Exercise 1
Durbin Watson

If you have not yet downloaded and installed GRETL, you can find it here
http://gretl.sourceforge.net/

Name: Moneeb Abu-Esba

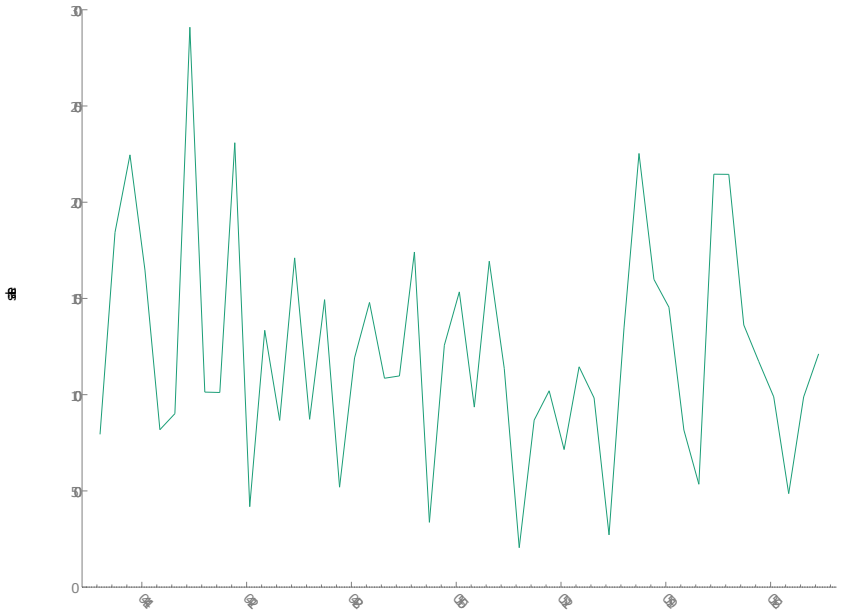
This exercise focuses on the Durbin Watson test. Answer the following short answer questions.

1. What is the issue using multiple regression on a data set that is ordered by time? What bad thing happens?

The issue is that regression is always assumed to be uncorrelated or independent error terms. The errors for the data points will end up being correlated as everything is ordered by time. The estimates of the standard errors of the coefficients are biased downward (More likely to reject the null hypothesis).

2. Pick one of the data sets provided (retail 1 to retail 6). Open the data in GRETL. Plot the time series data set. Does your examination by Mark I eyeball suggest that the problem that you mention in answer #1 above is present? Why or why not?

The problem is present as it is going “flip flop” on the 15000 y axis the graph series looks like it is going down then slowly going back up almost like a parabola.



3. Using the Durbin Watson tables for alpha = .05 and tell me what the D_L and D_U boundaries are.
45 dL=1.4982 dU=1.5813

no DL = 1.475 and DU=1.566 -4

no -

4. Run OLS regression on the data set and obtain the Durbin Watson statistic. What is the value?

Model 3: OLS, using observations 2011-04-11:2011-05-29 (T = 49)
Dependent variable: sales

	coefficient	std. error	t-ratio	p-value
const	12226.0	829.314	14.74	1.90e-019 ***

Mean dependent var 12226.02 S.D. dependent var 5805.200
Sum squared resid 1.62e+09 S.E. of regression 5805.200
R-squared 0.000000 Adjusted R-squared 0.000000
Log-likelihood −493.6818 Akaike criterion 989.3635
Schwarz criterion 991.2554 Hannan-Quinn 990.0813
rho −0.030237 Durbin-Watson 2.049105

The value is 2.049105.

5. Compare the Durbin Watson statistic to the boundaries in question #3. What is your conclusion?

2.049105 > 1.5813 fail to reject the null hypothesis

6. Randomly pick another retail data set from retail1 to retail6. Repeat steps 2 through 5 for that data set.

Data set 3:

dL = 1.3325

dU = 1.5805

no - DL=1.392 and DU =1.513 -4

Model 1: OLS, using observations 2011-05-16:2011-06-18 (T = 34)
Dependent variable: sales

	coefficient	std. error	t-ratio	p-value
const	15180.8	1125.64	13.49	5.59e-015 ***

Mean dependent var 15180.76 S.D. dependent var 6563.580
Sum squared resid 1.42e+09 S.E. of regression 6563.580
R-squared 0.000000 Adjusted R-squared 0.000000
Log-likelihood −346.5723 Akaike criterion 695.1446
Schwarz criterion 696.6710 Hannan-Quinn 695.6652
rho 0.138212 Durbin-Watson 1.706250

1.706250 > 1.5805 Fail to reject the null hypothesis