C08Q06

(a)

```
GQ statistic: 1.172853
critical value: [ 0.837669 , 1.196781 ]
```

=> Fail to Reject H0, there is insufficient evidence to conclude that $\sigma_M \neq \sigma_F$.

(b)

```
GQ statistic: 1.189914
critical value: 1.161325
```

=> Reject H0, it suggests that $\sigma_{MARRIED} > \sigma_{SINGLE}$.

(c)

```
NR-squared statistic: 59.03
critical value: 9.487729
```

=> Reject H0 , it suggests that heteroskedasticity exists

Yes, it does. The error variation for married and unmarried individuals are different according to the hypothesis testing.

C08Q06

(d)

```
degrees of freedom: 10
NR-squared statistic: 78.82
critical value: 18.30704
```

=> Reject H0, it suggests that the heteroskedasticity exists.

(e)

b3, b4 and b5 have gotten narrower,b1and b2 have gotten wider.

Yes, there is.

(f)

The t-value is not significant. It's is not in conflict with the results from part (b) because the exist of heteroskedasticity does not mean that the independent variable must have explanatory power over the dependent variable..

C08Q16

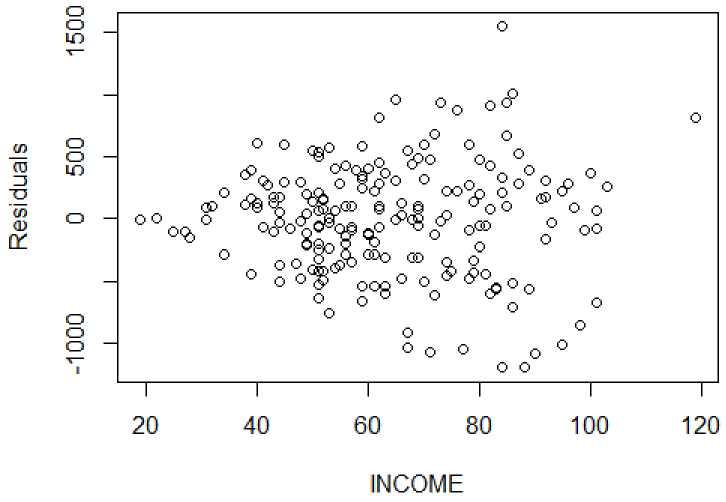
(a)

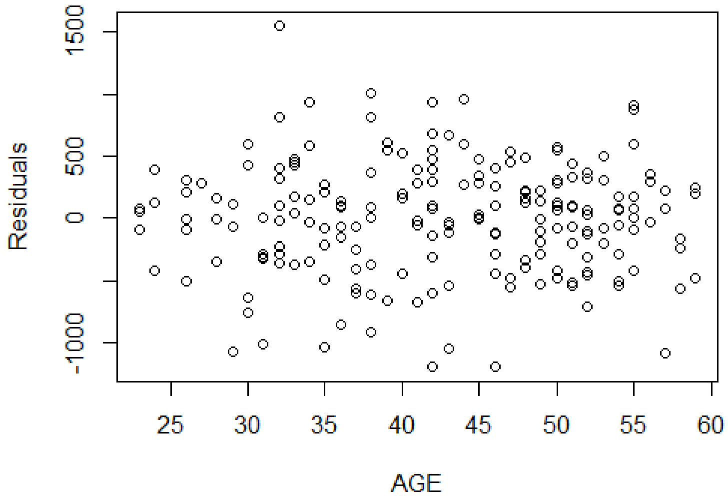
```
95% CI: [ -135.3298 ,  -28.32302 ]
```

(b)

It seem that income affects σ, σ increases as income increases.

Age, on the other hand, does not seem to show any clear pattern with σ.





C08Q16

(c)

H0: $\frac{\sigma^2_{f90}}{\sigma^2_{l90}} = 1$ H1: $\frac{\sigma^2_{f90}}{\sigma^2_{l90}} \neq 1$

```
GQ statistic: 0.3221587
critical value: [ 0.6534355 , 1.530373 ]
```

=> Reject H0, it suggests that $\sigma_{first90} \neq \sigma_{last90}$.

(d)(e)

```
95% CI: [ -135.3298 ,  -28.32302 ]
robust 95% CI: [ -139.323 ,  -24.32986 ]
GLS 95% CI        : [ -124.9146 ,  -38.73821 ]
robust GLS 95% CI: [ -126.4335 ,  -37.21932 ]
```

The narrowest interval is for GLS, followed by robust GLS, then OLS, with the widest interval being for robust.

