Time Series Course
PhD. In Business Administration and Quantitative Methods
Computer Class I

Juan de Dios Tena Horrillo

Contents of the class

- Introduction to Eviews

Starting EVIEWS in Windows

- Eviews is a statistical software and needs data to work with. The data can be stored in different formats: excel, spreadsheets, text files, etc
- It is essential to understand the features of such formats to import it into Eviews. Today, the underlying data is saved in Excel file.
- You should be familiar with the Excel environment and should be able to answer the following questions: where is the data saved? What is the name of the file? In which range (cells) is the data located? In which range (cells) are the series names located? In which range (cells) are the dates located?

The main windows in Eviews

- From the START menu, open EVIEWS 6.0 to work with.
- The opening Eviews window is composed of 3 blocks:
  - At the top, the main menu offers a selection of drop-down menus: File, Edit, Object, View, Proc, Quick, Options, Window and Help.
  - Just below the menu is the white command window. Eviews commands may be typed in this window. The command is executed as soon as you hit ENTER.
  - The remaining grey area is the work area where Eviews displays the various objects it creates

How to use Eviews: Graphical user interface vs. programming

- There are two ways to use Eviews:
  - Graphical user interface: by clicking on objects and menus.
  - Line-by-line commands: by writing in the command window (white area below the main Eviews menu).
  - Writing a complete program with a number of commands to be executed as soon as you run the program file (File/New/Program…)

Creating a new workfile

- Click File/New/Workfile… to open the dialog box.
- In the dialog box: choose “Dated-regular frequency” form the “workfile structure type” scroll-down menu.
- In the “data specification” menu, choose “Monthly” frequency.
- Insert 2002m01 and 2014m2 for the “start date” and “end date” respectively.
- On the right-hand side, you can optionally give a name to the workfile page you will be using (leave these fields empty for the moment).
- Click OK and the workfile will be created.

Creating a Workfile

- What is a workfile?

- A workfile is simple a container for Eviews objects. When you create a workfile to objects appear automatically: a constant labelled “c” and a series for residuals labelled “resid”. On the top of the workfile, a series of scrolled down menus is available: view, Proc, object, print, save, details, show, fetch, etc

Importing data

- There are various procedures to do it. To get started, do the following:
  - The data is contained in an Excel file, ipc-ipri.xls,
  - Importing in Eviews from the main Eviews menu: click on “File/Import/Read Text-Lotus-Excel…” to open the import wizard then browse the file you want to import.
  - CAREFUL: the source data file needs to be closed otherwise Eviews cannot import the data.

