The SAS System

The ARIMA Procedure

Preliminary Estimation

Initial Autoregressive Estimates	
	Estimate
1	0.97782
2	-0.03820

Initial Moving Average Estimates	
	Estimate
1	-0.02342

Constant Term Estimate	300.0818
White Noise Variance Est	2245834

Conditional Least Squares Estimation									
Iteration	SSE	MU	MA1,1	AR1,1	AR1,2	NUM1	Constant	Lambda	R Crit
0	45083672	4970.093	-0.02342	0.97782	-0.03820	367.2167	300.0818	0.00001	1
1	27714689	3608.459	0.05280	1.07951	-0.12407	387.0556	160.772	0.00001	0.942768
2	17824421	2592.060	0.16991	1.22918	-0.25982	397.1180	79.41781	0.00001	0.90288
3	12247214	1846.451	0.31429	1.40752	-0.42947	390.2751	40.53125	0.00001	0.843972
4	9086925	1309.909	0.46706	1.58455	-0.60238	367.1882	23.36087	0.00001	0.767114
5	7268323	925.2304	0.61477	1.73913	-0.75444	338.6143	14.16498	0.00001	0.675578
6	6201719	653.8933	0.75200	1.86280	-0.87611	306.7210	8.703956	0.00001	0.5805
7	5583812	470.6451	0.87740	1.95595	-0.96766	267.2953	5.511594	0.00001	0.499161
8	5459442	442.6328	0.90529	1.97311	-0.98453	253.3823	5.053617	0.00001	0.442807
9	5428548	436.4768	0.91220	1.97722	-0.98856	249.6194	4.948585	0.00001	0.431963
10	5398185	430.5359	0.91910	1.98131	-0.99256	245.7668	4.845965	0.00001	0.429744
11	5368290	424.8179	0.92603	1.98537	-0.99654	241.8115	4.745698	0.00001	0.42794
12	5360736	423.4464	0.92777	1.98638	-0.99753	240.7933	4.721112	0.00001	0.426612
13	5353203	422.0896	0.92951	1.98739	-0.99852	239.7673	4.696664	0.00001	0.426331
14	5345689	420.7477	0.93125	1.98840	-0.99951	238.7333	4.672352	0.00001	0.426084
15	5343803	420.4160	0.93169	1.98865	-0.99975	238.4727	4.666302	0.00001	0.425872

16	5341919	420.0852	0.93212	1.98891	-1.00000	238.2116	4.660261	0.00001	0.425823
17	5341919	420.0852	0.93212	1.98891	-1.00000	238.2116	4.660261	0.00001	0.425776

Warning: The model defined by the new estimates is unstable. The iteration process has been terminated.

Warning: Estimates may not have converged.

ARIMA Estimation Optimization Summary	
Estimation Method	Conditional Least Squares
Parameters Estimated	5
Termination Criteria	Maximum Relative Change in Estimates
Iteration Stopping Value	0.001
Criteria Value	1.124803
Maximum Absolute Value of Gradient	38849786
R-Square Change from Last Iteration	0.425776
Objective Function	Sum of Squared Residuals
Objective Function Value	5341919
Marquardt's Lambda Coefficient	0.00001
Numerical Derivative Perturbation Delta	0.001
Iterations	17
Warning Message	Estimates may not have converged.

Conditional Least Squares Estimation							
Parameter	**Estimate**	**Standard Error**	**t Value**	**Approx Pr > |t|**	**Lag**	**Variable**	**Shift**
MU	420.08522	410.66251	1.02	0.3128	0	y	0
MA1,1	0.93212	0.28591	3.26	0.0024	1	y	0
AR1,1	1.98891	0.15255	13.04	<.0001	1	y	0
AR1,2	-1.00000	0.14884	-6.72	<.0001	2	y	0
NUM1	238.21155	163.38091	1.46	0.1531	0	time	0

