have exact t distributions if the sample size is large.
- d. In the presence of homoskedasticity, the usual t statistics do not have exact t distributions if the sample size is small.

10. In the following equation, gdp refers to gross domestic product, and FDI refers to foreign direct investment.

$$\log(\text{gdp}) = 2.65 + 0.527\log(\text{bankcredit}) + 0.222\text{FDI}$$

(0.13) (0.022) (0.017)

Which of the following statements is then true?

- a. If gdp increases by 1%, bank credit increases by 0.527%, the level of FDI remaining constant.
- b. If bank credit increases by 1%, gdp increases by 0.527%, the level of FDI remaining constant.**
- c. If gdp increases by 1%, bank credit increases by $\log(0.527)\%$, the level of FDI remaining constant.

- d. If bank credit increases by 1%, gdp increases by $\log(0.527)\%$, the level of FDI remaining constant.
11. Which of the following statements is true when the dependent variable, $y > 0$?
- a. Taking log of a variable often expands its range.
 - b. Models using $\log(y)$ as the dependent variable will satisfy CLM assumptions more closely than models using the level of y .**
 - c. Taking log of variables make OLS estimates more sensitive to extreme values.
 - d. Taking logarithmic form of variables make the slope coefficients more responsive to rescaling.
12. Which of the following correctly identifies a limitation of logarithmic transformation of variables?
- a. Taking log of variables make OLS estimates more sensitive to extreme values in comparison to variables taken in level.
 - b. Logarithmic transformations cannot be used if a variable takes on zero or negative values.
 - c. Logarithmic transformations of variables are likely to lead to heteroskedasticity.**
 - d. Taking log of a variable often expands its range which can cause inefficient estimates.
13. Which of the following models is used quite often to capture decreasing or increasing marginal effects of a variable?
- a. Models with logarithmic functions
 - b. Models with quadratic functions**
 - c. Models with variables in level
 - d. Models with interaction terms
14. The following simple model is used to determine the annual savings of an individual on the basis of his annual income and education.
- $Savings = \theta_0 + \theta_1 Edu + \theta_2 Inc + u$**
- The variable 'Edu' takes a value of 1 if the person is educated and the variable 'Inc' measures the income of the individual.
- If $\theta_1 > 0$, _____.
- a. uneducated people have higher savings than those who are educated
 - b. educated people have higher savings than those who are not educated**
 - c. individuals with lower income have higher savings
 - d. individual with lower income have higher savings

15. The income of an individual in Brno depends on her ethnicity and several other factors which can be measured quantitatively. If there are 5 ethnic groups in Brno, how many dummy variables should be included in the regression equation for income determination in Brno?

- a. 1
- b. 5
- c. 6
- d. 4**