8.6

a.

H_0: 模型不存在異質變異數 ($\sigma_M^2 = \sigma_F^2$)

H_1: 模型存在異質變異數 ($\sigma_M^2 \neq \sigma_F^2$)

$\psi = \frac{\sigma_M^2}{\sigma_F^2} \sim F_{0.05}(576, 422)$

RR: $\{\psi | \psi > F_{0.05}(576, 422) = 1\}$

$\psi^* = \frac{9716.9174/576}{12.0242} = 1.1667$

拒絕虛無假設，有證據支持 $\sigma_M^2 \neq \sigma_F^2$

b.

$H_0: \sigma_{single}^2 = \sigma_{married}^2$ vs. $H_1: \sigma_{single}^2 > \sigma_{married}^2$

$\sigma_{single}^2 = 56231.0382/400 = 140.57176$

$\sigma_{married}^2 = 100703.0471/600 = 167.8384$

$\psi = \frac{\sigma_M^2}{\sigma_S^2} \sim F_{0.05}(599, 399)$

RR: $\{\psi | \psi > F_{0.05}(599, 399) = 1\}$

$\psi^* = \frac{167.8384}{142.57176} = 1.1771$

拒絕虛無假設，有證據支持 $\sigma_{single}^2 > \sigma_{married}^2$

c、

H_0：模型不存在異質變異數 vs. H_1：模型存在異質變異數

$\psi = NR^2 \sim \chi^2_{adj}(4)$

RR: $\{\psi | \psi > \chi^2_{0.05}(4) = 9.488\}$

$\psi^* = 59.03 > RR$

拒絕虛無假設，有證據支持模型存在異質變異數

跟(b)結果一樣

d、

White test use: educ、exper, metro, female, $educ^2$, $exper^2$, educxexper, educxmetro, educxfemale, experxmetro, experxfemale, metroxfemale

degree of freedom: 12+1-1=12

critical value $\chi^2_{0.95}(12) = 21.06$

test statistic > critical value

reject the null hypothesis

c.

narrower : EXPER, METRO, FEMALE

wider : intercept, EDUC,