Example: $\Delta \ln(GDP)$ for Belgium

$\rightarrow$ estimate tentative

Figure 50 : Esti (1) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 2007:4
Included observations: 147
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005831	0.001143	5.101796	0.0000
AR(1)	0.704082	0.058970	11.93958	0.0000

R-squared	[illegible]	Mean dependent var	0.005838
Adjusted R-squared	0.492268	S.D. dependent var	0.005754
S.E. of regression	0.004100	Akaike info criterion	-8.141966
Sum squared resid	0.002438	Schwarz criterion	-8.101280
Log likelihood	600.4345	F-statistic	142.5535
Durbin-Watson stat	1.578452	Prob(F-statistic)	0.000000

Inverted AR Roots	.70

Figure 51 : Esti (1) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 20
Included observati

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001725	0.000483	3.574372	0.0005
DLNGDP(-1)	0.704082	0.058970	11.93958	0.0000

R-squared	0.495746	Mean dependent var	0.005838
Adjusted R-squared	0.492268	S.D. dependent var	0.005754
S.E. of regression	0.004100	Akaike info criterion	-8.141966
Sum squared resid	0.002438	Schwarz criterion	-8.101280
Log likelihood	600.4345	F-statistic	142.5535
Durbin-Watson stat	1.578452	Prob(F-statistic)	0.000000

Figure 52 : Esti[illegible](2) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 20[illegible]
Included observati[illegible]
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005850	0.000847	6.909419	0.0000
AR(1)	0.911463	0.079576	11.45394	0.0000
AR(2)	-0.294443	0.079501	-3.703648	0.0003

R-squared	0.539602	Mean dependent var	0.005838
Adjusted R-squared	[illegible]	S.D. dependent var	0.005754
S.E. of regression	0.003932	Akaike info criterion	-8.219349
Sum squared resid	0.002226	Schwarz criterion	-8.158320
Log likelihood	[illegible]	F-statistic	84.38646
Durbin-Watson stat	2.146360	Prob(F-statistic)	0.000000

Inverted AR Roots	.46 -.29i	.46+.29i

Figure 53 : Estimated AR(3) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 20
Included observati
Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005871	0.000653	8.988452	0.0000
AR(1)	0.834814	0.080774	10.33520	0.0000
AR(2)	-0.058590	0.106640	-0.549416	0.5836
AR(3)	-0.257729	0.080542	-3.199851	0.0017

R-squared	0.570365	Mean dependent var	0.005838
Adjusted R-squared	0.561351	S.D. dependent var	0.005754
S.E. of regression	0.003811	Akaike info criterion	-8.274898
Sum squared resid	0.002077	Schwarz criterion	-8.193526
Log likelihood	612.2050	F-statistic	63.28015
Durbin-Watson stat	2.058299	Prob(F-statistic)	0.000000

Inverted AR Roots	.63 -.45i	.63+.45i	-.43

Figure 54 : Esti[illegible](1) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 20[illegible]
Included observati[illegible]
Convergence achieved after 9 iterations
Backcast: 1971:1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005841	0.000652	8.952723	0.0000
MA(1)	0.884440	0.039768	22.24020	0.0000

R-squared	0.470877	Mean dependent var	0.005838
Adjusted R-squared	0.467327	S.D. dependent var	0.005754
S.E. of regression	0.004200	Akaike info criterion	-8.093824
Sum squared resid	0.002558	Schwarz criterion	-8.053138
Log likelihood	596.8961	F-statistic	129.0381
Durbin-Watson stat	1.876355	Prob(F-statistic)	0.000000

Inverted MA Roots	-.88

Figure 55 : Esti[illegible](2) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 20[illegible]
Included observati[illegible]
Convergence achieved after 19 iterations
Backcast: 1970:4 1971:1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005824	0.000707	8.236254	0.0000
MA(1)	0.658915	0.075300	8.750510	0.0000
MA(2)	[illegible]	[illegible]	5.704152	0.0000

