

ARIMA Modeling and Forecasting

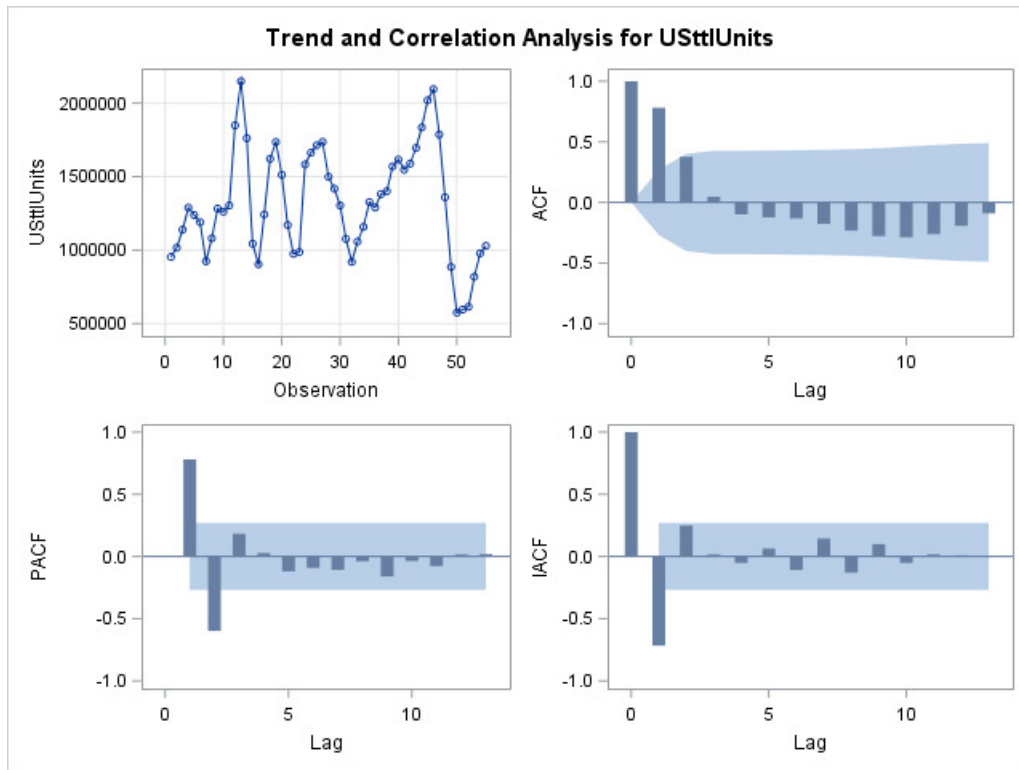
Results

The ARIMA Procedure

Name of Variable = USttlUnits	
Mean of Working Series	1322870
Standard Deviation	370905.8
Number of Observations	55

Autocorrelation Check for White Noise									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	46.50	6	<.0001	0.781	0.375	0.047	-0.098	-0.123	-0.132
12	70.78	12	<.0001	-0.177	-0.233	-0.278	-0.288	-0.261	-0.193

Phillips-Perron Unit Root Tests						
Type	Lags	Rho	Pr < Rho	Tau	Pr < Tau	
Zero Mean	0	-0.7744	0.5101	-0.60	0.4508	
	1	-1.1463	0.4448	-0.74	0.3913	
	2	-1.1729	0.4406	-0.75	0.3874	
Single Mean	0	-11.3659	0.0807	-2.50	0.1219	
	1	-16.3154	0.0197	-2.95	0.0466	
	2	-17.1900	0.0151	-3.02	0.0392	
Trend	0	-11.3943	0.3070	-2.49	0.3314	
	1	-16.2442	0.1093	-2.93	0.1606	
	2	-17.0168	0.0913	-3.00	0.1423	



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ARIMA Estimation Optimization Summary	
Estimation Method	Conditional Least Squares
Parameters Estimated	9
Termination Criteria	Maximum Relative Change in Estimates
Iteration Stopping Value	0.001
Criteria Value	3.086409
Maximum Absolute Value of Gradient	1.27E12
R-Square Change from Last Iteration	0.129423
Objective Function	Sum of Squared Residuals
Objective Function Value	1.559E12
Marquardt's Lambda Coefficient	0.0001
Numerical Derivative Perturbation Delta	0.001
Iterations	35
Warning Message	Estimates may not have converged.

