Exercise 1

Durbin Watson

Collin Real (yhi267)

If you have not yet downloaded and installed GRETL, you can find it here

<http://gretl.sourceforge.net/>

Name:

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?

Correlated error terms violate the independence assumption. If the error terms are correlated, the estimates of the standard errors of the coefficients are biased downward; therefore, the parameter values are expected to be smaller than the true value, and we are likely to reject a true null hypothesis. There error terms also assume constant variance, but if the variance depends on the value of X, heteroscedasticity exists (non-constant variance).

1. 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?

**Retail 3:**

A graph with lines and numbers

Description automatically generated

**A strong linear pattern/trend is not present on the time series plot, suggesting that autocorrelation is unlikely. If autocorrelation is not present in the dataset, our data satisfies the independence assumption.**

1. Using the Durbin Watson tables for alpha = .05 and tell me what the DL and DU boundaries are.

**DL: 1.393**

**DU: 1.514**

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

**1.706250**

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

Since the Durbin Watson statistic (1.706250) is > **DU** (1.514), we do not reject the null hypothesis. Our serial correlation coefficient between errors is zero, so the error terms are not correlated.

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