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7 Anexos e Apêndices

7.1. Anexo I: Relação das Ações Consideradas no Trabalho

A seguir a relação das empresas analisadas nesta dissertação:

	Valor Mercado R\$ 000	Beta Atual		Valor Mercado R\$ 000	Beta Atual		
1	Petrobras PN (PETR4)	204.789.437,00	0,90	27	Aracruz PNB (ARCZ6)	12.212.468,00	0,10
2	Vale Rio Doce PNA (VALE5)	108.242.880,00	0,30	28	Loj Americanas PN (LAME4)	6.081.022,00	1,00
3	Bradesco PN (BBDC4)	77.812.456,00	1,00	29	Acesita PN (ACES4)	2.688.700,00	0,90
4	Caemi PN (CMET4)	15.051.828,00	0,40	30	Cesp PN (CESP4)	2.462.040,00	1,40
5	Usiminas PNA (USIM5)	17.374.705,00	1,50	31	Ipiranga Pet PN (PTIP4)	1.933.094,00	0,70
6	Braskem PNA (BRKM5)	5.253.447,00	1,20	32	Klabin PN (KLBN4)	4.680.183,00	0,60
7	Bco Itau Hold Finan PN (ITAU4)	72.588.592,00	0,90	33	Light ON (LIGH3)	2.225.638,00	1,10
8	Sid Nacional ON (CSNA3)	19.750.923,00	1,20	34	Unipar PNB (UNIP6)	1.145.070,00	0,90
9	Gerdau PN (GGBR4)	24.213.636,00	1,10	35	Telesp Operac PN (TLPP4)	25.634.763,00	0,70
10	Arcelor BR ON (ARCE3)	23.792.018,00	0,60	36	Souza Cruz ON (CRUZ3)	12.291.795,00	0,40
11	Cemig PN (CMIG4)	16.159.844,00	0,90	37	Confab PN (CNFB4)	1.545.188,00	0,50
12	Petrobras ON (PETR3)	227.114.951,00	0,90	38	Bradesco ON (BBDC3)	68.948.986,00	1,10
13	Eletrobras PNB (ELET6)	30.129.373,00	1,20	39	Ambev ON (AMBV3)	56.230.622,00	0,60
14	Vale Rio Doce ON (VALE3)	122.061.120,00	0,40	40	Duratex PN (DURA4)	2.787.585,00	0,70
15	Brasil Telecom PN (BRTO4)	5.892.814,00	0,70	41	Randon Part PN (RAPT4)	1.399.864,00	0,50
16	Ambev PN (AMBV4)	65.150.175,00	0,60	42	Cemig ON (CMIG3)	13.615.114,00	0,80
17	Itausa PN (ITSA4)	29.568.690,00	0,90	43	Parapanema PN (PMAM4)	1.078.471,00	1,20
18	Sadia SA PN (SDIA4)	4.307.540,00	0,70	44	Suzano Papel PNA (SUZB5)	4.176.094,00	0,50
19	Eletrobras ON (ELET3)	30.970.849,00	1,30	45	Fosfertil PN (FFTL4)	2.465.805,00	0,30
20	Embraer PN (EMBR4)	14.544.916,00	0,80	46	Cesp ON (CESP3)	2.285.799,00	1,10
21	Embraer ON (EMBR3)	14.306.711,00	0,90	47	Telesp Operac ON (TLPP3)	21.354.102,00	0,70
22	Brasil ON (BBAS3)	44.692.203,00	1,20	48	Ripasa PN (RPSA4)	1.916.235,00	0,50
23	Gerdau Met PN (GOAU4)	7.990.229,00	0,90	49	Acesita ON (ACES3)	2.784.539,00	0,80
24	Perdigao PN (PRGA4)	3.338.167,00	0,90	50	Magnesita PNA (MAGS5)	612.652,00	0,70
25	Celese PNB (CLSC6)	1.311.434,00	0,80	51	Ibovespa (IBOV)	-	1,00
26	Votorantim C P PN (VCPA4)	6.628.608,00	0,20				

Fonte: ECONOMATICA – 12-fev-2006

7.2.

Apêndice I: Roteiro para Realização dos Cálculos e Testes Estatísticos Realizados no Eviews 5.0 (Exemplo: Vale do Rio Doce)

Como foi explicitado e justificado ao longo desta dissertação, foram realizados cálculos e testes estatísticos no Eviews 5.0, para todas as 51 empresas referidas neste trabalho.

Para não sobrecarregar o texto com os sucessivos testes e cálculos realizados referentes àquelas empresas, este apêndice se limita, apenas, a uma delas, a Vale do rio Doce. Para facilitar o acompanhamento dos procedimentos e testes realizados, apresenta-se, a seguir, o roteiro percorrido, passo a passo, para cada uma das empresas.

Passo 1:

Importar a série de retornos das ações.

