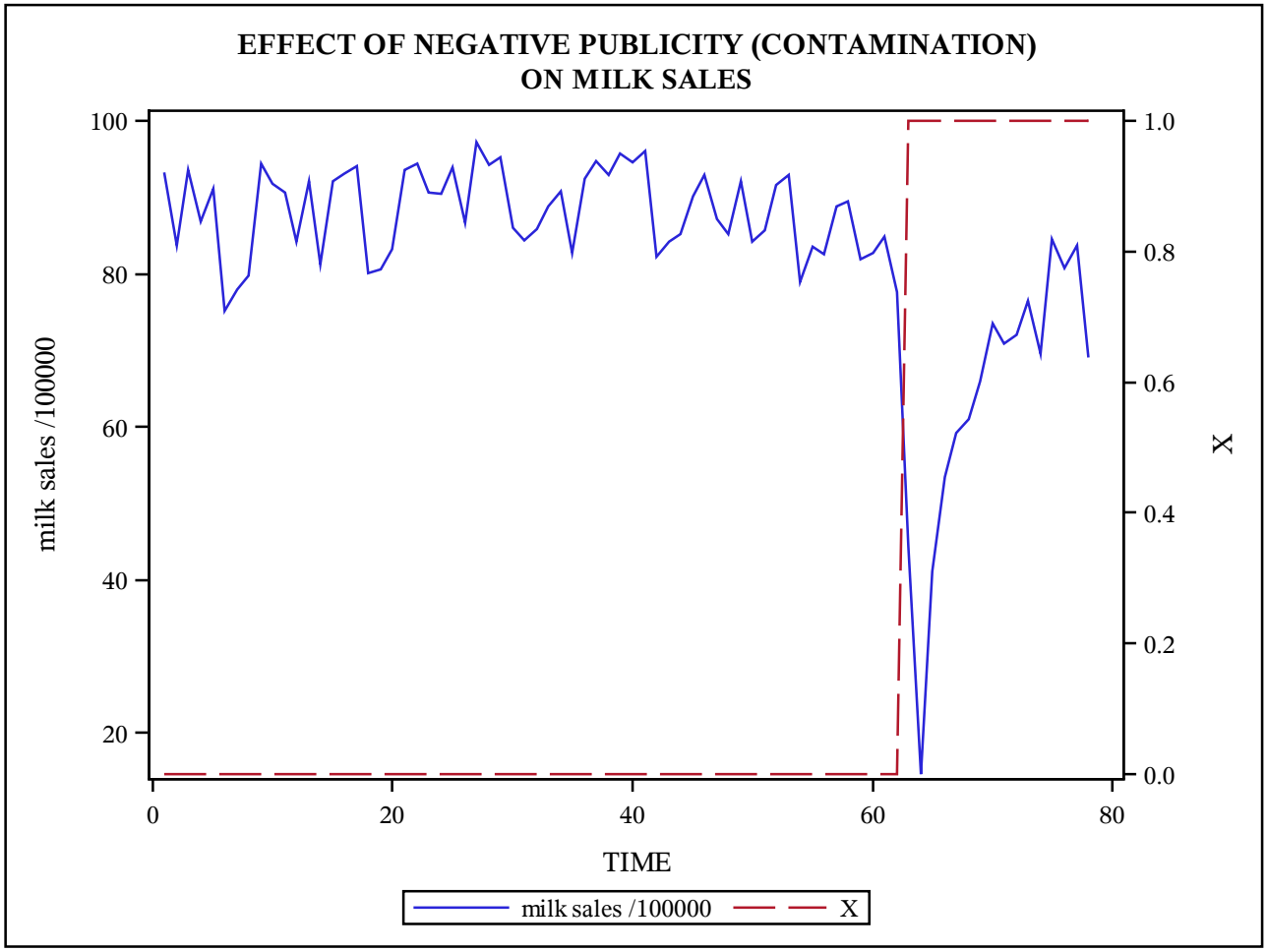
EFFECT OF NEGATIVE PUBLICITY (CONTAMINATION) ON MILK SALES

Obs	SALES	X	TIME
1	93.314	0	1
2	83.661	0	2
3	93.575	0	3
4	86.746	0	4
5	91.062	0	5
6	75.225	0	6
7	77.978	0	7
8	79.807	0	8
9	94.364	0	9
10	91.705	0	10
11	90.606	0	11
12	84.147	0	12
13	92.070	0	13
14	81.246	0	14
15	92.169	0	15
16	93.107	0	16
17	94.062	0	17
18	80.041	0	18
19	80.622	0	19
20	83.221	0	20
21	93.534	0	21
22	94.326	0	22
23	90.601	0	23
24	90.416	0	24
25	93.852	0	25
26	86.662	0	26
27	97.217	0	27
28	94.164	0	28
29	95.237	0	29
30	86.011	0	30
31	84.424	0	31
32	85.838	0	32
33	88.836	0	33
34	90.763	0	34

Obs	SALES	X	TIME
35	82.672	0	35
36	92.483	0	36
37	94.708	0	37
38	92.896	0	38
39	95.635	0	39
40	94.629	0	40
41	96.038	0	41
42	82.160	0	42
43	84.133	0	43
44	85.252	0	44
45	90.124	0	45
46	92.973	0	46
47	87.175	0	47
48	85.240	0	48
49	92.127	0	49
50	84.152	0	50
51	85.651	0	51
52	91.641	0	52
53	92.931	0	53
54	78.921	0	54
55	83.457	0	55
56	82.494	0	56
57	88.840	0	57
58	89.384	0	58
59	81.862	0	59
60	82.651	0	60
61	84.834	0	61
62	77.681	0	62
63	44.437	1	63
64	14.608	1	64
65	41.190	1	65
66	53.426	1	66
67	59.130	1	67
68	60.980	1	68

Obs	SALES	X	TIME
69	65.877	1	69
70	73.445	1	70
71	70.819	1	71
72	71.997	1	72
73	76.429	1	73
74	69.604	1	74
75	84.461	1	75
76	80.751	1	76
77	83.676	1	77
78	69.063	1	78