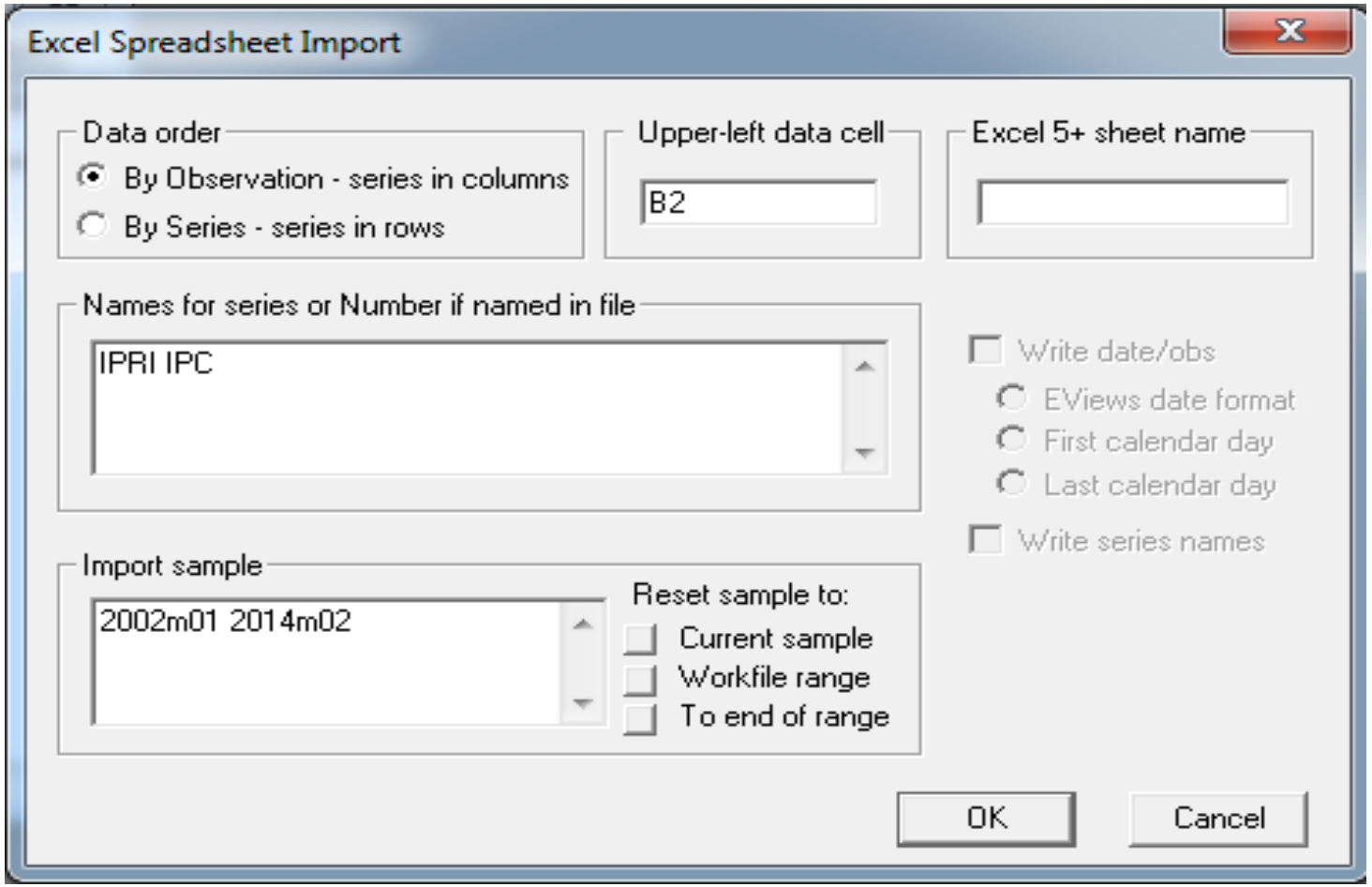
Importing data

- Once the file is selected, you will need to fill in the dialog box. “Data order” should be in columns (same as your Excel spreadsheet). The upper left data cell should be “B2” as presented in the Excel file. Leave “sheet name” empty.

- CAREFUL: dates will not be imported but have been inserted when you created the workfile and entered the “start date” and “end data”.

- In the “name of the series or number if named in file”, you can either write the name of each series, ipc and ipri with a space in between or write number 2, as there are two series to import and their name is already written in the Excel file. The “import sample” is already established. Click ok to import the data.

IMPORTING DATA



Looking at the data: basic charts

- The workfile now contains monthly prices from January 2002 to February 2014 on:

- IPC: Spanish Consumer Price Index
  (www.ine.es)