R-squared	0.498078	Mean dependent var	0.005838
Adjusted R-squared	0.491107	S.D. dependent var	0.005754
S.E. of regression	0.004105	Akaike info criterion	-8.132996
Sum squared resid	0.002427	Schwarz criterion	-8.071967
Log likelihood	600.7752	F-statistic	71.44862
Durbin-Watson stat	1.692709	Prob(F-statistic)	0.000000

Inverted MA Roots	-.33+.57i	-.33 -.57i

Figure 56 : Estima[illegible](1,1) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 20[illegible]
Included observati[illegible]
Convergence achi[illegible]terations
Backcast: 1971:1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005839	0.001000	5.836744	0.0000
AR(1)	0.581263	0.092106	6.310777	0.0000
MA(1)	0.270706	0.108949	2.484704	0.0141

R-squared	0.522981	Mean dependent var	0.005838
Adjusted R-squared	[illegible]	S.D. dependent var	0.005754
S.E. of regression	0.004002	Akaike info criterion	-8.183883
Sum squared resid	0.002306	Schwarz criterion	-8.122854
Log likelihood	604.5154	F-statistic	78.93724
Durbin-Watson stat	1.941688	Prob(F-statistic)	0.000000

Inverted AR Roots	.58
Inverted MA Roots	-.27

Figure 57 : Estima[illegible](1,2) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 2[illegible]
Included observat[illegible]
Convergence ach[illegible]terations
Backcast: 1970:4 1971:1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005832	0.001026	5.683222	0.0000
AR(1)	0.484945	0.123080	3.940075	0.0001
MA(1)	0.287716	0.124995	2.301818	0.0228
MA(2)	[illegible]	[illegible]	[illegible]	0.0006

R-squared	0.545511	Mean dependent var	0.005838
Adjusted R-squared	[illegible]	S.D. dependent var	0.005754
S.E. of regression	0.003920	Akaike info criterion	-8.218661
Sum squared resid	0.002197	Schwarz criterion	-8.137289
Log likelihood	608.0716	F-statistic	57.21298
Durbin-Watson stat	1.882080	Prob(F-statistic)	0.000000

Inverted AR Roots	.48	
Inverted MA Roots	-.14 -.57i	-.14+.57i

Figure 58 : Estima[illegible]A(2,1) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 2[illegible]
Included observat[illegible]
Convergence ach[illegible]terations
Backcast: 1971:1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005800	0.000623	9.306436	0.0000
AR(1)	1.335567	0.150299	8.886095	0.0000
AR(2)	-0.610058	0.104117	-5.859366	0.0000
MA(1)	-0.464456	0.178054	-2.608505	0.0101

R-squared	0.562620	Mean dependent var	0.005838
Adjusted R-squared	0.553444	S.D. dependent var	0.005754
S.E. of regression	0.003845	Akaike info criterion	-8.257033
Sum squared resid	0.002115	Schwarz criterion	-8.175661
Log likelihood	610.8920	F-statistic	61.31567
Durbin-Watson stat	2.085756	Prob(F-statistic)	0.000000

Inverted AR Roots	.67 -.41i	.67+.41i
Inverted MA Roots	.46	

Figure 59 : Estima[illegible](2,2) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 [illegible]
Included observ[illegible]
Convergence ac[illegible] iterations
Backcast: 1970:4 1971:1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005903	0.001008	5.857344	0.0000
AR(1)	-0.204331	0.136337	-1.498720	0.1362
AR(2)	0.467106	0.081719	5.716035	0.0000
MA(1)	1.163758	0.151428	7.685222	0.0000
MA(2)	0.172362	0.149734	1.151122	0.2516

R-squared	0.562108	Mean dependent var	0.005838
Adjusted R-squared	0.549778	S.D. dependent var	0.005754
S.E. of regression	0.003861	Akaike info criterion	-8.242268
Sum squared resid	0.002117	Schwarz criterion	-8.140553
Log likelihood	610.8067	F-statistic	45.57109
Durbin-Watson stat	1.960197	Prob(F-statistic)	0.000000