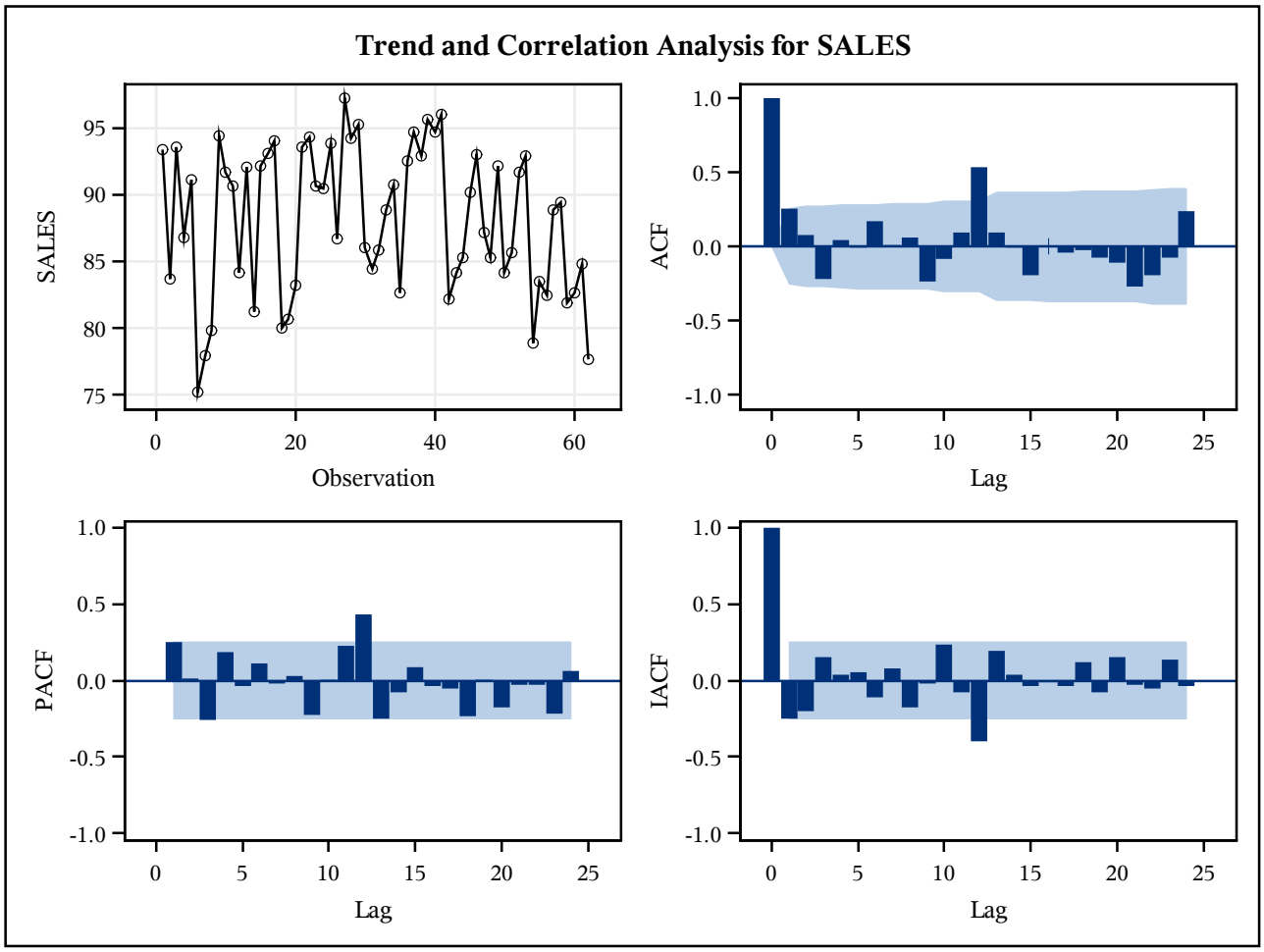

EFFECT OF NEGATIVE PUBLICITY (CONTAMINATION)
ON MILK SALES
milk sales /100000
X
TIME
100
80
60
40
20
1.0
0.8
0.6
0.4
0.2
0.0
0
20
40
60
80
milk sales /100000
X

The ARIMA Procedure

Warning: The value of NLAG is larger than 25% of the series length. The asymptotic approximations used for correlation based statistics and confidence intervals may be poor.

Name of Variable = SALES	
Mean of Working Series	88.1186
Standard Deviation	5.498379
Number of Observations	62

Autocorrelation Check for White Noise									
To Lag	**Chi-Square**	**DF**	**Pr > ChiSq**	**Autocorrelations**					
6	9.95	6	0.1268	0.253	0.080	-0.217	0.045	-0.008	0.169
12	38.37	12	0.0001	0.006	0.063	-0.234	-0.086	0.091	0.536
18	42.36	18	0.0010	0.092	-0.011	-0.191	0.002	-0.042	-0.027
24	61.23	24	<.0001	-0.072	-0.113	-0.269	-0.192	-0.077	0.238



