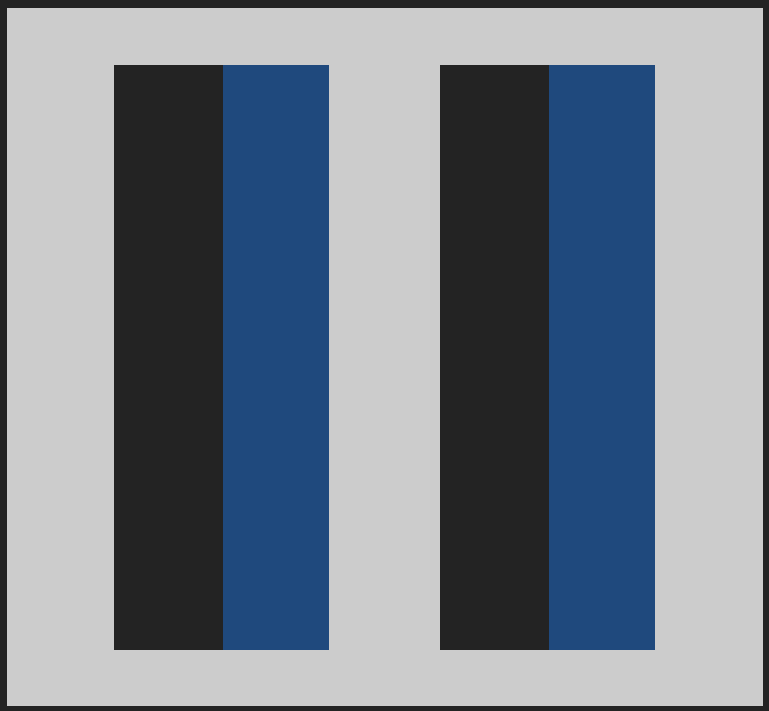
V11.0

ECONOMETRÍA APLICADA

JOSÉ ALBERTO MAURICIO



S2

ANÁLISIS UNIVARIANTE DE SERIES TEMPORALES

EJEMPLOS DE IDENTIFICACIÓN - ESTIMACIÓN - DIAGNOSIS

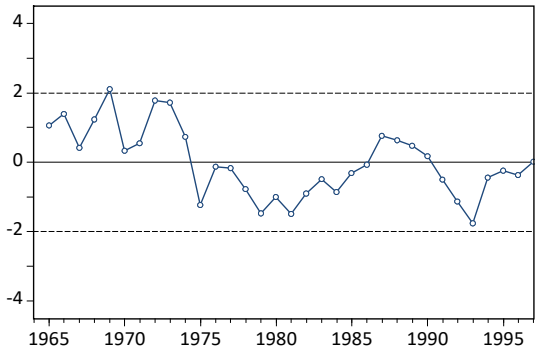
Departamento de Análisis Económico y Economía Cuantitativa
Universidad Complutense de Madrid

OPERACIONES CON EVIEWS

Sección 17 (pp. 66-74) + Sección 19 (pp. 80-94 + 98-105) de la guía *Introducción al Uso de EViews 4.1*.

EJEMPLO 1.1 - ST02 : Y = TVPIB

SERIE Y = TVPIB



N = 33 - MEDIA = 3.3556 - DT = 2.3947

MODELO M1 [W = Y] AR(1) CON MEDIA

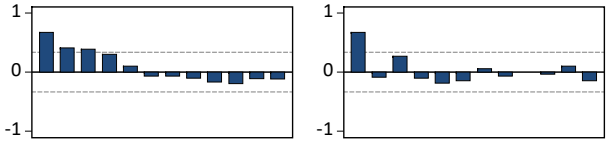
Dependent Variable: TVPIB Sample(adjusted): 1966 1997 Included observations: 32 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.113314	0.963375	3.231673	0.0030
AR(1)	0.674728	0.130195	5.182453	0.0000
S.E. of regression	1.763676	Akaike info criterion		4.033139
Sum squared resid	93.31659	Schwarz criterion		4.124748

$$(1 - 0.6747\,B)\,(y_t - 3.1133) = \hat{a}_t\,,$$

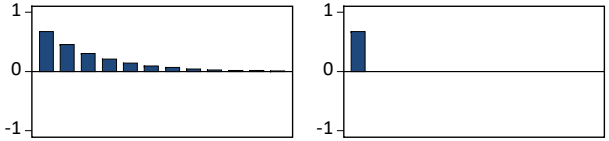
$$(0.1302) \qquad (0.9634)$$

$$n = 32,\ \hat{\sigma}_A = 1.7637,\ \text{AIC} = 4.0331,\ \text{BIC} = 4.1247.$$

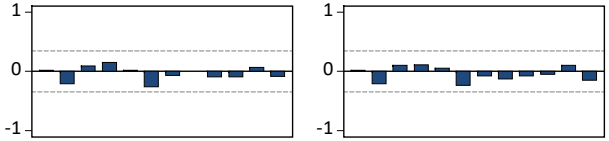
ACF - PACF MUESTRALES SERIE W = Y



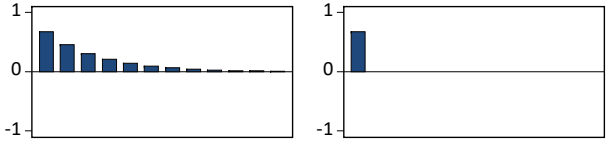
ACF - PACF TEÓRICAS MODELO M1 [W = Y]



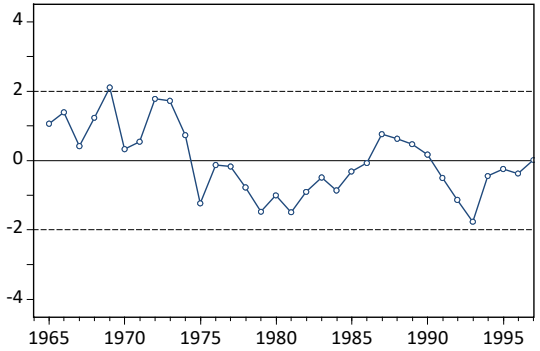
ACF - PACF RESIDUALES MODELO M1



COEFICIENTES PSI - PI MODELO M1 [Y]

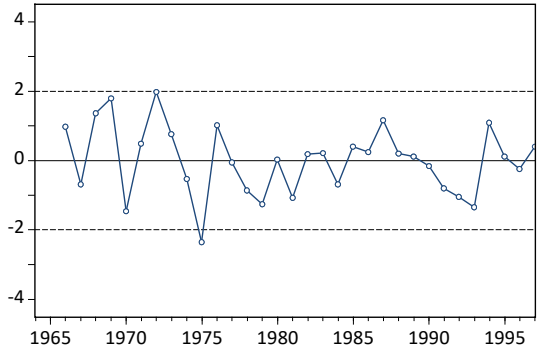


SERIE W = Y



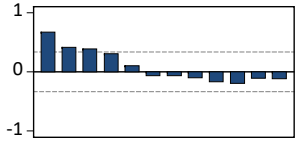
N = 33 - MEDIA = 3.3556 (0.0000) - DT = 2.3947

RESIDUOS M1

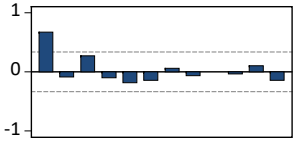


N = 32 - MEDIA = -0.000 (0.9999) - DT = 1.7349

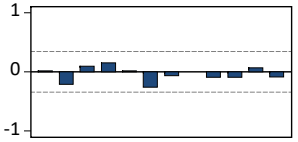
ACF



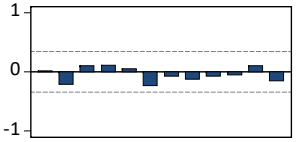
PACF



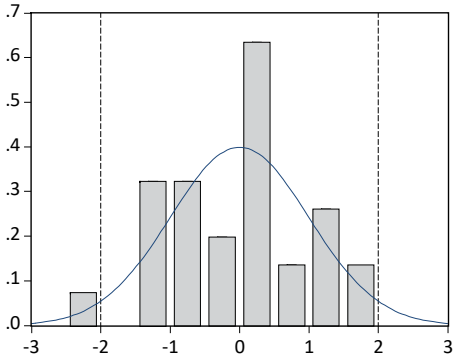
ACF



PACF



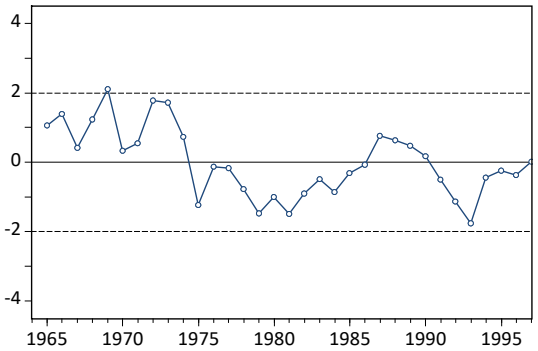
LJUNG-BOX Q(11) = 7.3435 (PROB = 0.7706) ARMA = 1



Series: RESIDUOS M1 Sample 1966 1997 Observations 32	
Mean	-6.93E-13
Median	0.211084
Maximum	3.446687
Minimum	-4.074205
Std. Dev.	1.734996
Skewness	-0.100184
Kurtosis	2.670820
Jarque-Bera	0.198009
Probability	0.905738

EJEMPLO 1.2 - ST02 : Y = TVPIB

SERIE Y = TVPIB



N = 33 - MEDIA = 3.3556 - DT = 2.3947

MODELO M2 [D(Y)] ARMA(1,1) [Y] ARIMA(1,1,1)

Dependent Variable: D(TVPIB) Sample(adjusted): 1967 1997 Included observations: 31 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.641104	0.166891	3.841461	0.0006
MA(1)	-0.964866	0.076901	-12.54686	0.0000
S.E. of regression	1.806798	Akaike info criterion		4.083330
Sum squared resid	94.67102	Schwarz criterion		4.175845

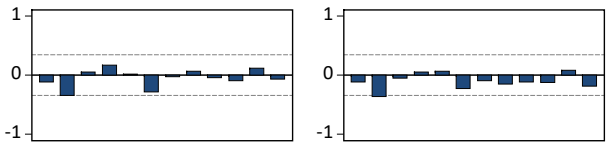
$$(1 - 0.6411B)\ \nabla y_t\ = (1 - 0.9649B)\hat{a}_t\,,$$

$$(0.1669) \qquad\qquad (0.0769)$$

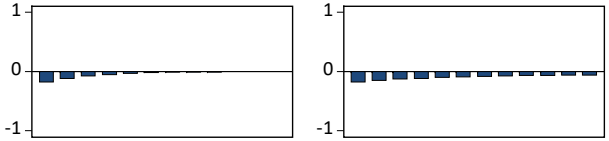
$$n = 31,\ \hat{\sigma}_A\ = 1.8068,\ \text{AIC} = 4.0833,\ \text{BIC} = 4.1758.$$

$$\text{No rechazar } \theta_1\ = 1 \Rightarrow \text{Volver a M1.}$$

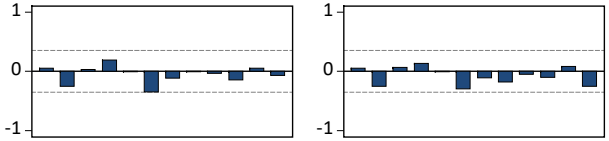
ACF - PACF MUESTRALES SERIE D(Y)



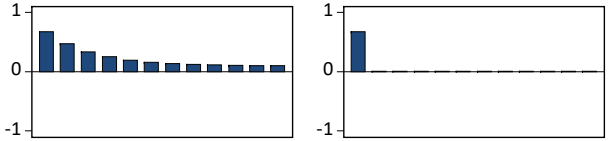
ACF - PACF TEÓRICAS MODELO M2 [D(Y)]



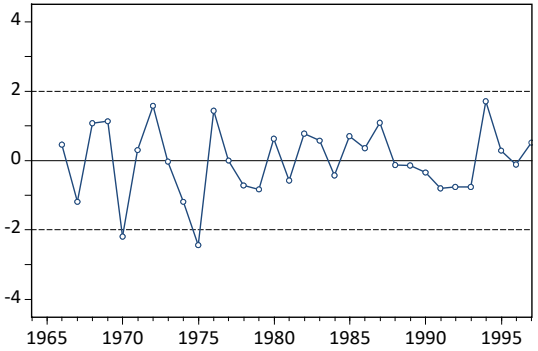
ACF - PACF RESIDUALES MODELO M2



COEFICIENTES PSI - PI MODELO M2 [Y]

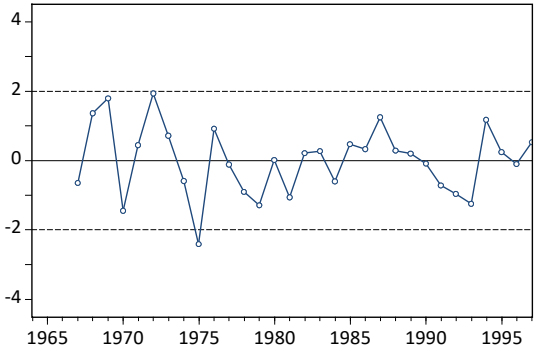


SERIE D(Y)



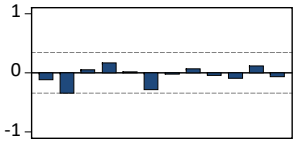
N = 32 - MEDIA = -0.078 (0.8172) - DT = 1.9069

RESIDUOS M2

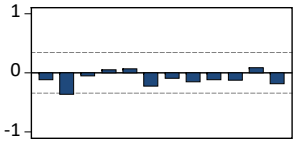


N = 31 - MEDIA = -0.286 (0.3691) - DT = 1.7523

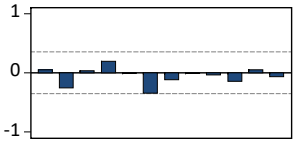
ACF



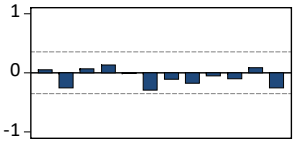
PACF



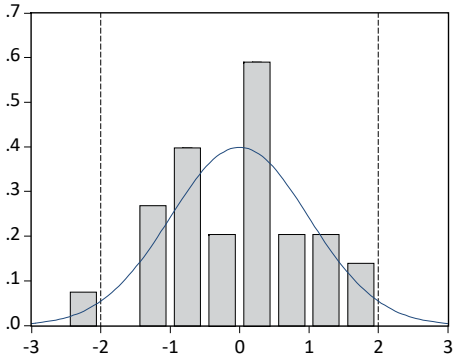
ACF



PACF



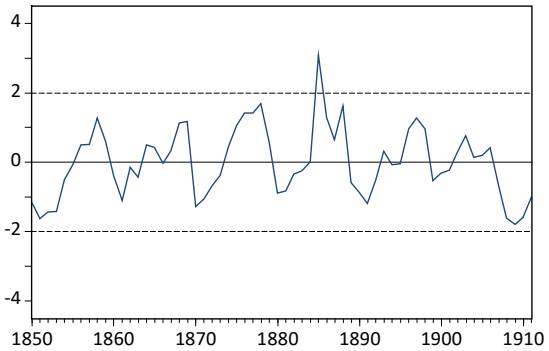
LJUNG-BOX Q(10) = 10.554 (PROB = 0.3932) ARMA = 2



Series: RESIDUOS M2 Sample 1967 1997 Observations 31	
Mean	-0.286991
Median	0.075995
Maximum	3.099323
Minimum	-4.502318
Std. Dev.	1.752310
Skewness	-0.144183
Kurtosis	2.758610
Jarque-Bera	0.182674
Probability	0.912710

