



We need to differencing





**ARIMA Model: W13.5**

Estimates at each iteration

Iteration SSE Parameters

 0 140047 0.100 10.168

 1 125391 0.250 8.475

 2 117634 0.400 6.772

 3 116293 0.489 5.740

 4 116290 0.493 5.657

 5 116290 0.494 5.650

Relative change in each estimate less than 0.0010

Final Estimates of Parameters

Type Coef SE Coef T P

AR 1 0.4936 0.0979 5.04 0.000

Constant 5.650 4.262 1.33 0.189

Differencing: 1 regular difference

Number of observations: Original series 82, after differencing 81

Residuals: SS = 116253 (backforecasts excluded)

 MS = 1472 DF = 79

Modified Box-Pierce (Ljung-Box) Chi-Square statistic

Lag 12 24 36 48

Chi-Square 6.6 21.1 22.2 25.3

DF 10 22 34 46

P-Value 0.763 0.513 0.940 0.994

**ARIMA Model: W13.5**

Estimates at each iteration

Iteration SSE Parameters

 0 140047 0.100 10.168

 1 125391 0.250 8.475

 2 117634 0.400 6.772

 3 116293 0.489 5.740

 4 116290 0.493 5.657

 5 116290 0.494 5.650

Relative change in each estimate less than 0.0010

Final Estimates of Parameters

Type Coef SE Coef T P

AR 1 0.4936 0.0979 5.04 0.000

Constant 5.650 4.262 1.33 0.189

Differencing: 1 regular difference

Number of observations: Original series 82, after differencing 81

Residuals: SS = 116253 (backforecasts excluded)

 MS = 1472 DF = 79

Modified Box-Pierce (Ljung-Box) Chi-Square statistic

Lag 12 24 36 48

Chi-Square 6.6 21.1 22.2 25.3

DF 10 22 34 46

P-Value 0.763 0.513 0.940 0.994

Forecasts from period 82

 95% Limits

Period Forecast Lower Upper Actual

 83 1645.51 1570.31 1720.71

 84 1659.31 1524.14 1794.48

 85 1671.77 1483.78 1859.76

 86 1683.57 1449.37 1917.78

 87 1695.05 1420.03 1970.07

 88 1706.36 1394.83 2017.90

 89 1717.60 1372.93 2062.27

 90 1728.80 1353.71 2103.89

 91 1739.97 1336.65 2143.30

 92 1751.14 1321.39 2180.89

 93 1762.30 1307.64 2216.97

 94 1773.46 1295.17 2251.76

 95 1784.62 1283.81 2285.44

 96 1795.78 1273.41 2318.15

 97 1806.94 1263.87 2350.01

 98 1818.10 1255.09 2381.10

 99 1829.26 1247.00 2411.52

 100 1840.41 1239.51 2441.32

 101 1851.57 1232.59 2470.55

 102 1862.73 1226.19 2499.28

So the model

Before differencing is

ARIMA (1,1,0)

(1-B)(1-0.4936B)Zt=at

AFTER DIFFERENCING

AR(1)

Wt(1-0.4936B)=at









We need to transform the data to 1\ Z







**ARIMA Model: C3**

Estimates at each iteration

Iteration SSE Parameters

 0 0.820004 0.100 0.100 0.091

 1 0.005970 0.117 0.083 0.009

 2 0.000054 0.198 0.123 0.002

 3 0.000045 0.127 -0.027 0.002

 4 0.000034 0.112 -0.177 0.002

 5 0.000020 0.200 -0.327 0.001

 6 0.000011 0.350 -0.431 0.001

 7 0.000006 0.500 -0.414 0.001

 8 0.000003 0.650 -0.367 0.001

 9 0.000001 0.800 -0.348 0.000

 10 0.000000 0.929 -0.469 0.000

 11 0.000000 1.003 -0.575 -0.000

 12 0.000000 1.017 -0.551 -0.000

 13 0.000000 1.018 -0.553 -0.000

 14 0.000000 1.018 -0.552 -0.000

Relative change in each estimate less than 0.0010

Final Estimates of Parameters

Type Coef SE Coef T P

AR 1 1.0177 0.0217 46.93 0.000

MA 1 -0.5522 0.0939 -5.88 0.000

Constant -2.44902E-05 -8.49677E-06 2.88 0.005

Mean 0.0013870 0.0004812

Number of observations: 82

Residuals: SS = 0.0000000641077 (backforecasts excluded)

 MS = 0.0000000008115 DF = 79

Modified Box-Pierce (Ljung-Box) Chi-Square statistic

Lag 12 24 36 48

Chi-Square 7.2 26.0 31.2 46.4

DF 9 21 33 45

P-Value 0.621 0.206 0.555 0.413

The model is

ARIMA(1,0,1)

Zt=1.0177z(t-1) +at+0.5522a(t-1)