Inverted AR Roots	.59	-.79
Inverted MA Roots	-.17	-.99

Figure 60 : Estima[illegible](3,2) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 [illegible]
Included observ[illegible]
Convergence ac[illegible] iterations
Backcast: 1970:4 1971:1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005825	0.000630	9.244649	0.0000
AR(1)	[illegible]	[illegible]	[illegible]	0.0000
AR(2)	0.501768	0.125699	3.991834	0.0001
AR(3)	-0.486215	0.088530	-5.492067	0.0000
MA(1)	[illegible]	[illegible]	[illegible]	0.0000
MA(2)	-0.538773	0.002485	-216.8091	0.0000

R-squared	0.594192	Mean dependent var	0.005838
Adjusted R-squared	0.579761	S.D. dependent var	0.005754
S.E. of regression	0.003730	Akaike info criterion	-8.304646
Sum squared resid	0.001962	Schwarz criterion	-8.182588
Log likelihood	616.3915	F-statistic	41.28419
Durbin-Watson stat	2.100323	Prob(F-statistic)	0.000000

Inverted AR Roots	.68 -.38i	.68+.38i	-.81
Inverted MA Roots	.54	-.99	

Example: $\Delta \ln(GDP)$ for Belgium

- Overfitting: test [illegible] joint significance of the MA-coefficients [illegible]ng from the AR(3) to the ARMA(3,2) mo[illegible]

$$F = \frac{(0.002077 - 0.001962)/2}{0.001962/(147-6)} = 4.13$$

where the 5% critical values ≈ 3.07.

Or test the joint significance of the coefficients needed for going from the ARMA(3,2) to the ARMA(4,4) model

$$F = \frac{(0.001962 - 0.001630)/3}{0.001630/(147-9)} = 9.38$$

where the 5% critical values ≈ 2.68.

Figure 62 : Estima[illegible](4,4) model for $\Delta \ln(GDP)$ Belgium

Sample(adjuste[illegible]4
Included obser[illegible] adjusting endpoints
Convergence a[illegible] iterations
Backcast: 1970[illegible]

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005358	0.000650	8.237166	0.0000
AR(1)	0.645318	0.215114	2.999885	0.0032
AR(2)	[illegible]	[illegible]	[illegible]	[illegible]
AR(3)	-0.038514	0.208333	-0.184865	0.8536
AR(4)	-0.110431	0.156096	-0.707455	0.4805
MA(1)	[illegible]	[illegible]	[illegible]	0.2378
MA(2)	-0.408080	0.122208	-3.339241	0.0011
MA(3)	-0.282807	0.199376	-1.418458	0.1583
MA(4)	[illegible]	[illegible]	-4.808488	0.0000

R-squared	0.662905	Mean dependent var	0.005838
Adjusted R-squared	[illegible]	S.D. dependent var	0.005754
S.E. of regression	0.003437	Akaike info criterion	-8.449443
Sum squared resid	0.001630	Schwarz criterion	-8.266355
Log likelihood	630.0340	F-statistic	33.92249
Durbin-Watson stat	2.025286	Prob(F-statistic)	0.000000

Inverted AR Roots	.75	.64	-.37 -.30i	-.37+.30i
Inverted MA Roots	.99	-.14 -.72i	-.14+.72i	-.95

- Residual diagnostics: note that for both the AR(3) and the ARMA(3,2) the [illegible] correlation left in the residuals.

  This indicates/i[illegible]t:
  - The fitted A[illegible] models are not rich enough to capture all of the dynamics in $\Delta \ln(GDP)$ for Belgium
  - The least squares estimator is biased and inconsistent!

Note that especially the correlation at lag 4 looks significant. As we have quarterly data, this might be a seasonal effect. In order to account for seasonality, an additional MA coefficient at lag 4 is added. For truly seasonal patterns, such an MA-component best captures spikes (and not decay) at the quarterly lags. Also note that the MA(4) is highly significant in the ARMA(4,4) model.