Caminho: File > Open > Foreign Data as Workfile > Selecionar Arquivo

O arquivo deve ter o seguinte formato:

Cotacoes
Vale Rio Doce PNA (VALE5)
Em Real(ex-Cr\$)>IPCA>29Dez05

Data	Retorno
4/1/1994	6%
5/1/1994	7%
6/1/1994	7%
7/1/1994	4%
10/1/1994	4%
11/1/1994	-1%
12/1/1994	10%
13/1/1994	13%
14/1/1994	0%
17/1/1994	9%
18/1/1994	6%
19/1/1994	5%
20/1/1994	10%
21/1/1994	-3%
24/1/1994	0%

Após selecionar o arquivo, será apresentada a seguinte tela:



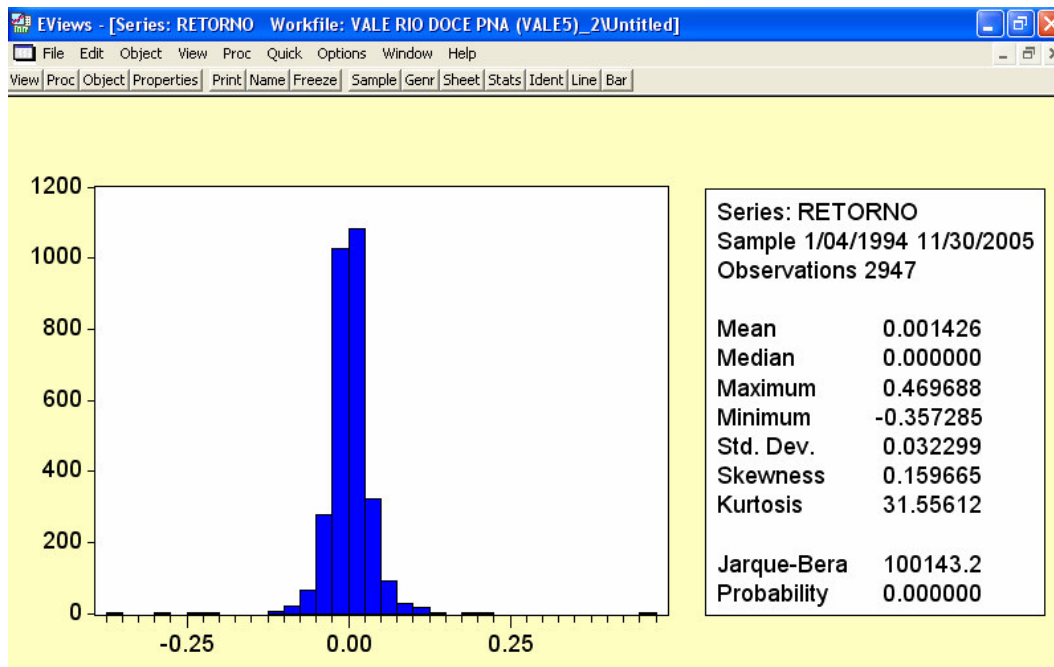
Finalmente, selecionar, na tela acima, a opção RETORNO.

Passo 2:

Realizar a estatística descritiva, onde, além do teste de normalidade (Jarque-Bera), são realizado outros calculados como, por exemplo, a média dos retornos, desvio-padrão, mediana, etc.

Caminho: View > Descriptive Statistics > Histogram and Stats Table

Abaixo, seguem os resultados:

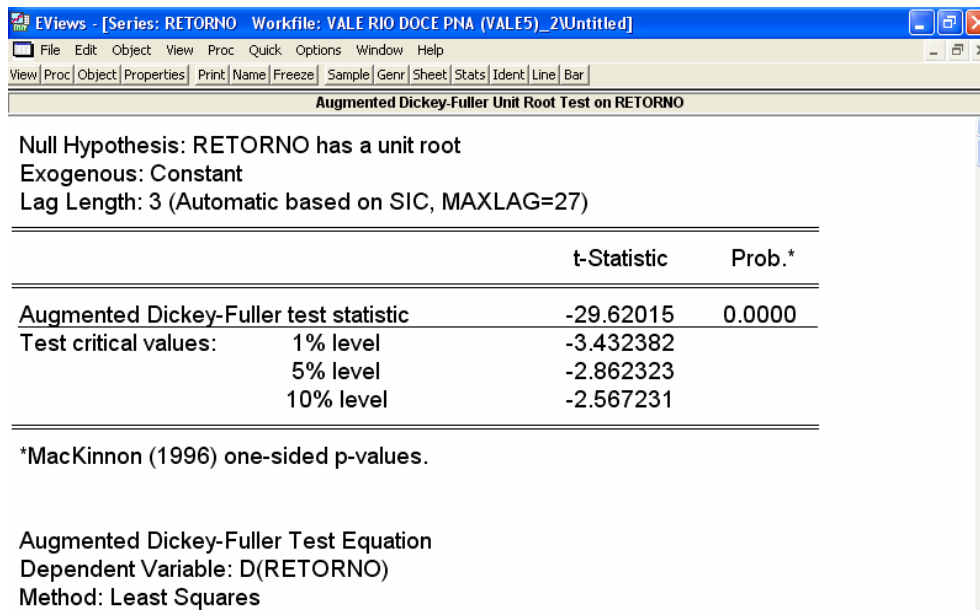


Passo 3:

Realizar o teste da estacionariedade (Augmented Dickey-Fuller).

Caminho: View > Unit Root Test > Selecionar no campo Test Type a opção Augmented Dickey-Fuller

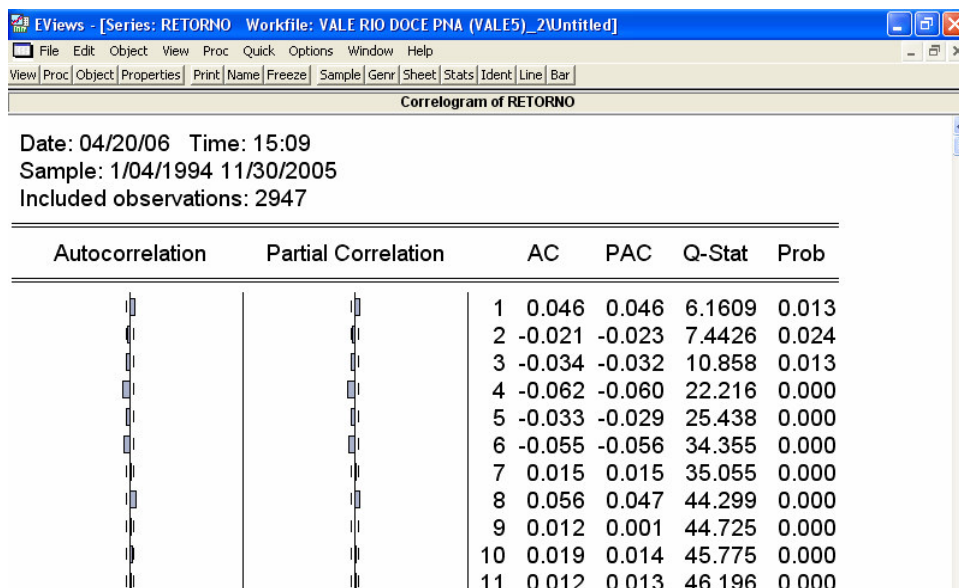
A seguir, o resultado do teste:

**Passo 4:**

Traçar o correlograma e calcular os coeficientes de auto-correlação e estatística Q de Ljung-Box.

Caminho: View > Correlogram > Selecionar a opção Level

Resultados:

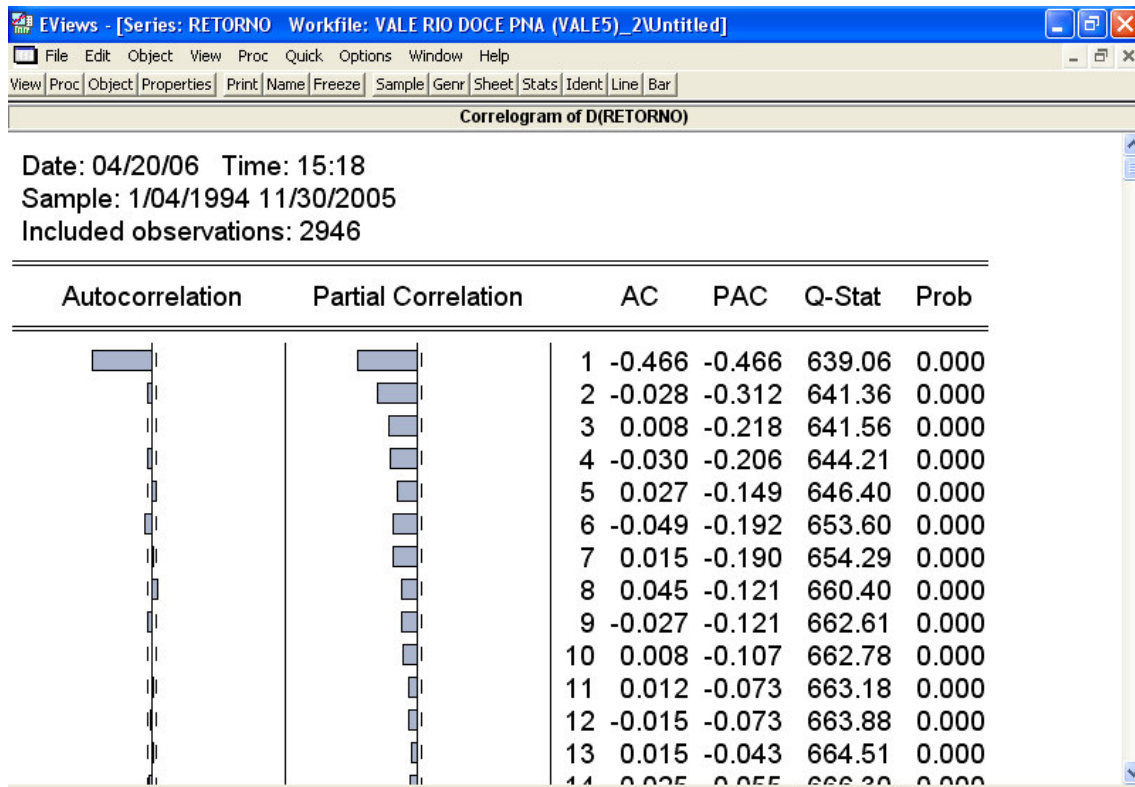


Passo 5:

Como o comportamento do correlograma não permite a identificação do modelo ARIMA, é necessário traçar o correlograma da série diferenciada.

Caminho: View > Correlogram > Selecionar a opção 1st difference

A seguir, o resultado do correlograma da série diferenciada:

**Passo 6:**

Calcular as equações de regressão dos diferentes modelos ARIMA (p,d,q).

Caminho: Quick > Estimate Equation

Após seguir o caminho acima, o quadro abaixo será apresentado:

Equation Estimation

Specification | Options

Equation specification
Dependent variable followed by list of regressors including ARMA and PDL terms, OR an explicit equation like $Y=c(1)+c(2)X$.

Estimation settings
Method: LS - Least Squares (NLS and ARMA)
Sample: 1/04/1994 11/30/2005

OK Cancelar

Para calcular as equações, é necessário preencher, no quadro acima, o campo Equation Specification. A seguir, a especificação e os resultados das equações para cada modelo estudado:

AR(1)

Equation Especification: *retorno AR(1)*

EViews - [Equation: UNTITLED Workfile: VALE RIO DOCE PNA (VALE5)_2\Untitled]