The ARIMA Procedure

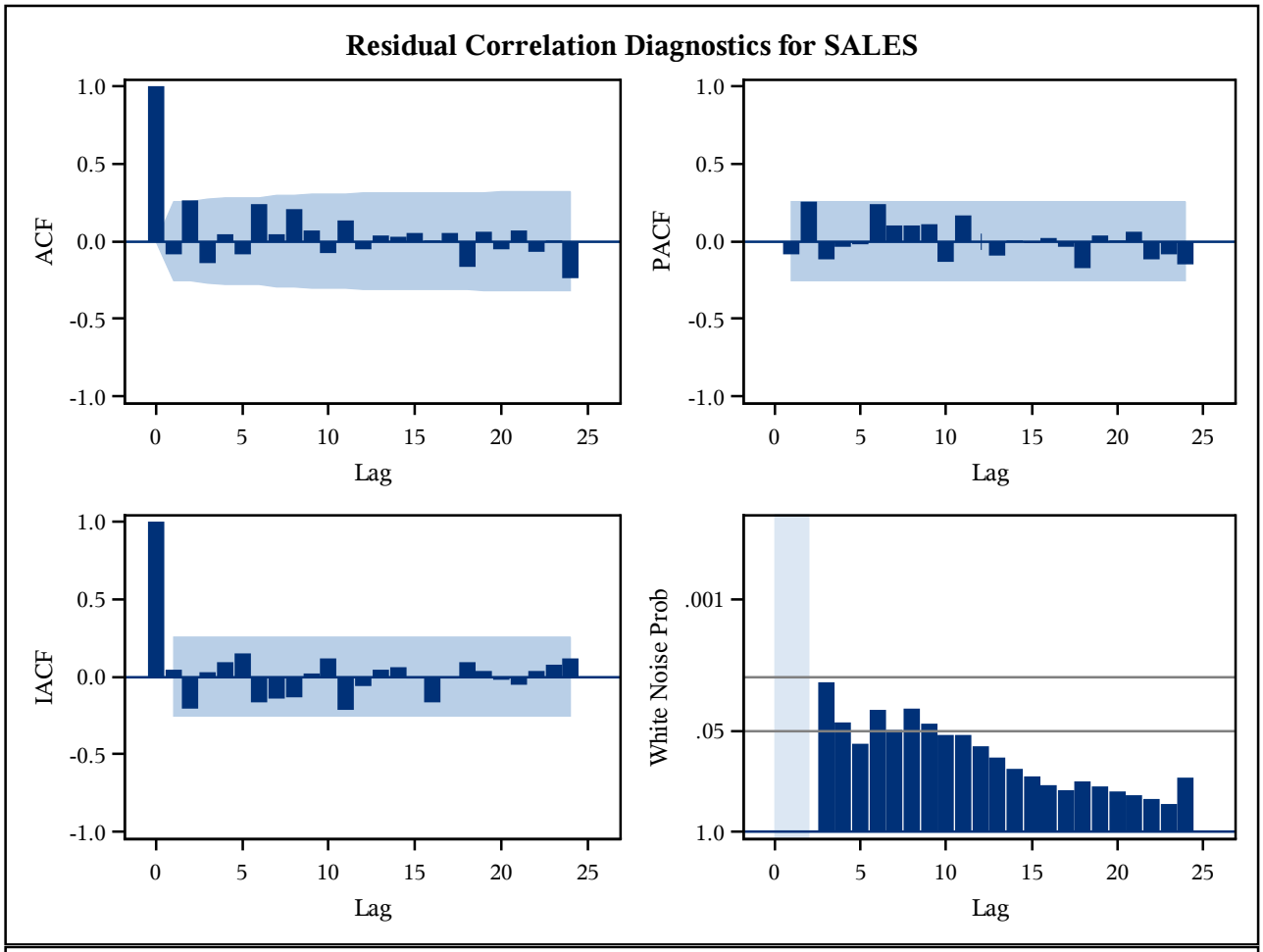
Maximum Likelihood Estimation					
Parameter	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**	**Lag**
MU	86.72671	2.18672	39.66	<.0001	0
AR1,1	0.43499	0.10891	3.99	<.0001	1
AR2,1	0.78633	0.06807	11.55	<.0001	12

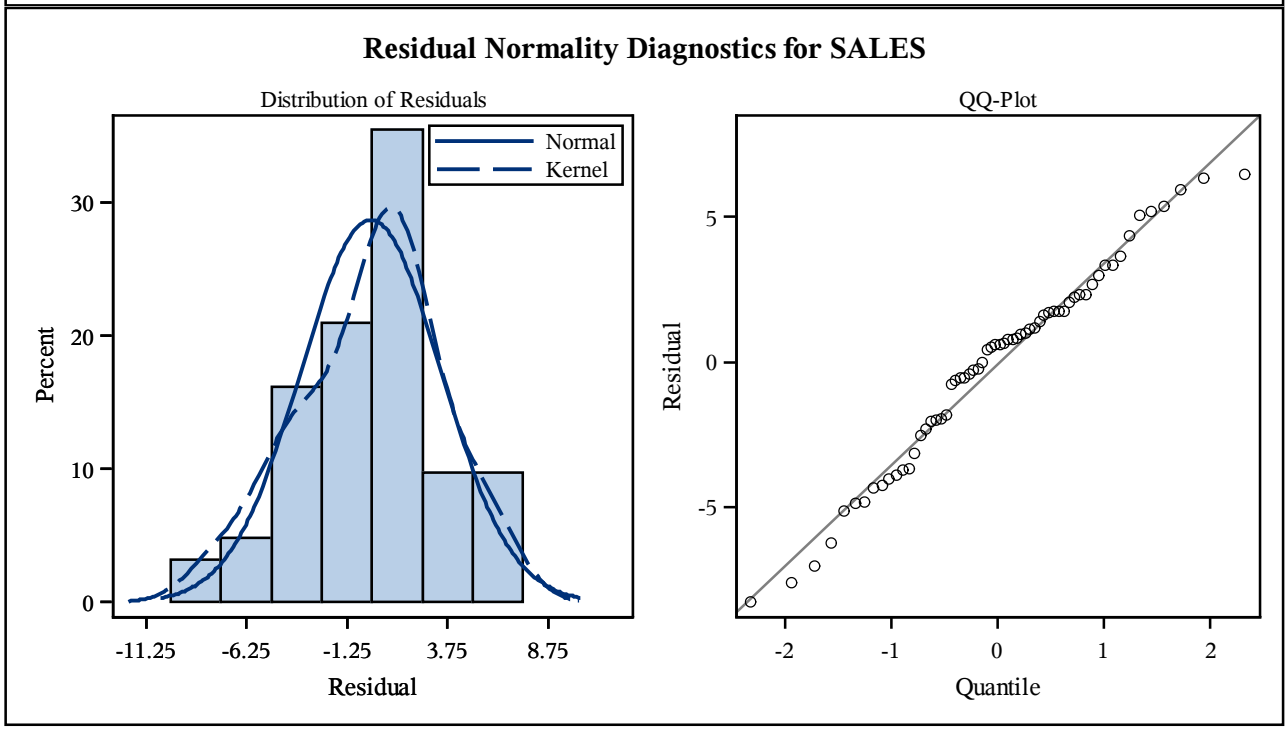
Constant Estimate	10.47011
Variance Estimate	12.50087
Std Error Estimate	3.535657
AIC	347.2407
SBC	353.6221
Number of Residuals	62

