EE325 HW 5

**11.1** (*a*) *False*. The estimators are unbiased but are inefficient.

(*b*) *True.*

(*c*) *False*. Typically, but not always, will the variance be overestimated.

(*d*) *False*. Besides heteroscedasticity, such a pattern may result from autocorrelation, model specification errors, etc.

(*e*) *True*.

(*f*) *True*.

(*g*) *False.* Heteroscedasticity is about the variance of the error term $u_i$ and not about the variance of a regressor.

**11.16**

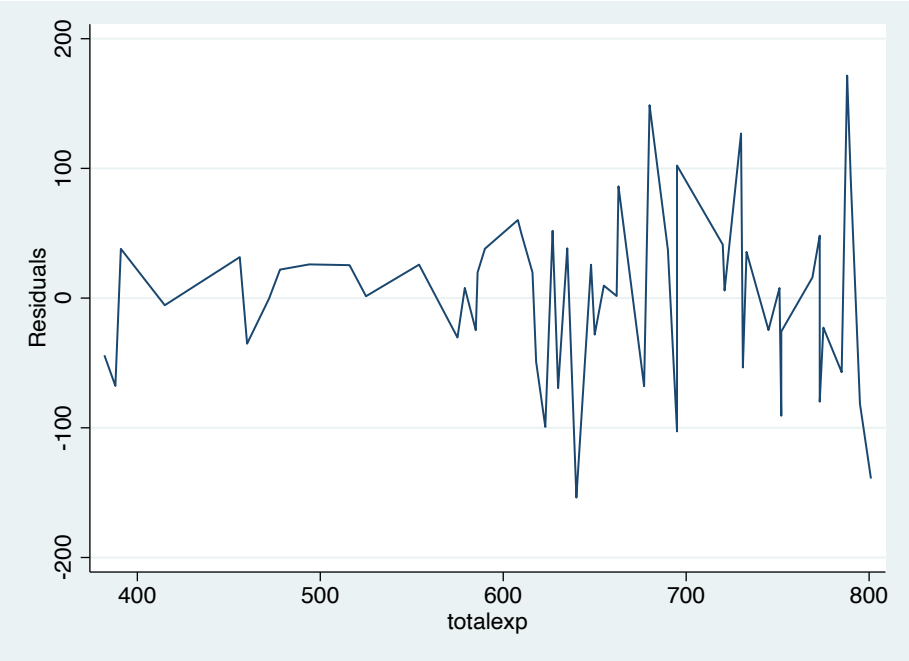
**a.**

| Source | SS | df | MS | Number of obs | = | 55 |
|---|---|---|---|---|---|---|
| | | | | F(1, 53) | = | 31.10 |
| Model | 139022.82 | 1 | 139022.82 | Prob > F | = | 0.0000 |
| Residual | 236893.616 | 53 | 4469.69087 | R-squared | = | 0.3698 |
| | | | | Adj R-squared | = | 0.3579 |
| Total | 375916.436 | 54 | 6961.41549 | Root MSE | = | 66.856 |

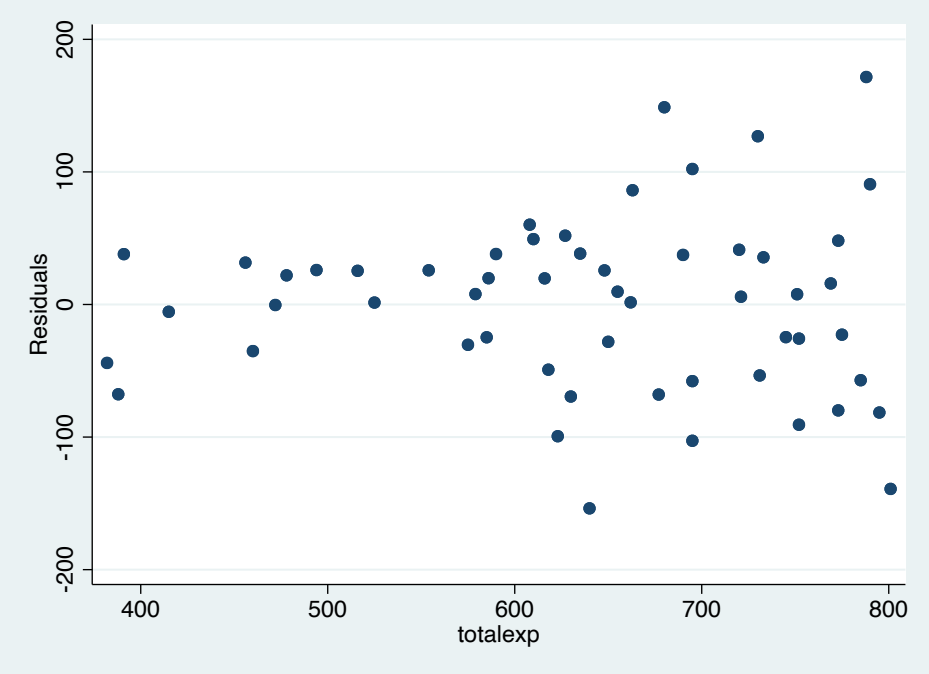
| foodexp | Coefficient | Std. err. | t | P>\|t\| | [95% conf. | interval] |
|---|---|---|---|---|---|---|
| totalexp | .4368088 | .0783226 | 5.58 | 0.000 | .2797135 | .593904 |
| _cons | 94.20878 | 50.85635 | 1.85 | 0.070 | -7.796134 | 196.2137 |

