**Məmmədrzayev Vüsal\_Ekonometrika**

 **Final Exam Questions (Student Version)**

1. Discuss the structure of Economic data: Cross Sectional Data, Time Series Data and Panel or Longitudinal Data
2. Provide one example for each structure of Data that is used in Econometric Analysis. Discuss the problems that are associated with Time Series Data.
3. We have simple linear regression Model, which estimate the effect of training on Wage level as following:

 $wage=β\_{0}+ β\_{1}training+u$

Explain the factors that can be included in u. Why do we assume that expectation of error term is 0? Is it strong assumption? Explain the coefficients of above Model. Do you expect correlation between training and u? Why and why not?

1. Simple Linear Regression Model which estimate the effect of fertilizers on production level of crop is given as following:

 $wage=β\_{0}+ β\_{1}fertilizer+u$

Explain the factors that can be included in u. Why do we assume that expectation of error term is 0? Is it strong assumption? Explain the coefficients of above Model. Do you expect correlation between fertilizer and u? Why and why not?

1. **Problem Solving: Construction of fitted value and residual graph.**
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3. Discuss total sum of squares (SST), Explained sum of squares (SSE) and Residual sum of squares (SSR).
4. Discuss the 3 Assumptions that we made for Simple Linear Regression. Discuss the potential problems related to these assumptions.
5. Drive $β\_{0}^{} and β\_{1}$ coefficients by applying OLS method.
6. **Problem Solving: Simple Linear Regression.**
7. **Problem Solving: Interpretation of regression coefficients.**
8. List and explain the Gauss-Markov Assumptions for Simple Regression. Explain the importance of these Assumptions. What is unbiased estimators?
9. Let`s kids denote the number of children ever born to a woman and let *educ* denote years of education for the woman. A simple model relating fertility to years of education is

 $kids=β\_{0 }+β\_{1}educ+u$

1. What kinds of factors are contained in u? Are these likely to be correlated with level of education?
2. Will a simple regression analysis uncover the ceteris paribus effect of education on fertility? Explain

14. **Problem Solving: Calculation of regression coefficients.**

**15. Problem Solving: Calculation of regression coefficients.**

**16. Problem Solving: Calculation of regression coefficients.**

**17. Problem Solving: Construction of confidence interval**

**18. Problem Solving: Calculation of regression coefficients.**

**19. Problem Solving: Calculation of regression coefficients.**

**20. Problem Solving: Calculation of Hypothesis.**

**21. Problem Solving: Calculation of Hypothesis.**

**22. Problem Solving: Calculation of Hypothesis.**

**23. Problem Solving: Calculation of Hypothesis.**

**24. Problem Solving: Calculation of Hypothesis.**

**25. Problem Solving: Calculation of Hypothesis.**

26. **Problem Solving: STATA Regression output.**

27. Discuss the main Assumptions for unbiased OLS estimators.

28. **Problem Solving: STATA Regression output.**

29. **Problem Solving: STATA Regression output.**

30. **Problem Solving: Regression equation.**

31. **Problem Solving: Regression equation.**

32. Discuss the F statistic test. Why and how do we use it. Provide detailed explanation.

33. **Problem Solving: Joint significance test**

34. **Problem Solving: Joint Significance test**

35. **Problem Solving: Multicollinearity**

36. What is omitted variable bias? What problems do they create for unbiasedness of OLS estimators?

37. Explain the test that we use to check the significance of each estimators in multiple linear regression. Furthermore, discuss the test that we use for checking joint significance. Explain your answer.

38. Discuss the homoscedasticity and normally distributed residuals assumptions in multiple regression context. Why do they important? Discuss the importance of perfect collinearity assumption.

39. **Problem Solving: STATA Regression output.**

40. Discuss R2 the coefficient of determination. Discuss the adjusted R2.

41. **Problem Solving: STATA Regression output.**

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46. **Problem Solving: STATA Regression output.**

47. **Problem Solving: STATA Regression output.**

48. Discuss omitted variable bias and its consequences on regression coefficient. In which situation, we do not have omitted variable bias. Explain each of them.

49. **Problem Solving: Multicollinearity.**

50. **Problem Solving: Multicollinearity.**

51. What is dummy variable trap? What are the consequences of that problem?

52. **Problem Solving: Some questions related to Regression output.**

53. **Problem Solving: STATA Regression output.**

54. What is linear probability model? Why do we use it? Provide on example about that model.

55. **Problem Solving: Linear Probability model.**

56. Discuss the possible drawbacks of linear probability model.

57. **Problem Solving: STATA Regression output.**

58. Explain the ways to find the effect of interaction terms and quadratic terms in the regression. Moreover, explain the importance of using interaction and quadratic term.

59. **Problem Solving: STATA Regression output with quadratic term on it.**

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63. Suppose that you would like to estimate whether elite high schools add more value to their students than other high schools. Your data contains a test score on student competence measured at the end of high school, gender, parental education, and whether the student graduated from an elite high school.

(a) Write down a regression model that may enable you to estimate the effect of elite schools on student´s achievement.

(b) State the assumptions under which OLS consistently estimates the effect in this regression. Do you think they are satisfied in this case?

(c) Could you use elementary school grade point average as a proxy variable for unobservable? Would its inclusion lead to consistent estimation of the effect?

**64. Problem Solving: STATA Regression output.**

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**67.** **Problem Solving: Analysis or Regression output.**

**68**. **Problem Solving: STATA Regression output.**

**69**. What is the purpose for the use of beta coefficients? How can we derive these coefficients? What is the main advantage of it compared to simple regression coefficients?

**70**. Discuss the main advantages and disadvantages of using logarithmic functional form.

**71**. **Problem Solving: STATA Regression output.**

**72. Problem Solving: Beta Coefficients.**

73. Discuss the heteroscedasticity assumption and its possible consequences on estimated coefficient.

74. **Problem Solving: STATA Regression output.**

75. Discuss Heteroscedasticity problem and its possible consequences. How can we solve that problem?