6204640251
Pimmada K.

1. a.) Estimation Regression for log (salaryi)

$\log(salary_i) = 4.5881 + 0.2572 \log(sales_i) + 0.0112\, ROE_i + 0.1580\, finance_i + 0.1809\, consprod_i - 0.2830\, Utility_i$

Interpret $B_1$ : If $Sale_i$ increases by 1% , $salary_i$ will rise by 4.5887 % .

1. b.) Overall Significance Level

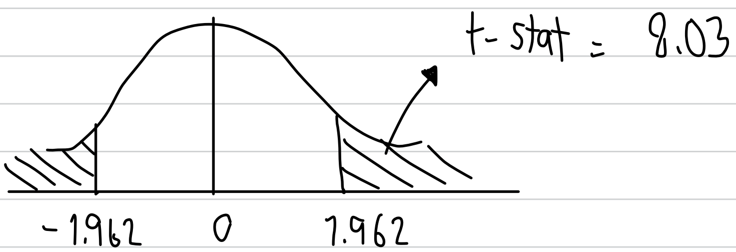
$H_0$ : $B_i = 0$ ; Every independent variables has no relationship with dependent var.
$H_1$ : $B_i \neq 0$ ; At least 1 independent variable has relationship with dependent var.

Prob.>F = 0.000 means that p-value equals zero.
p-value < $\alpha$ ; 0.000 < 0.05
We can reject Ho and cannot conclude that
every independent variables has no relationship with dependent variable.

- Individual Test

# For $B_1$ ( $l\,sales_i$ )
$H_0$ : $B_1 = 0$ ; Sales has no impact on $l\,salary_i$
$H_1$ : Otherwise ; Sales has an impact on $l\,salary_i$

t-stat = 8.03
t-Cri = $t_{0.05,\, 209-6}$ = $t_{0.05,\, 203}$ = 1.962

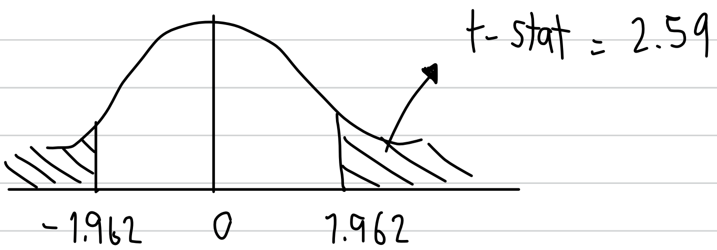



∴ We can reject Ho. Sales has an impact on $l\,salary_i$ at significance level 0.05.

# For $B_2$ (ROE)

$H_0: B_2 = 0$ ; ROE has no impact on $l\,salary_i$
$H_1$: Otherwise ; ROE has an impact on $l\,salary_i$

$t\text{-stat} = 2.59$
$t\text{-Cri} = t_{0.05,\ 209-6} = t_{0.05,\ 203} = 1.962$

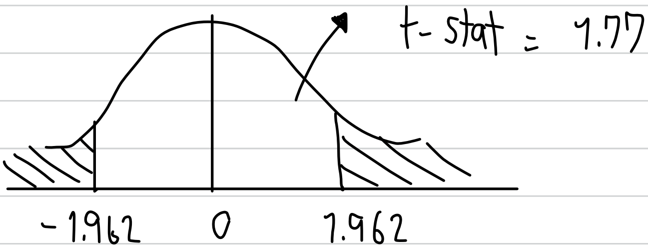



∴ We can reject Ho. ROE has an impact on $l\,salary_i$ at significance level 0.05.

# For $B_3$ (finance)

$H_0: B_3 = 0$ ; Finance has no impact on $l\,salary_i$
$H_1$: Otherwise ; Finance has an impact on $l\,salary_i$

$t\text{-stat} = 1.77$
$t\text{-Cri} = t_{0.05,\ 209-6} = t_{0.05,\ 203} = 1.962$

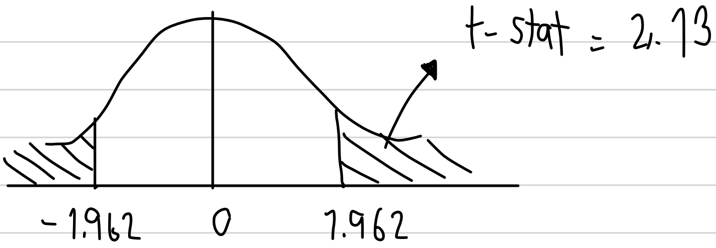



∴ We can't reject Ho. Finance has no impact on $l\,salary_i$ at significance level 0.05.