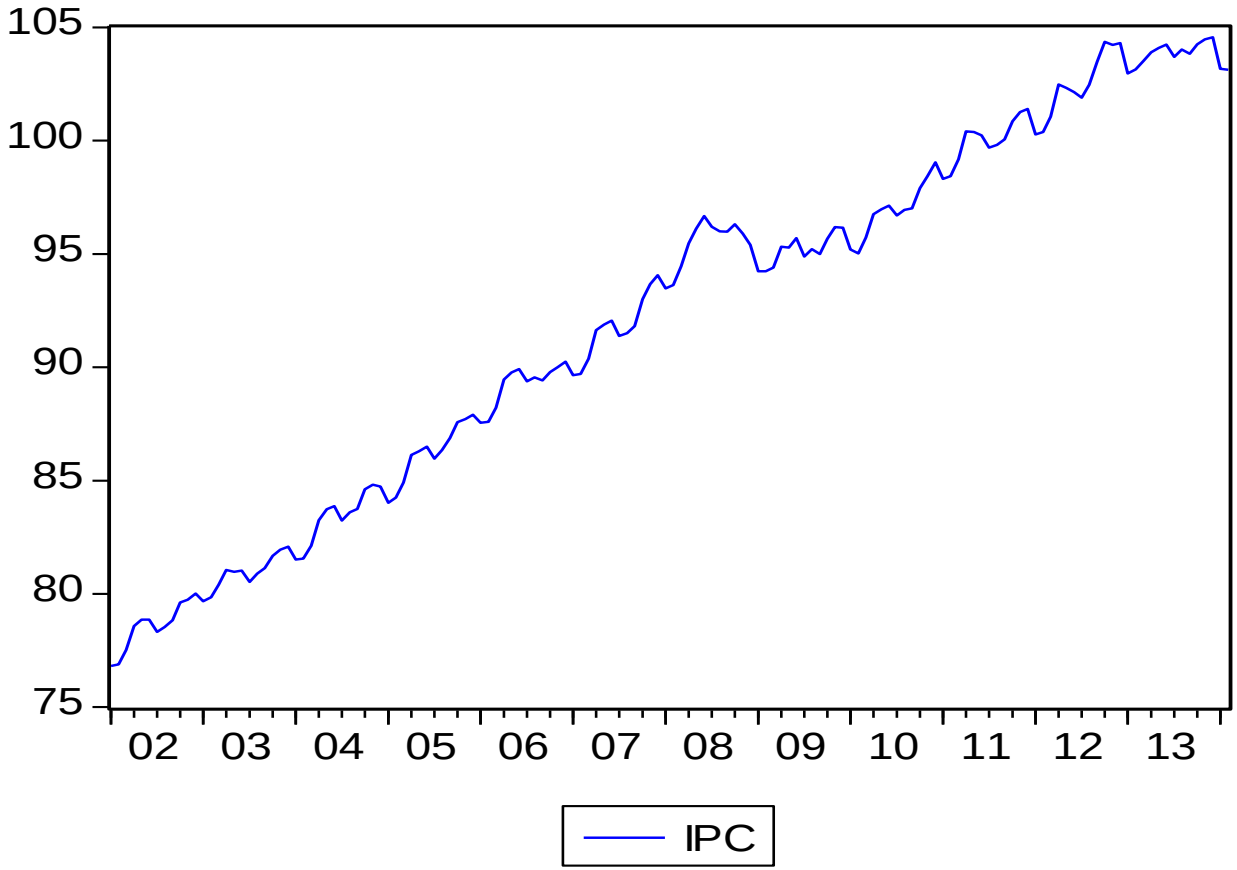
- IPRI: Spanish Industrial goods Price Index
  (www.ine.es)

Looking at the data: basic charts

- A basic steps can be done to look at the series:

  - Double-click the first series “IPC”. A spreadsheet-type window opens where the values of the series are available from 2002m01 up to the end of the sample 2014m02. From the view menu, slect “Graph” then “Line & Symbol” to display a chart of the price index.

