8.6.

a. Use GQ test to test

1. $H_0: \sigma_M^2 = \sigma_F^2$ against $H_1: \sigma_M^2 \neq \sigma_F^2$.

2. $\varphi = \frac{\hat{\sigma}_M^2}{\hat{\sigma}_F^2} \sim F_{593,419}$

3. $RR = \{\varphi \mid \varphi > 1.196808 \text{ or } \varphi < 0.8376694\}$.

4. $\varphi^* = \frac{97161.9174 / 593}{12007.4^2} = 1.174853$.

5. $\varphi^* \notin RR$, fail to reject H_0, can't conclude that H_1 is true.

b.

1. $H_0: \sigma_S^2 = \sigma_M^2$ against $H_1: \sigma_S^2 < \sigma_M^2$

2. $\varphi = \frac{\hat{\sigma}_S^2}{\hat{\sigma}_M^2} \sim F_{395,595}$

3. $RR = \{\varphi \mid \varphi < F_{0.05,395,595} = 0.858586\}$.

4. $\varphi^* = \frac{56231.0382 / 395}{100,703.0491 / 595} = 0.8411111$

5. $\varphi \in RR$, reject H_0, conclude that H_1 is true. $\sigma_S^2 < \sigma_M^2$

c.

1. H_0: homoskedasticity against H_1: heteroskedasticity

2. $\varphi = N \times R^2 \sim \chi_4^2$

3. $RR = \{\varphi \mid \varphi > \chi^2_{0.95,4} = 9.488\}$.

4. $NR^2 = 59.03 \in RR$, reject H_0, conclude that H_1 is true.

d.

df: 4 + 2 (連乎) + 2×2 (連×虛次) + 1 (連連) + 1 (虛×虛) = 12

$\chi^2_{0.95,12} = 21.026$.

white test: 18.82 > 21.026 $\notin RR$. reject H_0, conclude H_1 is true.

e.

narrower: EXPER, METRO, FEMALE

wider: EDUC

no inconsistency, the difference show that heteroskedasticity affects variables differently.

f.

using robust SE is aiming to analyst that the influence of heteroskedasticity on SE, the t-value show that married or not have insignificantly different from expected wage, however, partcb) is testing whether variance of error differs between groups, which is separate issue. Both results are compatible.