# For B4

$H_0: B_4 = 0$ ; Consprod has no impact on lsalary$_i$
$H_1$ : Otherwise ; Consprod has an impact on lsalary$_i$

$t\text{-stat} = 2.13$
$t\text{-Cri} = t_{0.05,\ 209-6} = t_{0.05,\ 203} = 1.962$

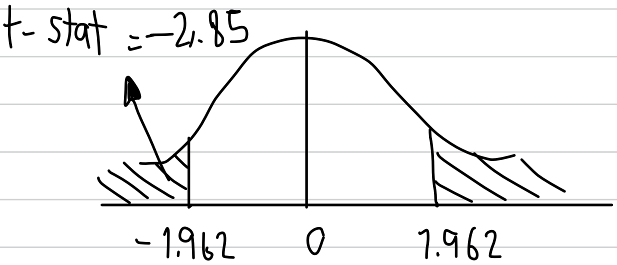



∴ We can reject Ho. Consprod has an impact on lsalary$_i$ at significance level 0.05.

# For B5

$H_0: B_5 = 0$ ; Utility has no impact on lsalary$_i$
$H_1$ : Otherwise ; Utility has an impact on lsalary$_i$

$t\text{-stat} = -2.85$
$t\text{-Cri} = t_{0.05,\ 209-6} = t_{0.05,\ 203} = 1.962$




∴ We can reject Ho. Utility has an impact on lsalary$_i$ at significance level 0.05.

1. c.) $-0.283005\,\%$.

1. d.) It's not possible. There will be no observations.
In this case, we can have at most 2 dummy variables.
There must have a base line / reference to compare.

1. e.) Interaction variable is beneficial, since it causes an additional effect which can tell effect of two attributes considered individually.

# t- test from model 2.1

2. a.) $H_0: B_1 = 0$ ( Smoking has no impact on birth weight )
$H_1: B_1 \neq 0$ ( Smoking has an impact on birth weight )

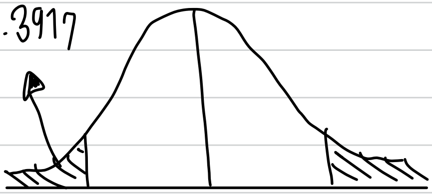
Find $t_{cal} = \dfrac{\hat{B_i} - B_i}{S.E._{\hat{\beta_i}}} = \dfrac{-0.5877 - 0}{0.1090} = -5.3917$

Tcritical : $d.f. = n-K = 1191 - 3 = 1188$
$\alpha = 0.05$

เปิดตาราง $t = -1.960 , 1.960$

Conclude the test :

$t_{cal} = -5.3917$



$-1.960$ $0$ $1.960$

$\therefore$ we can reject Ho, and we can say that Smoking has effect on birth weight. #

2. b.) Construct 99% CI of $B_2$

$t_{\frac{\alpha}{2}, d.f.} = t_{\frac{0.01}{2}, 1188} = t_{0.005, 1188} = 2.581$

$$\hat{B_2} - (t_{\frac{\alpha}{2}, d.f.})(S.E.\hat{B_2}) < B_2 < \hat{B_2} + (t_{\frac{\alpha}{2}, d.f.})(S.E.\hat{B_2})$$

$$0.0625 - 2.581 (0.0324) < B_2 < 0.0625 + 2.581 (0.0324)$$

$$-0.0213 < B_2 < 0.1462$$ #

From Model 2.2

2. c.) $H_0 : B_1 = 0$ ( Smoking has no impact on birth weight )

$H_1 : B_1 \neq 0$ ( Smoking has an impact on birth weight )

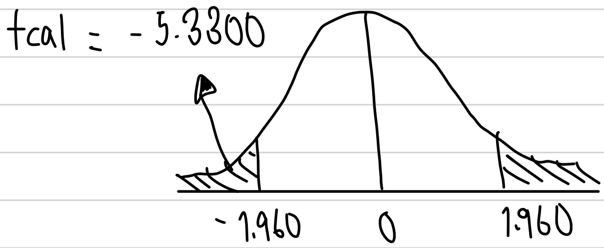
Find $t_{cal} = \frac{\hat{B_i} - B_i}{S.E.\hat{\beta_i}} = \frac{-0.5895 - 0}{0.1106} = -5.3300$

Tcritical : $d.f. = n-K = 1191-5 = 1186$

$\alpha = 0.05$

$\hookrightarrow = -1.960 , 1.960$

Conclude the test :




$\therefore$ we can reject Ho, and we can say that Smoking has effect on birth weight. #

The result in 2.a) will be unchanged.

from model 2.2

2.d.) • Overall Significance

$H_0 : B_1 = 0$
$H_1 : B_1 \neq 0$

Use F-stat = 10.05

Prob. >F = 0.000
F-stat > F-critical
10.05 > $F_{4,1186}$

∴ We can reject Ho and we can say that there's at least 1 independent variable that has relationship with dependent variable.