- An ARMA(1,(2,4)) model has the smallest AIC and SBC with the residuals being $\approx$ white noise.

Figure 63 : Correlogra[...]ed residuals from AR(3) model for $\Delta \ln(GDP)$ Belgium

Sample:
Included
Q-statistic probabilities adjusted for 3 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.033	-0.033	0.1621	
		2	0.050	0.049	0.5348	
		3	0.166	0.170	4.7500	
		4	-0.243	-0.241	13.759	0.000
		5	0.096	0.076	15.179	0.001
		6	-0.034	-0.038	15.360	0.002
		7	0.121	0.211	17.633	0.001
		8	0.059	-0.037	18.180	0.003
		9	0.076	0.137	19.101	0.004
		10	-0.048	-0.170	19.469	0.007
		11	-0.018	0.094	19.523	0.012
		12	-0.111	-0.230	21.514	0.011
		13	-0.097	0.067	23.058	0.011
		14	0.107	-0.034	24.940	0.009
		15	-0.053	0.097	25.400	0.013
		16	0.059	-0.108	25.982	0.017
		17	-0.002	0.062	25.983	0.026
		18	0.003	-0.025	25.984	0.038
		19	-0.117	-0.071	28.333	0.029
		20	-0.094	-0.088	29.843	0.028
		21	-0.063	-0.069	30.522	0.033
		22	-0.016	0.075	30.565	0.045
		23	0.074	-0.012	31.526	0.049
		24	-0.077	-0.042	32.571	0.051
		25	0.084	-0.009	33.843	0.051

Figure 64 : Correlogra ed residuals from ARMA(3,2) model for $\Delta \ln(GDP)$ Belgium

Sample:
Included
Q-statistic probabilities adjusted for 5 ARMA term(s)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.053	-0.053	0.4233	
		2	0.183	0.181	5.4921	
		3	0.036	0.055	5.6879	
		4	-0.226	-0.265	13.494	
		5	0.064	0.028	14.128	
		6	-0.039	0.072	14.360	0.000
		7	0.165	0.183	18.598	0.000
		8	0.086	0.034	19.771	0.000
		9	0.108	0.065	21.630	0.000
		10	-0.038	-0.082	21.858	0.001
		11	-0.055	-0.031	22.350	0.001
		12	-0.101	-0.079	23.995	0.001
		13	-0.135	-0.094	26.986	0.001
		14	0.123	0.112	29.469	0.001
		15	-0.064	-0.036	30.143	0.001
		16	0.121	0.012	32.603	0.001
		17	-0.043	-0.086	32.918	0.001
		18	0.027	0.091	33.043	0.002
		19	-0.149	-0.143	36.834	0.001
		20	-0.089	-0.034	38.208	0.001
		21	-0.081	-0.092	39.338	0.001
		22	-0.021	0.072	39.415	0.002
		23	0.077	0.002	40.474	0.002
		24	-0.049	-0.059	40.909	0.002
		25	0.088	0.004	42.291	0.003

Figure 65 : Estimate[illegible]1,(2,4)) model for $\Delta \ln(GDP)$ Belgium

Sample: 1971:2 2[illegible]
Included observati[illegible]
Convergence achi[illegible]terations
Backcast: 1970:2 1971:1

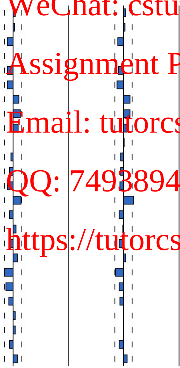
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005305	0.000206	25.74216	0.0000
AR(1)	0.826454	0.048550	17.02258	0.0000
MA(2)	-0.221029	0.065615	-3.368584	0.0010
MA(4)	-0.695479	0.066347	-10.48250	0.0000