LOOKING AT THE DATA: BASIC CHARTS



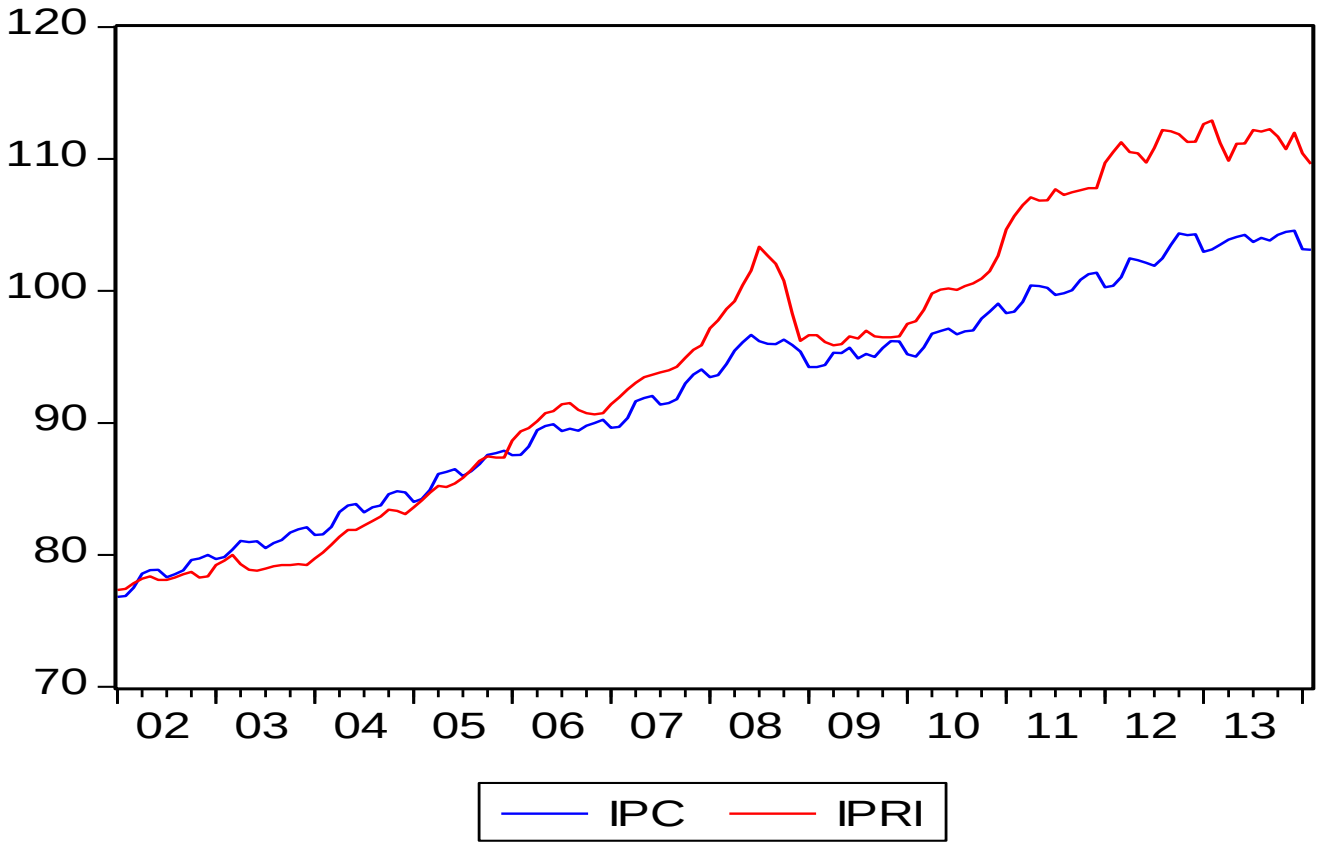
Looking at the data: basic charts

- Does the series look stationary (mean-reverting)?
- Do you think there is a unit root or deterministic trend (non-stationarity)
- Do you think there is trend in the data?

Looking at the data: basic charts

- Highlight “IPC” and “IPRI” (click each of them once holding down the “Ctrl” key). Right-click your selection and choose “open” then “as group”. The two series appear in one spreadsheet-type window. Again, click “View”, select “Graph”, then “Line & Symbol”. You will get a chat of both indexes.