Conditional Least Squares Estimation					
Parameter	Estimate	Standard Error	t Value	Approx Pr > t	Lag
MU	1168118.0	90145.3	12.96	<.0001	0
MA1,1	-2.48065	0.27512	-9.02	<.0001	1
MA1,2	-2.71977	0.79803	-3.41	0.0014	2
MA1,3	-1.54020	0.80762	-1.91	0.0628	3
MA1,4	-0.47130	0.30104	-1.57	0.1243	4
AR1,1	-0.93518	0.29642	-3.15	0.0028	1
AR1,2	0.03690	0.46414	0.08	0.9370	2
AR1,3	0.27687	0.27088	1.02	0.3121	3
AR1,4	-0.10935	0.31768	-0.34	0.7322	4

Constant Estimate	2021740
Variance Estimate	3.389E10
Std Error Estimate	184082.4
AIC	1497.8
SBC	1515.866
Number of Residuals	55

* AIC and SBC do not include log determinant.

Correlations of Parameter Estimates									
Parameter	MU	MA1,1	MA1,2	MA1,3	MA1,4	AR1,1	AR1,2	AR1,3	AR1,4
MU	1.000	0.330	0.280	0.239	0.190	0.149	0.075	-0.314	-0.220
MA1,1	0.330	1.000	0.944	0.845	0.672	0.854	0.707	-0.607	-0.751
MA1,2	0.280	0.944	1.000	0.973	0.875	0.817	0.849	-0.519	-0.825
MA1,3	0.239	0.845	0.973	1.000	0.962	0.735	0.886	-0.413	-0.826
MA1,4	0.190	0.672	0.875	0.962	1.000	0.589	0.861	-0.261	-0.749
AR1,1	0.149	0.854	0.817	0.735	0.589	1.000	0.790	-0.523	-0.730

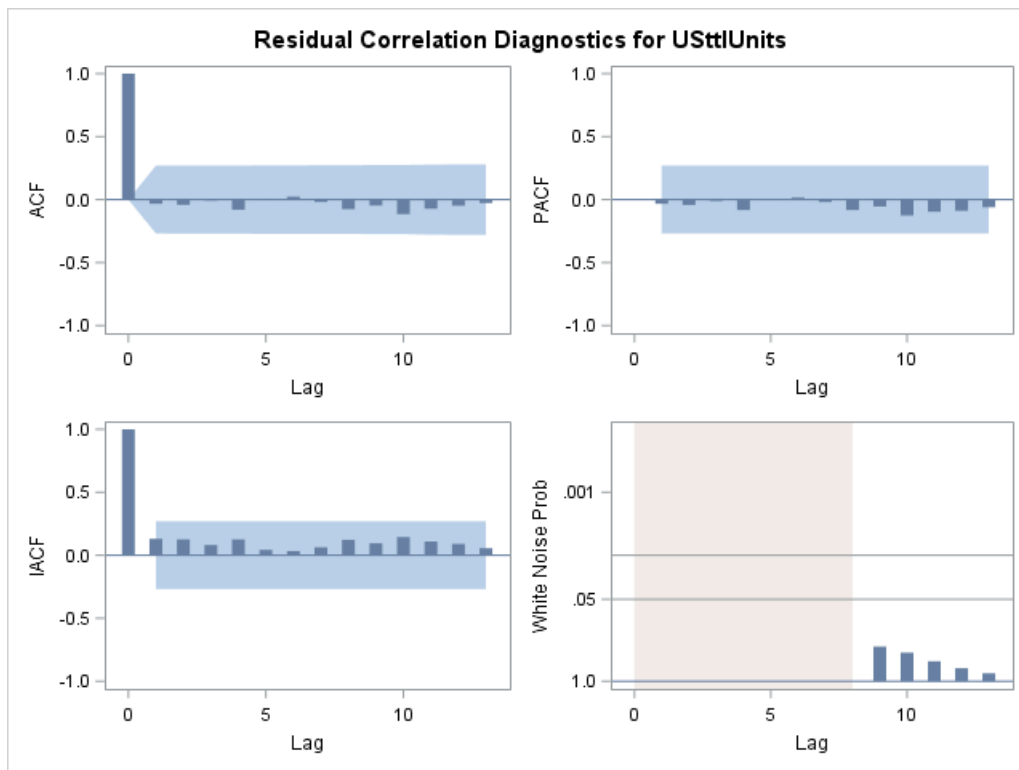
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Correlations of Parameter Estimates									
Parameter	MU	MA1,1	MA1,2	MA1,3	MA1,4	AR1,1	AR1,2	AR1,3	AR1,4
AR1,2	0.075	0.707	0.849	0.886	0.861	0.790	1.000	-0.186	-0.751
AR1,3	-0.314	-0.607	-0.519	-0.413	-0.261	-0.523	-0.186	1.000	0.638
AR1,4	-0.220	-0.751	-0.825	-0.826	-0.749	-0.730	-0.751	0.638	1.000