EJEMPLO 2 - ST08 : Y = MINK

SERIE Y = MINK



N = 62 - MEDIA = 52063 - DT = 19014

MODELO M1 [W = LOG(Y)] AR(2) CON MEDIA

Dependent Variable: LOG(MINK)
Sample(adjusted): 1852 1911
Included observations: 60 after adjusting endpoints

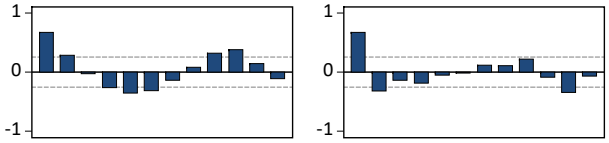
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.82315	0.081415	132.9388	0.0000
AR(1)	0.855761	0.123794	6.912760	0.0000
AR(2)	-0.289433	0.126616	-2.285921	0.0260
S.E. of regression	0.273111	Akaike info criterion		0.290928
Sum squared resid	4.251601	Schwarz criterion		0.395545

$$(1 - 0.8558B + 0.2894B^2)\,(\ln y_t - 10.8232) = \hat{a}_t\,,$$
$$(0.1238) \quad (0.1266) \quad (0.0814)$$

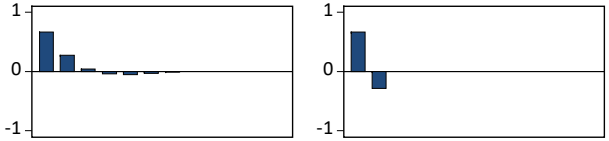
$$n = 60,\ \hat{\sigma}_A = 0.2731,\ \text{AIC} = 0.2909,\ \text{BIC} = 0.3955.$$

$$\hat{\phi}(x) = 0 \Rightarrow x_1^*, x_2^* = 1.48 \mp 1.13i \Rightarrow d = 1.86 > 1.\ \hat{\text{corr}}[\hat{\phi}_1, \hat{\phi}_2] = -0.69.$$

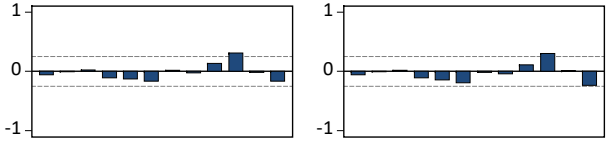
ACF - PACF MUESTRALES SERIE W = LOG(Y)



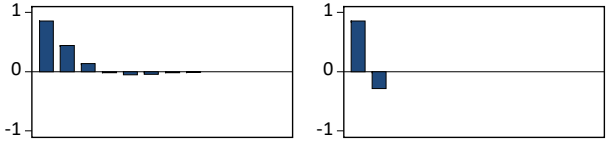
ACF - PACF TEÓRICAS MODELO M1 [W = LOG(Y)]



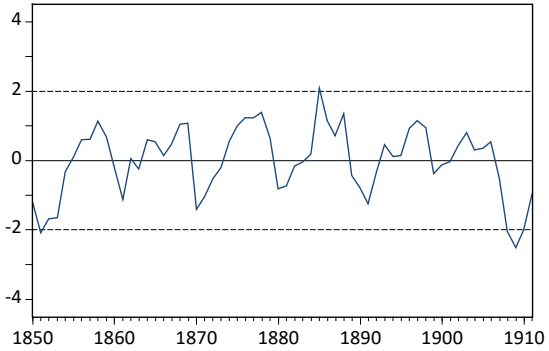
ACF - PACF RESIDUALES MODELO M1



COEFICIENTES PSI - PI MODELO M1 [LOG(Y)]

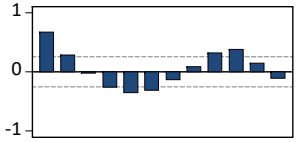


SERIE W = LOG(Y)

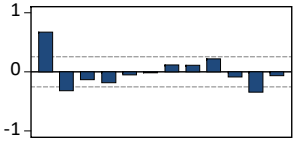


N = 62 - MEDIA = 10.788 (0.0000) - DT = 0.3974

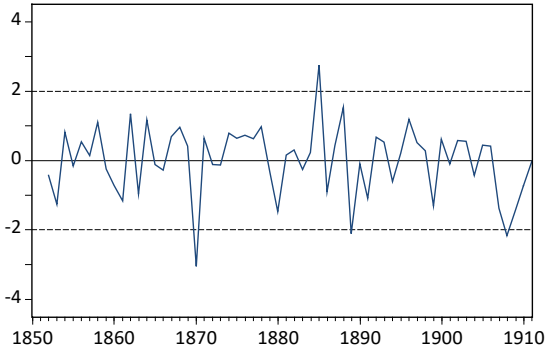
ACF



PACF

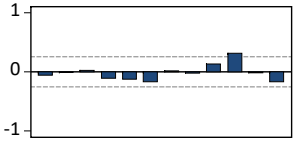


RESIDUOS M1

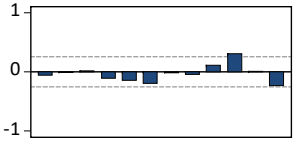


N = 60 - MEDIA = 0.0000 (0.9999) - DT = 0.2684

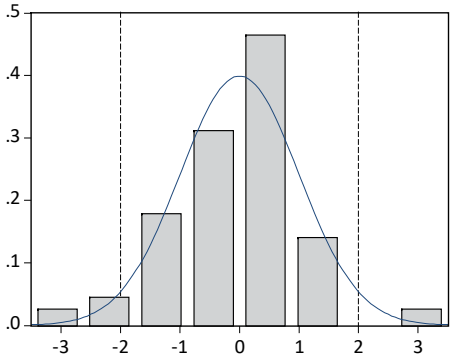
ACF



PACF



LJUNG-BOX Q(10) = 15.003 (PROB = 0.1319) ARMA = 2

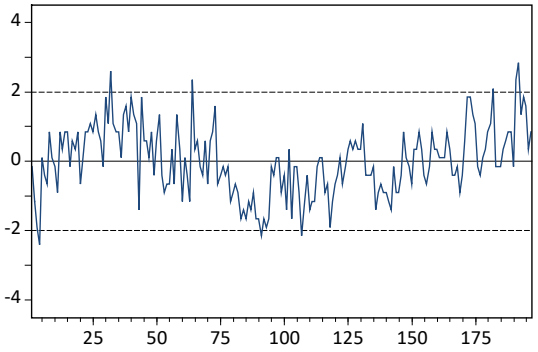


Series: RESIDUOS M1
Sample 1852 1911
Observations 60

Mean	2.59E-14
Median	0.048413
Maximum	0.741338
Minimum	-0.819413
Std. Dev.	0.268442
Skewness	-0.492193
Kurtosis	3.955144
Jarque-Bera	4.703291
Probability	0.095212

EJEMPLO 3.1 - ST17 : Y = BJRA

SERIE Y = BJRA



N = 197 - MEDIA = 17.062 - DT = 0.3992

MODELO M1 [W1 = Y] ARMA(1,1) CON MEDIA

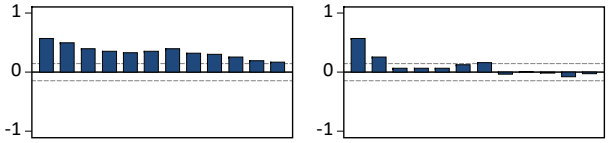
Dependent Variable: BJRA Sample(adjusted): 2 197 Included observations: 196 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.11141	0.110643	154.6537	0.0000
AR(1)	0.917624	0.041351	22.19102	0.0000
MA(1)	-0.608054	0.081951	-7.419684	0.0000
S.E. of regression	0.313900	Akaike info criterion		0.535700
Sum squared resid	19.01686	Schwarz criterion		0.585876

$$(1 - 0.9176B)\,(y_t - 17.1114) = (1 - 0.6081B)\hat{a}_t\,,$$
$$(0.0414) \qquad (0.1106) \qquad (0.0820)$$

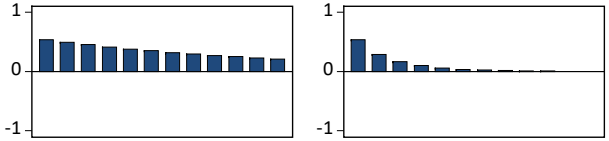
$$n = 196,\ \hat{\sigma}_A = 0.3139,\ \text{AIC} = 0.5357,\ \text{BIC} = 0.5859.$$

$$\hat{\text{corr}}[\hat{\phi}_1, \hat{\theta}_1] = -0.72.$$

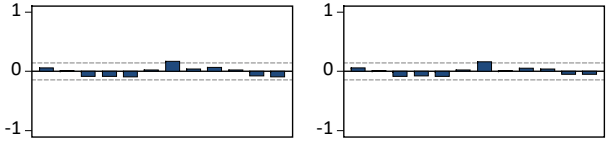
ACF - PACF MUESTRALES SERIE W1 = Y



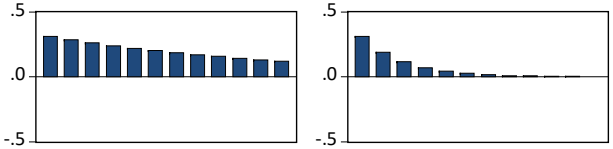
ACF - PACF TEÓRICAS MODELO M1 [W1 = Y]



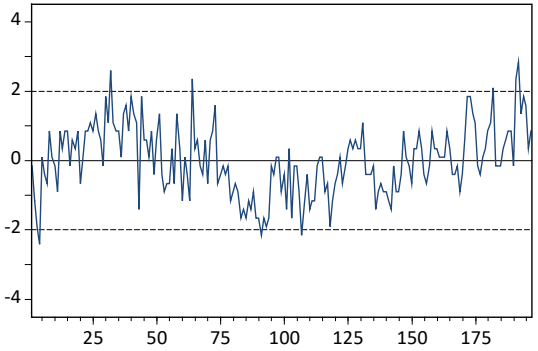
ACF - PACF RESIDUALES MODELO M1



COEFICIENTES PSI - PI MODELO M1 [Y]

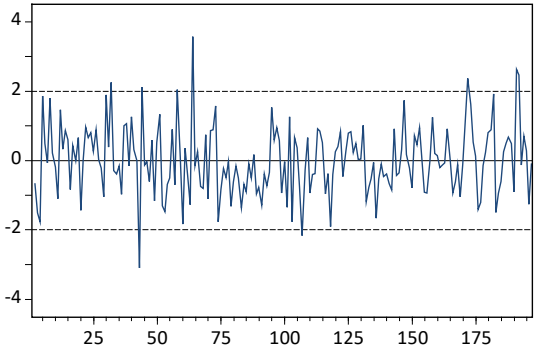


SERIE W1 = Y



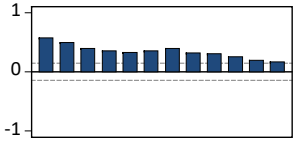
N = 197 - MEDIA = 17.062 (0.0000) - DT = 0.3992

RESIDUOS M1

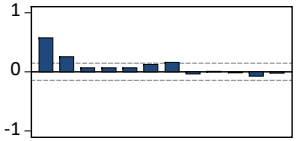


N = 196 - MEDIA = -0.002 (0.9061) - DT = 0.3122

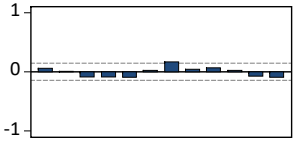
ACF



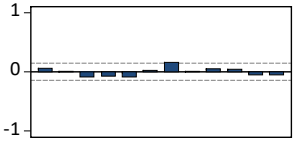
PACF



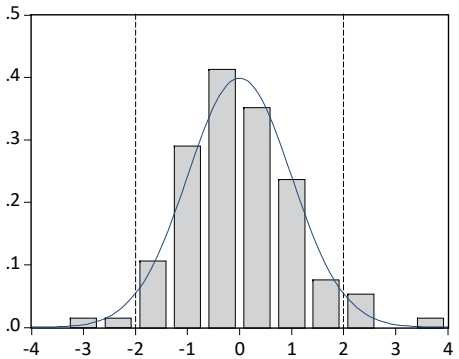
ACF



PACF



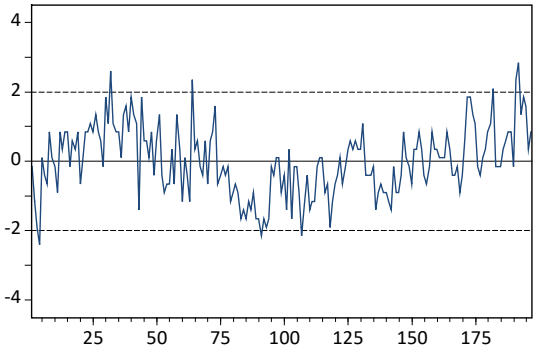
LJUNG-BOX Q(10) = 15.458 (PROB = 0.1162) ARMA = 2



Series: RESIDUOS M1 Sample 2 197 Observations 196	
Mean	-0.002632
Median	-0.022199
Maximum	1.114857
Minimum	-0.968975
Std. Dev.	0.312275
Skewness	0.335838
Kurtosis	3.615857
Jarque-Bera	6.781820
Probability	0.033678

EJEMPLO 3.2 - ST17 : Y = BJRA

SERIE Y = BJRA



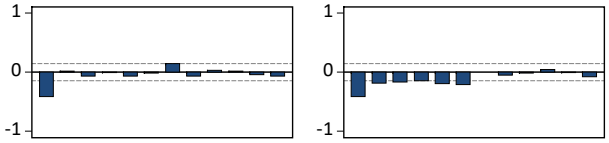
N = 197 - MEDIA = 17.062 - DT = 0.3992

MODELO M2 [W2 = D(Y)] MA(1) [Y] IMA(1,1)

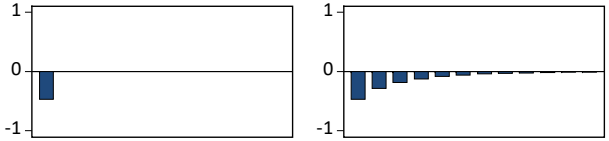
Dependent Variable: D(BJRA)				
Sample(adjusted): 2 197				
Included observations: 196 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	-0.702478	0.051036	-13.76448	0.0000
S.E. of regression	0.317607	Akaike info criterion		0.549087
Sum squared resid	19.67052	Schwarz criterion		0.565812

$$\nabla y_t = (1 - 0.7025B)\hat{a}_t\,,$$
$$(0.0510)$$
$$n = 196,\ \hat{\sigma}_A = 0.3176,\ \text{AIC} = 0.5491,\ \text{BIC} = 0.5658.$$

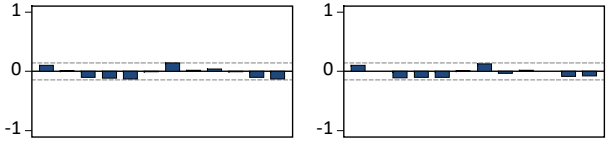
ACF - PACF MUESTRALES SERIE W2 = D(Y)



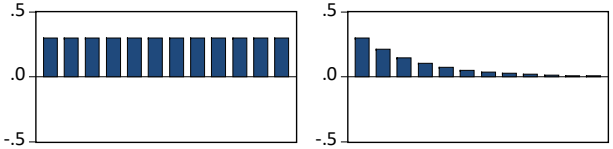
ACF - PACF TEÓRICAS MODELO M2 [W2 = D(Y)]