C08Q18

(a)

```
GQ statistic: 0.8062789
critical value: [ 0.9452566 , 1.058097 ]
```

=> Reject H0, it suggests that $\sigma_M \neq \sigma_F$.

(b)

```
NR2 (METRO, FEMALE, BLACK): 23.55681 critical value: 11.34487
NR2 (all exp. variables  ): 109.4243 critical value: 21.66599
```

=> Reject H0, Both test suggest the heteroskedasticity exists.

Yes, they support our conclusions in part (a).

(c)

```
NR2: 182.6723 critical value: 57.34207
```

=> Reject H0, it suggest the heteroskedasticity exists.

C08Q18

(d)(e)(f)

OLS

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	1.2014e+00	3.2115e-02	37.4089	< 2.2e-16	***
educ	1.0123e-01	1.7583e-03	57.5737	< 2.2e-16	***
exper	2.9622e-02	1.3003e-03	22.7799	< 2.2e-16	***
I(exper^2)	-4.4578e-04	2.6354e-05	-16.9148	< 2.2e-16	***
female	-1.6550e-01	9.5291e-03	-17.3680	< 2.2e-16	***
black	-1.1153e-01	1.6942e-02	-6.5826	4.860e-11	***
metro	1.1902e-01	1.2307e-02	9.6711	< 2.2e-16	***
south	-4.5755e-02	1.3561e-02	-3.3740	0.0007438	***
midwest	-6.3943e-02	1.4104e-02	-4.5338	5.862e-06	***
west	-6.5891e-03	1.4402e-02	-0.4575	0.6473209	

robust

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	1.2014e+00	3.2794e-02	36.6340	< 2.2e-16	***
educ	1.0123e-01	1.9058e-03	53.1160	< 2.2e-16	***
exper	2.9622e-02	1.3149e-03	22.5276	< 2.2e-16	***
I(exper^2)	-4.4578e-04	2.7597e-05	-16.1533	< 2.2e-16	***
female	-1.6550e-01	9.4883e-03	-17.4428	< 2.2e-16	***
black	-1.1153e-01	1.6094e-02	-6.9297	4.482e-12	***
metro	1.1902e-01	1.1582e-02	10.2762	< 2.2e-16	***
south	-4.5755e-02	1.3902e-02	-3.2914	0.001001	**
midwest	-6.3943e-02	1.3724e-02	-4.6591	3.217e-06	***
west	-6.5891e-03	1.4557e-02	-0.4526	0.650813	

FGLS

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	1.1922e+00	3.1593e-02	37.7359	< 2.2e-16	***
educ	1.0166e-01	1.7646e-03	57.6111	< 2.2e-16	***
exper	3.0090e-02	1.2975e-03	23.1905	< 2.2e-16	***
I(exper^2)	-4.5614e-04	2.6789e-05	-17.0269	< 2.2e-16	***
female	-1.6621e-01	9.4808e-03	-17.5315	< 2.2e-16	***
black	-1.1085e-01	1.6992e-02	-6.5237	7.199e-11	***
metro	1.1777e-01	1.1459e-02	10.2771	< 2.2e-16	***
south	-4.4843e-02	1.3522e-02	-3.3162	0.0009158	***
midwest	-6.3192e-02	1.3984e-02	-4.5189	6.288e-06	***
west	-5.4938e-03	1.4377e-02	-0.3821	0.7023654	

robust_FGLS

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	1.1922e+00	3.2360e-02	36.8422	< 2.2e-16	***
educ	1.0166e-01	1.8928e-03	53.7107	< 2.2e-16	***
exper	3.0090e-02	1.3046e-03	23.0643	< 2.2e-16	***
I(exper^2)	-4.5614e-04	2.7408e-05	-16.6423	< 2.2e-16	***
female	-1.6621e-01	9.4381e-03	-17.6109	< 2.2e-16	***
black	-1.1085e-01	1.5869e-02	-6.9857	3.020e-12	***
metro	1.1777e-01	1.1563e-02	10.1851	< 2.2e-16	***
south	-4.4843e-02	1.3834e-02	-3.2414	0.001193	**
midwest	-6.3192e-02	1.3713e-02	-4.6083	4.111e-06	***
west	-5.4938e-03	1.4509e-02	-0.3787	0.704951	

C08Q18

(g)

I prefer the FGLS model because most standard errors of it are smaller than those of the other models.