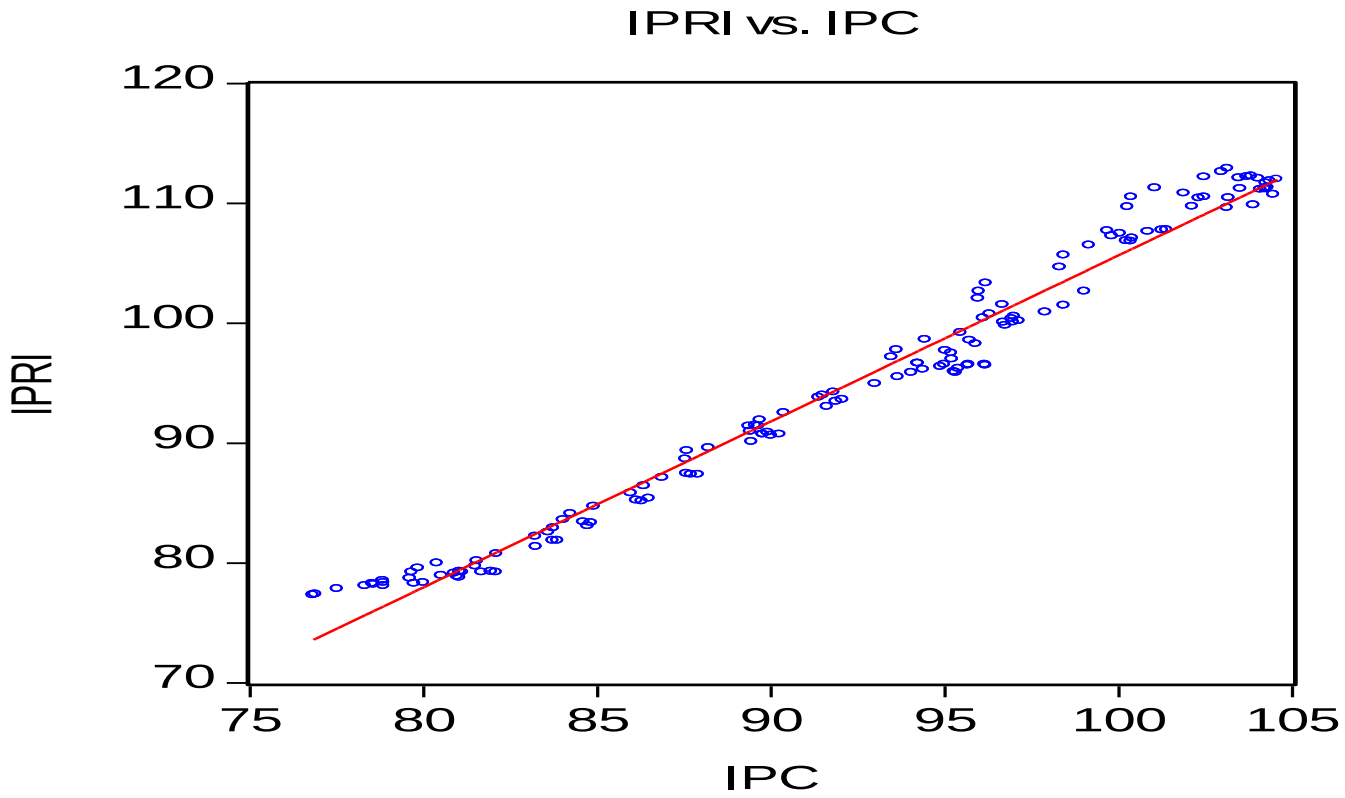
LOOKING AT THE DATA: BASIC CHARTS



Looking at the data: basic charts

- Another interesting graph is the scatter plot. Highlight “IPC” and “IPRI” (click each of them once holding down the “Ctrl” key). Right-click you selection and choose “open” then “as group”. The two series appear in one spreadsheet-type window. Again, click “View”, select “Graph” then “Scatter”.

LOOKING AT THE DATA: BASIC CHARTS



Stationarity

- An important concern in econometrics is to know whether a series is stationary or non stationary.

- A time series is weakly stationary if it has:

  - Constant mean,
  - Constant variance,
  - Constant auto-covariances or auto-correlations for equally space observations (k) but not depending on period t.

Stationarity

- You can test for unit roots: double click on the series you are interested in, then click on the “View” menu and choose “Unit Root Test…”. You can for example use the “Augmented Dickey-Fuller” test leaving the setting unchanged before clicking ok.
- Look at the different options in the “Unit root test” window. You might want to test whether the “1st difference” of your series is stationary, etc.
- NOTE: If you do not remember how to interpret a test, you can use the Eviews help file. From the eviews menu, click help/Eviews help topics.. and type the name of the test you are looking for.

STATIONARITY

Null Hypothesis: IPC has a unit root
Exogenous: Constant
Lag Length: 13 (Automatic based on SIC, MAXLAG=13)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.403946	0.5786
Test critical values:	1% level	-3.480425	
	5% level	-2.883408	
	10% level	-2.578510	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IPC)
Method: Least Squares
Date: 04/07/14 Time: 11:02
Sample (adjusted): 2003M03 2014M02
Included observations: 132 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IPC(-1)	-0.004954	0.003528	-1.403946	0.1630
D(IPC(-1))	0.357476	0.088116	4.056859	0.0001
D(IPC(-2))	-0.005048	0.089135	-0.056634	0.9549
D(IPC(-3))	-0.179132	0.088866	-2.015752	0.0461
D(IPC(-4))	0.068327	0.089521	0.763247	0.4469
D(IPC(-5))	0.044404	0.087301	0.508633	0.6120
D(IPC(-6))	0.119115	0.086762	1.372885	0.1724
D(IPC(-7))	-0.161449	0.087270	-1.849993	0.0668
D(IPC(-8))	0.127229	0.088570	1.436477	0.1535
D(IPC(-9))	-0.179662	0.089281	-2.012317	0.0465
D(IPC(-10))	-0.170768	0.090871	-1.879230	0.0627
D(IPC(-11))	0.065088	0.091154	0.714043	0.4766
D(IPC(-12))	0.471345	0.091004	5.179404	0.0000
D(IPC(-13))	-0.306153	0.093427	-3.276904	0.0014
C	0.593475	0.342082	1.734889	0.0854