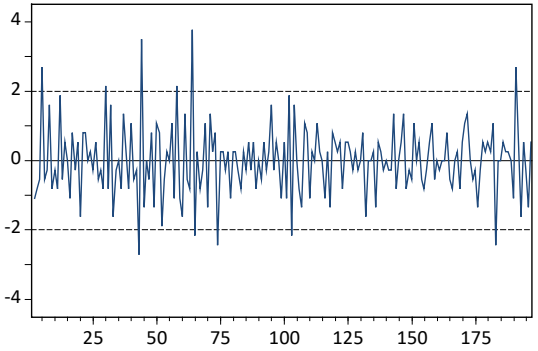
ACF - PACF RESIDUALES MODELO M2



COEFICIENTES PSI - PI MODELO M2 [Y]

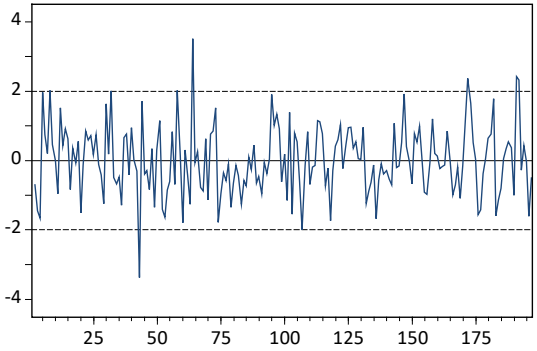


SERIE W2 = D(Y)



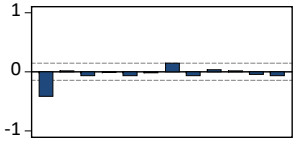
N = 196 - MEDIA = 0.0020 (0.9385) - DT = 0.3703

RESIDUOS M2

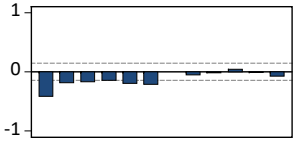


N = 196 - MEDIA = 0.0118 (0.6004) - DT = 0.3173

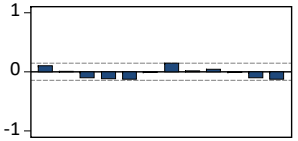
ACF



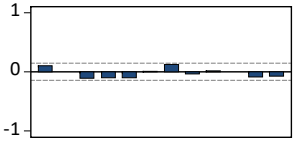
PACF



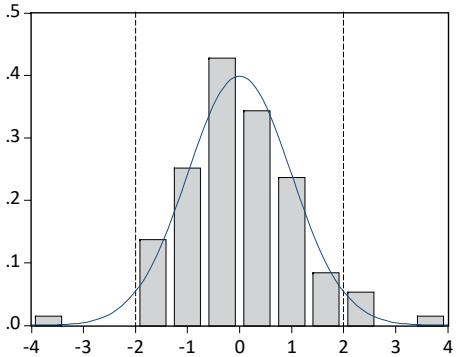
ACF



PACF



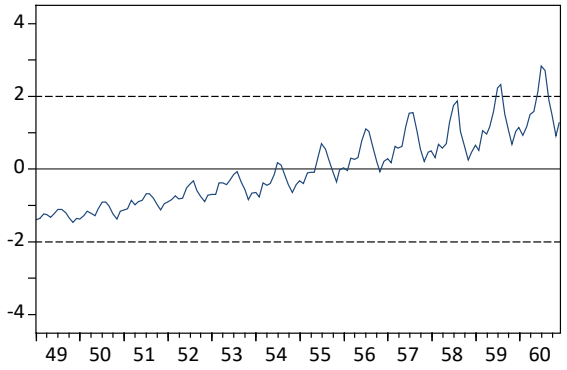
LJUNG-BOX Q(11) = 20.056 (PROB = 0.0445) ARMA = 1



Series: RESIDUOS M2	
Sample 2 197	
Observations 196	
Mean	0.011893
Median	-0.010323
Maximum	1.127966
Minimum	-1.059806
Std. Dev.	0.317384
Skewness	0.243714
Kurtosis	3.587747
Jarque-Bera	4.761431
Probability	0.092484

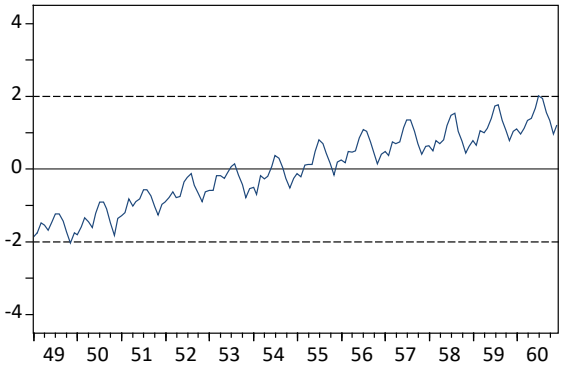
EJEMPLO 4 - ST19 : Y = AIRLINE

SERIE Y = AIRLINE



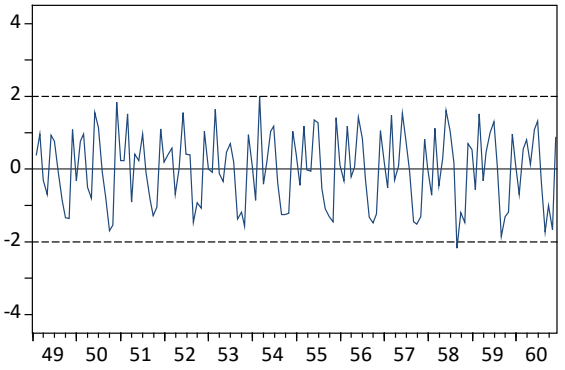
N = 144 - MEDIA = 280.29 - DT = 119.96

SERIE LOG(Y)



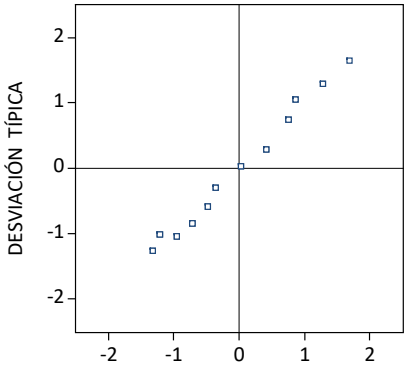
N = 144 - MEDIA = 5.5421 - DT = 0.4414

SERIE DLOG(Y)

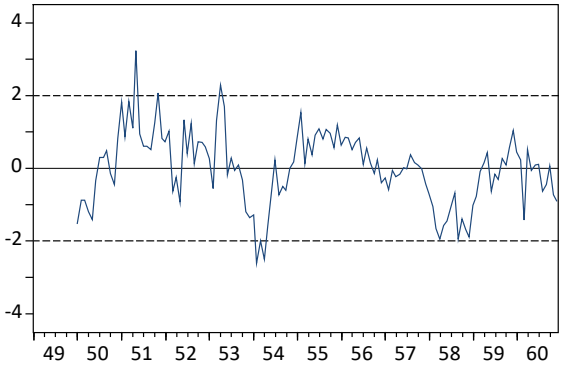


N = 143 - MEDIA = 0.0094 - DT = 0.1065

SERIE Y

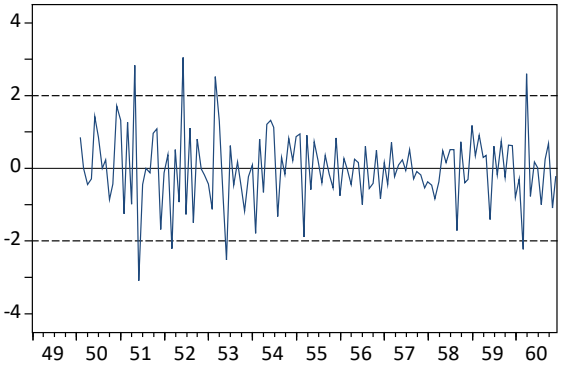


SERIE DLOG(Y, 0, 12)



N = 132 - MEDIA = 0.1198 - DT = 0.0616

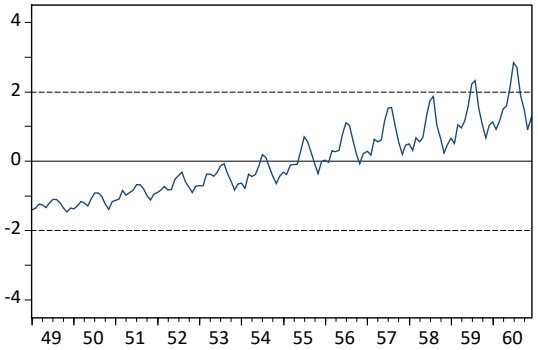
SERIE W = DLOG(Y, 1, 12)



N = 131 - MEDIA = 0.0002 (0.9422) - DT = 0.0458

EJEMPLO 4.1 - ST19 : Y = AIRLINE

SERIE Y = AIRLINE



N = 144 - MEDIA = 280.29 - DT = 119.96

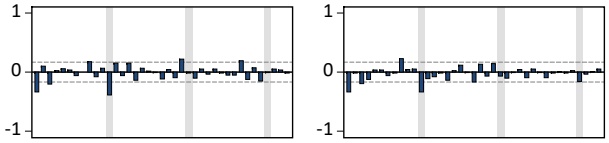
MODELO M1 [W] MA(1)×MA(1)$_{12}$ [LOG(Y)] IMA(1,1)×IMA(1,1)$_{12}$ ["AIRLINE MODEL"]

Dependent Variable: DLOG(AIRLINE, 1, 12)				
Sample(adjusted): 1950:02 1960:12				
Included observations: 131 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	-0.404855	0.080238	-5.045651	0.0000
SMA(12)	-0.631572	0.069841	-9.042955	0.0000
S.E. of regression	0.036500	Akaike info criterion		-3.767866
Sum squared resid	0.171859	Schwarz criterion		-3.723970

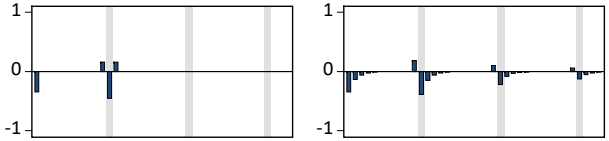
$$\nabla\nabla_{12}\,\ln y_t \;=\; \underset{(0.0802)}{(1-0.4049B)}\;\underset{(0.0698)}{(1-0.6316B^{12})}\hat{a}_t\,,$$

$$n = 131,\;\; \hat{\sigma}_A = 0.0365,\;\; \mathrm{AIC} = -3.7679,\;\; \mathrm{BIC} = -3.7240.$$

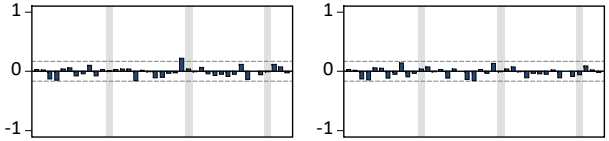
ACF - PACF MUESTRALES SERIE W



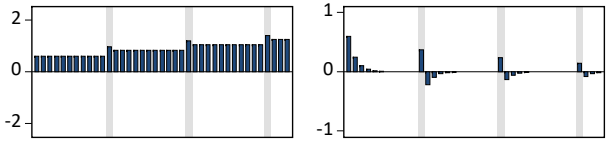
ACF - PACF TEÓRICAS MODELO M1 [W]



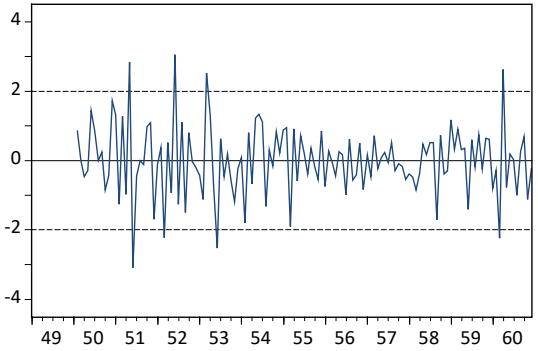
ACF - PACF RESIDUALES MODELO M1



COEFICIENTES PSI - PI MODELO M1 [LOG(Y)]

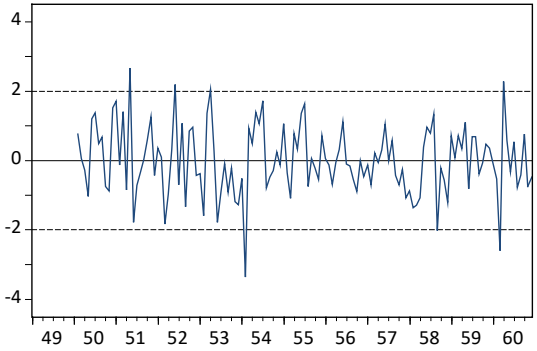


SERIE W = DLOG(Y, 1, 12)



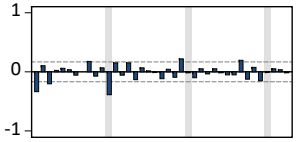
N = 131 - MEDIA = 0.0002 (0.9422) - DT = 0.0458

RESIDUOS M1

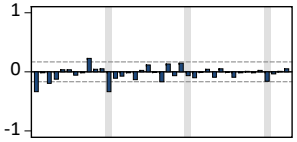


N = 131 - MEDIA = 0.0003 (0.9143) - DT = 0.0363

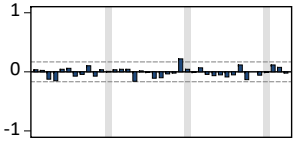
ACF



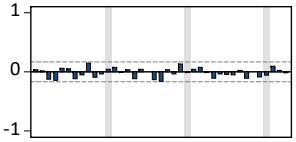
PACF



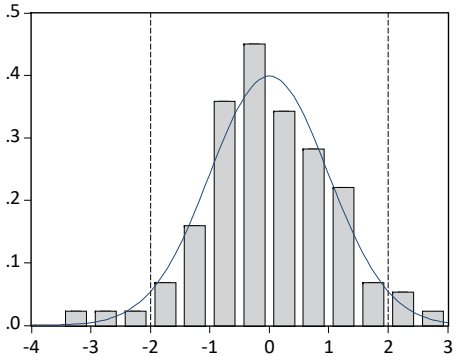
ACF



PACF



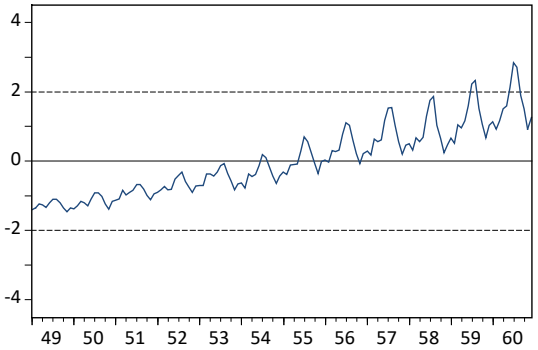
LJUNG-BOX Q(37) = 39.789 (PROB = 0.3469) ARMA = 2



Series: RESIDUOS M1	
Sample 1950:02 1960:12	
Observations 131	
Mean	0.000342
Median	-0.002962
Maximum	0.097408
Minimum	-0.122032
Std. Dev.	0.036358
Skewness	-0.082868
Kurtosis	3.475025
Jarque-Bera	1.381596
Probability	0.501176

EJEMPLO 4.2 - ST19 : Y = AIRLINE

SERIE Y = AIRLINE



N = 144 - MEDIA = 280.29 - DT = 119.96

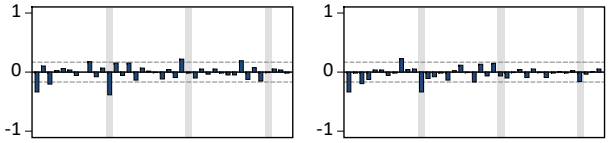
MODELO M2 [W] AR(1)×MA(1)$_{12}$ [LOG(Y)] ARI(1,1)×IMA(1,1)$_{12}$