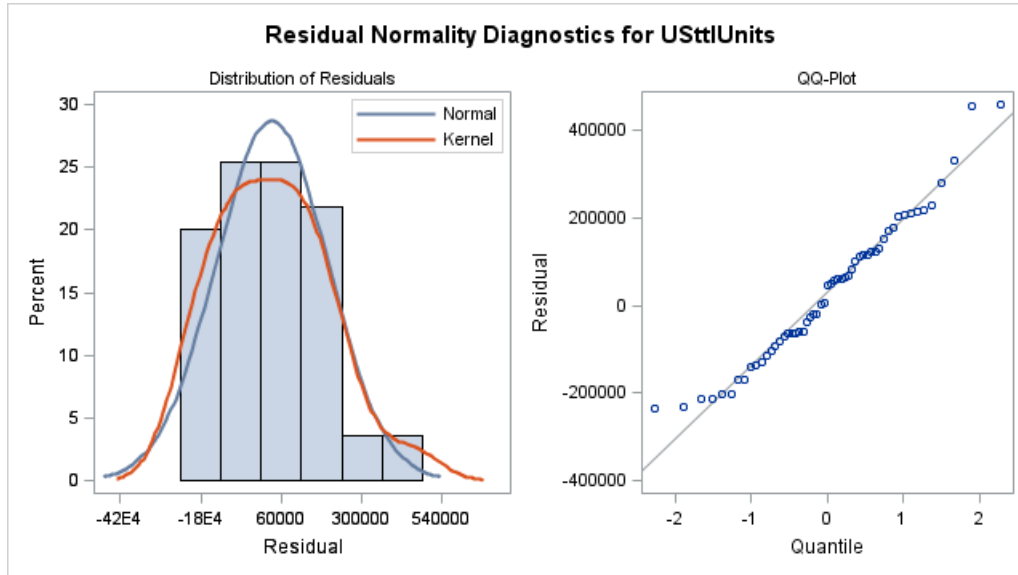
Autocorrelation Check of Residuals									
To Lag	Chi-Square	DF	Pr > ChiSq	Autocorrelations					
6	.	0	.	0.010	-0.001	0.031	-0.036	0.048	0.070
12	0.98	4	0.9126	0.038	-0.019	0.009	-0.054	-0.023	-0.012
18	4.19	10	0.9384	0.005	0.014	0.085	0.103	-0.057	0.133
24	10.37	16	0.8468	-0.006	-0.002	0.167	0.056	-0.170	0.068



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Model for variable USttlUnits

Estimated Mean 1168118

Autoregressive Factors

Factor 1: $1 + 0.93518 B^{**}(1) - 0.0369 B^{**}(2) - 0.27687 B^{**}(3) + 0.10935 B^{**}(4)$

Moving Average Factors

Factor 1: $1 + 2.48065 B^{**}(1) + 2.71977 B^{**}(2) + 1.5402 B^{**}(3) + 0.4713 B^{**}(4)$