File Edit Object View Proc Quick Options Window Help

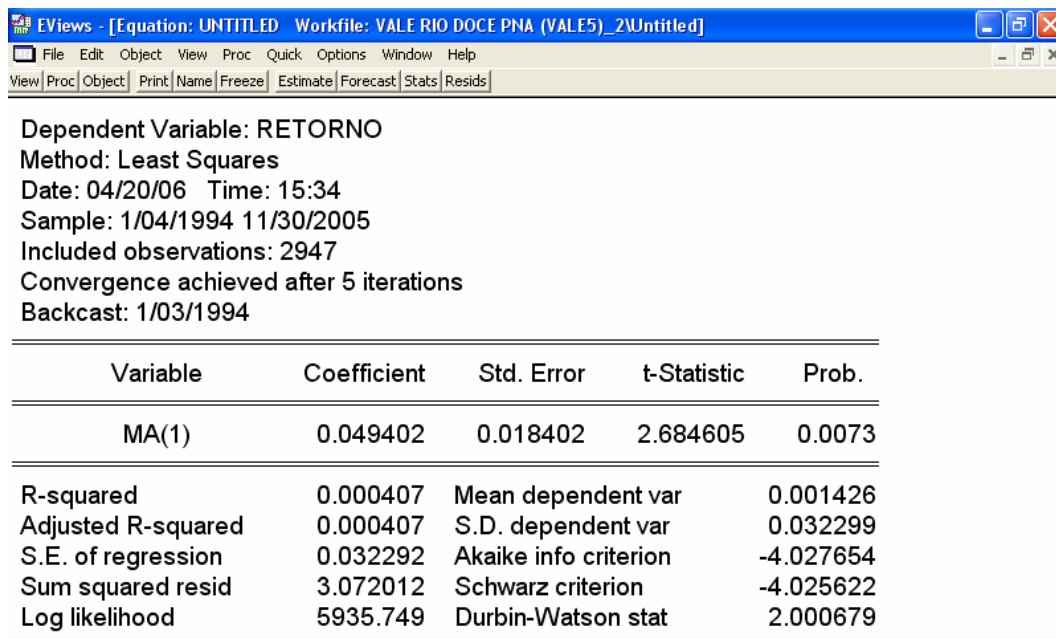
View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: RETORNO
Method: Least Squares
Date: 04/20/06 Time: 15:31
Sample (adjusted): 1/05/1994 11/30/2005
Included observations: 2946 after adjustments
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.047541	0.018397	2.584097	0.0098

R-squared	0.000367	Mean dependent var	0.001407
Adjusted R-squared	0.000367	S.D. dependent var	0.032288
S.E. of regression	0.032282	Akaike info criterion	-4.028256
Sum squared resid	3.069122	Schwarz criterion	-4.026224
Log likelihood	5934.621	Durbin-Watson stat	1.998881

MA(1)

Equation Especification: *retorno MA(1)*


EViews - [Equation: UNTITLED Workfile: VALE RIO DOCE PNA (VALE5)_2\Untitled]

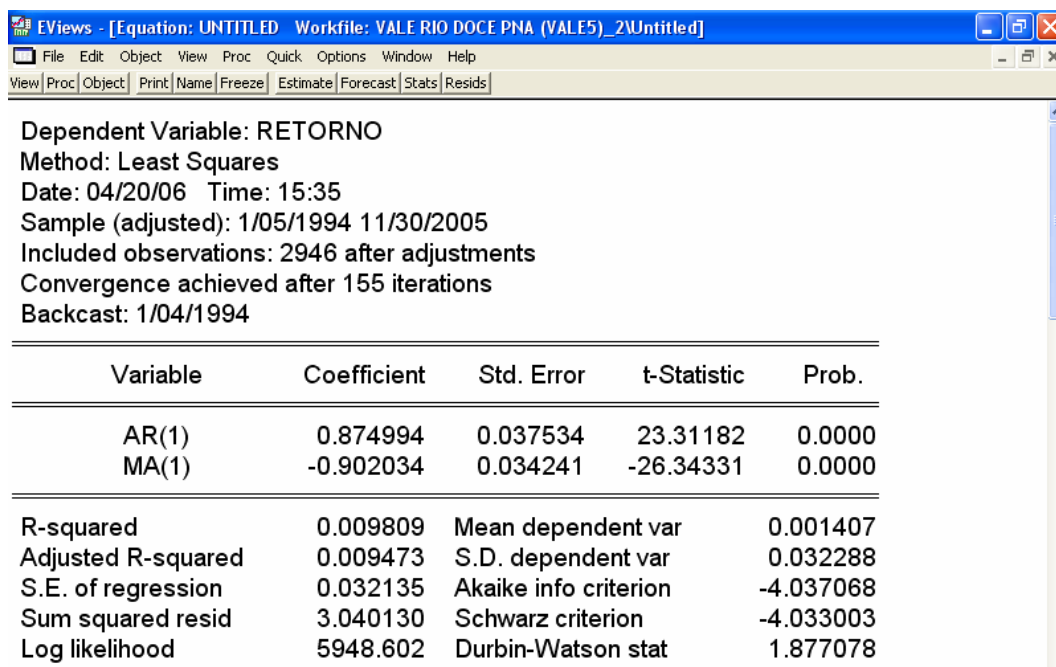
File Edit Object View Proc Quick Options Window Help

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: RETORNO
 Method: Least Squares
 Date: 04/20/06 Time: 15:34
 Sample: 1/04/1994 11/30/2005
 Included observations: 2947
 Convergence achieved after 5 iterations
 Backcast: 1/03/1994

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MA(1)	0.049402	0.018402	2.684605	0.0073
R-squared	0.000407	Mean dependent var		0.001426
Adjusted R-squared	0.000407	S.D. dependent var		0.032299
S.E. of regression	0.032292	Akaike info criterion		-4.027654
Sum squared resid	3.072012	Schwarz criterion		-4.025622
Log likelihood	5935.749	Durbin-Watson stat		2.000679

ARMA(1,1)