Dependent Variable: DLOG(AIRLINE, 1, 12)
Sample(adjusted): 1950:03 1960:12
Included observations: 130 after adjusting endpoints

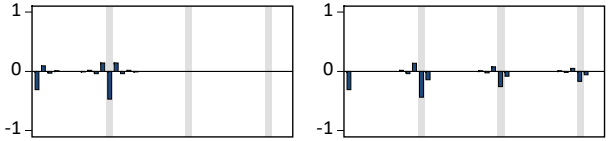
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.310378	0.083775	-3.704907	0.0003
MA(12)	-0.703182	0.060984	-11.53052	0.0000
S.E. of regression	0.036667	Akaike info criterion		-3.758623
Sum squared resid	0.172090	Schwarz criterion		-3.714507

$$(1+0.3104)\nabla\nabla_{12}\,\ln y_t = (1-0.7032B^{12})\hat{a}_t\,,$$
$$(0.0838) \qquad\qquad (0.0610)$$
$$n=130,\ \hat{\sigma}_A=0.0367,\ \text{AIC}=-3.7586,\ \text{BIC}=-3.7145.$$

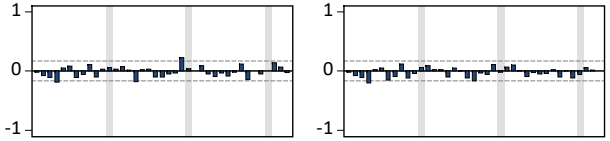
ACF - PACF MUESTRALES SERIE W



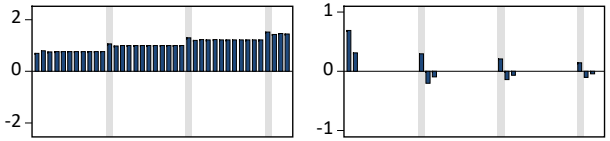
ACF - PACF TEÓRICAS MODELO M2 [W]



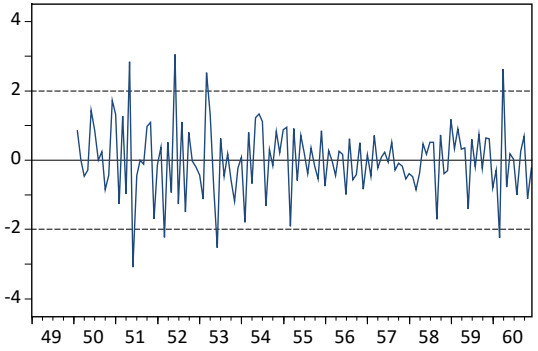
ACF - PACF RESIDUALES MODELO M2



COEFICIENTES PSI - PI MODELO M2 [LOG(Y)]

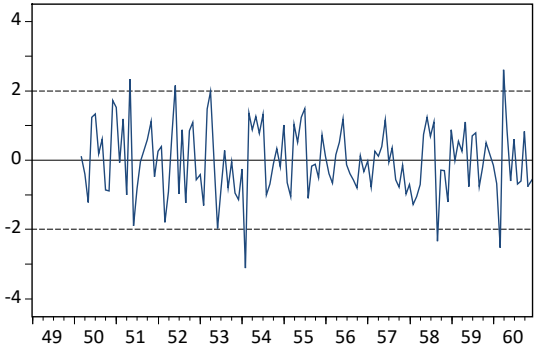


SERIE W = DLOG(Y, 1, 12)



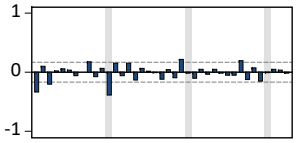
N = 131 - MEDIA = 0.0002 (0.9422) - DT = 0.0458

RESIDUOS M2

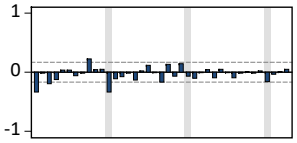


N = 130 - MEDIA = 0.0000 (0.9808) - DT = 0.0365

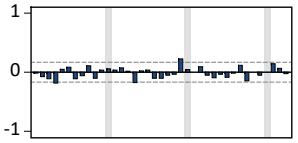
ACF



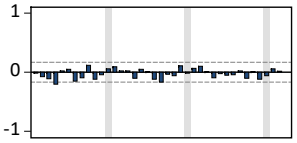
PACF



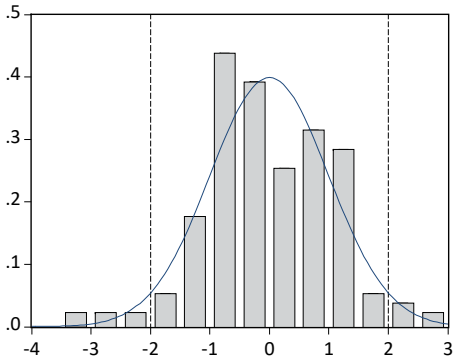
ACF



PACF



LJUNG-BOX Q(37) = 48.484 (PROB = 0.0979) ARMA = 2

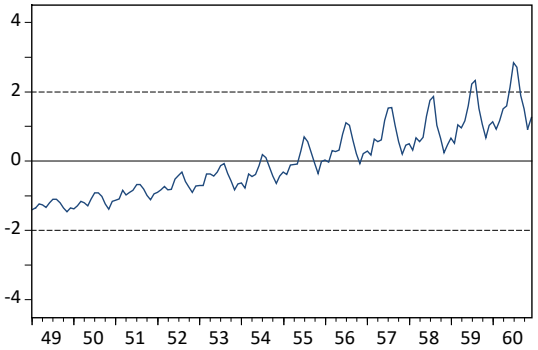


Series: RESIDUOS M2
Sample 1950:03 1960:12
Observations 130

Mean	7.72E-05
Median	-0.001757
Maximum	0.095440
Minimum	-0.113636
Std. Dev.	0.036524
Skewness	-0.079981
Kurtosis	3.199277
Jarque-Bera	0.353703
Probability	0.837904

EJEMPLO 4.3 - ST19 : Y = AIRLINE

SERIE Y = AIRLINE



N = 144 - MEDIA = 280.29 - DT = 119.96

MODELO M3 [W] ARMA(1,1)×MA(1)$_{12}$ [LOG(Y)] ARIMA(1,1,1)×IMA(1,1)$_{12}$

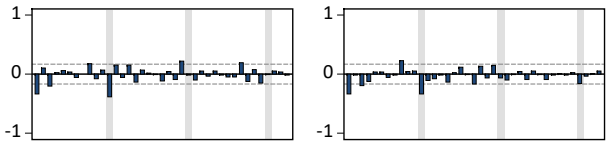
Dependent Variable: DLOG(AIRLINE, 1, 12) Sample(adjusted): 1950:03 1960:12 Included observations: 130 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.228962	0.169046	1.354438	0.1780
MA(1)	-0.600411	0.136506	-4.398417	0.0000
SMA(12)	-0.656061	0.067298	-9.748628	0.0000
S.E. of regression	0.036608	Akaike info criterion		-3.754284
Sum squared resid	0.170200	Schwarz criterion		-3.688110

$$(1-0.2290)\nabla\nabla_{12}\,\ln y_t = (1-0.6004B)\,(1-0.6561B^{12})\hat{a}_t\,,$$
$$(0.1690) \qquad (0.1365) \qquad (0.0673)$$

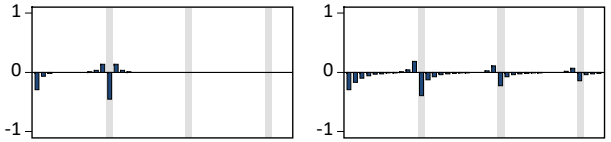
$$n = 130,\ \hat{\sigma}_A = 0.0366,\ \text{AIC} = -3.7543,\ \text{BIC} = -3.6881.$$

$$\phi_1 \text{ no significativo, } \hat{\text{corr}}[\hat{\phi}_1\,,\hat{\theta}_1\,] = -0.86.$$

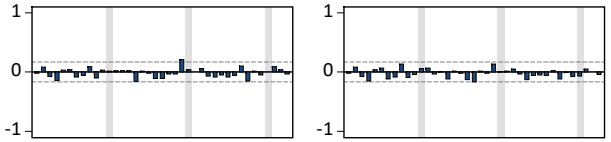
ACF - PACF MUESTRALES SERIE W



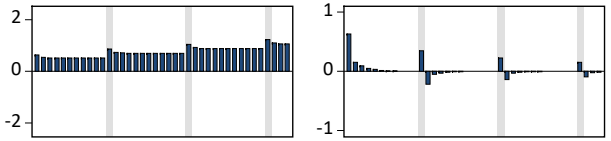
ACF - PACF TEÓRICAS MODELO M3 [W]



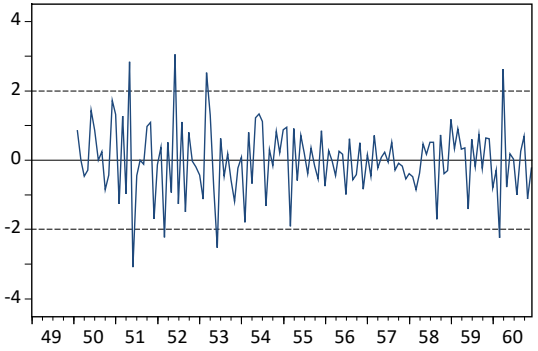
ACF - PACF RESIDUALES MODELO M3



COEFICIENTES PSI - PI MODELO M3 [LOG(Y)]

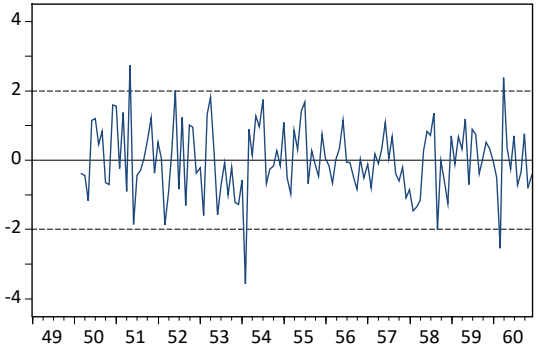


SERIE W = DLOG(Y, 1, 12)



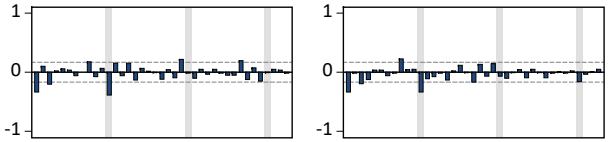
N = 131 - MEDIA = 0.0002 (0.9422) - DT = 0.0458

RESIDUOS M3

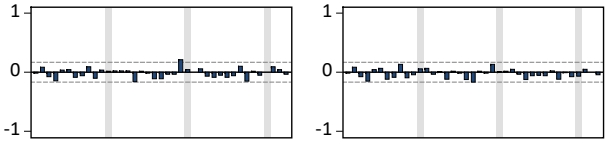


N = 130 - MEDIA = -0.000 (0.8072) - DT = 0.0363

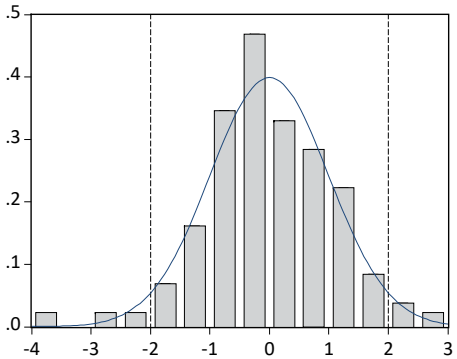
ACF PACF



ACF PACF



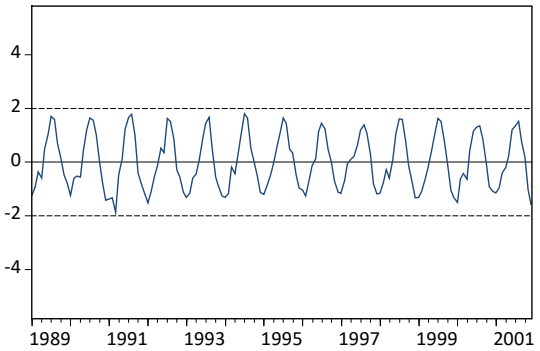
LJUNG-BOX Q(36) = 38.601 (PROB = 0.3528) ARMA = 3



Series: RESIDUOS M3 Sample 1950:03 1960:12 Observations 130	
Mean	-0.000778
Median	-0.003250
Maximum	0.098781
Minimum	-0.130651
Std. Dev.	0.036315
Skewness	-0.150029
Kurtosis	3.713991
Jarque-Bera	3.249017
Probability	0.197008

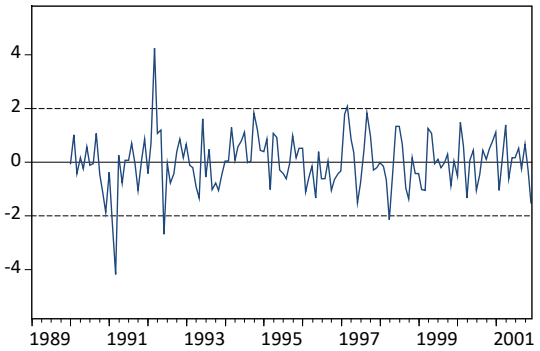
EJEMPLO 5 - ST14 : Y = TEMP

SERIE Y = TEMP



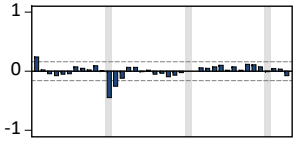
N = 156 - MEDIA = 15.060 - DT = 6.8735

SERIE W = D(Y, 0, 12)

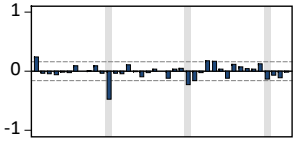


N = 144 - MEDIA = -0.063 (0.7319) - DT = 2.2094

ACF



PACF

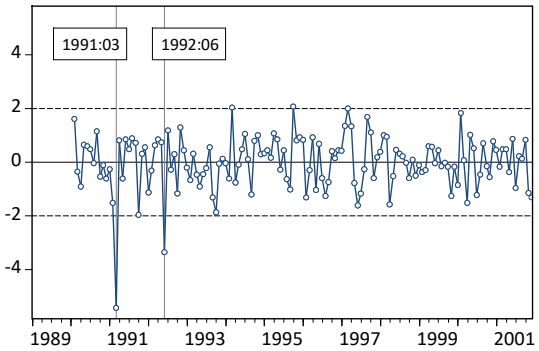


MODELO M1 [W] AR(1)×MA(1)$_{12}$ [Y] AR(1)×IMA(1,1)$_{12}$

Dependent Variable: D(TEMP, 0, 12) Sample(adjusted): 1990:02 2001:12 Included observations: 143 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.230195	0.082631	2.785833	0.0061
MA(12)	-0.918262	0.019442	-47.22967	0.0000
S.E. of regression	1.603138	Akaike info criterion		3.795690
Sum squared resid	362.3772	Schwarz criterion		3.837129

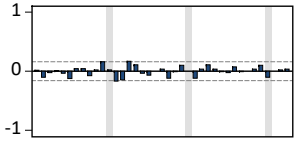
$$(1 - 0.2302B)\ \nabla_{12}\, y_t \ = (1 - 0.9183B^{12})\hat{a}_t\,,$$
$$(0.0826) \qquad\qquad (0.0194)$$
$$n = 143,\ \ \hat{\sigma}_A = 1.6031,\ \ \mathrm{AIC} = 3.7957,\ \ \mathrm{BIC} = 3.8371.$$

