**Addis Ababa University**

**School of Commerce**

**Department of Economics**

**Introduction to Econometrics (Assignment)**

***Review Questions***

1. Econometrics deals with the measurement of economic relationships which are stochastic or random. The simplest form of economic relationships between two variables X and Y can be represented by:

 ; where are regression parameters and  the stochastic disturbance term

What are the reasons for the insertion of U-term in the model?

1. The following data refers to the demand for money (M) and the rate of interest (R) in for eight different economics:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| M (In billions) | 56 | 50 | 46 | 30 | 20 | 35 | 37 | 61 |
| R% | 6.3 | 4.6 | 5.1 | 7.3 | 8.9 | 5.3 | 6.7 | 3.5 |

1. Assuming a relationship , obtain the OLS estimators of 
2. Calculate the coefficient of determination for the data and interpret its value
3. If in a 9th economy the rate of interest is R=8.1, predict the demand for money(M) in this economy.
4. The following data refers to the price of a good ‘P’ and the quantity of the good supplied, ‘S’.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| P | 2 | 7 | 5 | 1 | 4 | 8 | 2 | 8 |
| S | 15 | 41 | 32 | 9 | 28 | 43 | 17 | 40 |

1. Estimate the linear regression line 
2. Estimate the standard errors of 
3. Test the hypothesis that price influences supply
4. Obtain a 95% confidence interval for 
5. The following table gives data on quantity supplied and prices of a certain commodities for ten years.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Price | 2 | 3 | 6 | 9 | 10 | 12 | 16 | 19 | 22 | 24 |
| Quantity Supplied | 10 | 14 | 16 | 19 | 24 | 30 | 32 | 38 | 43 | 50 |

* + 1. Plot the data in scatter diagram
    2. Assume that quantity supplied is linearly related to the price of commodity as

. Estimate the model.

* + 1. Interpret the estimated value of the regression coefficients obtained in (b).
    2. Compute the correlation coefficient ( and coefficient of determination ()
    3. Interpret the result obtained in d.

1. Consider the classical regression model .The higher the value of , the larger is the variance of OLS estimates of and .True or False. Explain briefly?
2. The following results have been obtained from a simple of 11 observations on the values of sales (Y) of a firm and the corresponding prices (X).



* 1. Estimate the regression line of sale on price and interpret the results
  2. What is the part of the variation in sales which is not explained by the regression line?
  3. Estimate the price elasticity of sales.

1. Consider the OLS regression

(3.2) (0.39) n=10.

Where is the predicted consumption and is income.

1. Construct a 95% confidence interval for the intercept
2. Construct a 95% confidence interval for the slope.
3. Test the hypothesis that the true value of the slope is 1.5
4. Test the hypothesis that the true value of the slope is 1.0
5. The following table includes the GNP(X) and the demand for food (Y) for a country over ten years period.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| year | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
| Y | 6 | 7 | 8 | 10 | 8 | 9 | 10 | 9 | 11 | 10 |
| X | 50 | 52 | 55 | 59 | 57 | 58 | 62 | 65 | 68 | 70 |

1. Estimate the food function
2. Compute the coefficient of determination and find the explained and unexplained variation in the food expenditure.
3. Compute the standard error of the regression coefficients and conduct test of significance at the 5% level of significance.
4. Given the following regression result of  as

(31.327) ( )

( ) 16.616

n=10.

* + 1. Fill the missing number
    2. Would you reject that

1. A sample of 20 observations corresponding to the regression model  gave the following data.



a. Estimate 

b. Calculate the variance of the estimates

c. Estimate the conditional mean of Y corresponding to a value of X fixed at X=10.

1. Suppose that a researcher estimates a consumptions function and obtains the following results:



where C=Consumption, Yd=disposable income, and numbers in the parenthesis are the ‘t-ratios’

1. Test the significant of Yd statistically using t-ratios
2. Determine the estimated standard deviations of the parameter estimates
3. State and prove Guass-Markov theorem
4. Given the model:

 with usual OLS assumptions. Derive the expression for the error variance.

1. Given the following estimated regression line

(0.122) (0.114)

1. Establish a 95% confidence interval for (for intercept)
2. Establish a 95% confidence interval for (for slope)
3. Test the hypothesis against the alternative hypothesis

, using confidence interval approach.

1. Test the hypothesis against the alternative hypothesis

, test statistic.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Group Assignment | | | | | | | |
| Group 1 | Group 2 | Group 3 | Group 4 | Group 5 | Group 6 | Group 7 |
| 1,9 | 2,11 | 3,10 | 4,12 | 5,8 | 6,14 | 7,13 |