R-squared	0.658776	Mean dependent var	0.005838
Adjusted R-squared	0.651617	S.D. dependent var	0.005754
S.E. of regression	0.003397	Akaike info criterion	-8.505295
Sum squared resid	0.001650	Schwarz criterion	-8.423922
Log likelihood	629.1392	F-statistic	92.02632
Durbin-Watson stat	1.918171	Prob(F-statistic)	0.000000

Inverted AR Roots	.83			
Inverted MA Roots	.98	-.00 -.85i	-.00+.85i	-.98

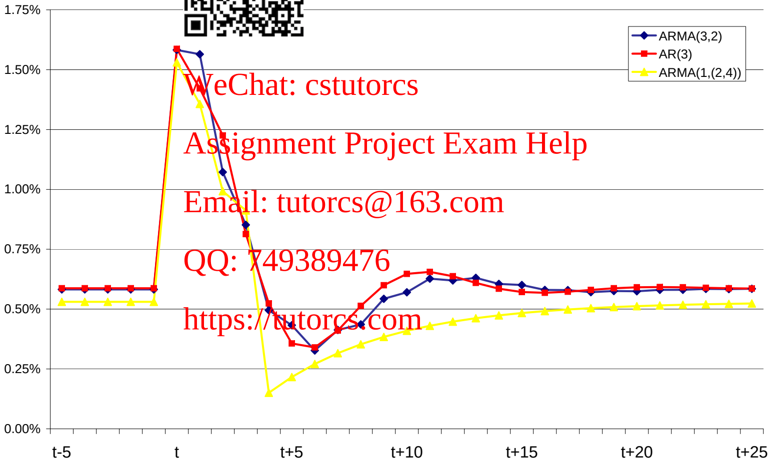
Figure 66 : Correlogra[illegible]ed residuals from ARMA(1,(2,4)) model for $\Delta\,\ln(GDP)$ Belgium[illegible]

Sample: [illegible]
Included [illegible]
Q-statistic [illegible] for 3 ARMA term(s)



Lag	AC	PAC	Q-Stat	Prob
1	0.033	0.033	0.1650	
2	0.021	0.020	0.2341	
3	-0.102	-0.103	1.8063	
4	0.000	0.007	1.8063	0.179
5	-0.101	-0.097	3.3674	0.186
6	-0.112	-0.118	5.3151	0.150
7	0.114	0.130	7.3407	0.119
8	0.136	0.118	10.275	0.068
9	0.096	0.064	11.740	0.068
10	0.002	0.010	11.740	0.109
11	-0.048	-0.056	12.110	0.146
12	-0.070	-0.052	12.900	0.167
13	-0.109	-0.060	14.847	0.138
14	0.154	0.196	18.757	0.066
15	-0.058	-0.085	19.316	0.081
16	0.053	-0.010	19.778	0.101
17	-0.068	-0.077	20.438	0.117
18	0.081	0.041	21.566	0.120
19	-0.166	-0.139	26.302	0.050
20	-0.135	-0.077	29.444	0.031
21	-0.074	-0.074	30.406	0.034
22	0.036	-0.005	30.638	0.044
23	0.038	0.005	30.889	0.057
24	-0.068	-0.087	31.705	0.063
25	0.088	0.058	33.105	0.060

Figure 67 : Impulse response function for estimated AR(3), ARMA(3,2) and ARMA(1,(2,4)) models for ln(GDP) Belgium



- Parameter stability test: note that the DGP appears to change around 1[illegible]

  Split the sample [illegible]b-samples, e.g. 1970:1-1994:4 and 1995:1-2007:4, [illegible]m Chow test.

$$F = \frac{(0.001650 - (0.000539 + 0.000809))/4}{(0.000539 + 0.000809)/(147 - 8)} = 7.79$$

  where the 5% critical values ≈ 2.45.

  ARMA process is not stable over the sample period! Especially if you want to predict future output growth, you better estimate the ARMA process over a smaller sample size in order to avoid parameter instability. The model estimated over the period 1995:1-2007:4 passes the diagnostic checks, i.e. no autocorrelation in the residuals and no parameter instability (check!).