Equation Especification: *retorno AR(1) MA(1)*


EViews - [Equation: UNTITLED Workfile: VALE RIO DOCE PNA (VALE5)_2\Untitled]

File Edit Object View Proc Quick Options Window Help

View Proc Object Print Name Freeze Estimate Forecast Stats Resids

Dependent Variable: RETORNO
 Method: Least Squares
 Date: 04/20/06 Time: 15:35
 Sample (adjusted): 1/05/1994 11/30/2005
 Included observations: 2946 after adjustments
 Convergence achieved after 155 iterations
 Backcast: 1/04/1994

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.874994	0.037534	23.31182	0.0000
MA(1)	-0.902034	0.034241	-26.34331	0.0000
R-squared	0.009809	Mean dependent var		0.001407
Adjusted R-squared	0.009473	S.D. dependent var		0.032288
S.E. of regression	0.032135	Akaike info criterion		-4.037068
Sum squared resid	3.040130	Schwarz criterion		-4.033003
Log likelihood	5948.602	Durbin-Watson stat		1.877078

ARIMA(1,1,0)

Equation Specification: *retorno* $d(\text{retorno})$ AR(1)

EViews - [Equation: UNTITLED Workfile: VALE RIO DOCE PNA (VALE5)_2\Untitled]					
File Edit Object View Proc Quick Options Window Help					
View Proc Object Print Name Freeze Estimate Forecast Stats Resids					
Dependent Variable: RETORNO					
Method: Least Squares					
Date: 04/20/06 Time: 15:53					
Sample (adjusted): 1/06/1994 11/30/2005					
Included observations: 2945 after adjustments					
Convergence achieved after 20 iterations					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
D(RETORNO)	0.499906	0.006809	73.41478	0.0000	
AR(1)	0.512767	0.017131	29.93166	0.0000	
R-squared	0.613741	Mean dependent var	0.001383		
Adjusted R-squared	0.613610	S.D. dependent var	0.032266		
S.E. of regression	0.020057	Akaike info criterion	-4.979804		
Sum squared resid	1.183912	Schwarz criterion	-4.975738		
Log likelihood	7334.762	Durbin-Watson stat	1.619028		

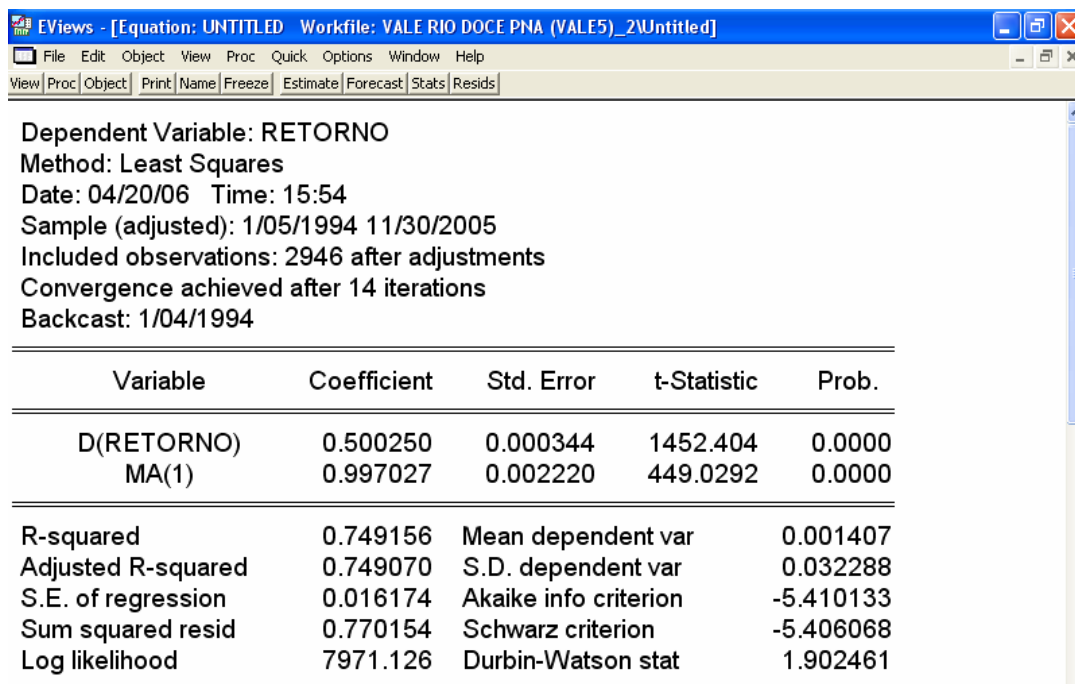
ARIMA(0,1,1)

Equation Specification: *retorno* $d(\text{retorno})$ MA(1)

EViews - [Equation: UNTITLED Workfile: VALE RIO DOCE PNA (VALE5)_2\Untitled]					
File Edit Object View Proc Quick Options Window Help					
View Proc Object Print Name Freeze Estimate Forecast Stats Resids					
Dependent Variable: RETORNO					
Method: Least Squares					
Date: 04/20/06 Time: 15:54					
Sample (adjusted): 1/05/1994 11/30/2005					
Included observations: 2946 after adjustments					
Convergence achieved after 14 iterations					
Backcast: 1/04/1994					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
D(RETORNO)	0.500250	0.000344	1452.404	0.0000	
MA(1)	0.997027	0.002220	449.0292	0.0000	
R-squared	0.749156	Mean dependent var	0.001407		
Adjusted R-squared	0.749070	S.D. dependent var	0.032288		
S.E. of regression	0.016174	Akaike info criterion	-5.410133		
Sum squared resid	0.770154	Schwarz criterion	-5.406068		
Log likelihood	7971.126	Durbin-Watson stat	1.902461		