.

b) The residuals obtained from this regression look as follows:




Plotting residuals (R1) against total expenditure, we observe




It seems that as total expenditure increases, the absolute value of the residuals also increase, perhaps nonlinearly.

c)
White's general test statistic : 7.374513 Chi-sq( 2) P-value = .025
H0= Homoscedasticity
H1= Otherwise
White's general test statistic : 7.374513
Critical Chi-sq(2) = 5.9914 (5% significance level)
Reject H0
There is enough evidence to say that there is heteroscedasticity

d) White's heteroscedasticity-consistent standard errors
Compared with the OLS regression results given in (a), there is not much difference in the standard error of the slope coefficient. although the standard error of the intercept has declined.

Linear regression

| | |
|---|---|
| Number of obs | **55** |
| F(1, 53) | **34.60** |
| Prob > F | **0.0000** |
| R-squared | **0.3698** |
| Root MSE | **66.856** |

| foodexp | Coefficient | Robust std. err. | t | P>\|t\| | [95% conf. | interval] |
|---|---|---|---|---|---|---|
| totalexp | **.4368088** | **.0742544** | **5.88** | **0.000** | **.2878733** | **.5857442** |
| _cons | **94.20878** | **43.26305** | **2.18** | **0.034** | **7.434094** | **180.9835** |

12.26

a)

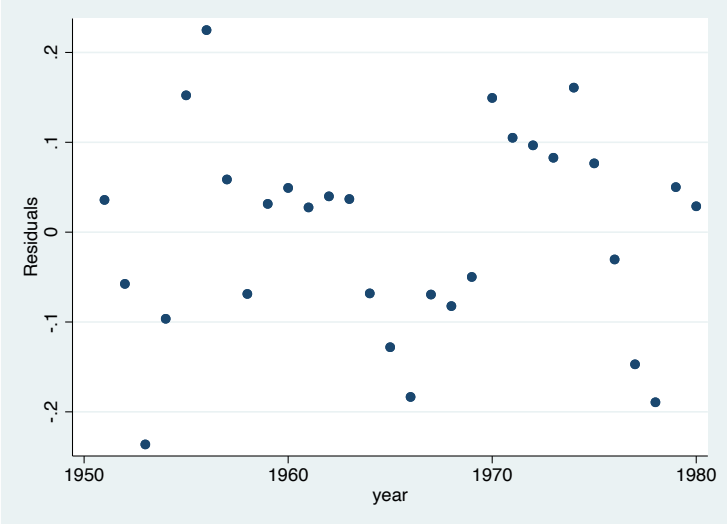
| Source | SS | df | MS | Number of obs | = | 30 |
|---|---|---|---|---|---|---|
| | | | | F(4, 25) | = | 91.54 |
| Model | 5.42774163 | 4 | 1.35693541 | Prob > F | = | 0.0000 |
| Residual | .370572985 | 25 | .014822919 | R-squared | = | 0.9361 |
| | | | | Adj R-squared | = | 0.9259 |
| Total | 5.79831462 | 29 | .199941883 | Root MSE | = | .12175 |

| lnc | Coefficient | Std. err. | t | P>\|t\| | [95% conf. | interval] |
|---|---|---|---|---|---|---|
| lni | .4675086 | .1659868 | 2.82 | 0.009 | .1256524 | .8093647 |
| lnl | .2794423 | .1147258 | 2.44 | 0.022 | .0431602 | .5157244 |
| lnh | -.0051515 | .142947 | -0.04 | 0.972 | -.2995564 | .2892534 |
| lna | .4414491 | .1065083 | 4.14 | 0.000 | .222091 | .6608071 |
| _cons | -1.500441 | 1.00302 | -1.50 | 0.147 | -3.5662 | .5653184 |

.

Interpret the meaning …… (Hint: Double log regression…. Must use the correct unit of analysis to receive full credits)

b)



c)
H0= No positive autocorrelation
H1= Otherwise
H0*= No negative autocorrelation
H1= Otherwise
Durbin–Watson d-statistic (5,  30) =  .9549404
From Durbin–Watson table
dL=1.071
dU=1.833
4-dU=4-1.071
4-dL=4-1.833
Reject H0= No positive autocorrelation
There is enough evidence to say that there is positive first-order autocorrelation.