Transforming and creating series

- In many cases, we remove the effects of trends, changes in price levels, etc… by working with growth rates.
- You can create growth rate series form level variables. To generate new series click “Quick” in the Eviews menu, then choose “Generate Series…”. In the dialog box type:
- Ipc_gr=ipc/ipc(-1)-1 where ipc(-1) is the lagged value of ipc.
- NOTE: remember that the formula for the period on period growth rate is so that we are looking here at the month-on-month growth rate of IPC.

Transforming and creating series

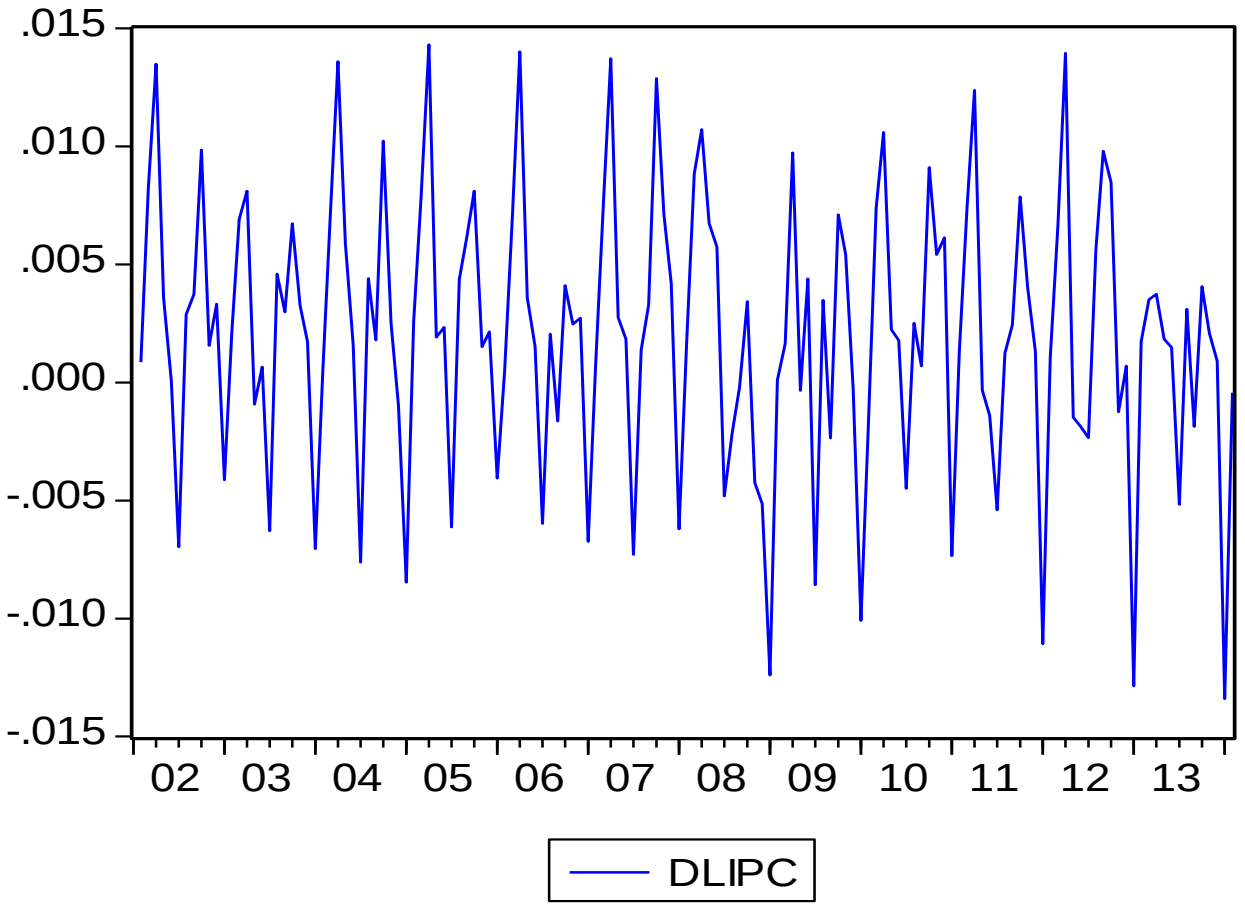
- A different way to approximate growth series consist of taking the difference of the logarithms of the time series.