Figure 68 : Estimated … from ARMA(1,(2,4)) model for $\Delta \ln(GDP)$ Belgium

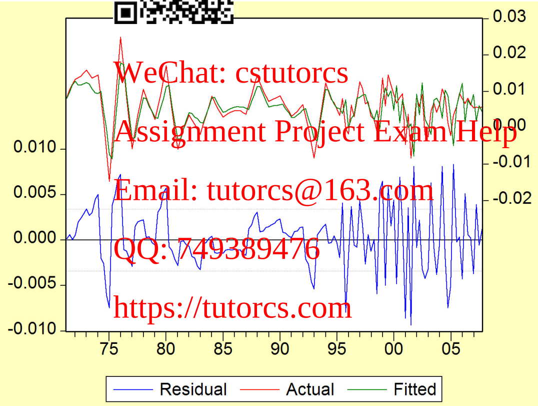


Figure 69 : Estimated [illegible](2,4)) model for $\Delta \ln(GDP)$ Belgium (1971:2-1994:4)

Sample: 1971:2 1[illegible]
Included observa[illegible]
Convergence achieved after 25 iterations
Backcast: 1970:2 1971:1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.004986	0.002177	2.290402	0.0243
AR(1)	0.885904	0.047424	18.68061	0.0000
MA(2)	[illegible]	[illegible]	-1.018953	0.3109
MA(4)	-0.772815	0.133766	-5.777360	0.0000

R-squared	[illegible]	Mean dependent var	0.006057
Adjusted R-squared	0.851047	S.D. dependent var	0.006304
S.E. of regression	0.002433	Akaike info criterion	-9.158194
Sum squared resid	0.000539	Schwarz criterion	-9.050663
Log likelihood	439.0142	F-statistic	180.0238
Durbin-Watson stat	0.808649	Prob(F-statistic)	0.000000

Inverted AR Roots	.89			
Inverted MA Roots	.99	-.00+.89i	-.00 -.89i	-.99

Figure 70 : Estimated [illegible](2,4)) model for $\Delta \ln(GDP)$ Belgium (1995:1-2007:4)

Sample: 1995:1 2[illegible]
Included observat[illegible]
Convergence achieved after 11 iterations
Backcast: 1994:1 1994:4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005406	0.000286	18.88504	0.0000
AR(1)	0.435196	0.134607	3.233077	0.0022
MA(2)	[illegible]	[illegible]	-2.142310	0.0373
MA(4)	-0.528349	0.126916	-4.162999	0.0001

R-squared	0.255307	Mean dependent var	0.005436
Adjusted R-squared	0.208764	S.D. dependent var	0.004615
S.E. of regression	0.004105	Akaike info criterion	-8.079476
Sum squared resid	0.000809	Schwarz criterion	-7.929381
Log likelihood	214.0664	F-statistic	5.485364
Durbin-Watson stat	2.104329	Prob(F-statistic)	0.002533

Inverted AR Roots	.44			
Inverted MA Roots	.94	.00 -.78i	-.00+.78i	-.94

Figure 72 : Using an del to forecast $\Delta \ln(GDP)$ from 2005:1 onward (estimation per 1-2004:4)