Forecasts for variable USttlUnits

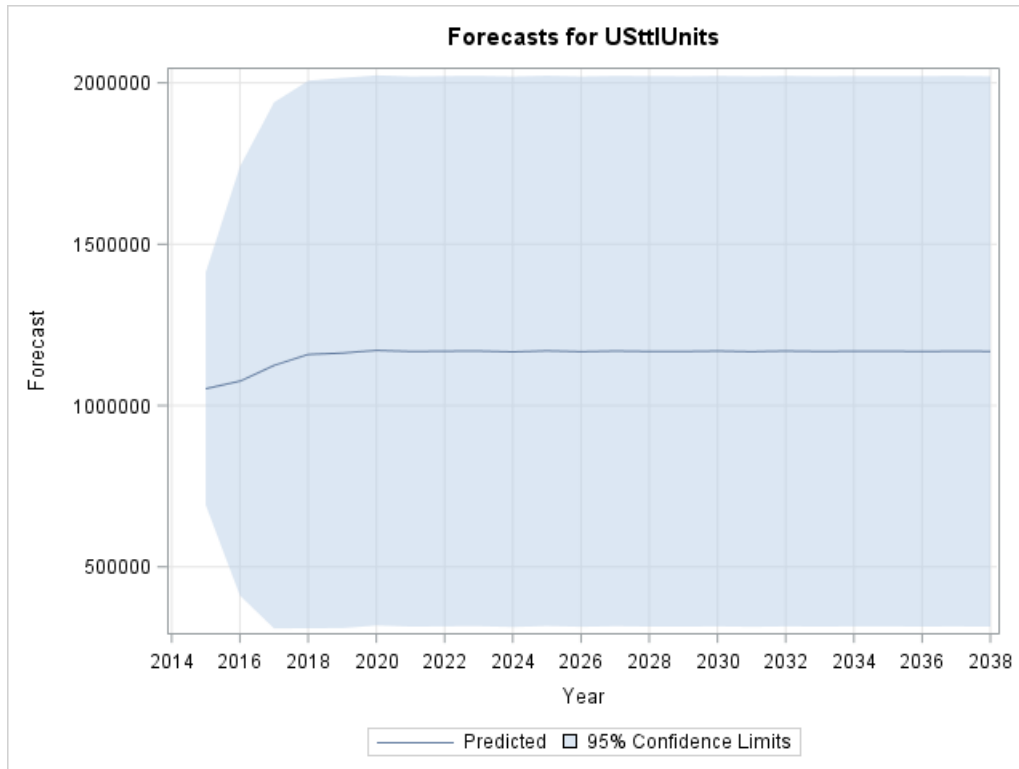
Obs	Forecast	Std Error	95% Confidence Limits	
56	1052440.0	184082	691645.1	1413234.9
57	1075644.0	338854	411501.3	1739786.6
58	1124586.0	416050	309143.2	1940028.8
59	1158290.4	432798	310021.7	2006559.2
60	1162749.0	434909	310343.1	2015154.8
61	1170836.2	434909	318430.3	2023242.1
62	1167417.3	434984	314863.7	2019970.9
63	1168461.8	435072	315735.4	2021188.2
64	1169110.3	435089	316350.8	2021869.9
65	1166711.4	435093	313945.5	2019477.3
66	1169641.8	435096	316870.2	2022413.5
67	1166878.2	435109	314079.7	2019676.6
68	1168835.8	435129	315998.1	2021673.4
69	1167976.7	435146	315107.1	2020846.4
70	1167766.7	435153	314882.4	2020651.0
71	1168775.6	435154	315889.1	2021662.1