- To generate this new series click “Quick” in the Eviews menu, the choose “Generate Series…” In the dialog box type.

  - Dlipc=dlog(ipc) in one step,

  - 1) Lipc=log(ipc) and
  - 2) dlipc=d(lipc) in two steps.

Transforming and creating series

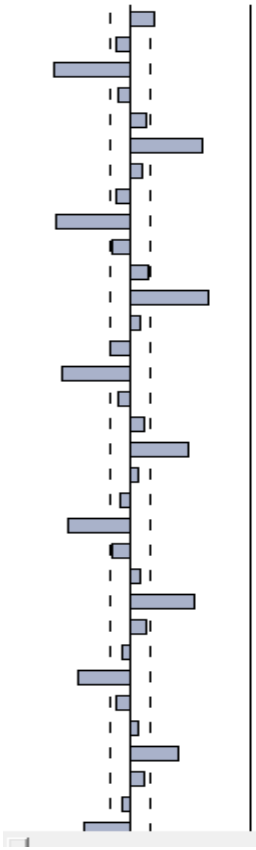


Transforming and creating series

- How can we interpret the transformed time series?
- Is this series stationary yet?

TRANSFORMING AND CREATING SERIES

Date: 04/07/14 Time: 11:08
Sample: 2002M01 2014M02
Included observations: 145

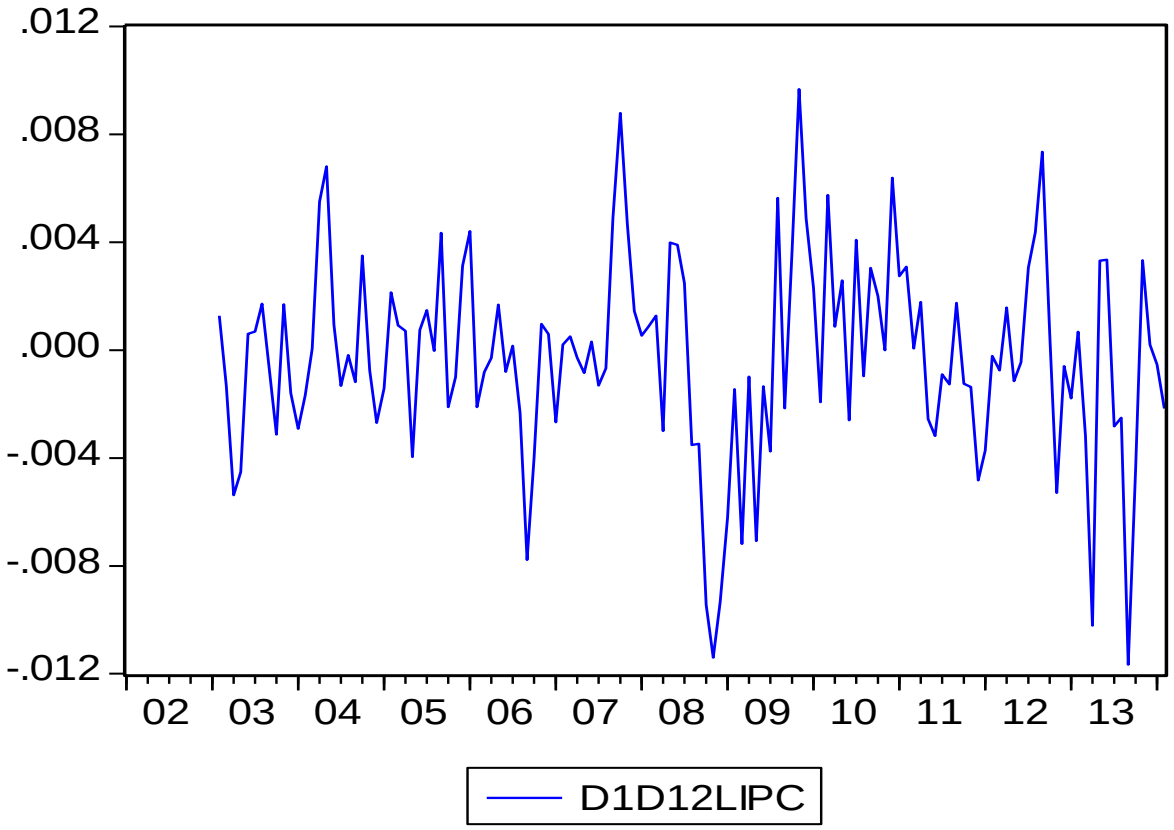


Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.218	0.218	7.0634	0.008
		2	-0.129	-0.185	9.5388	0.008
		3	-0.668	-0.646	76.454	0.000
		4	-0.107	0.232	78.194	0.000
		5	0.140	0.047	81.179	0.000
		6	0.634	0.321	142.74	0.000
		7	0.112	-0.068	144.66	0.000
		8	-0.129	-0.036	147.26	0.000
		9	-0.642	-0.278	211.94	0.000
		10	-0.155	-0.030	215.73	0.000
		11	0.157	0.148	219.67	0.000
		12	0.677	0.243	293.08	0.000
		13	0.096	-0.186	294.57	0.000
		14	-0.172	-0.017	299.40	0.000
		15	-0.588	0.033	356.16	0.000
		16	-0.102	-0.066	357.87	0.000
		17	0.115	-0.075	360.09	0.000
		18	0.503	-0.076	402.48	0.000
		19	0.080	0.024	403.57	0.000
		20	-0.096	0.079	405.16	0.000
		21	-0.546	-0.118	456.48	0.000
		22	-0.148	-0.079	460.26	0.000
		23	0.092	-0.025	461.74	0.000
		24	0.554	0.117	515.90	0.000
		25	0.141	0.084	519.44	0.000
		26	-0.060	0.055	520.08	0.000
		27	-0.453	0.047	557.16	0.000
		28	-0.115	-0.067	559.57	0.000
		29	0.066	0.041	560.36	0.000
		30	0.425	-0.029	593.82	0.000
		31	0.117	-0.057	596.37	0.000
		32	-0.069	-0.093	597.28	0.000
		33	0.407	0.155	628.75	0.000

Transforming and creating series

