computer questions

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C1. The following model can be used to study whether campaign expenditures affect election outcomes:

$$voteA = \beta_0 + \beta_1 \log(expendA) + \beta_2 \log(expendB) + \beta_3 prtystrA + u,$$

where *voteA* is the percentage of the vote received by Candidate A, *expendA* and *expendB* are campaign expenditures by Candidates A and B, and *prtystrA* is a measure of party strength for Candidate A (the percentage of the most recent presidential vote that went to A's party).

i. What is the interpretation of $\beta_1$ ?

ii. In terms of the parameters, state the null hypothesis that a 1% increase in A's expenditures is offset by a 1% increase in B's expenditures.

iii. Estimate the given model using the data in VOTE1 and report the results in usual form. Do A's expenditures affect the outcome? What about B's expenditures? Can you use these results to test the hypothesis in part (ii)?

iv. Estimate a model that directly gives the *t* statistic for testing the hypothesis in part (ii). What do you conclude? (Use a two-sided alternative.)

i) when expend A increase by 1 %, vote A will increase by $\beta_1$ units.

ii) $H_0: \beta_1 = -\beta_2$
$H_a: \beta_1 \neq -\beta_2$

$H_0: \beta_2 + \beta_1 = 0$
$H_a: \beta_2 + \beta_1 \neq 0$

iii) $voteA = 45.0789 + 6.0833 \log(expendA) - 6.6154 \log(expendB) + 0.1520(prtystrA)$

both A's expenditure and B's expenditure effect the out come but in different effect because $\beta_1$ and $\beta_2$ has different value and sign, so we can use them to test Hypothesis in part ii) iv)

$H_0 : \beta_2 + \beta_1 = 0$

$H_a : \beta_2 + \beta_1 \neq 0$

let $\hat{\theta} = \hat{\beta}_2 + \hat{\beta}_1$

$H_0 : \theta_1 = 0$

$H_a : \theta_1 \neq 0$ $\rightarrow$ $t = \dfrac{\hat{\theta}_1 - 0}{s.e.\ \hat{\theta}_1}$

so, $\beta_1 = \theta_1 - \beta_2$

$\text{vote } A = 45.0789 + (\theta_1 - \beta_2) \log(\text{expend } A) - \beta_2 \log(\text{expend } B) + \beta_3 (\text{prtystrA}) + u$

$\text{vote } A = \beta_0 + \theta_1 \log(\text{expend } A) + \beta_2 (\log(\text{expend } B) - \log(\text{expend } A)] + \beta_3 (\text{prtystrA}) + u$

From the data set

$$t = \frac{\hat{\theta}_1 - 0}{s.e.(\hat{\theta})} = \frac{-0.5321 - 0}{0.5331} = -0.998 \approx -1$$

if we are testing with 1% significant level...

$P \text{ value} = 0.1587 > 0.005$

, so we cant reject Ho since P value is greater than 0.005

means that 1% increase in A's expenditure is offset by a 1% increase in B's expenditure.

C6. Use the data in WAGE2 for this exercise.

i. Consider the standard wage equation

$$\log(wage) = \beta_0 + \beta_1 educ + \beta_2 exper + \beta_3 tenure + u.$$

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State the null hypothesis that another year of general workforce experience has the same effect on $\log(wage)$ as another year of tenure with the current employer.

ii. Test the null hypothesis in part (i) against a two-sided alternative, at the 5% significance level, by constructing a 95% confidence interval. What do you conclude?

i) $H_0: \beta_2 - \beta_3 = 0$

$H_a: \beta_2 - \beta_3 \neq 0$

ii) $H_0: \beta_2 - \beta_3 = 0$

$H_a: \beta_2 - \beta_3 \neq 0$

let $\hat\theta_1 = \hat\beta_2 - \hat\beta_3 \rightarrow t = \dfrac{\hat\theta_1 - 0}{s.e.\,\hat\theta_1}$