Correlations of Parameter Estimates			
Parameter	**MU**	**AR1,1**	**AR2,1**
MU	1.000	-0.100	-0.127
AR1,1	-0.100	1.000	0.114
AR2,1	-0.127	0.114	1.000

Autocorrelation Check of Residuals									
To Lag	**Chi-Square**	**DF**	**Pr > ChiSq**	**Autocorrelations**					
6	10.95	4	0.0272	-0.084	0.261	-0.144	0.043	-0.082	0.238
12	16.66	10	0.0822	0.045	0.207	0.067	-0.078	0.134	-0.055
18	19.75	16	0.2319	0.032	0.024	0.048	-0.000	0.055	-0.166
24	27.09	22	0.2078	0.063	-0.052	0.066	-0.067	0.001	-0.237

The ARIMA Procedure





The ARIMA Procedure

Model for variable SALES	
Estimated Mean	86.72671

Autoregressive Factors	
Factor 1:	1 - 0.43499 B**(1)
Factor 2:	1 - 0.78633 B**(12)

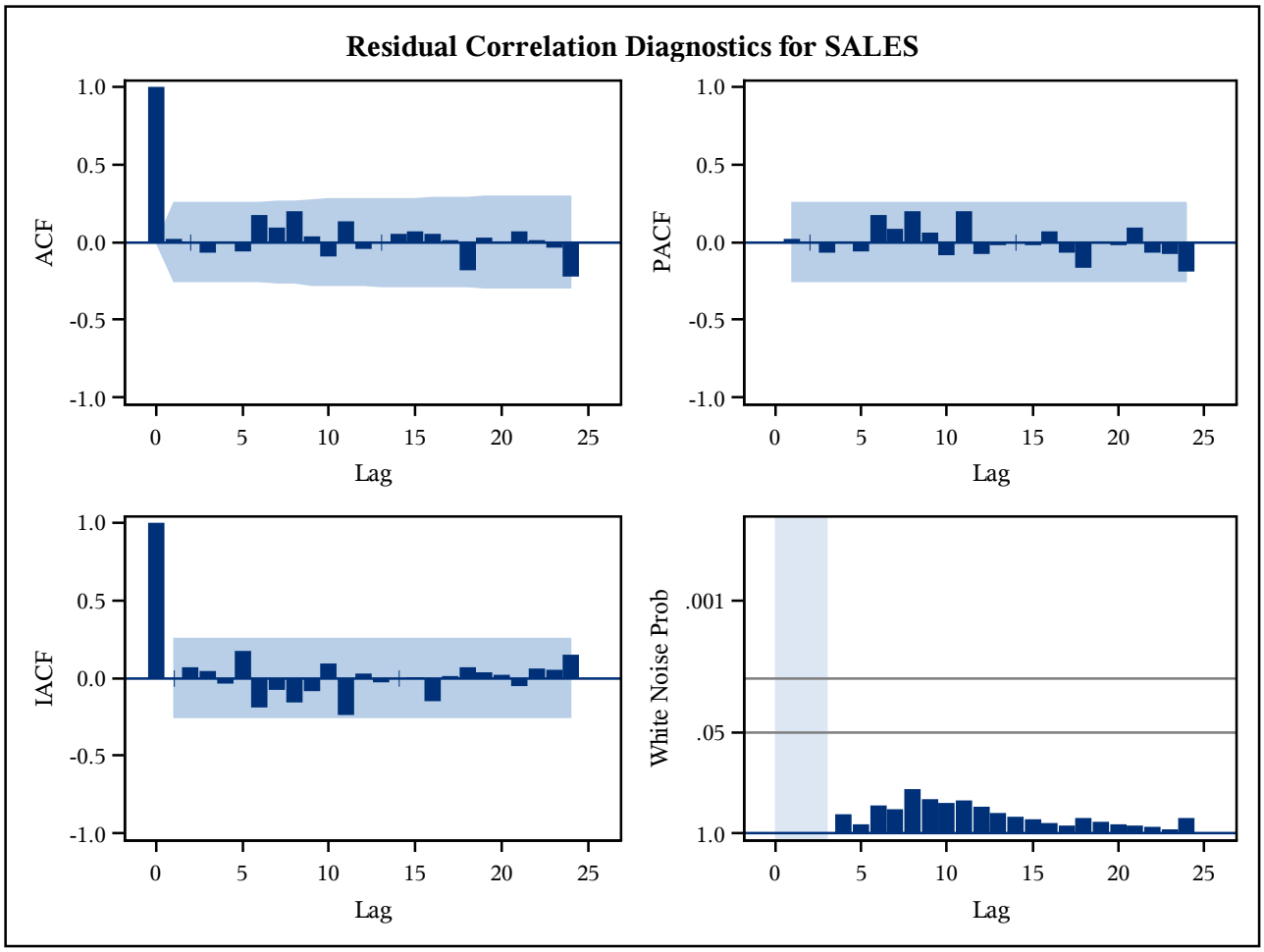
Maximum Likelihood Estimation					
Parameter	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**	**Lag**
MU	86.50110	2.79239	30.98	<.0001	0
MA1,1	-0.33669	0.11988	-2.81	0.0050	2
AR1,1	0.37702	0.11661	3.23	0.0012	1
AR2,1	0.82783	0.06187	13.38	<.0001	12

Constant Estimate	9.27823
Variance Estimate	11.14454
Std Error Estimate	3.338344
AIC	343.6485
SBC	352.157
Number of Residuals	62