RESIDUOS M1

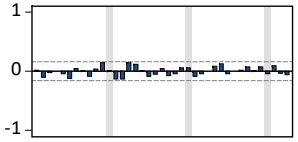


N = 143 - MEDIA = -0.029 (0.8235) - DT = 1.5972

ACF

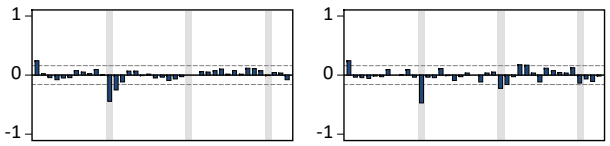


PACF

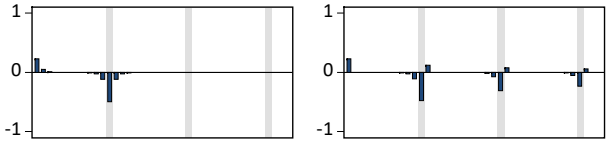


LJUNG-BOX Q(37) = 40.436 (PROB = 0.3210) ARMA = 2

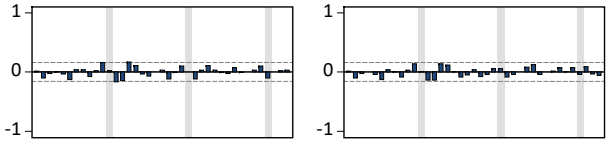
ACF - PACF MUESTRALES SERIE W



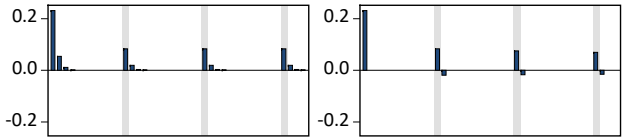
ACF - PACF TEÓRICAS MODELO M1 [W]

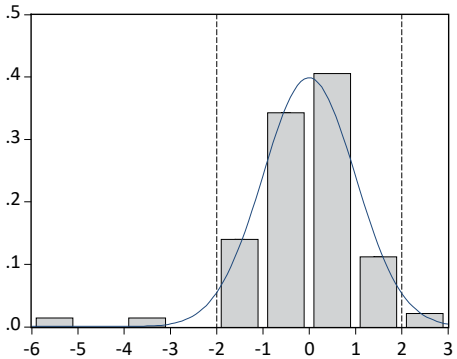


ACF - PACF RESIDUALES MODELO M1



COEFICIENTES PSI - PI MODELO M1 [Y]

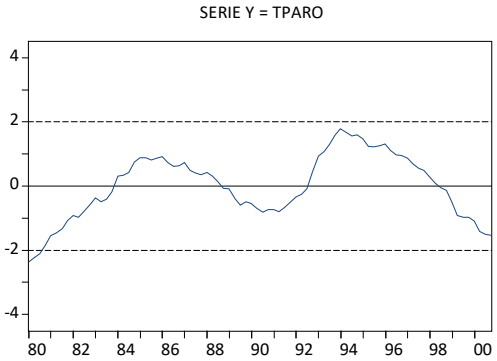




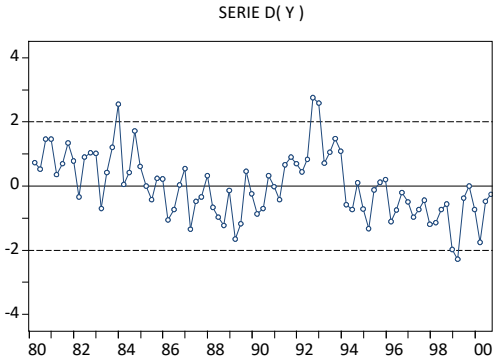
Series: RESIDUOS M1
Sample 1990:02 2001:12
Observations 143

Mean	-0.029838
Median	0.145630
Maximum	3.288845
Minimum	-8.688720
Std. Dev.	1.597203
Skewness	-1.303904
Kurtosis	8.368614
Jarque-Bera	212.2518
Probability	0.000000

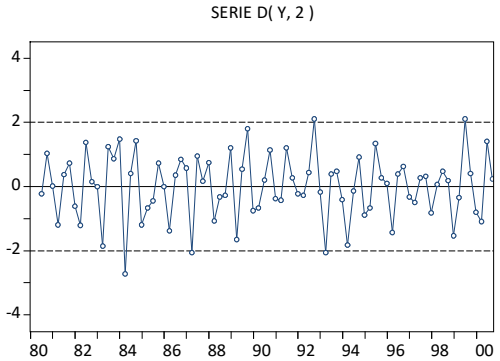
EJEMPLO 6 - ST20 : Y = TPARO



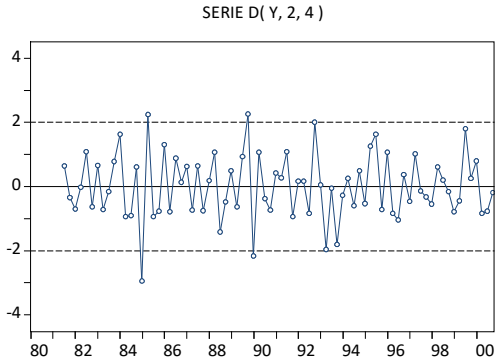
N = 84 - MEDIA = 18.557 - DT = 3.3472



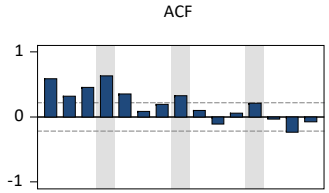
N = 83 - MEDIA = 0.0338 (0.6241) - DT = 0.6271

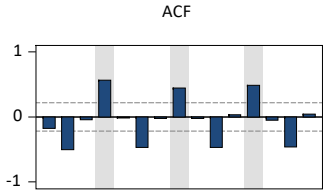


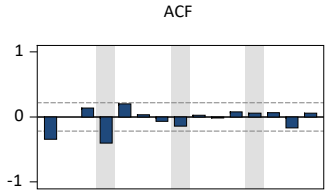
N = 82 - MEDIA = -0.007 - DT = 0.5715

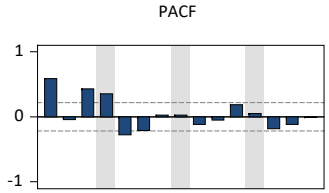


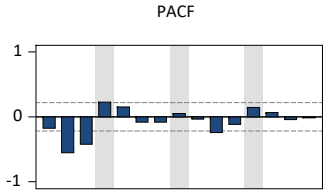
N = 78 - MEDIA = 0.0008 (0.9878) - DT = 0.5206

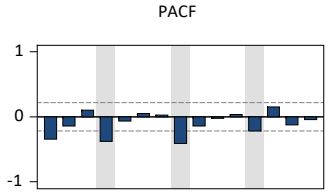






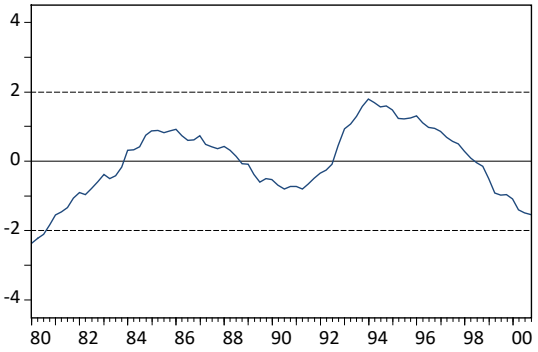






EJEMPLO 6.1 - ST20 : Y = TPARO

SERIE Y = TPARO



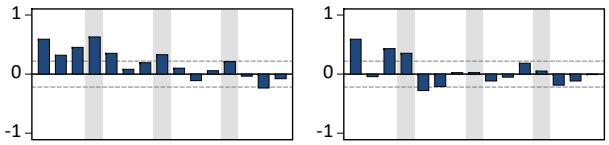
N = 84 - MEDIA = 18.557 - DT = 3.3472

MODELO M1 [W1] AR(1)×AR(1)$_4$ [Y] ARI(1,1)×AR(1)$_4$

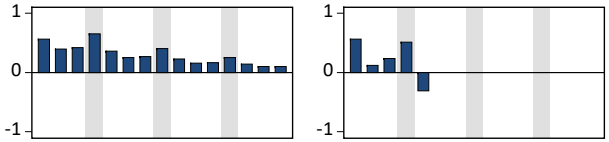
Dependent Variable: D(TPARO)				
Sample(adjusted): 1981:3 2000:4				
Included observations: 78 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.504119	0.099914	5.045524	0.0000
SAR(4)	0.618084	0.091276	6.771571	0.0000
S.E. of regression	0.407059	Akaike info criterion		1.065589
Sum squared resid	12.59296	Schwarz criterion		1.126017

$$(1 - 0.5041B)\,(1 - 0.6181B^4)\,\nabla y_t = \hat{a}_t\,,$$
$$(0.0999) \qquad (0.0913)$$
$$n = 78,\ \hat{\sigma}_A = 0.4071,\ \text{AIC} = 1.0656,\ \text{BIC} = 1.1260.$$

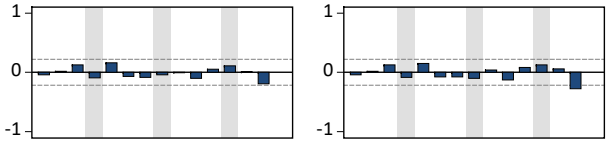
ACF - PACF MUESTRALES SERIE W1



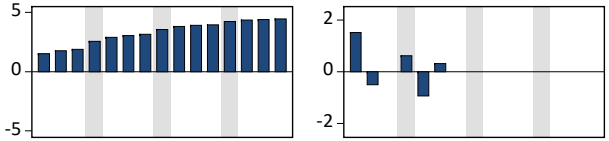
ACF - PACF TEÓRICAS MODELO M1 [W1]



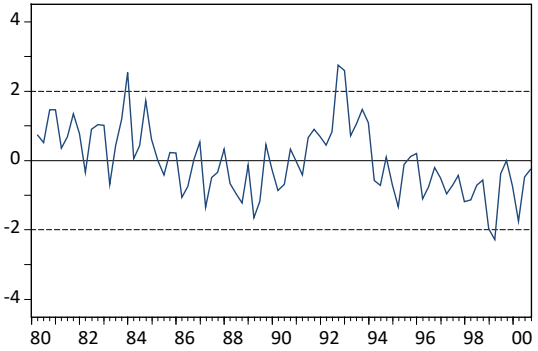
ACF - PACF RESIDUALES MODELO M1



COEFICIENTES PSI - PI MODELO M1 [Y]

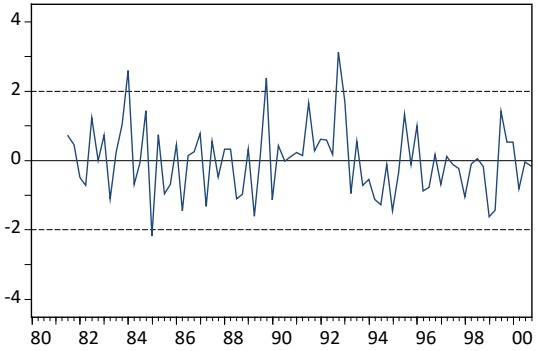


SERIE W1 = D(Y)



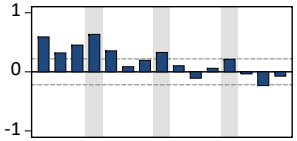
N = 83 - MEDIA = 0.0338 (0.6241) - DT = 0.6271

RESIDUOS M1

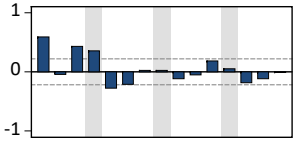


N = 78 - MEDIA = -0.018 (0.6876) - DT = 0.4039

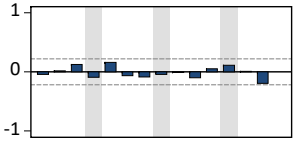
ACF



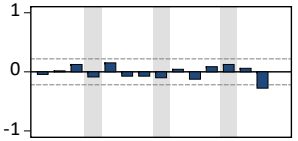
PACF



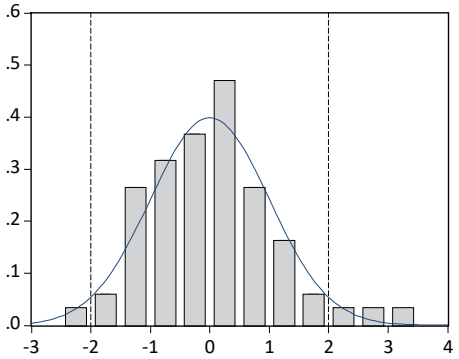
ACF



PACF



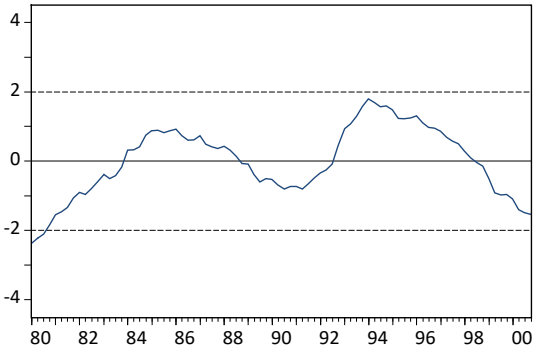
LJUNG-BOX Q(13) = 11.516 (PROB = 0.5676) ARMA = 2



Series: RESIDUOS M1	
Sample 1981:3 2000:4	
Observations 78	
Mean	-0.018458
Median	-0.007574
Maximum	1.247057
Minimum	-0.900895
Std. Dev.	0.403980
Skewness	0.539093
Kurtosis	3.636416
Jarque-Bera	5.094405
Probability	0.078300

EJEMPLO 6.2 - ST20 : Y = TPARO

SERIE Y = TPARO



N = 84 - MEDIA = 18.557 - DT = 3.3472

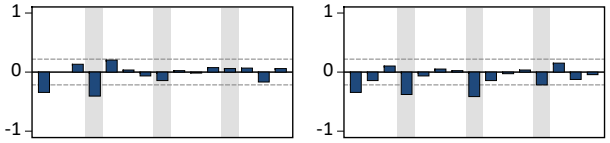
MODELO M2 [W2] MA(1)×MA(1)$_4$ [Y] IMA(2,1)×IMA(1,1)$_4$

Dependent Variable: D(TPARO, 2, 4)
Sample(adjusted): 1981:3 2000:4
Included observations: 78 after adjusting endpoints

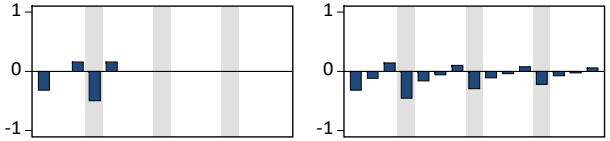
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	-0.366535	0.101409	-3.614440	0.0005
SMA(4)	-0.902203	0.039382	-22.90915	0.0000
S.E. of regression	0.378918	Akaike info criterion		0.922314
Sum squared resid	10.91201	Schwarz criterion		0.982742

$$\nabla^2\nabla_4\, y_t \;=\; (1-0.3665B)\;(1-0.9022B^4)\hat{a}_t\,,$$
$$(0.1014)\qquad(0.0394)$$
$$n=78,\;\; \hat{\sigma}_A=0.3789,\;\; \mathrm{AIC}=0.9223,\;\; \mathrm{BIC}=0.9827.$$

