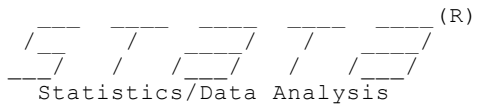

User: Pulak Mishra
Project: Autocorrelation

```
1 . generate time=(1)+_n-1
```
Generating the variable 'time'

```
2 . tsset time, yearly
        time variable:  time, 1 to 34
                delta:  1 year
```
Setting the datasheet as time-series (yearly)

```
3 . reg var_apr agri_diver var_rain var_temp var_apd
```
Estimation of the Model: var_apr = f(agri_diver, var_rain, var_temp, var_apd)

Source	SS	df	MS		
Model	.018236207	4	.004559052	Number of obs	= 34
Residual	.002850245	29	.000098284	F(4, 29)	= 46.39
Total	.021086451	33	.000638983	Prob > F	= 0.0000
				R-squared	= 0.8648
				Adj R-squared	= 0.8462
				Root MSE	= .00991

Statistically significant model with very high explanatory power

var_apr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
agri_diver	-.1105513	.4077527	-0.27	0.788	-.9444992	.7233965
var_rain	.4039371	.1007471	4.01	0.000	.1978861	.6099881
var_temp	-1.433444	.5559696	-2.58	0.015	-2.57053	-.2963588
var_apd	1.218768	.1064392	11.45	0.000	1.001075	1.436461
_cons	.0849617	.351032	0.24	0.810	-.6329793	.8029027

Statistically significant impact of 'var_rain', 'var_temp' and 'var_apd' on 'var_apr'

```
4 . predict uhat, res
```
Estimating the residual - 'uhat'

```
5 . runtest uhat, mean
N(uhat <= -4.10877606448e-11) = 16
N(uhat >  -4.10877606448e-11) = 18
          obs = 34
      N(runs) = 11
            z = -2.43
     Prob>|z| = .02
```
Runs test for autocorrelation with respect to mean of the residual

Rejection of the null hypothesis and negative value of z statistic indicating presence of positive autocorrelation

```
6 . runtest uhat, threshold(0)
N(uhat <= 0) = 16
N(uhat >  0) = 18
          obs = 34
      N(runs) = 11
            z = -2.43
     Prob>|z| = .02
```
Runs test for autocorrelation with respect to zero

Rejection of the null hypothesis and negative value of z statistic indicating presence of positive autocorrelation

```
7 . estat dwatson

Durbin-Watson d-statistic(  5,    34) =  1.265261
```
Durbin-Watson test for autocorrelation

Value of dL and dU with 34 observations and 4 independent variables at 5 percent significance level are 1.208 and 1.728 respectively, Hence, computed value of DW 'd' statistic lies in the 'indecisive' zone.

```
8 . estat bgodfrey
```
Breusch-Godfrey test for autocorrelation

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	df	Prob > chi2
1	5.490	1	0.0191

H0: no serial correlation

Rejection of the null hypothesis indicates presence of autocorrelation

```
 9 . generate var_aprl1=L1.var_apr
(1 missing value generated)
```
Generating one period lag for 'var_apr'

```
10 . generate var_apdl1=L1.var_apd
(1 missing value generated)
```
Generating one period lag for 'var_apd'

```
11 . generate agri_diverl1=L1.agri_diver
(1 missing value generated)
```
Generating one period lag for 'agri_diver'

```
12 . generate var_rainl1=L1.var_rain
(1 missing value generated)
```
Generating one period lag for 'var_rain'

```
13 . generate var_templ1=L1.var_temp
(1 missing value generated)
```
Generating one period lag for 'var_temp'

```
14 . generate var_apr1= var_apr-(1-1.265261/2)* var_aprl1
(1 missing value generated)
```
Generating generalized difference for 'var_apr'

```
15 . generate var_apd1= var_apd-(1-1.265261/2)* var_apdl1
(1 missing value generated)
```
Generating generalized difference for 'var_apd'

```
16 . generate agri_diver1= agri_diver -(1-1.265261/2)*agri_diverl1
(1 missing value generated)
```
Generating generalized difference for 'agri_diver'

```
17 . generate var_rain1= var_rain-(1-1.265261/2)* var_rainl1
(1 missing value generated)
```
Generating generalized difference for 'var_rain'

```
18 . generate var_temp1= var_temp-(1-1.265261/2)*var_templ1
(1 missing value generated)
```
Generating generalized difference for 'var_temp'

```
19 . reg var_apr1 agri_diver1 var_rain1 var_temp1 var_apd1
```
Estimation of the Model: var_apr1 = f(agri_diver1, var_rain1, var_temp1, var_apd1)

Source	SS	df	MS
Model	.013082444	4	.003270611
Residual	.002360607	28	.000084307
Total	.01544305	32	.000482595

Number of obs	= 33
F(4, 28)	= 38.79
Prob > F	= 0.0000
R-squared	= 0.8471
Adj R-squared	= 0.8253
Root MSE	= .00918

Statistically significant model with very high explanatory power

var_apr1	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
agri_diver1	-.323242	.4775256	-0.68	0.504	-1.301409	.6549248
var_rain1	.3276613	.1216618	2.69	0.012	.0784484	.5768743
var_temp1	-1.573703	.7201271	-2.19	0.037	-3.048817	-.0985896
var_apd1	1.180259	.1112621	10.61	0.000	.9523488	1.408169
_cons	.1731106	.2588753	0.67	0.509	-.3571714	.7033926

Statistically significant impact of 'var_rain1', 'var_temp1' and 'var_apd1' on 'var_apr1'

```
20 . predict u1hat, res
(1 missing value generated)
```
Estimating the residual of the new model - 'u1hat'

```
21 . runtest u1hat, mean
N(u1hat <= -4.21123607366e-11) = 16
N(u1hat >  -4.21123607366e-11) = 17
          obs = 33
       N(runs) = 14
             z = -1.23
      Prob>|z| = .22
```
Runs test for autocorrelation with respect to mean of the residual

The null hypothesis is not rejected indicating no autocorrelation problem

```
22 . runtest u1hat, threshold(0)
  N(u1hat <= 0) = 16
  N(u1hat >  0) = 17
            obs = 33
       N(runs) = 14
             z = -1.23
      Prob>|z| = .22
```

Runs test for autocorrelation with respect to zero

The null hypothesis is not rejected indicating no autocorrelation problem

```
23 . estat dwatson
```

Durbin-Watson test for autocorrelation

```
Durbin-Watson d-statistic(  5,    33) =  1.866144
```

Value of dL and dU with 33 observations and 4 independent variables at 5 percent significance level are 1.193 and 1.730 respectively, Hence, computed value of DW 'd' statistic lies between dU and 4-dU indicating no autocorrelation problem in the new model.

```
24 . estat bgodfrey
```

Breusch-Godfrey test for autocorrelation

```
Breusch-Godfrey LM test for autocorrelation
```

lags(*p*)	chi2	df	Prob > chi2
1	0.192	1	0.6615

H0: no serial correlation

The null hypothesis is not rejected indicating no autocorrelation problem

```
25 .
```