ARIMA(1,1,1)

Equation Especification: *retorno d(retorno) AR(1) MA(1)*



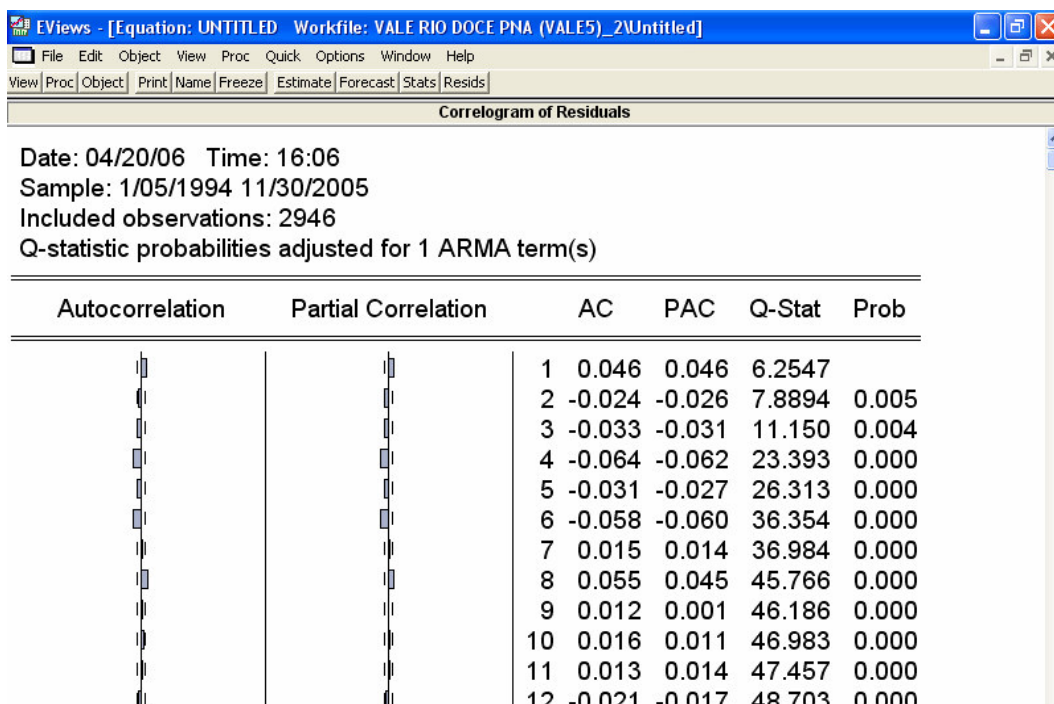
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RETORNO)	0.500250	0.000344	1452.404	0.0000
MA(1)	0.997027	0.002220	449.0292	0.0000
R-squared	0.749156	Mean dependent var		0.001407
Adjusted R-squared	0.749070	S.D. dependent var		0.032288
S.E. of regression	0.016174	Akaike info criterion		-5.410133
Sum squared resid	0.770154	Schwarz criterion		-5.406068
Log likelihood	7971.126	Durbin-Watson stat		1.902461

Passo 7:

Verificar se existe auto-correlação nos resíduos encontrados com a aplicação das equações de regressão.

Caminho: View > Residual Tests > Correlogram – Q – Statistics

Como para a Vale do Rio Doce o melhor modelo encontrado foi o ARIMA (0,1,1), segue, abaixo, o teste dos resíduos para esse modelo:



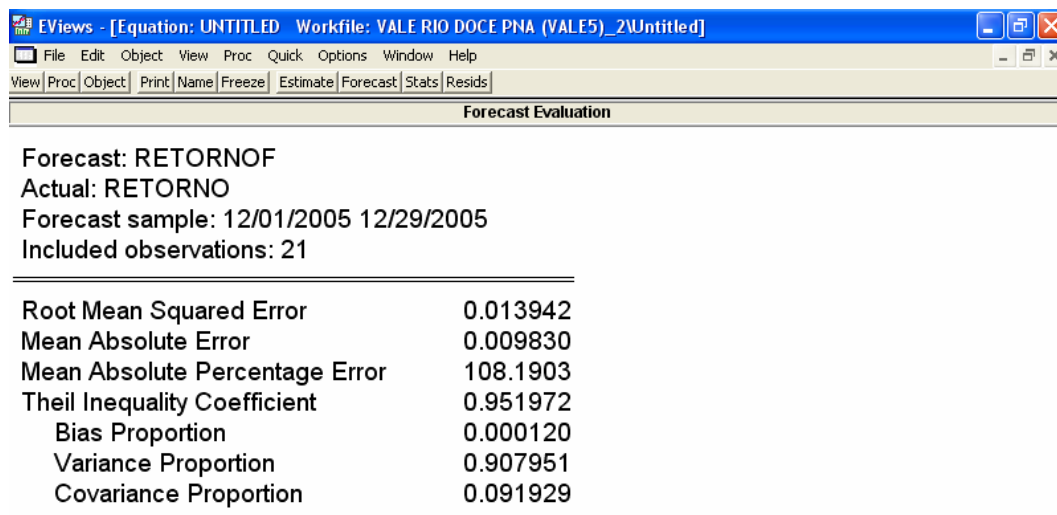
Passo 8:

Realizar as previsões utilizando as equações de regressão de cada modelo e avaliar suas performances.