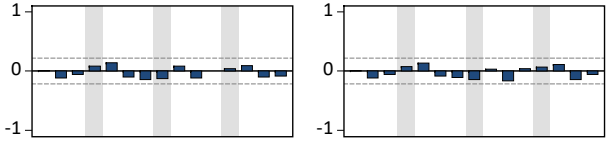
ACF - PACF MUESTRALES SERIE W2



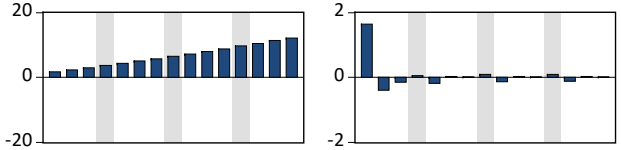
ACF - PACF TEÓRICAS MODELO M2 [W2]



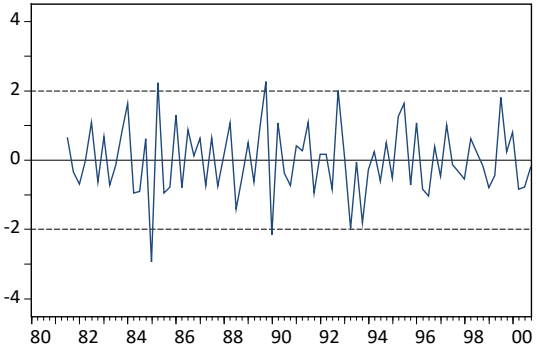
ACF - PACF RESIDUALES MODELO M2



COEFICIENTES PSI - PI MODELO M2 [Y]

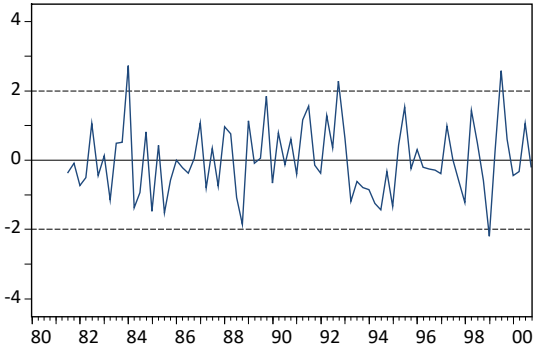


SERIE W2 = D(Y, 2, 4)



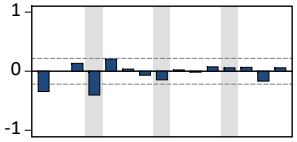
N = 78 - MEDIA = 0.0008 (0.9878) - DT = 0.5206

RESIDUOS M2

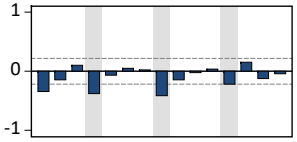


N = 78 - MEDIA = -0.021 (0.6210) - DT = 0.3758

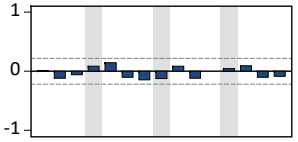
ACF



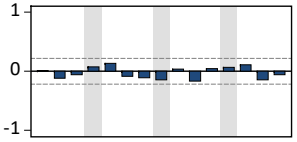
PACF



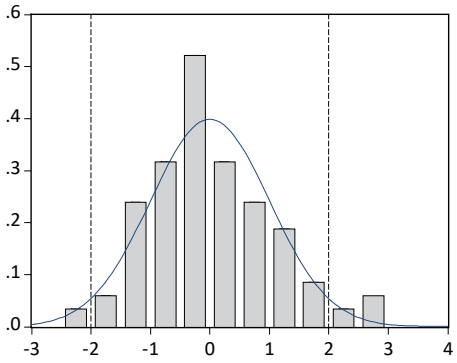
ACF



PACF



LJUNG-BOX Q(13) = 12.681 (PROB = 0.4727) ARMA = 2

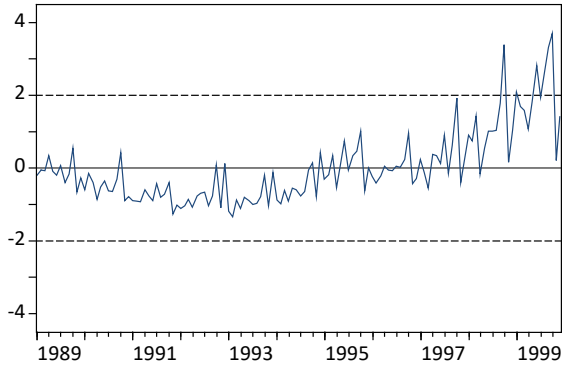


Series: RESIDUOS M2
Sample 1981:3 2000:4
Observations 78

Mean	-0.021124
Median	-0.083196
Maximum	1.002727
Minimum	-0.847173
Std. Dev.	0.375849
Skewness	0.451928
Kurtosis	3.126850
Jarque-Bera	2.707405
Probability	0.258282

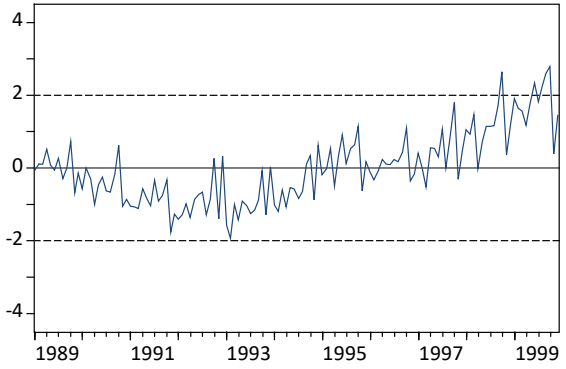
EJEMPLO 7 - ST14 : Y = VIVIN (1989:01 - 1999:12)

SERIE Y = VIVIN



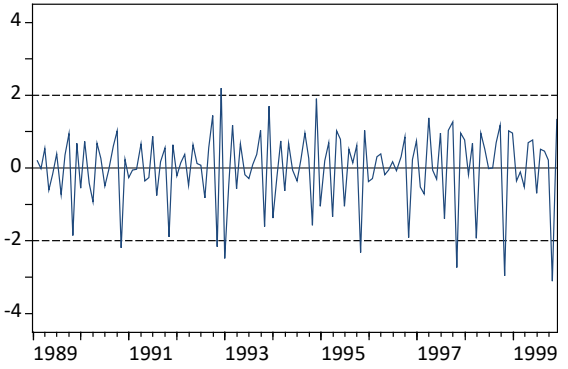
N = 132 - MEDIA = 24.214 - DT = 9.0226

SERIE LOG(Y)



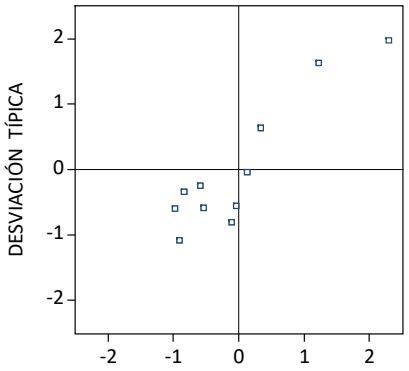
N = 132 - MEDIA = 3.1288 - DT = 0.3313

SERIE DLOG(Y)

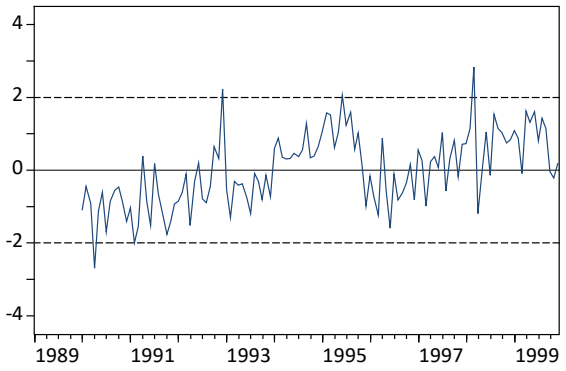


N = 131 - MEDIA = 0.0038 - DT = 0.2557

SERIE Y

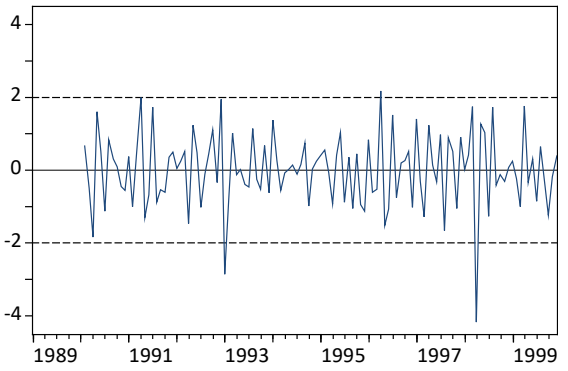


SERIE DLOG(Y, 0, 12)



N = 120 - MEDIA = 0.0584 - DT = 0.2094

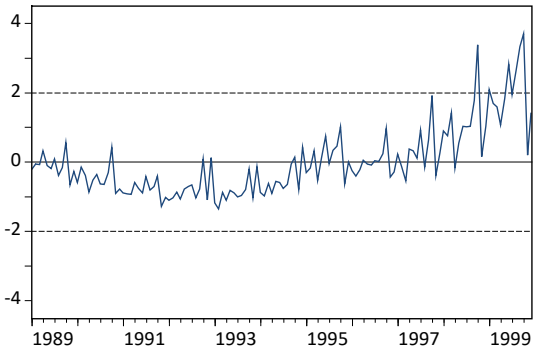
SERIE W = DLOG(Y, 1, 12)



N = 119 - MEDIA = 0.0022 (0.9049) - DT = 0.2031

EJEMPLO 7.1 - ST14 : Y = VIVIN (1989:01 - 1999:12)

SERIE Y = VIVIN



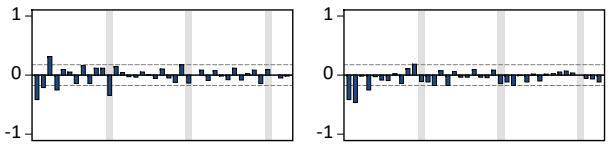
N = 132 - MEDIA = 24.214 - DT = 9.0226

MODELO M1 [W] AR(2)×MA(1)$_{12}$ [LOG(Y)] ARI(2,1)×IMA(1,1)$_{12}$

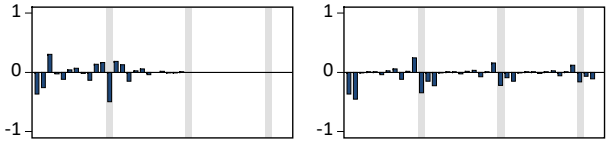
Dependent Variable: DLOG(VIVIN, 1, 12)				
Sample(adjusted): 1990:04 1999:12				
Included observations: 117 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	-0.540389	0.083098	-6.503034	0.0000
AR(2)	-0.458262	0.083140	-5.511961	0.0000
MA(12)	-0.880889	0.024155	-36.46818	0.0000
S.E. of regression	0.135919	Akaike info criterion		-1.128208
Sum squared resid	2.106035	Schwarz criterion		-1.057383

$$(1 + 0.5404B + 0.4583B^2)\,\nabla\nabla_{12}\,\ln y_t = (1 - 0.8809B^{12})\hat{a}_t\,,$$
$$(0.0831)\quad (0.0831)\qquad\qquad (0.0242)$$
$$n = 117,\ \hat{\sigma}_A = 0.1359,\ \text{AIC} = -1.1282,\ \text{BIC} = -1.0574.$$
$$\hat{\phi}(x) = 0 \Rightarrow x_1^*, x_2^* = -0.59 \mp 1.35i \Rightarrow d = 1.48 > 1.$$

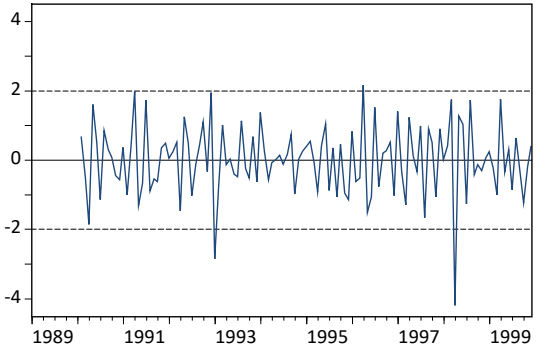
ACF - PACF MUESTRALES SERIE W



ACF - PACF TEÓRICAS MODELO M1 [W]

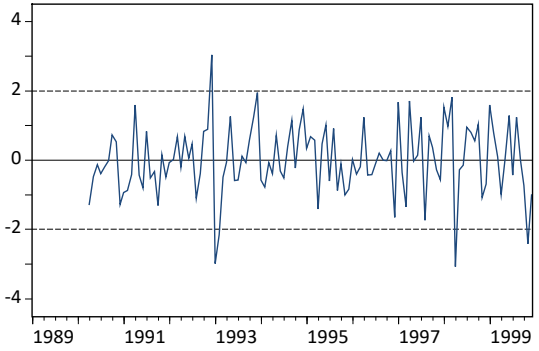


SERIE W = DLOG(Y, 1, 12)



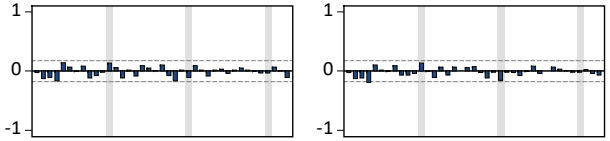
N = 119 - MEDIA = 0.0022 (0.9049) - DT = 0.2031

RESIDUOS M1

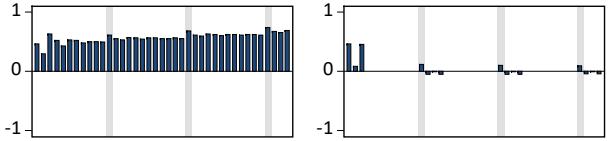


N = 117 - MEDIA = 0.0073 (0.5534) - DT = 0.1345

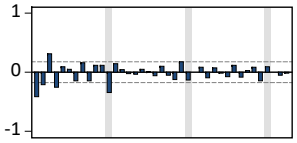
ACF - PACF RESIDUALES MODELO M1



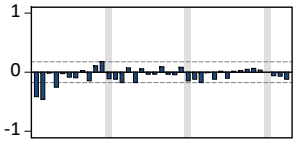
COEFICIENTES PSI - PI MODELO M1 [LOG(Y)]



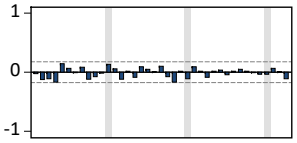
ACF



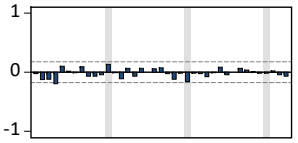
PACF



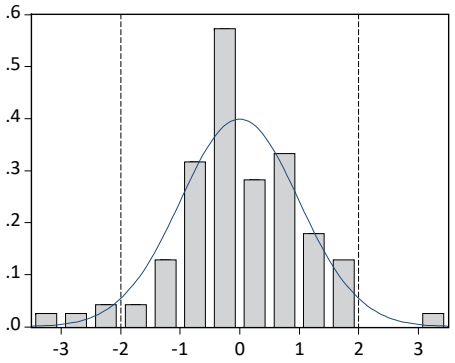
ACF



PACF



LJUNG-BOX Q(36) = 35.708 (PROB = 0.4823) ARMA = 3

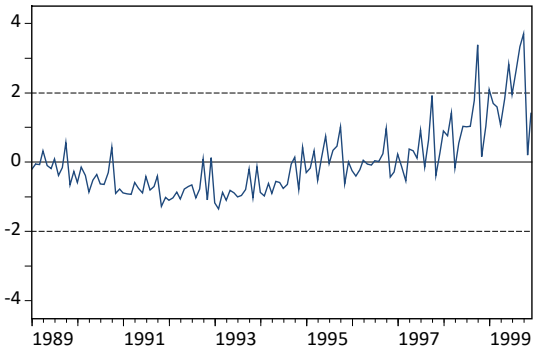


Series: RESIDUOS M1
Sample 1990:04 1999:12
Observations 117

Mean	0.007393
Median	-0.001318
Maximum	0.416466
Minimum	-0.406085
Std. Dev.	0.134538
Skewness	-0.196957
Kurtosis	3.865282
Jarque-Bera	4.406425
Probability	0.110448

