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**HW 1**

Answer all of the following questions:

1. You are interested to know what is the average number of times a college student interviews with potential employers in his/her senior year. You have collected a sample and calculated several sample statistics. The hypothesis you would like to test is:

$$H_0: \mu = 5 \quad H_1: \mu \neq 5$$

where  $\mu$  is the average number of interviews. The sample average is 4.5. The p-value of this test is 0.06.

- a. What conclusion should you draw at the 5% significance level? The critical values are -1.96 and 1.96
  - b. What conclusion should you draw at the 10% significance level? The critical values are -1.645 and 1.645.
  - c. Which of the following could be the 95% confidence interval?
    - A. (4.2 - 4.8)
    - B. (4.4 - 4.8)
    - C. (3.9 - 5.1)
    - D. (4.2 - 5.1)
2. You would like to estimate a regression that explains the log of hourly wage on years of education. You were able to obtain the following estimated line:

$$\ln(\text{wage}) = 1.2 + 0.12 * \text{Schooling}$$

were wage is hourly wage in \$, and Schooling is the number of years completed.

- a. What is the estimated wage per hour for an individual with 16 years of education?
- b. What is the estimated wage per hour for an individual with 17 years of education?
- c. Based on your answers in parts a and b, what is the percentage change in the estimated wage from 16 to 17 years of education?
- d. Repeat parts a to c, but for a change in schooling from 16 to 16.1 years of schooling.
- e. Based on the estimation, how much a college graduate earns on average more than a high school graduate. State your answer in percentage and in absolute values.

3. You would like to estimate the effect of family income on the number of kids. That is, whether rich families have more/less kids than non-rich families. You were able to obtain the following estimated line:

$$\text{Kids} = 1.5 + 0.05 \ln(\text{family income})$$

were family income is in thousands of \$.

- a. What is the estimated number of kids in a family with an income of \$200 thousands? (round to 4 decimal places)
  - b. What is the estimated number of kids in a family with an income of \$202 thousands (that is 1% more than in part a)? (round to 4 decimal places)
  - c. Interpret the coefficient on  $\log(\text{family income})$ .
4. An economist wanted to test whether getting job benefits (such as health care and retirement contributions) affect the worker's wage per hour. That is, do workers who receive job benefits receive lower wages (because a part of their compensation is in the form of job benefits). The economist collected the data and ran two regressions with the following outputs:

$$\ln(\text{wage}) = 1.2 + 1.3 \text{benefits}$$

(0.3)            (0.4)

$$\ln(\text{wage}) = 1.1 + 0.4 \text{benefits} + 0.15 \text{educ}$$

(0.3)            (0.8)            (0.04)

Where *benefits* is a dummy variable equal to one if the worker receives job benefits and zero otherwise. The variable *educ* is the worker's education in years. The first regression controls for the *benefits* dummy variable only and the second regression controls in addition for years of education.

- a. Interpret the coefficients in each regression and state whether the estimated coefficients are statistically significant.
- b. Explain why the estimated coefficient on *benefits* changed significantly in the second regression?