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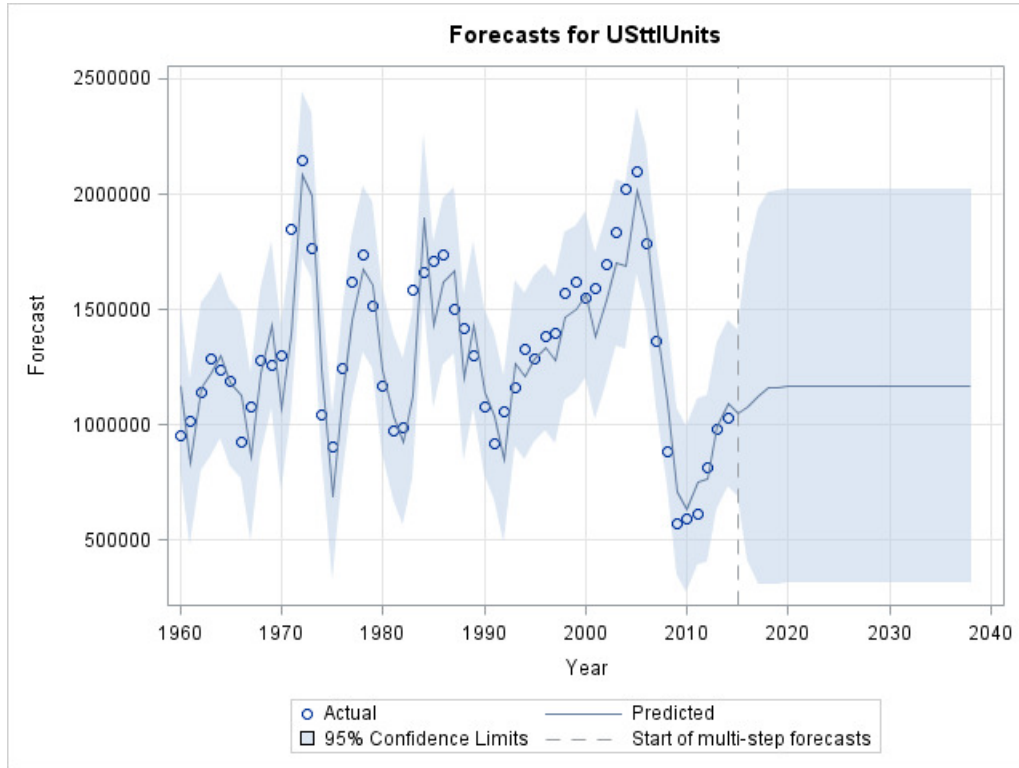
Forecasts for variable USttlUnits				
Obs	Forecast	Std Error	95% Confidence Limits	
72	1167372.5	435154	314485.4	2020259.5
73	1168757.7	435157	315865.4	2021650.0
74	1167712.8	435162	314811.5	2020614.1
75	1168242.3	435166	315332.8	2021151.7
76	1168245.5	435168	315331.7	2021159.2
77	1167821.2	435169	314906.6	2020735.9
78	1168479.0	435169	315564.3	2021393.6
79	1167791.2	435169	314875.5	2020706.8



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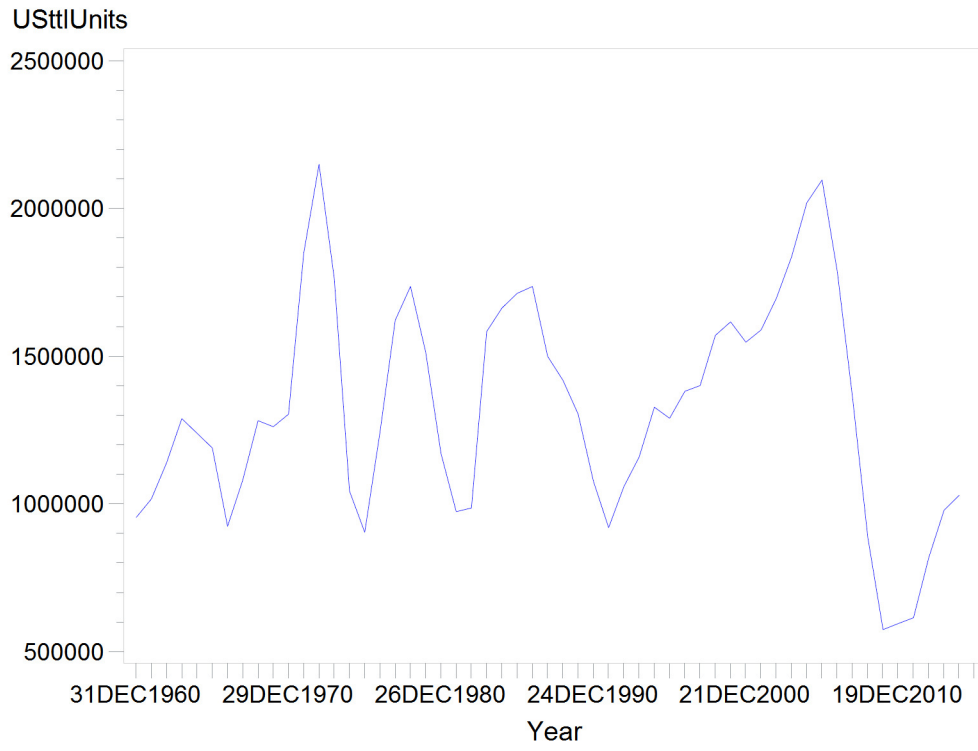
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Actual Values



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Residuals