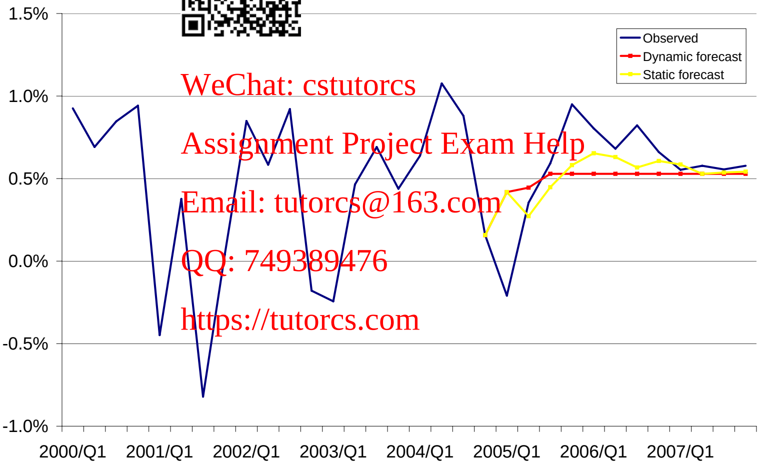


Figure 73 : Using an … el to forecast $\Delta \ln(GDP)$ from 2005:1 onward (estimation pe… 1-2004:4)

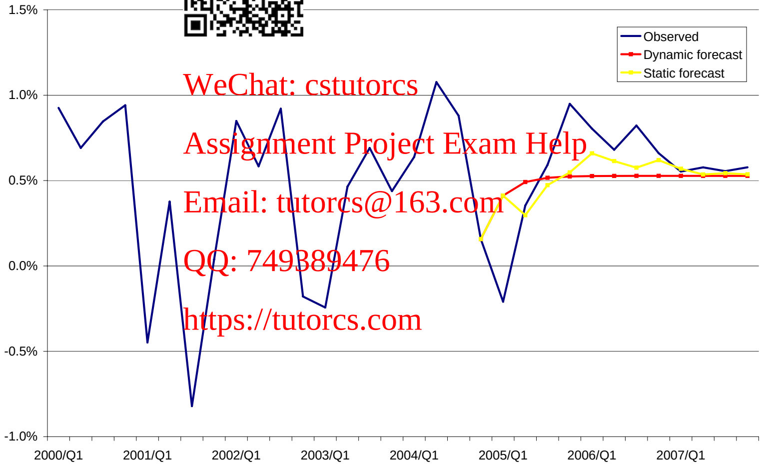


Figure 74 : Using an [illegible]2,4)) model to forecast $\Delta \ln(GDP)$ from 2005:1 onward (estima[illegible]: 1995:1-2004:4)

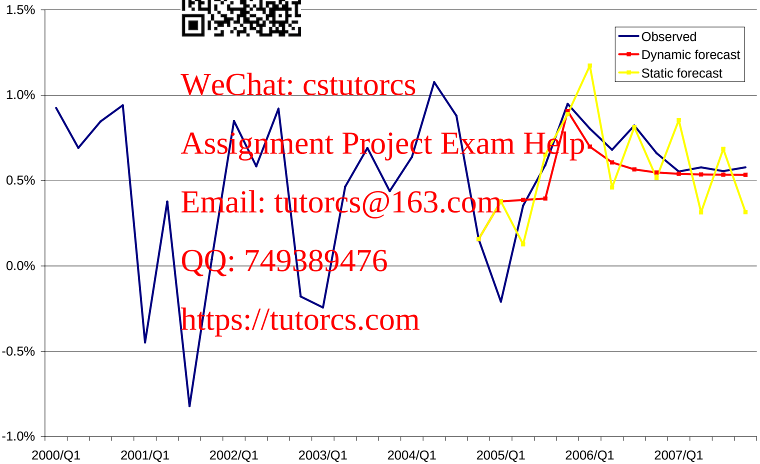


Figure 75 : Using an del to forecast $\Delta \ln(GDP)$ from 2005:1 onward (estimation pe 1-2004:4)

Figure 76 : Using an [illegible]el to forecast $\Delta \ln(GDP)$ from 2005:1 onward (estimation pe[illegible]1-2004:4)