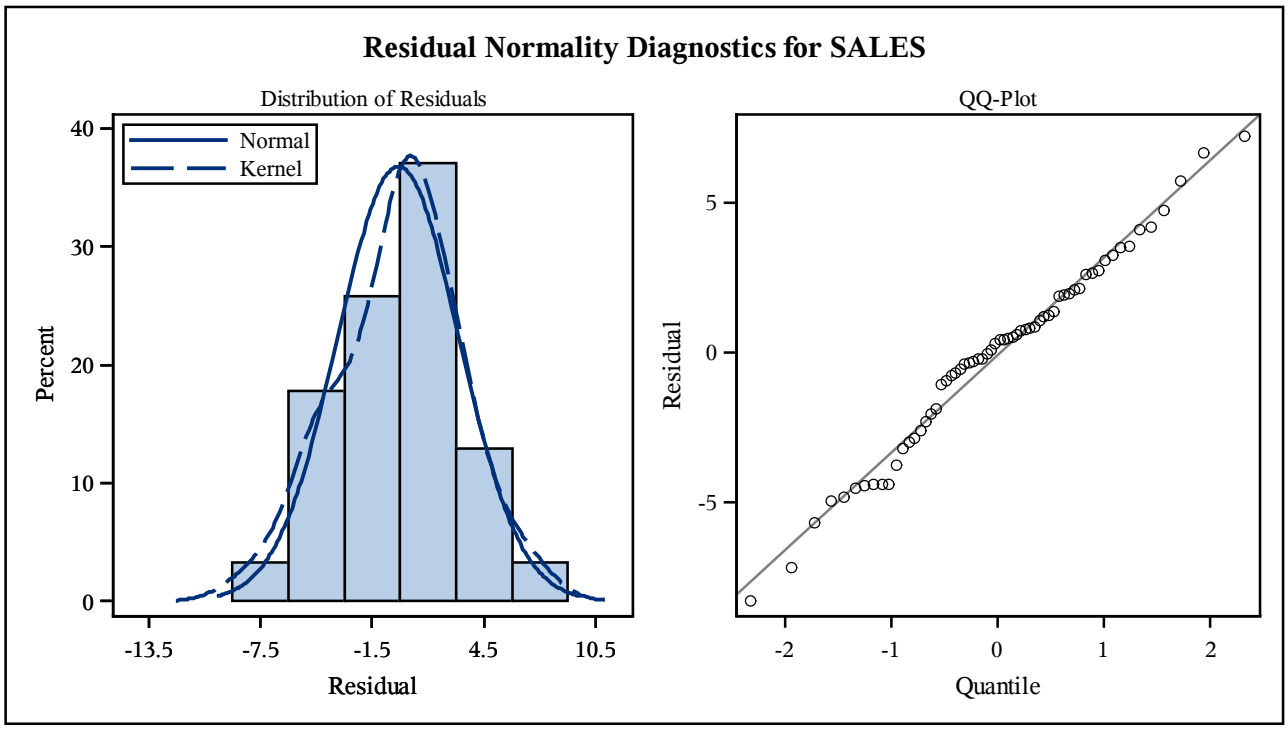
Correlations of Parameter Estimates				
Parameter	**MU**	**MA1,1**	**AR1,1**	**AR2,1**
MU	1.000	0.034	-0.073	-0.119
MA1,1	0.034	1.000	0.318	-0.216
AR1,1	-0.073	0.318	1.000	0.023
AR2,1	-0.119	-0.216	0.023	1.000

The ARIMA Procedure

Autocorrelation Check of Residuals									
To Lag	**Chi-Square**	**DF**	**Pr > ChiSq**	**Autocorrelations**					
6	2.72	3	0.4376	0.021	-0.006	-0.066	0.001	-0.059	0.174
12	8.63	9	0.4723	0.093	0.200	0.037	-0.094	0.134	-0.047
18	12.29	15	0.6567	-0.010	0.049	0.063	0.049	0.013	-0.180
24	18.15	21	0.6394	0.026	0.007	0.064	0.012	-0.041	-0.223



The ARIMA Procedure



Model for variable SALES	
Estimated Mean	86.5011

Autoregressive Factors	
Factor 1:	1 - 0.37702 B**(1)
Factor 2:	1 - 0.82783 B**(12)

Moving Average Factors	
Factor 1:	1 + 0.33669 B**(2)

The ARIMA Procedure

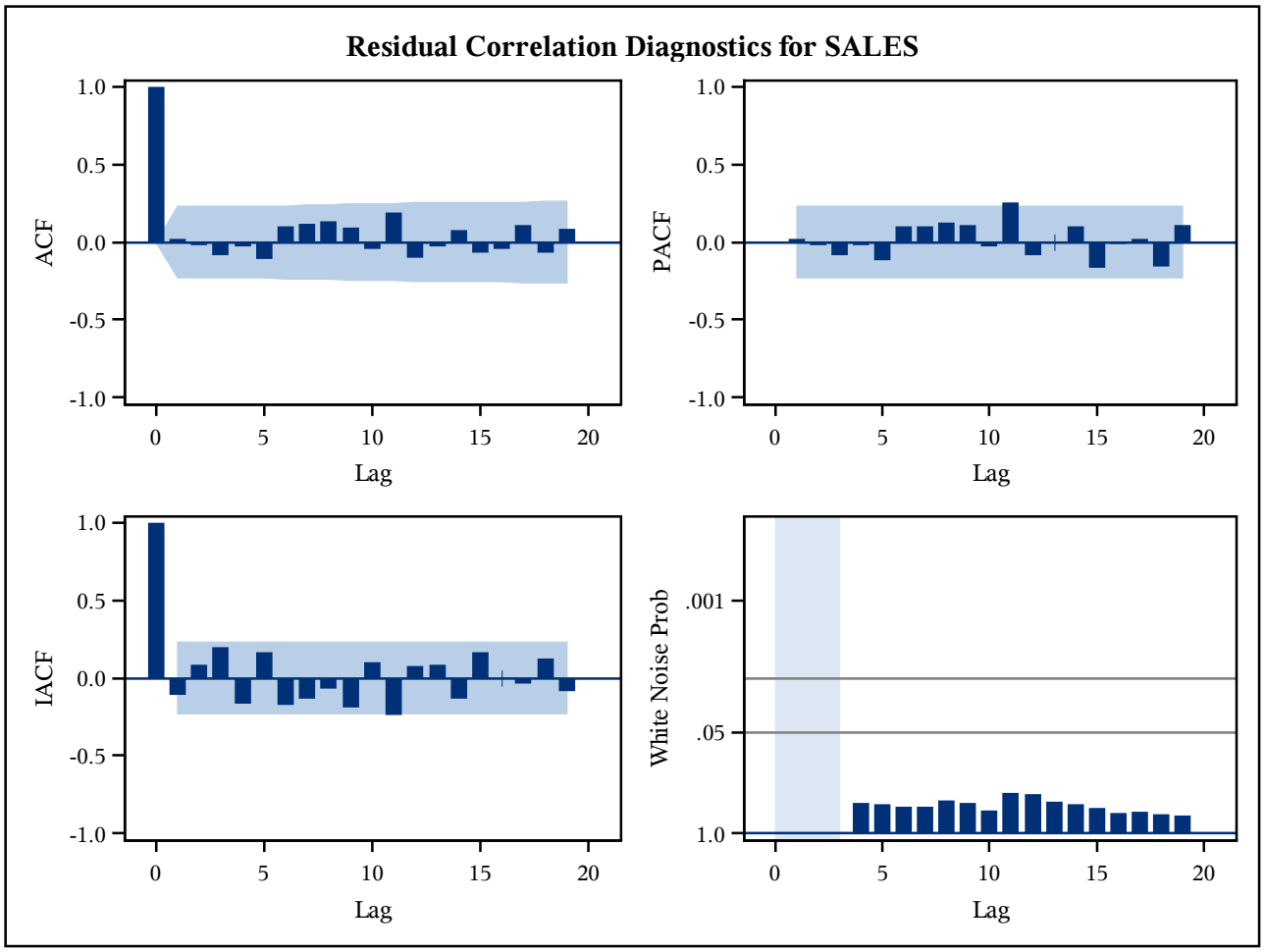
Maximum Likelihood Estimation							
Parameter	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**	**Lag**	**Variable**	**Shift**
MU	86.64309	2.42721	35.70	<.0001	0	SALES	0
MA1,1	-0.32063	0.11984	-2.68	0.0075	2	SALES	0
AR1,1	0.28931	0.11552	2.50	0.0123	1	SALES	0
AR2,1	0.78118	0.06973	11.20	<.0001	12	SALES	0
NUM1	-42.43659	2.77236	-15.31	<.0001	0	X	0
NUM1,1	10.86773	4.67470	2.32	0.0201	1	X	0
NUM1,2	-48.62838	2.98761	-16.28	<.0001	2	X	0
DEN1,1	0.56532	0.03343	16.91	<.0001	1	X	0