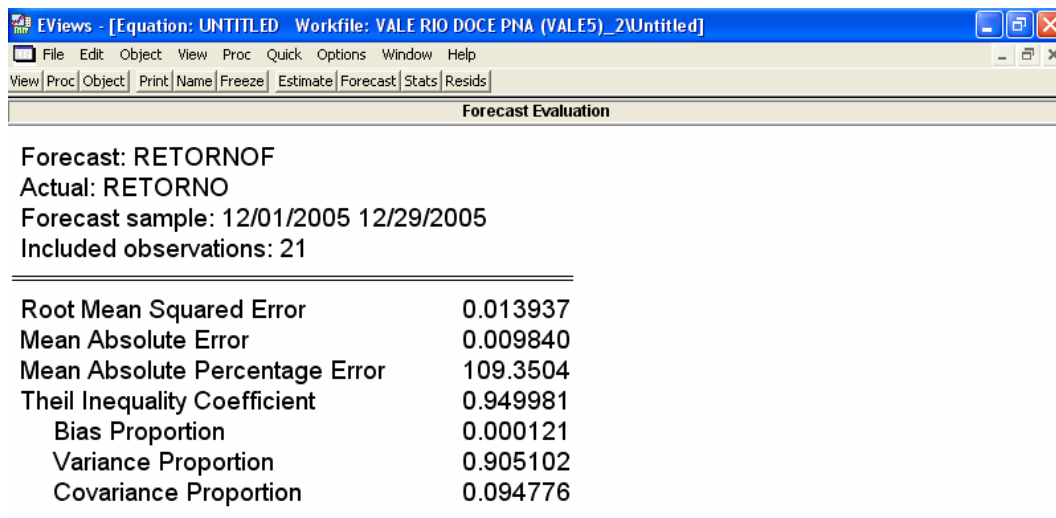
Caminho: Forecast > Preencher no campo Forecast Sample com o período da previsão – 12/01/2005 12/31/2005

A seguir os resultados para cada modelo de regressão:

AR(1)



MA(1)

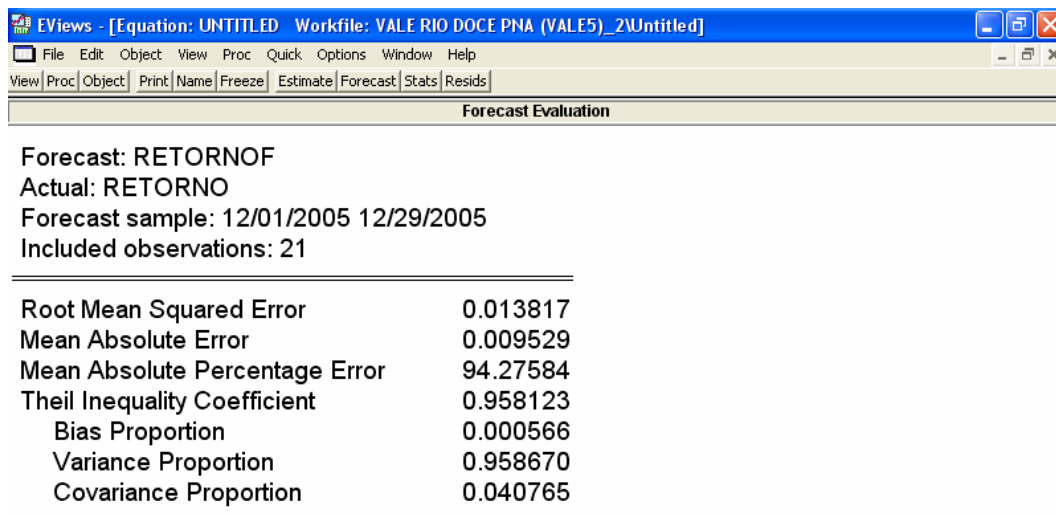


Forecast Evaluation

Forecast: RETORNOF
Actual: RETORNO
Forecast sample: 12/01/2005 12/29/2005
Included observations: 21

Root Mean Squared Error	0.013937
Mean Absolute Error	0.009840
Mean Absolute Percentage Error	109.3504
Theil Inequality Coefficient	0.949981
Bias Proportion	0.000121
Variance Proportion	0.905102
Covariance Proportion	0.094776

ARMA(1,1):

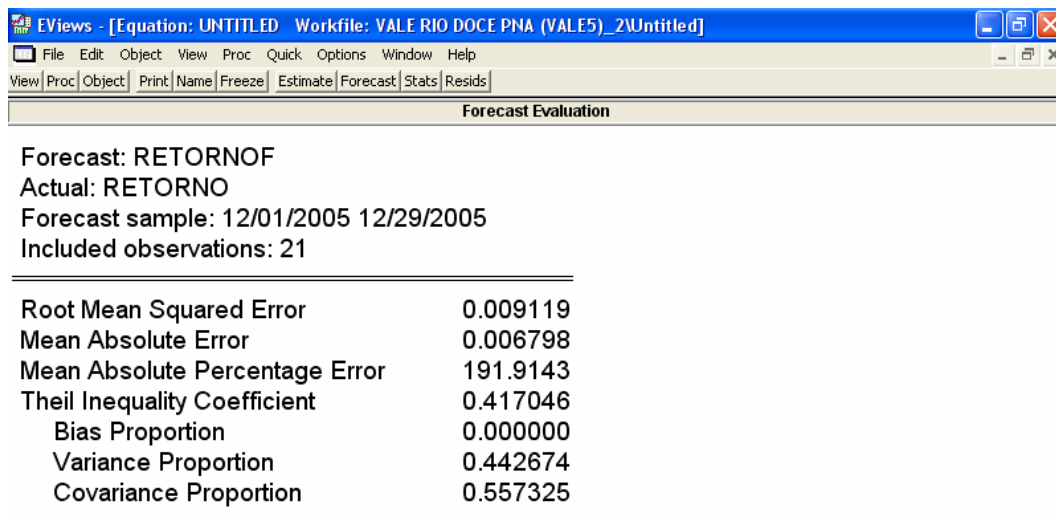


Forecast Evaluation

Forecast: RETORNOF
Actual: RETORNO
Forecast sample: 12/01/2005 12/29/2005
Included observations: 21

