**EXAMPLE 1: X1:Revenue, X2: Offices, Y: Profit**

* 1. **REGRESSION MODEL**

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| --- | --- |
|  |  |



-0.000249

* 1. **AUTOCORRELATION**
     1. **GRAPHICAL DIAGNOSIS FOR AUTOCORRELATION**



* + 1. **DURBIN WATSON / VON NEUMANN AUTOCORRELATION TESTS**

H0: ρ=0 (No autocorrelation)

H1: ρ≠0 (There is positive or negative autocorrelation)

Compare with DW table value; K: number of independent variables, n

K=2, n=25 dL=1.21 dU=1.55 (alpha=0.05)

dL

dU

4-dU

4-dL

4

0

2

ρ>0

ρ=0

ρ<0

Uncertain

Uncertain

1.55 < **1.948** < 4-1.55=2.45 There is no autocorrelation!

* 1. **NORMALITY**
     1. **GRAPHICAL DIAGNOSIS - P-P PLOTS**



* + 1. **KOLMOGROV SMIRNOV OR SHAPIRO WILK TESTS**

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* + 1. **TESTS OF α3 and α4.**



* 1. **HETEROSCEDASTICITY**
     1. **GRAPHICAL DIAGNOSIS**

|  |  |
| --- | --- |
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* + 1. **SPEARMAN RANK CORRELATION INSPECTION**

**Spearman Rank Correlation between Absolute Residuals and Explanatory (independent) Variables**

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* 1. **MULTICOLLINEARITY – CHECK THE VIF’s**

**EXAMPLE 2**

**Sales: Y , Ad Period: X**

**2.1. REGRESSION MODEL**

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**2.2. AUTOCORRELATION**

**2.2.1. GRAPHICAL**

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| --- |
|  |

**2.2.2. DURBIN WATSON TEST**

**Since there is autocorrelation, calculate and transform all Y and X variables.**

**2.2.3. REGRESSION MODEL AFTER THE TRANSFORMATION OF THE VARIABLES IN ORDER TO GET RID OF AUTOCORRELATION PROBLEM**

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**2.2.4. CHECK AGAIN FOR AUTOCORRELATION**

**K=1 n=14 (we lost one observation) THEREFORE (n<15) CHECK WITH VON NEUMANN**

**and n’=n-k=14-1=13**

**From the table for α=0.05, n’=13, V=1.2521 and V\*=3.3996 . Since our V=1.79 is between these values then we decide that there is no autocorrelation left after the transformation and that we should use the transformed regression model.**

**2.3. NORMALITY TEST**

**We have to use the residuals obtained from transformed model to check if they are normally distributed or not.**

**2.3.1. GRAPHICAL DIAGNOSIS**



**2.3.2. TESTS**

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**2.3.3. TESTS OF α3 and α4**

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**2.4. HETEROSCEDASTICITY : transformed model**

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