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1.a)

$\log wage_i = 0.4737 + 0.0709 educ_i + 0.0389 exper_i - 0.006\ expersq_i + 0.1925\ union_i - 0.4421\ female_i$

as $educ_i$ goes up by 1 unit
$\log wage_i$ goes up by 0.0709

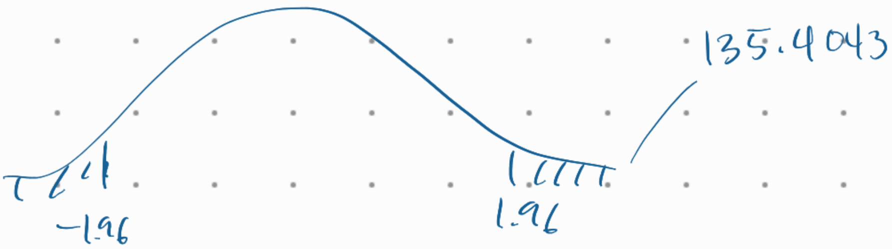
$\alpha = 0.05$ test for $educ_i$ or β_2

$H_0: \beta_2 = 0$, $H_a: \beta_2 \neq 0$

$t_{cal}(\beta_2) = \dfrac{\hat{\beta}_2 - \beta_2}{se_{\hat{\beta}_2}} = 0.708503 / 0.0052325$
$= 135.4043$

$t_{LB} = -1.96$

$t_{UB}\ 1.96$



reject H_0

so we can make sure that 95 out of 100 times that coefficient $educ_i$ is not significantly different from zero

1.b) $H_0: \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$

H_a: otherwise

$$F_{cal} = \frac{ESS/df}{RSS/df} = \frac{ESS/k-1}{RSS/n-k} = \frac{166.011417/6-1}{276.96855/1260-6} = 149.2486$$

$\alpha = 0.05$

$F_{(5,1254)} = 2.21$

So reject H_0

We can make sure that 95% $\beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are not simultaneously zero

1.c) H_0: Physical attractiveness has no marginal contribution to the model $(\beta_5 = \beta_6 = 0)$

H_a: otherwise

$$F_{cal} = \frac{ESS_{new} - ESS_{old} / (\text{number of new regressors})}{RSS_{new}/(n-k_{new})}$$

$$= \frac{168.697151 - 166.011417 / 2}{276.242816 / 1252} = 6.085$$

$\alpha = 0.05$

$F_{upper,\alpha}(2, 1252) = 3$

$F_{cal} > F_{cri}$ so reject H_0

→ physical attractiveness has a marginal contribution to the model 95% of times

1.d) $t\ cal(\beta_5) = -0.4388235 / 0.028877 = 15.1963$

$t\ cal(\beta_6) = -0.1388291 / 0.0417749 = -3.3233$

$tcal(\beta_7) = 0.070104 / 0.0302609 = 2.3157$

$t_{cri} = [-1.96, 1.96]$

it might indicate that in 1977 physical attractiveness of women might have effect on wage.

2a) on next page

2.a) Yes, if you do not live in the city then the household expenditure is reduce and the more children the larger the expenditure.

2.b) hypothesis

for β_1 $H_0: \beta_1 = 0$, $H_a: \beta_1 \neq 0$

for β_2 $H_0: \beta_2 = 0$, $H_a: \beta_2 \neq 0$

for β_3 $H_0: \beta_3 = 0$, $H_a: \beta_3 \neq 0$

$t_{cal}(\beta_1) = 43.83$
$t_{cal}(\beta_2) = -15.8$
$t_{cal}(\beta_3) = 6.82$
$\alpha = 0.01$

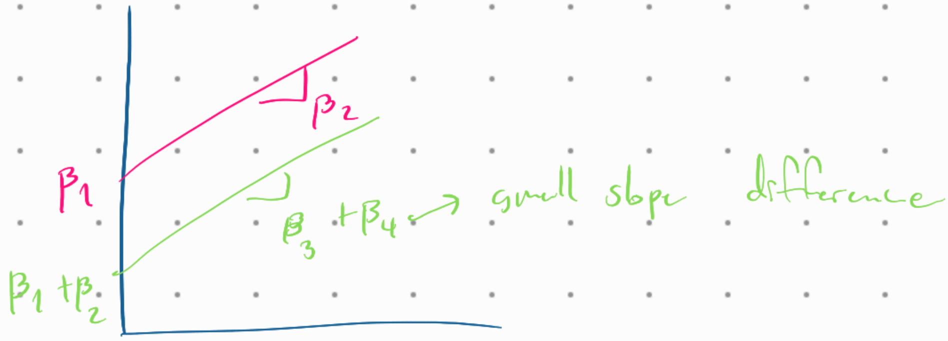
UB: 2.576
LB: -2.576

reject H_0 for β_1, β_2, β_3
β_1 are significantly different from zero
β_2 are significantly different from zero
β_3 are significantly different from zero

2.c) $E(hhexp_i \mid area_i = 1 \mid child_i = 3) = 9736 - 2835(1) + 881(3)$
$= 9544$ per month

2d)

the only significant coefficient are β_1, β_2 and β_3.



3a) VIF should not exceeds 10
and TOL or 1/VIF should be closer to 1 not 0
so age and age sq is linearly correlated.

3b) because we know that age square and age is correlated we should drop age square out of equation

3c) because there is less correlation in the scatter plot that it could be a sign of heteroscedasticity

3 d)
$$\frac{R^2_{\hat{u}_i^2}/(k)}{(1-R^2_{\hat{u}_i^2})/(n-k-1)} = \frac{0.0184 / 5}{1-0.0184 / 2032-5-1} = 7.5954$$

$F_{cri} = F_{0.05(5, 2032)} = 2.21$

$F_{cal} > F_{cri}$ so reject the H_0 so heteroscedasticity is present in our model