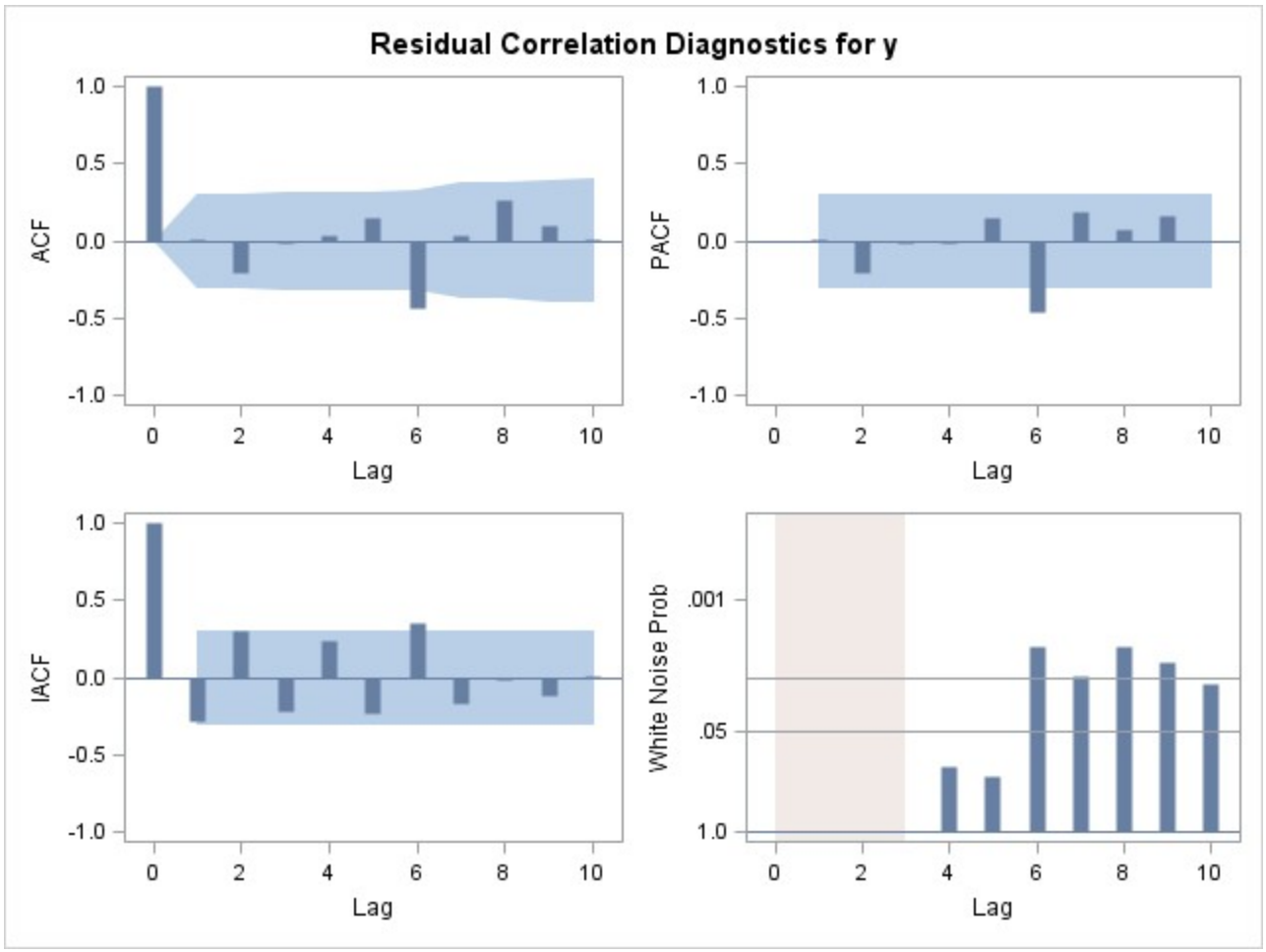
Constant Estimate	4.660261
Variance Estimate	140576.8
Std Error Estimate	374.9357
AIC	636.4142
SBC	645.2202