Root Mean Squared Error	0.013817
Mean Absolute Error	0.009529
Mean Absolute Percentage Error	94.27584
Theil Inequality Coefficient	0.958123
Bias Proportion	0.000566
Variance Proportion	0.958670
Covariance Proportion	0.040765

ARIMA (1,1,0)

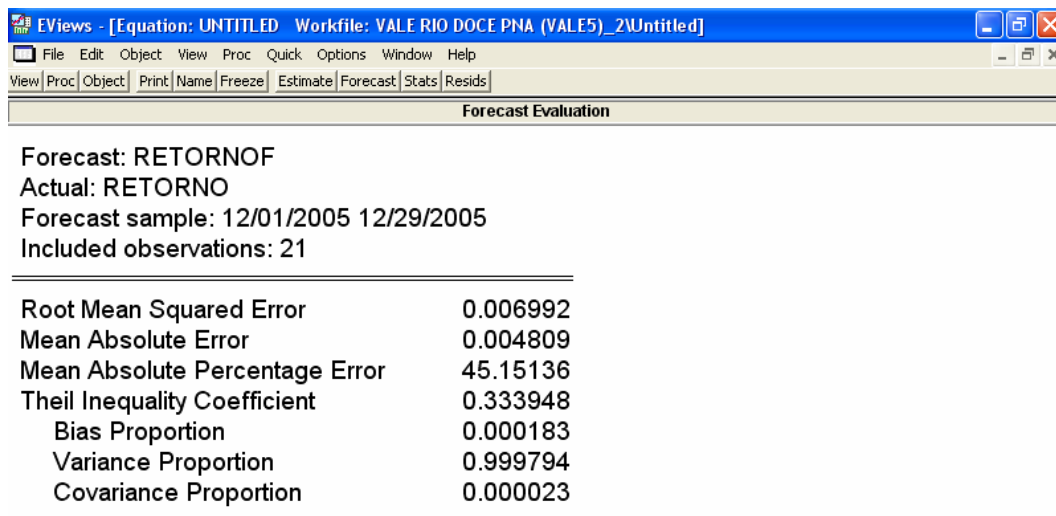


Forecast Evaluation

Forecast: RETORNOF
Actual: RETORNO
Forecast sample: 12/01/2005 12/29/2005
Included observations: 21

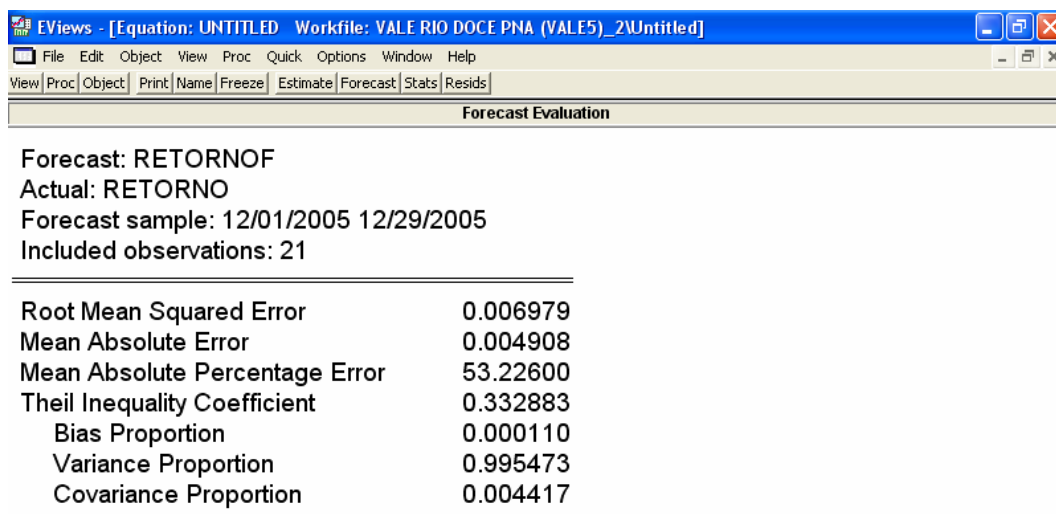
Root Mean Squared Error	0.009119
Mean Absolute Error	0.006798
Mean Absolute Percentage Error	191.9143
Theil Inequality Coefficient	0.417046
Bias Proportion	0.000000
Variance Proportion	0.442674
Covariance Proportion	0.557325

ARIMA (0,1,1)



Forecast Evaluation	
Forecast: RETORNOF	
Actual: RETORNO	
Forecast sample: 12/01/2005 12/29/2005	
Included observations: 21	
Root Mean Squared Error	0.006992
Mean Absolute Error	0.004809
Mean Absolute Percentage Error	45.15136
Theil Inequality Coefficient	0.333948
Bias Proportion	0.000183
Variance Proportion	0.999794
Covariance Proportion	0.000023

ARIMA (1,1,1)



Forecast Evaluation	
Forecast: RETORNOF	
Actual: RETORNO	
Forecast sample: 12/01/2005 12/29/2005	
Included observations: 21	
Root Mean Squared Error	0.006979
Mean Absolute Error	0.004908
Mean Absolute Percentage Error	53.22600
Theil Inequality Coefficient	0.332883
Bias Proportion	0.000110
Variance Proportion	0.995473
Covariance Proportion	0.004417