EJEMPLO 7.2 - ST14 : Y = VIVIN (1989:01 - 1999:12)

SERIE Y = VIVIN



N = 132 - MEDIA = 24.214 - DT = 9.0226

MODELO M2 [W] MA(1)×MA(1)$_{12}$ [LOG(Y)] IMA(1,1)×IMA(1,1)$_{12}$ ["AIRLINE MODEL"]

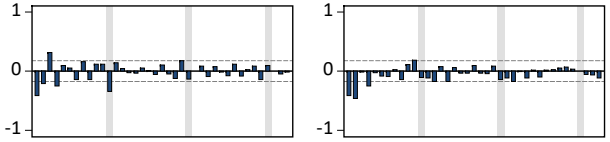
Dependent Variable: DLOG(VIVIN, 1, 12)
Sample(adjusted): 1990:02 1999:12
Included observations: 119 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	-0.675318	0.069979	-9.650227	0.0000
SMA(12)	-0.891754	0.023624	-37.74739	0.0000
S.E. of regression	0.137109	Akaike info criterion		-1.119418
Sum squared resid	2.199467	Schwarz criterion		-1.072710

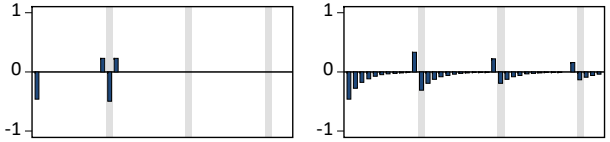
$$\nabla\nabla_{12}\,\ln y_t \;=\; \underset{(0.0700)}{(1-0.6753B)}\;\underset{(0.0236)}{(1-0.8918B^{12})}\hat{a}_t\,,$$

$$n = 119,\;\; \hat{\sigma}_A = 0.1371,\;\; \mathrm{AIC} = -1.1194,\;\; \mathrm{BIC} = -1.0727.$$

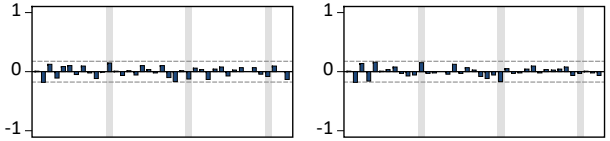
ACF - PACF MUESTRALES SERIE W



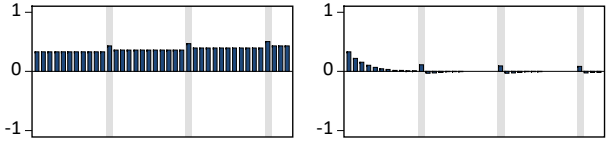
ACF - PACF TEÓRICAS MODELO M2 [W]



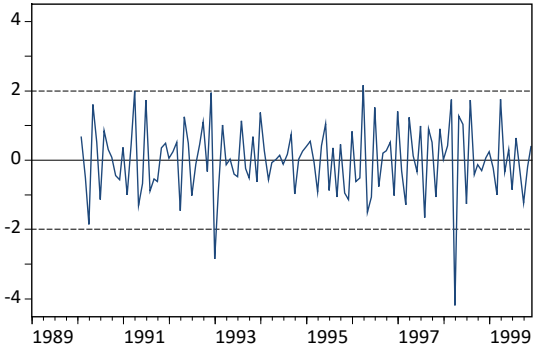
ACF - PACF RESIDUALES MODELO M2



COEFICIENTES PSI - PI MODELO M2 [LOG(Y)]

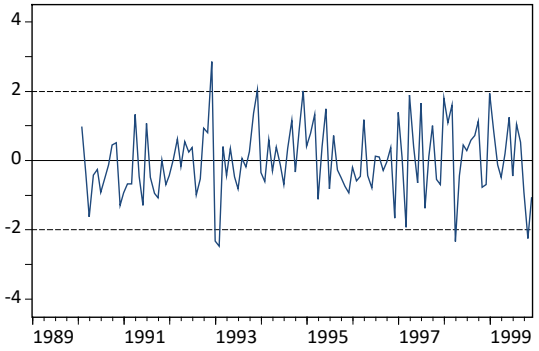


SERIE W = DLOG(Y, 1, 12)



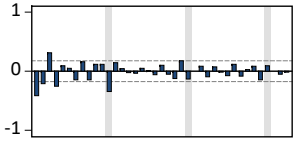
N = 119 - MEDIA = 0.0022 (0.9049) - DT = 0.2031

RESIDUOS M2

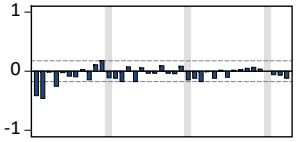


N = 119 - MEDIA = 0.0189 (0.1289) - DT = 0.1351

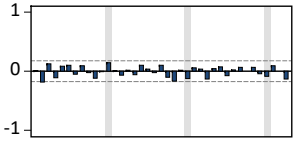
ACF



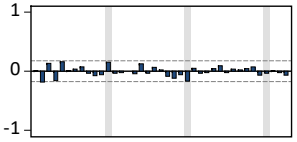
PACF



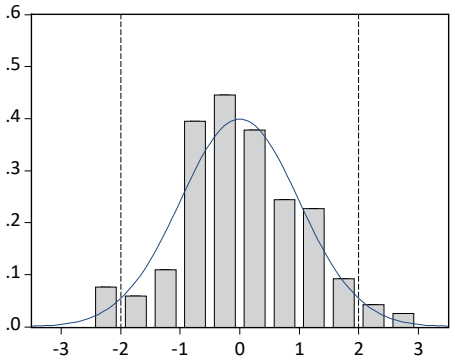
ACF



PACF



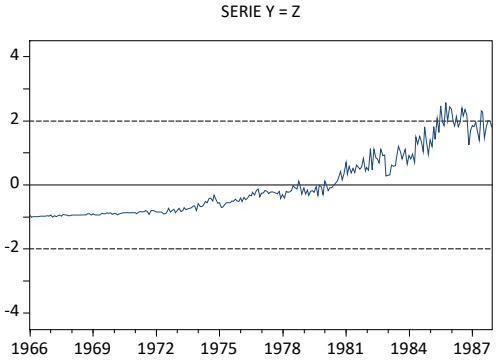
LJUNG-BOX Q(37) = 42.397 (PROB = 0.2495) ARMA = 2



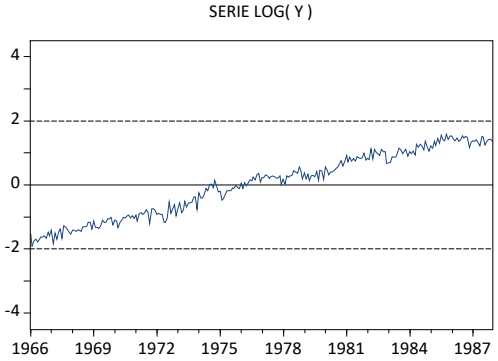
Series: RESIDUOS M2
Sample 1990:02 1999:12
Observations 119

Mean	0.018948
Median	0.001226
Maximum	0.405127
Minimum	-0.313931
Std. Dev.	0.135194
Skewness	0.079117
Kurtosis	3.088950
Jarque-Bera	0.163377
Probability	0.921559

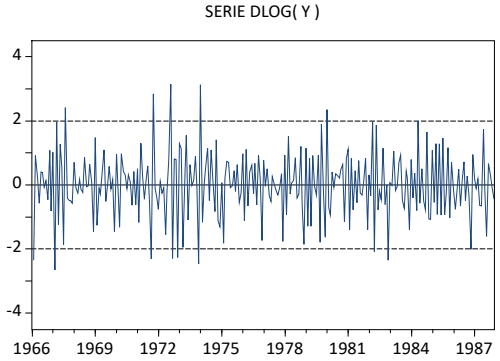
EJEMPLO 8 - ST21 : Y = Z (1966:01 - 1987:12)



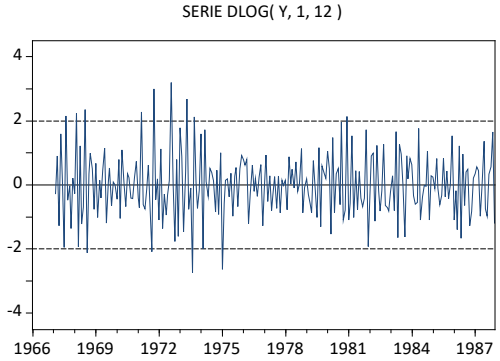
N = 264 - MEDIA = 232681 - DT = 214718



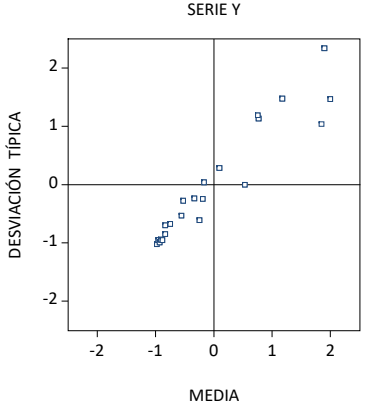
N = 264 - MEDIA = 11.838 - DT = 1.1011

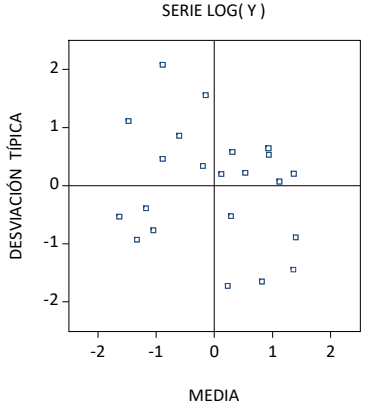


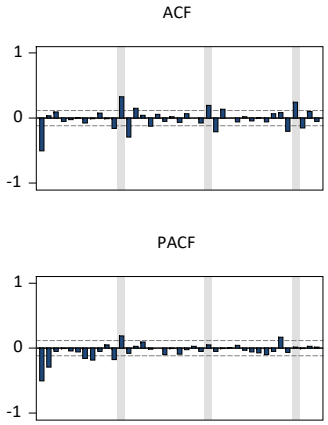
N = 263 - MEDIA = 0.0121 (0.2636) - DT = 0.1760

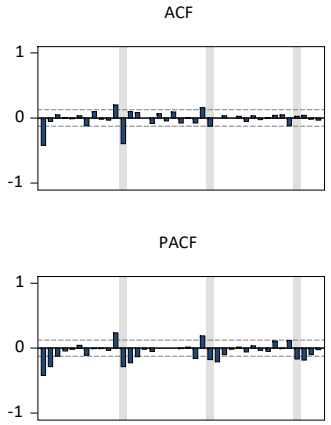


N = 251 - MEDIA = -0.000 (0.9751) - DT = 0.2033



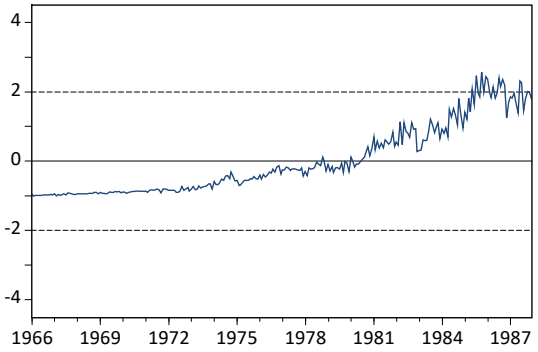






EJEMPLO 8.1 - ST21 : Y = Z (1966:01 - 1987:12)

SERIE Y = Z



N = 264 - MEDIA = 232681 - DT = 214718

MODELO M1 [W1] MA(1)×AR(1)$_{12}$ [LOG(Y)] IMA(1,1)×AR(1)$_{12}$

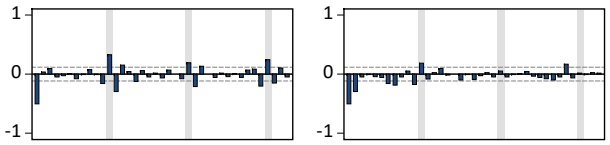
Dependent Variable: DLOG(Z)				
Sample(adjusted): 1967:02 1987:12				
Included observations: 251 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(12)	0.309584	0.060077	5.153114	0.0000
MA(1)	-0.580050	0.051610	-11.23900	0.0000
S.E. of regression	0.142174	Akaike info criterion		-1.055587
Sum squared resid	5.033182	Schwarz criterion		-1.027496

$$(1 - 0.3096B^{12})\ \nabla \ln y_t = (1 - 0.5801B)\hat{a}_t\,,$$
$$(0.0601) \qquad\qquad (0.0516)$$

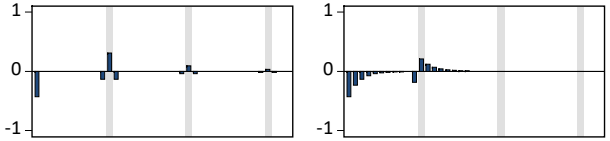
$n = 251,\ \hat{\sigma}_A = 0.1422,\ \text{AIC} = -1.0556,\ \text{BIC} = -1.0275.$

Nivel medio significativo (distinto de cero) en serie de residuos.