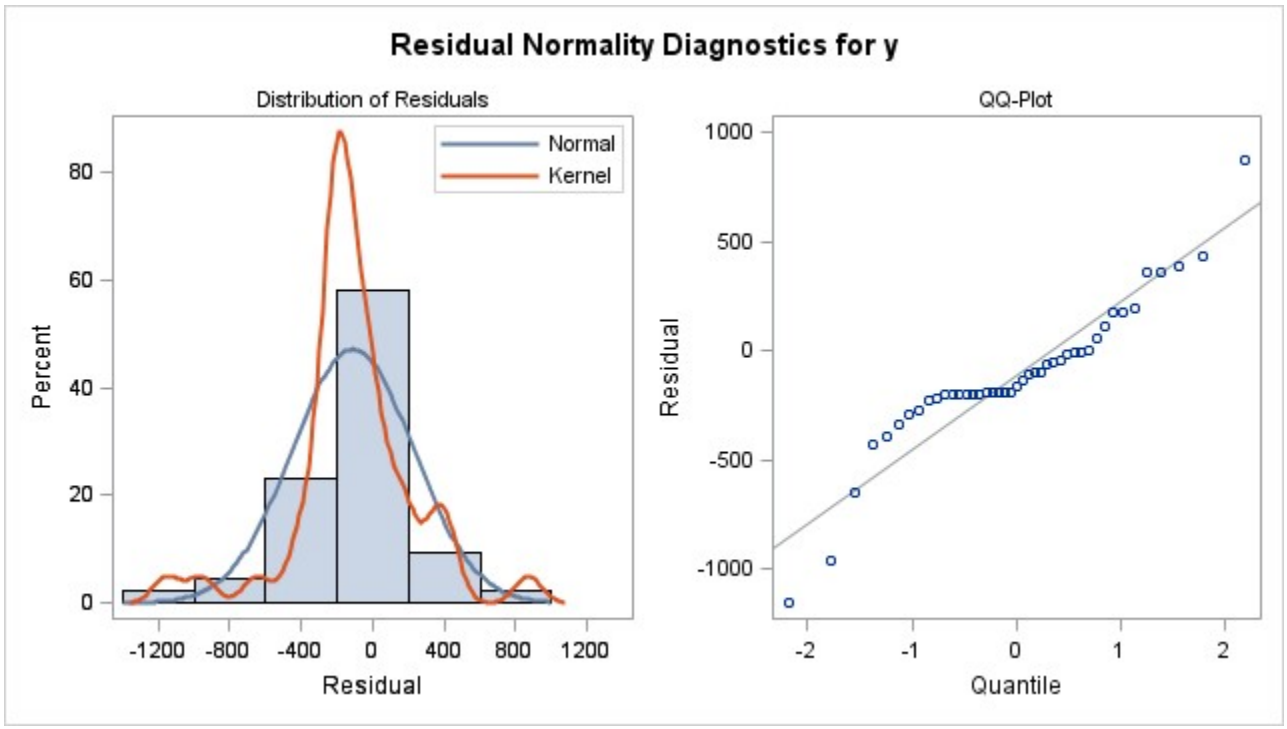
Number of Residuals	43

*** AIC and SBC do not include log determinant.**

Correlations of Parameter Estimates					
Variable Parameter	y MU	y MA1,1	y AR1,1	y AR1,2	time NUM1
y MU	1.000	0.353	0.338	-0.333	-0.426
y MA1,1	0.353	1.000	0.957	-0.949	-0.968
y AR1,1	0.338	0.957	1.000	-0.999	-0.972
y AR1,2	-0.333	-0.949	-0.999	1.000	0.971
time NUM1	-0.426	-0.968	-0.972	0.971	1.000

Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	9.12	3	0.0278	0.097	-0.098	0.062	0.097	0.213	-0.317
12	19.53	9	0.0210	0.106	0.293	0.133	0.070	-0.042	0.242
18	22.57	15	0.0936	0.085	-0.139	-0.045	0.087	0.088	0.016
24	23.87	21	0.2994	-0.002	-0.029	0.005	0.039	0.045	0.093





