

Instructions: This quiz is to be completed entirely in class. You may not use cell phones, and you may only access internet resources you are specifically directed to use. Go to Blackboard and open the data file posted under Quiz #3. Use it to answer the following questions. **Place your answers to the bolded questions directly on this page.** You must submit the Excel file you used to perform calculations into the Quiz #3 folder in Blackboard, and submit the paper version of the quiz to the instructor to be eligible to receive full credit.

1. The data on sheet #1 represents working status of a sample of women and the number of children they have at home. Conduct a χ^2 -test to determine if working status and number of children are dependent. **State the null and alternative hypotheses, test statistic and P-value. State the conclusion of the test.**

H_0 : The variables job status & # of children are independent
 H_a : The variables are dependent
 $\chi^2 = 89.46$
 p-value: $1.717 \times 10^{-18} \ll 0.05$

reject null:
 the variables are dependent

2. The data on sheet #2 represents data various economic factors. We want to use a subset of the remaining variables to predict Interest Rates on US Treasury Bonds (Interest). Construct a table of correlations and chose the two variables that have the strongest correlation to Interest and build a multiple regression model from those variables. **Write your regression equation, R^2 value, and the meaning of each variable used. State the overall hypothesis test for your model.**

$$Y = 2.26 + 0.28X_1 + 1.348X_2 \quad 0.96 = R^2$$

Crude
purchase

H_0 : all $\beta_i = 0$ $F = 108.8$
 H_a : at least one $\beta_i \neq 0$ p-value = $4.97 \times 10^{-7} \ll 0.05$,
 reject null. There is predictive value in model; not all coeffs are 0.

3. Using the same data, conduct a hypothesis test on each coefficient in the model. State the null and alternative hypotheses. Should both variables and the intercept be retained or not? **State the test statistic and p-value for each variable and your conclusion. Are any of your variables nonlinear? Explain your reasoning.**

$H_0: \beta_0 = 0$
 $H_a: \beta_0 \neq 0$
 $t = 2.005$
 p-value = 0.076
 fail to reject at 0.05

$H_0: \beta_1 = 0$
 $H_a: \beta_1 \neq 0$
 $t = 12.79$
 p-value = 4.47×10^{-7}
 reject null

$H_0: \beta_2 = 0$
 $H_a: \beta_2 \neq 0$
 $t = 2.16$
 p-value = 0.059
 fail to reject at 0.05

based on residual graphs, they do not appear nonlinear

Submit your completed Excel file to Blackboard, and submit your paper quiz to your instructor in class.

however the scatterplots suggest purchase is nonlinear.