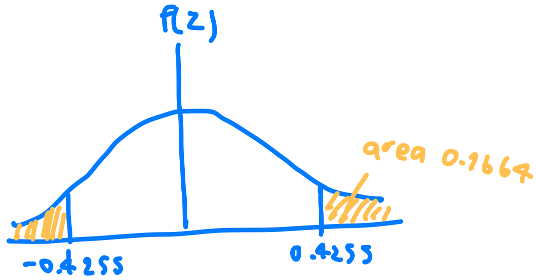
$\hat\theta_1 = \hat\beta_2 - \hat\beta_3$ , we have $\hat\beta_2 = \hat\theta_1 + \hat\beta_3$

$\log(wage) = \beta_0 + \beta_1(educ) + (\theta_1 + \beta_3)(exper) + \beta_3(tenure) + u$

$\log(wage) = \beta_0 + \beta_1(educ) + \theta_1(exper) + \beta_3(exper + tenure) + u$

from the data set

$t = \dfrac{0.002 - 0}{0.0047} = 0.4255$




P value $= 0.1664 > 0.0025$

, so we cant reject Ho since P value is greater than 0.0025

means that, percentage change in year of general workforce experience has the same affect on percentage change in year of tenure with the current employer.

C8. The data set 401KSUBS contains information on net financial wealth (*nettfa*), age of the survey respondent (*age*), annual family income (*inc*), family size (*fsize*), and participation in certain pension plans for people in the United States. The wealth and income variables are both recorded in thousands of dollars. For this question, use only the data for single-person households (so $fsize = 1$ ).

i. How many single-person households are there in the data set?

ii. Use OLS to estimate the model

$$nettfa = \beta_0 + \beta_1 inc + \beta_2 age + u,$$

and report the results using the usual format. Be sure to use only the single-person households in the sample. Interpret the slope coefficients. Are there any surprises in the slope estimates?

i) from the data set.

there are 2017 household.

ii) $nettfa = -43.0398 + 0.7993\, inc + 0.8427\, age$

the slope of annual family income of 0.7993 means that when annual family income increase by \$1, the net financial wealth is expected to increase by \$ 0.7993.

the slope of age survey respondent of 0.847 means that when age survey respondent increase by \$1, the net financial wealth is expected to increase by \$ 0.847.

age survey respondent expected to have greater impact on financial wealth compare to annual family income.

iii. Does the intercept from the regression in part (ii) have an interesting meaning? Explain.

iv. Find the *p*-value for the test $H_0: \beta_2 = 1$ against $H_1: \beta_2 < 1$. Do you reject $H_0$ at the 1% significance level?

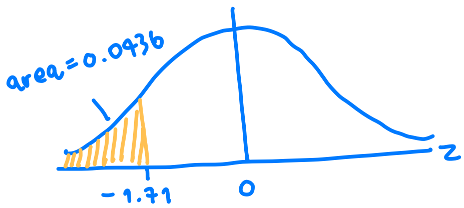
v. If you do a simple regression of *nettfa* on *inc*, is the estimated coefficient on *inc* much different from the estimate in part (ii)? Why or why not?

iii) if the age of survay respondents and annual family income is 0, financial wealth expected to have loss of $43039.8

iv) $H_0 : \beta_2 = 1$

$H_a : \beta_2 < 1$

$$z = \frac{0.843 - 1}{0.092} = -1.71$$




P value = 0.0436 > 0.01

We can not reject Ho at 1% significant level

V) from the data set.

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. regress inc nettfa if fsize == 1

      Source |       SS           df       MS      Number of obs   =     2,017
-------------+----------------------------------   F(1, 2015)      =    181.60
       Model |  46335.1731         1  46335.1731   Prob > F        =    0.0000
    Residual |  514127.962     2,015  255.150354   R-squared       =    0.0827
-------------+----------------------------------   Adj R-squared   =    0.0822
       Total |  560463.135     2,016  278.007508   Root MSE        =    15.973

------------------------------------------------------------------------------
         inc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      nettfa |    .100737   .0074754    13.48   0.000     .0860768    .1153973
       _cons |   28.07666   .3699027    75.90   0.000     27.35123    28.80209
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the slope is chaged alot as it reduces from $799.32 to 100.7 ,So there is a greater impact of annual income on net financial wealth than net financial wealth on an annual family income.