paper and pencil question

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1. Which of the following can cause the usual OLS *t* statistics to be invalid (that is, not to have *t* distributions under H_0)?

   i. Heteroskedasticity.

   ii. A sample correlation coefficient of .95 between two independent variables that are in the model.

   iii. Omitting an important explanatory variable.

2. Consider an equation to explain salaries of CEOs in terms of annual firm sales, return on equity (*roe*, in percentage form), and return on the firm's stock (*ros*, in percentage form):

$$\log(salary) = \beta_0 + \beta_1 \log(sales) + \beta_2 roe + \beta_3 ros + u.$$

   i. In terms of the model parameters, state the null hypothesis that, after controlling for *sales* and *roe*, *ros* has no effect on CEO salary. State the alternative that better stock market performance increases a CEO's salary.

   ii. Using the data in CEOSAL1, the following equation was obtained by OLS:

$$\widehat{\log(salary)} = 4.32 + .280 \log(sales) + .0174\, roe + .00024\, ros$$
$$(.32)\ \ (.035)\qquad\qquad (.0041)\qquad (.00054)$$
$$n = 209,\ R^2 = .283.$$

   By what percentage is *salary* predicted to increase if *ros* increases by 50 points? Does *ros* have a practically large effect on *salary*?

   iii. Test the null hypothesis that *ros* has no effect on *salary* against the alternative that *ros* has a positive effect. Carry out the test at the 10% significance level.

i) $H_0: \beta_3 = 0$

$H_a: \beta_3 \neq 0$

ii) if ros increases by 1 point, salary will predicted to increase by 0.00024 percent

when ros increases by 50 point

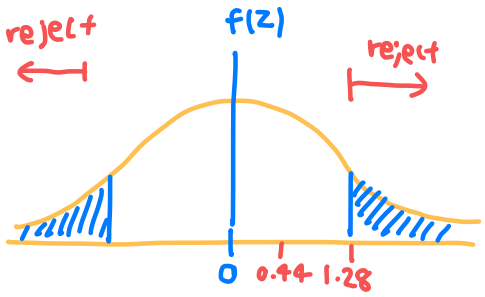
Salary will predicte to increase by $0.00024 \times 50 = 0.012$ %.

No, ros has a tiny impact on salary ∴.

iii) 10% significant level

$H_0: \beta_3 = 0$

$H_a: \beta_3 \neq 0$



$$z = \frac{\hat{\beta}_3 - \beta_3}{se.\hat{\beta}_3}$$

$$z = \frac{0.00024}{0.00054}$$

$$z = 0.444$$

We cannot reject H_0 at 10% significant level

,so ros alone has no impact on salary.

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iv. Would you include *ros* in a final model explaining CEO compensation in terms of firm performance? Explain.

NO, as the return on firm's stock has no impacts on CEO compensation. base on the Hypothesis testing.