Constant Estimate	13.47429
Variance Estimate	13.85939
Std Error Estimate	3.72282
AIC	434.6872
SBC	453.3331
Number of Residuals	76

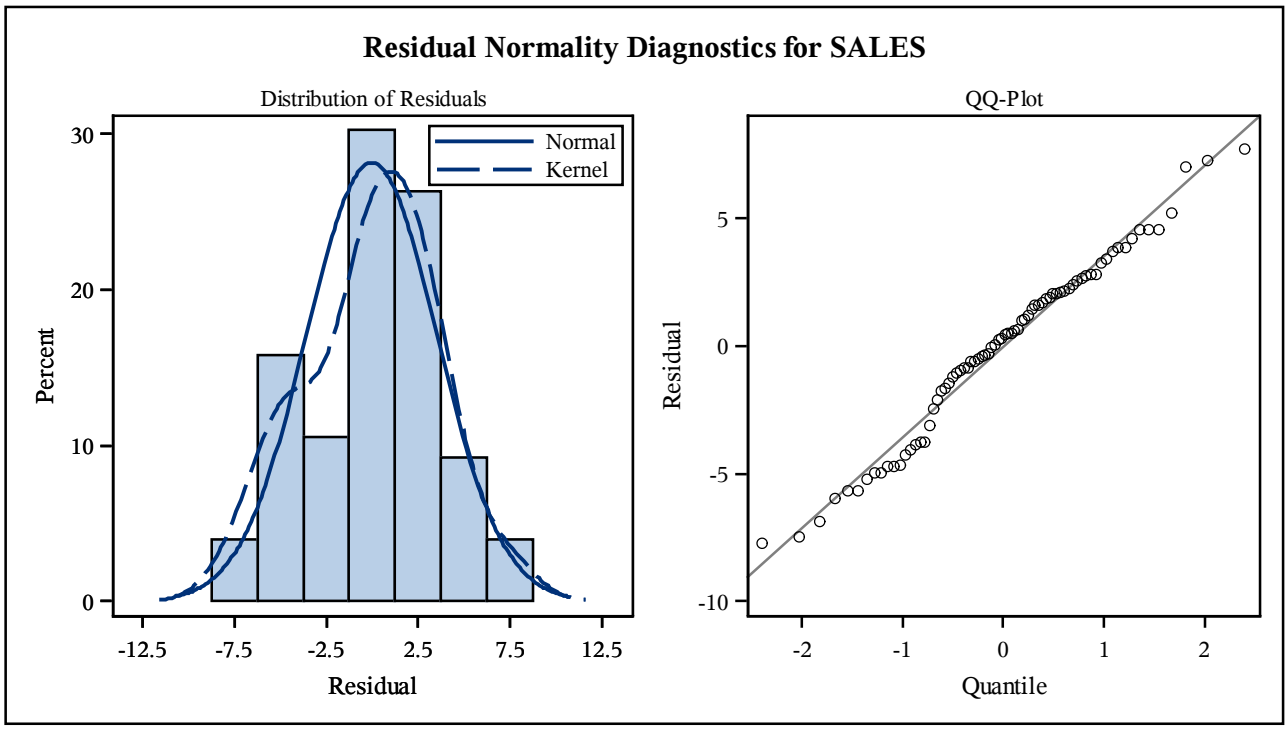
Correlations of Parameter Estimates								
Variable Parameter	**SALES MU**	**SALES MA1,1**	**SALES AR1,1**	**SALES AR2,1**	**X NUM1**	**X NUM1,1**	**X NUM1,2**	**X DEN1,1**
SALES MU	1.000	0.020	-0.081	-0.114	-0.101	-0.011	0.027	-0.051
SALES MA1,1	0.020	1.000	0.283	-0.171	-0.036	0.080	-0.139	-0.062
SALES AR1,1	-0.081	0.283	1.000	-0.001	0.179	0.146	-0.060	-0.072
SALES AR2,1	-0.114	-0.171	-0.001	1.000	0.124	0.089	-0.056	0.001
X NUM1	-0.101	-0.036	0.179	0.124	1.000	0.716	-0.242	-0.063
X NUM1,1	-0.011	0.080	0.146	0.089	0.716	1.000	-0.809	-0.453
X NUM1,2	0.027	-0.139	-0.060	-0.056	-0.242	-0.809	1.000	0.405
X DEN1,1	-0.051	-0.062	-0.072	0.001	-0.063	-0.453	0.405	1.000