Model for variable y

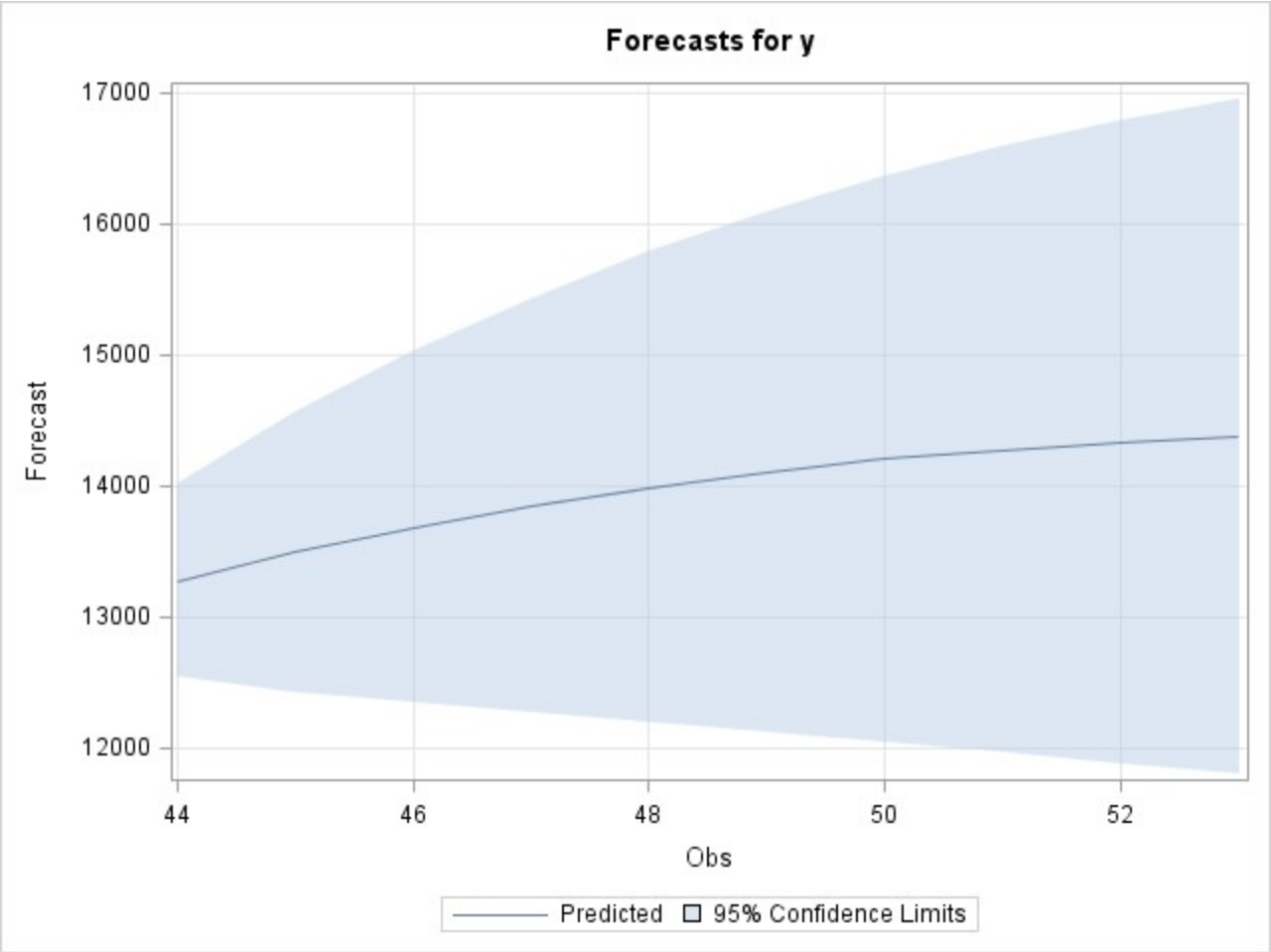
Estimated Intercept	420.0852

Autoregressive Factors	
Factor 1:	1 - 1.98891 B**(1) + 1 B**(2)

Moving Average Factors	
Factor 1:	1 - 0.93212 B**(1)

Input Number 1	
Input Variable	time
Overall Regression Factor	238.2116

Forecasts for variable y				
Obs	Forecast	Std Error	95% Confidence Limits	
44	13270.0587	374.9357	12535.1981	14004.9192
45	13487.8403	545.5010	12418.6780	14557.0026
46	13679.5715	684.2799	12338.4076	15020.7354
47	13845.7680	805.7481	12266.5307	15425.0052
48	13987.2286	914.7338	12194.3832	15780.0739
49	14105.0266	1013.2463	12119.1004	16090.9529
50	14200.4980	1102.1879	12040.2495	16360.7465
51	14275.2261	1181.9750	11958.5977	16591.8545
52	14331.0247	1252.8153	11875.5517	16786.4976
53	14369.9172	1314.8507	11792.8572	16946.9773


Forecasts for y
Forecast
17000
16000
15000
14000
13000
12000
44
46
48
50
52
Obs
Predicted
95% Confidence Limits