$WAGE = \beta_1 + \beta_2 EDUC + \beta_3 EXPER + \beta_4 METRO + e_i$

$N = 1,000.$ WAGE in \$/hr.

a.

$n_m = 577$ $n_f = 423$

① $H_0: \sigma_m^2 = \sigma_f^2$ $SSE_M = 97161.9174$. $df_m = 577 - 4 = 573$

$H_a: \sigma_m^2 \neq \sigma_f^2$ $\hat{\sigma}_f = 12,024$. $df_w = 423 - 4 = 419$

$MSE_M \rightarrow \hat{\sigma}_m^2 = \frac{97161.9174}{573} = 169.57$

$\hat{\sigma}_f = 144.5766$.

$F_0 = \frac{\hat{\sigma}_m^2}{\hat{\sigma}_f^2} = 1.17$, $RR \in \{F \geq F_{0.025}(573, 419), F \leq F_{0.975}(573, 419)\}$ 1.2 1/1

$F_1 = 1.17 < 1.2 \Rightarrow$ reject $H_0 \Rightarrow$ 男女間的工資未存在異質 thr.

don't

b. Model : $WAGE = \beta_1 + \beta_2 EDUC + \beta_3 EXPER + \beta_4 METRO + \beta_5 FEMALE + \varepsilon_i$

$N_S = 400$ $SSE_S = 5623.0382$ $N_M = 600$ $SSE_M = 10703.0471$

$\alpha = 0.05$

$H_0 : \sigma^2_{single} = \sigma^2_{married}$

① ② $\alpha = 0.05$

$H_a : \sigma^2_{single} \neq \sigma^2_{married}$

③ Test statistic : $F_0 = \frac{\hat{\sigma}^2_M}{\hat{\sigma}^2_S}$ 此 $F_{0.025}(600-5, 400-5)$

④ $RR \leftarrow \{F_0 \geq F_{0.025}(595, 395),\ F \leq F_{0.975}(595, 395)\}$

$F_{0.975}(595, 395) \rightarrow 1/2$

⑤ $F_0 = \frac{\left(\frac{SSE_M}{595}\right)}{\left(\frac{SSE_S}{395}\right)} = 1.19$

⑥ 未存在要質變要.

c.

NR test statistic = $nR^2 = 59.03 \sim \chi^2(2)$

(先檢定 FEMALE & METRO)

$\chi^2_{0.05}(2) = 5.99$

$59.03 > 5.99 \Rightarrow$ reject $H_0$，此二變數與異質變異數高度相關

此輔助迴歸並未將 Married 納入，無法回答 b 題

d.

$4 + 4 + \binom{4}{2} = 4 + 4 + 6 = 14$ (df)

$\chi^2_{0.05}(14) \sim nR^2$

$\chi^2_{0.05}(14) = 23.7$

$98.82 > 23.7 \Rightarrow$ Reject $H_0$，存在異質變異數

e. 誰的年大，誰的心寬

Wider: EDUC.

Narrower: EXPER, MUETRO, FEMALE } 不一致.

f.

(b)的模型中並未發現已婚 or 未婚存在異質變異數

part (f)中，加入主迴歸後 $t_0 = 1 < 1.96$.

表示結婚 or 未婚並無顯著差異

做者並不矛盾