The ARIMA Procedure

Autocorrelation Check of Residuals									
To Lag	**Chi-Square**	**DF**	**Pr > ChiSq**	**Autocorrelations**					
6	2.60	3	0.4581	0.021	-0.016	-0.085	-0.025	-0.110	0.103
12	10.57	9	0.3063	0.114	0.138	0.091	-0.042	0.190	-0.104
18	13.46	15	0.5671	-0.028	0.077	-0.067	-0.040	0.108	-0.069
24	20.19	21	0.5093	0.085	0.035	-0.006	-0.044	-0.077	-0.209



The ARIMA Procedure



Model for variable SALES	
Estimated Intercept	86.64309

Autoregressive Factors	
Factor 1:	1 - 0.28931 B**(1)
Factor 2:	1 - 0.78118 B**(12)

Moving Average Factors	
Factor 1:	1 + 0.32063 B**(2)

Input Number 1	
Input Variable	X

Numerator Factors	
Factor 1:	-42.437 - 10.8677 B**(1) + 48.6284 B**(2)

Denominator Factors	
Factor 1:	1 - 0.56532 B**(1)

The ARIMA Procedure

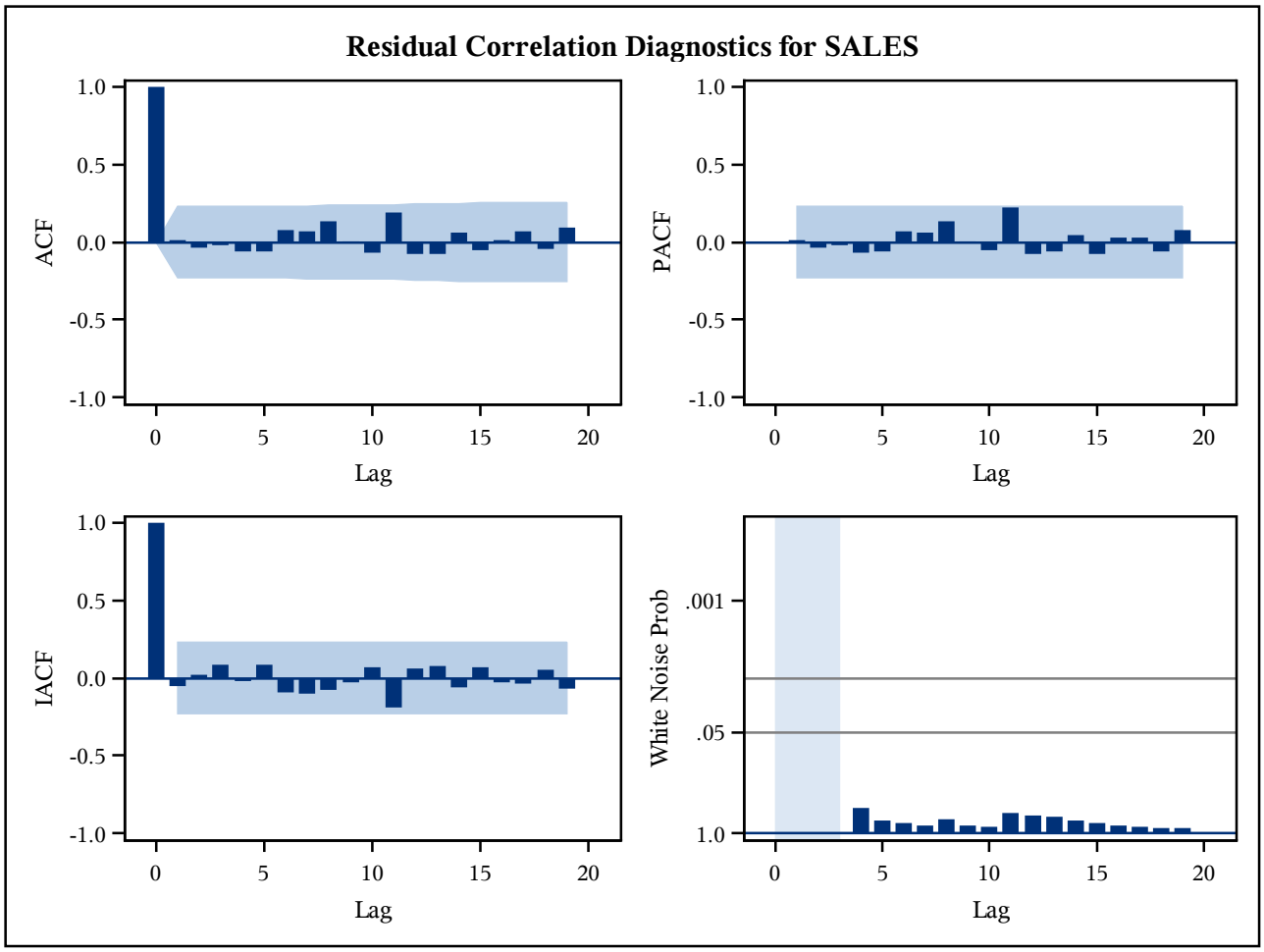
Maximum Likelihood Estimation							
Parameter	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**	**Lag**	**Variable**	**Shift**
MU	86.41344	3.33634	25.90	<.0001	0	SALES	0
MA1,1	-0.35512	0.10939	-3.25	0.0012	2	SALES	0
AR1,1	0.42321	0.10927	3.87	0.0001	1	SALES	0
AR2,1	0.83102	0.05850	14.21	<.0001	12	SALES	0
NUM1	-43.32197	2.59718	-16.68	<.0001	0	X	0
NUM1,1	16.96881	3.99539	4.25	<.0001	1	X	0
NUM1,2	-35.67537	4.37052	-8.16	<.0001	2	X	0
NUM1,3	-16.46455	4.55969	-3.61	0.0003	3	X	0
DEN1,1	0.35239	0.06887	5.12	<.0001	1	X	0