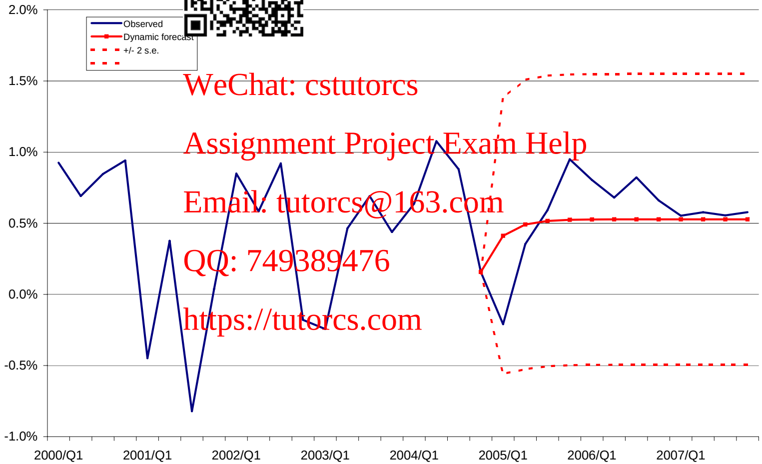


Figure 77 : Using an A…2,4)) model to forecast $\Delta \ln(GDP)$ from 2005:1 onward (estima… : 1995:1-2004:4)

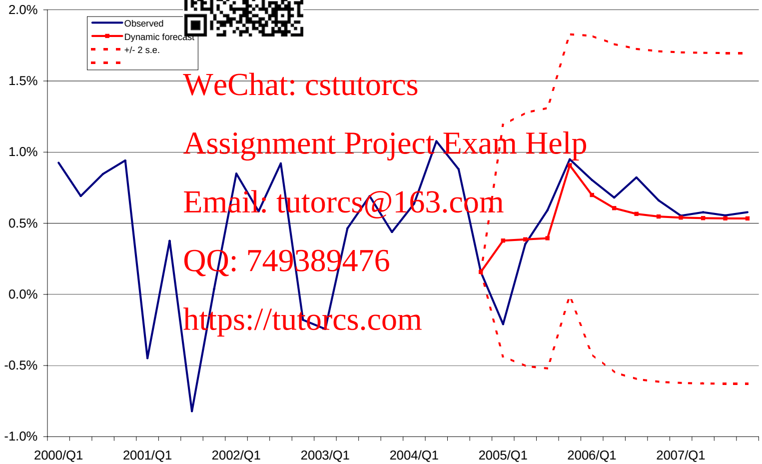


Figure 78 : Forecast a[illegible] an MA(2) model in forecasting $\Delta \ln(GDP)$ from 2005:[illegible] estimation period: 1995:1-2004:4)

Forecast: DLNGDPF
Actual: DLNGDP
Forecast sample: 2005:1 2007:4
Included observations: 12

Root Mean Squared Error	0.002336
Mean Absolute Error	0.001556
Mean Abs. Percent Error	39.58930
Theil Inequality Coefficient	0.197821
Bias Proportion	0.038087
Variance Proportion	0.579495
Covariance Proportion	0.382418

Figure 79 : Forecast a[illegible] an AR(1) model in forecasting $\Delta \ln(GDP)$ from 2005:[illegible] estimation period: 1995:1-2004:4)

Forec[illegible]DPF
Actual: DLNGDP
Forecast sample: 2005:1 2007:4
Included observations: 12

Root Mean Squared Error	0.002339
Mean Absolute Error	0.001507
Mean Abs. Percent Error	38.21297
Theil Inequality Coefficient	0.198067
Bias Proportion	0.036135
Variance Proportion	0.625387
Covariance Proportion	0.338478

Figure 80 : Forecast a[illegible] an ARMA(1,(2,4)) model in forecasting $\Delta \ln(GDP)$ from 2005:[illegible] estimation period: 1995:1-2004:4)

Forecast: DLNGDPF
Actual: DLNGDP
Forecast sample: 2005:1 2007:4
Included observations: 12

Root Mean Squared Error	0.002013
Mean Absolute Error	0.001275
Mean Abs. Percent Error	35.09018
Theil Inequality Coefficient	0.166328
Bias Proportion	0.014317
Variance Proportion	0.482558
Covariance Proportion	0.503125