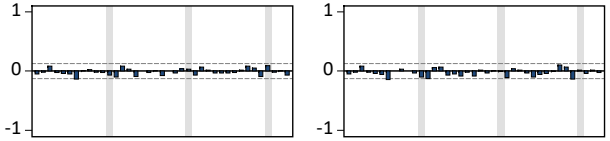
ACF - PACF MUESTRALES SERIE W1



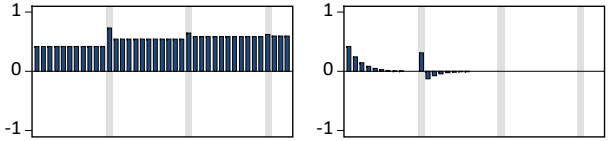
ACF - PACF TEÓRICAS MODELO M1 [W1]



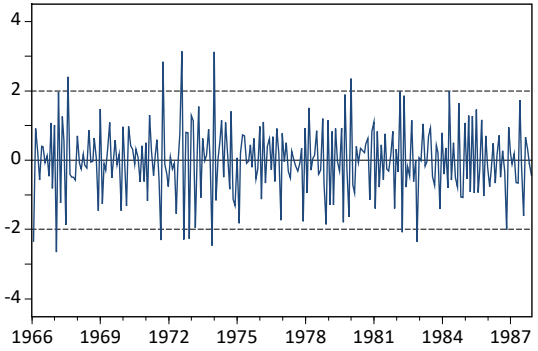
ACF - PACF RESIDUALES MODELO M1



COEFICIENTES PSI - PI MODELO M1 [LOG(Y)]

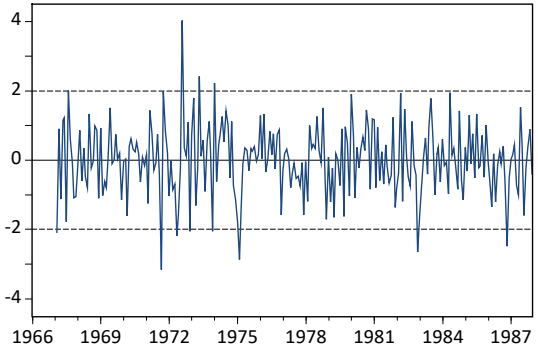


SERIE W1 = DLOG(Y)



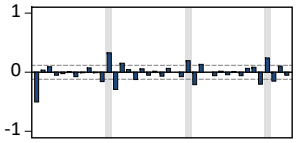
N = 263 - MEDIA = 0.0121 (0.2636) - DT = 0.1760

RESIDUOS M1

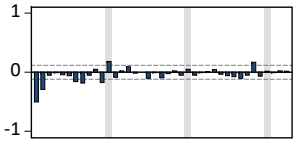


N = 251 - MEDIA = 0.0205 (0.0212) - DT = 0.1403

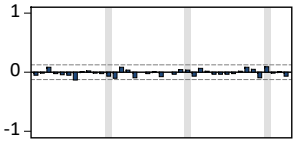
ACF



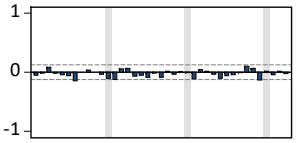
PACF



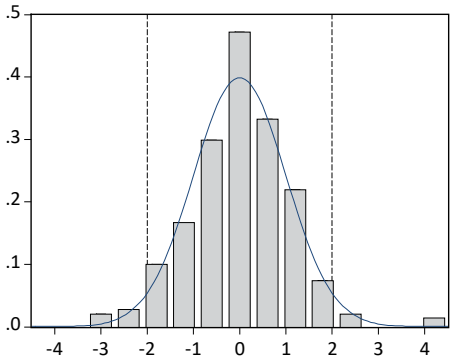
ACF



PACF



LJUNG-BOX Q(37) = 34.115 (PROB = 0.6050) ARMA = 2

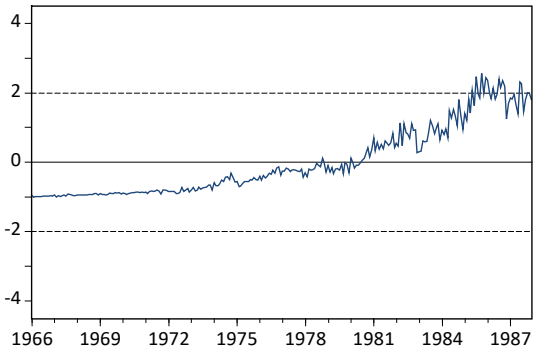


Series: RESIDUOS M1
Sample 1967:02 1987:12
Observations 251

Mean	0.020536
Median	0.023879
Maximum	0.587071
Minimum	-0.422163
Std. Dev.	0.140390
Skewness	-0.028745
Kurtosis	3.910572
Jarque-Bera	8.706006
Probability	0.012868

EJEMPLO 8.2 - ST21 : Y = Z (1966:01 - 1987:12)

SERIE Y = Z



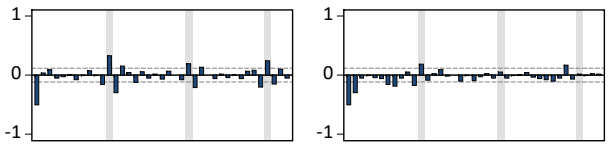
N = 264 - MEDIA = 232681 - DT = 214718

MODELO M2 [W2] MA(1)×AR(1)$_{12}$ [LOG(Y)] IMA(1,1)×AR(1)$_{12}$ CON MEDIA

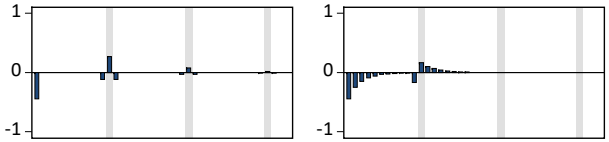
Dependent Variable: DLOG(Z)				
Sample(adjusted): 1967:02 1987:12				
Included observations: 251 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013086	0.004617	2.834448	0.0050
AR(12)	0.270757	0.061105	4.431040	0.0000
MA(1)	-0.623391	0.049614	-12.56494	0.0000
S.E. of regression	0.140570	Akaike info criterion		-1.074335
Sum squared resid	4.900495	Schwarz criterion		-1.032198

$$(1 - 0.2708B^{12})\,(\nabla \ln y_t - 0.0131) = (1 - 0.6234B)\hat{a}_t\,,$$
$$(0.0611) \qquad (0.0046) \qquad (0.0496)$$
$$n = 251,\ \hat{\sigma}_A = 0.1406,\ \text{AIC} = -1.0743,\ \text{BIC} = -1.0322.$$

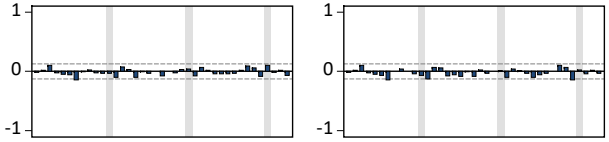
ACF - PACF MUESTRALES SERIE W2



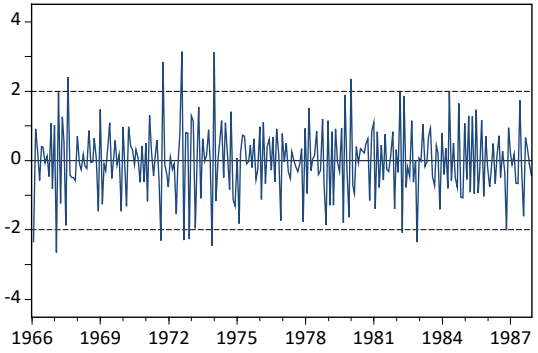
ACF - PACF TEÓRICAS MODELO M2 [W2]



ACF - PACF RESIDUALES MODELO M2

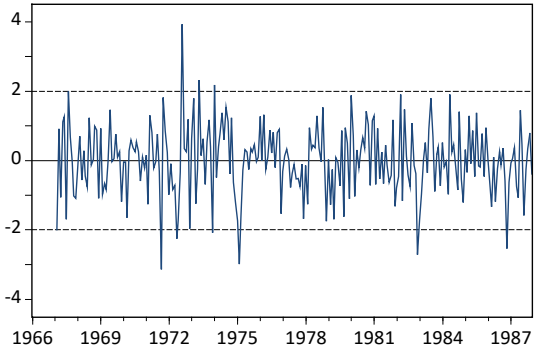


SERIE W2 = DLOG(Y) [= W1]



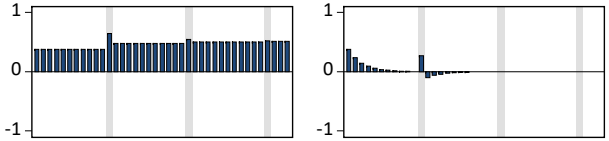
N = 263 - MEDIA = 0.0121 (0.2636) - DT = 0.1760

RESIDUOS M2

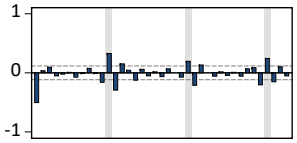


N = 251 - MEDIA = -0.000 (0.9273) - DT = 0.1400

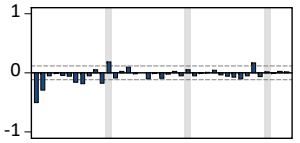
COEFICIENTES PSI - PI MODELO M2 [LOG(Y)]



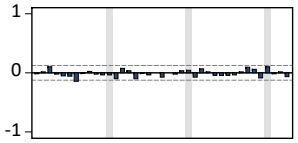
ACF



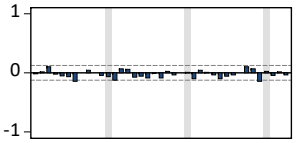
PACF



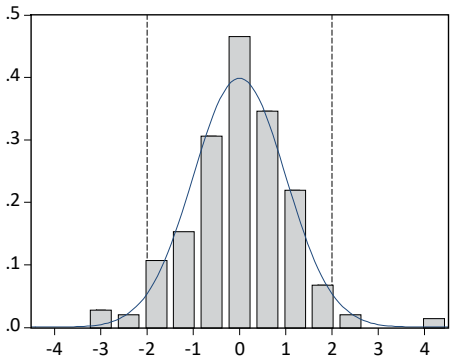
ACF



PACF



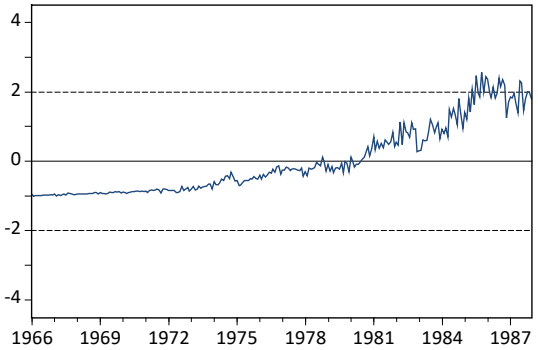
LJUNG-BOX Q(37) = 35.617 (PROB = 0.5338) ARMA = 2



Series: RESIDUOS M2	
Sample 1967:02 1987:12	
Observations 251	
Mean	-0.000806
Median	-4.44E-05
Maximum	0.550042
Minimum	-0.440204
Std. Dev.	0.140005
Skewness	-0.093698
Kurtosis	3.854385
Jarque-Bera	8.001572
Probability	0.018301

EJEMPLO 8.3 - ST21 : Y = Z (1966:01 - 1987:12)

SERIE Y = Z



N = 264 - MEDIA = 232681 - DT = 214718

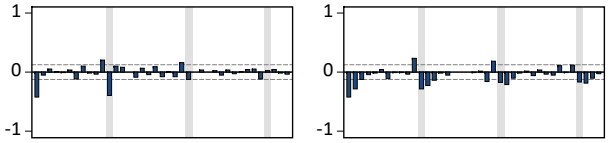
MODELO M3 [W3] MA(1)×MA(1)$_{12}$ [LOG(Y)] IMA(1,1)×IMA(1,1)$_{12}$ ["AIRLINE MODEL"]

Dependent Variable: DLOG(Z, 1, 12)				
Sample(adjusted): 1967:02 1987:12				
Included observations: 251 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	-0.575248	0.050840	-11.31487	0.0000
SMA(12)	-0.889822	0.026586	-33.46895	0.0000
S.E. of regression	0.132292	Akaike info criterion		-1.199668
Sum squared resid	4.357819	Schwarz criterion		-1.171577

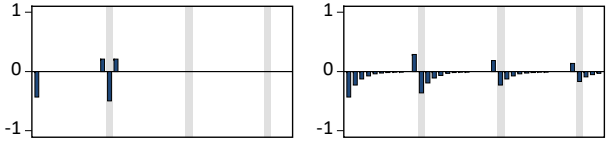
$$\nabla\nabla_{12}\,\ln y_t \;=\; \underset{(0.0508)}{(1-0.5752B)}\;\underset{(0.0266)}{(1-0.8898B^{12})}\hat{a}_t\,,$$

$$n = 251,\;\; \hat{\sigma}_A = 0.1323,\;\; \mathrm{AIC} = -1.1997,\;\; \mathrm{BIC} = -1.1716.$$

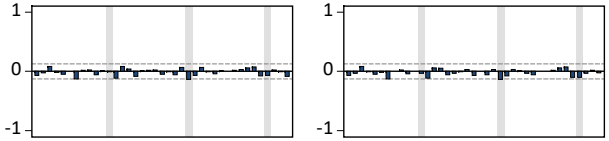
ACF - PACF MUESTRALES SERIE W3



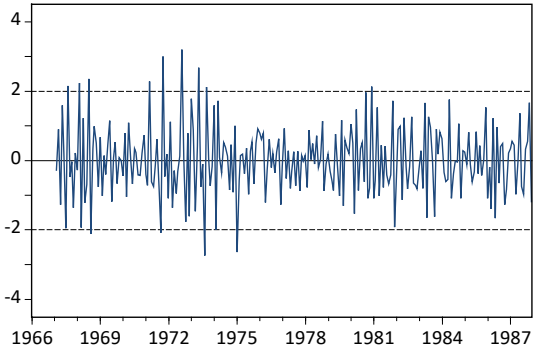
ACF - PACF TEÓRICAS MODELO M3 [W3]



ACF - PACF RESIDUALES MODELO M3

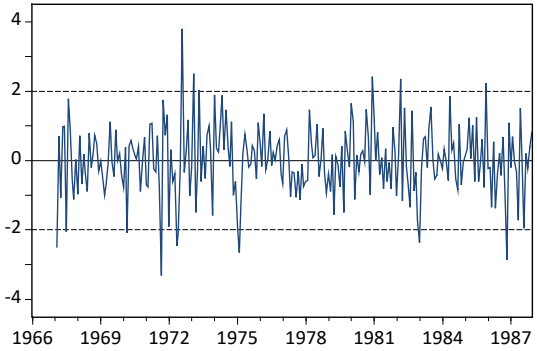


SERIE W3 = DLOG(Y, 1, 12)



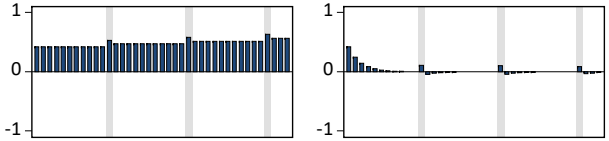
N = 251 - MEDIA = -0.000 (0.9751) - DT = 0.2033

RESIDUOS M3

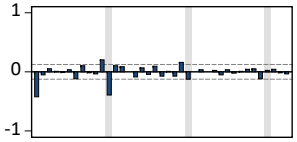


N = 251 - MEDIA = -0.013 (0.1126) - DT = 0.1313

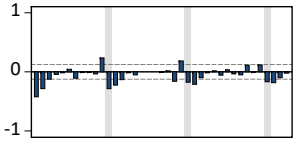
COEFICIENTES PSI - PI MODELO M3 [LOG(Y)]



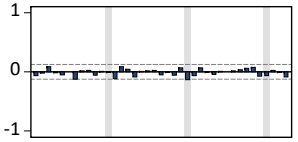
ACF



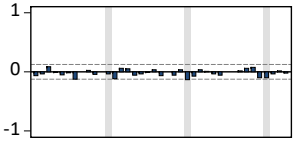
PACF



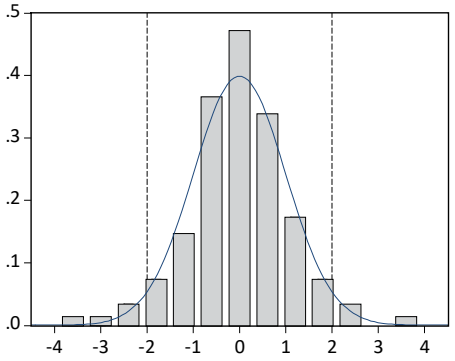
ACF



PACF



LJUNG-BOX Q(37) = 37.521 (PROB = 0.4452) ARMA = 2



Series: RESIDUOS M3	
Sample 1967:02 1987:12	
Observations 251	
Mean	-0.013200
Median	-0.013682
Maximum	0.487311
Minimum	-0.449112
Std. Dev.	0.131363
Skewness	-0.062932
Kurtosis	4.113205
Jarque-Bera	13.12590
Probability	0.001412