Constant Estimate	8.422503
Variance Estimate	12.54709
Std Error Estimate	3.542188
AIC	425.6257
SBC	446.4831
Number of Residuals	75

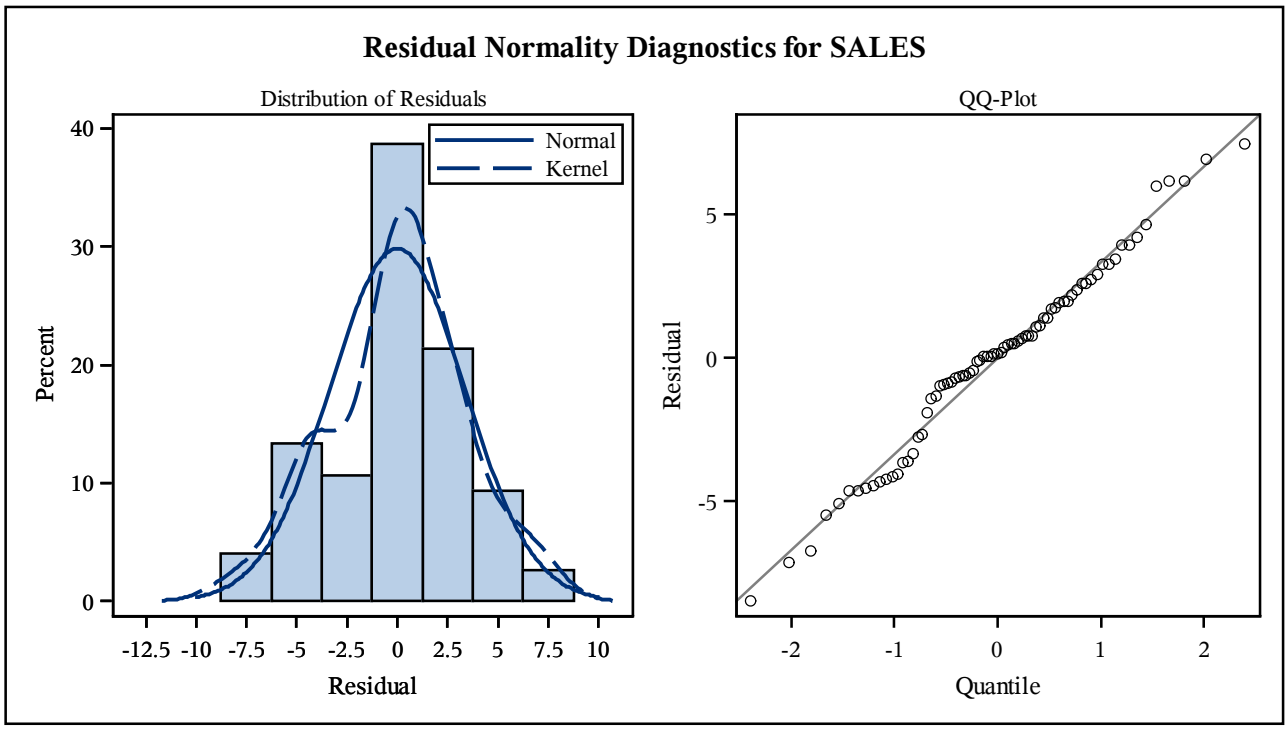
Correlations of Parameter Estimates									
Variable Parameter	**SALES MU**	**SALES MA1,1**	**SALES AR1,1**	**SALES AR2,1**	**X NUM1**	**X NUM1,1**	**X NUM1,2**	**X NUM1,3**	**X DEN1,1**
SALES MU	1.000	0.057	-0.014	-0.085	-0.078	0.048	0.044	-0.020	-0.065
SALES MA1,1	0.057	1.000	0.301	-0.145	-0.022	0.079	-0.096	0.021	-0.007
SALES AR1,1	-0.014	0.301	1.000	0.013	0.199	0.113	-0.027	0.024	-0.035
SALES AR2,1	-0.085	-0.145	0.013	1.000	0.106	0.075	0.022	-0.047	-0.026
X NUM1	-0.078	-0.022	0.199	0.106	1.000	0.555	-0.193	0.189	0.014
X NUM1,1	0.048	0.079	0.113	0.075	0.555	1.000	-0.043	-0.342	-0.558
X NUM1,2	0.044	-0.096	-0.027	0.022	-0.193	-0.043	1.000	-0.828	-0.641
X NUM1,3	-0.020	0.021	0.024	-0.047	0.189	-0.342	-0.828	1.000	0.821
X DEN1,1	-0.065	-0.007	-0.035	-0.026	0.014	-0.558	-0.641	0.821	1.000

The ARIMA Procedure

Autocorrelation Check of Residuals									
To Lag	**Chi-Square**	**DF**	**Pr > ChiSq**	**Autocorrelations**					
6	1.25	3	0.7403	0.015	-0.038	-0.022	-0.064	-0.057	0.076
12	7.49	9	0.5862	0.066	0.135	0.006	-0.067	0.193	-0.076
18	9.47	15	0.8518	-0.080	0.062	-0.055	0.014	0.073	-0.042
24	19.55	21	0.5500	0.092	-0.014	-0.045	-0.028	-0.066	-0.273



The ARIMA Procedure



Model for variable SALES	
Estimated Intercept	86.41344

Autoregressive Factors	
Factor 1:	1 - 0.42321 B**(1)
Factor 2:	1 - 0.83102 B**(12)

Moving Average Factors	
Factor 1:	1 + 0.35512 B**(2)

Input Number 1	
Input Variable	X

Numerator Factors	
Factor 1:	-43.322 - 16.9688 B**(1) + 35.6754 B**(2) + 16.4645 B**(3)

Denominator Factors	
Factor 1:	1 - 0.35239 B**(1)