• Individual Test from 2.C for B1 => we can reject Ho.
and 2.e for B3 & B4 => we can't reject Ho.

For B2: $H_0 : B_2 = 0$ family income has no impact
$H_1 : B_2 \neq 0$ otherwise

$t.stat = \frac{\hat{B_2} - B_2}{S.E.\hat{B_2}} = \frac{0.0538254 - 0}{0.0366502} = 1.4686$

Tcritical : d.f. = n-K = 1191 - 5 = 1186
$\alpha = 0.05$
↳ = -1.960 , 1.960

t-stat < |tcal|
∴ We can't reject Ho

2.e.) $H_0 : B_3 = 0$ father edu has no impact
$H_1 : B_3 \neq 0$ otherwise

$H_0 : B_4 = 0$ mother has no impact
$H_1 : B_4 \neq 0$ otherwise

$t\text{-}stat = \frac{\hat{B_3} - B_3}{S.E.\hat{B_3}} = \frac{0.4937 - 0}{0.2833} = 1.7427$

$t\text{-}stat = \frac{\hat{B_4} - B_4}{S.E.\hat{B_4}} = \frac{-0.4379 - 0}{0.3197} = -1.3697$

Tcritical : d.f. = n-K = 1191 - 5 = 1186
$\alpha = 0.05$
↳ = -1.960 , 1.960

Tcritical : d.f. = n-K = 1191 - 5 = 1186
$\alpha = 0.05$
↳ = -1.960 , 1.960

Conclude : We cannot reject Ho, we can say that both father and mother's education have no effect on birth weight.

3. a.) d.f.

a. All variables - 1 dependent variable = 7 - 1 = 6

b. No. of obs. - all variables (k) = 428 - 7 = 421

c. No. of obs. - 1 = 428 - 1 = 427

3. b.) Find sum square : TSS = ESS + RSS

F-Stat = $\frac{MSE}{MSR}$ = $\frac{g}{h}$

$13.19 = \frac{MSE}{0.4465}$

∴ MSE = 5.8897

from the model,

∴ MSR = 0.4465

$MSE = \frac{ESS}{d.f.}$

$5.8897 = \frac{ESS}{6}$

∴ ESS = 35.3381 (e.)

$MSR = \frac{RSS}{d.f.}$

$0.4465 = \frac{RSS}{421}$

∴ RSS = 187.9876 (f.)

∴ MST = MSE + MSR = 6.3362

| Source | SS | df | MS |
|---|---|---|---|
| Model | 35.3381 | 6 | 5.8897 |
| Residual | 187.9876 | 421 | .446526442 |
| Total | 223.327441 | 427 | 6.3362 |

| | | |
|---|---|---|
| Number of obs | = | 428 |
| F(____, _______) | = | 13.19 |
| Prob > F | = | 0.0000 |
| R-squared $R^2$ | = | 0.1582 → $R^2$ |
| Adj R-squared | = | 0.1462 |
| Root MSE | = | .66823 |

| lwage | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| exper | .039819 | .013393 | 2.97 | 0.003 | .0134936 | .0661444 |
| expersq | -.0007812 | .0004022 | -1.94 | 0.053 | -.0015718 | 9.37e-06 |
| educ | .1078319 | .0144021 | 7.49 | 0.000 | .079523 | .1361409 |
| age | -.0014653 | .0052925 | -0.28 | 0.782 | -.0118682 | .0089377 |
| kidslt6 | -.0607106 | .0887626 | -0.68 | 0.494 | -.2351836 | .1137625 |
| kidsge6 | -.014591 | .0278981 | -0.52 | 0.601 | -.069428 | .0402459 |
| _cons | -.4209078 | .316905 | -1.33 | 0.185 | -1.043821 | .2020053 |

3. c.) from the model, $R^2 = 0.1582$

Adjusted $R^2$ $\quad (\bar{R}^2) = 1 - (1-R^2)\dfrac{(n-1)}{(n-k)}$

$$\bar{R}^2 = 1 - (1-0.1582)\frac{(428-1)}{(428-7)}$$

$$\bar{R}^2 = 1 - 0.853797$$

$$\therefore \bar{R}^2 = 0.1462 \ \#$$

3.d.) Maximum $R^2$ will be less than 0.1582

3. e.) Age is not significance and I believe that this make an economic sense. Elderly may work at low wage for example senior construction worker แรงงานก่อสร้าง And teenagers may work at high wage such as อายุน้อยร้อยล้าน ขายของออนไลน์.