- In this case stationarity is achieved by taking 1 regular and 1 seasonal difference of the series.

Transforming and creating series



TRANSFORMING AND CREATING SERIES

Null Hypothesis: D1D12LIPC has a unit root
Exogenous: Constant
Lag Length: 11 (Automatic based on SIC, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.132956	0.0000
Test critical values:	1% level	-3.485115	
	5% level	-2.885450	
	10% level	-2.579598	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(D1D12LIPC)
Method: Least Squares
Date: 04/07/14 Time: 11:13
Sample (adjusted): 2004M02 2014M02
Included observations: 121 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D1D12LIPC(-1)	-1.006086	0.164046	-6.132956	0.0000
D(D1D12LIPC(-1))	0.389767	0.158568	2.458049	0.0156
D(D1D12LIPC(-2))	0.392137	0.151163	2.594129	0.0108
D(D1D12LIPC(-3))	0.358505	0.146358	2.449512	0.0159
D(D1D12LIPC(-4))	0.389897	0.139888	2.787198	0.0063
D(D1D12LIPC(-5))	0.526409	0.134256	3.920923	0.0002
D(D1D12LIPC(-6))	0.445663	0.128537	3.467192	0.0008
D(D1D12LIPC(-7))	0.396072	0.124335	3.185510	0.0019
D(D1D12LIPC(-8))	0.399495	0.117383	3.403333	0.0009
D(D1D12LIPC(-9))	0.433892	0.105159	4.126070	0.0001
D(D1D12LIPC(-10))	0.365164	0.100782	3.623321	0.0004
D(D1D12LIPC(-11))	0.612007	0.087630	6.984014	0.0000
C	-0.000123	0.000269	-0.459309	0.6469

R-squared	0.548266	Mean dependent var	6.16E-06
Adjusted R-squared	0.498073	S.D. dependent var	0.004161

Descriptive statistics

- It is important to understand and describe your series with descriptive statistics. But these statistics only make sense for the stationary transformation of the data.

- The mean: “scalar d1d12lipc_mean=@mean(d1d12lipc)". In the workfile, a new object “ipc_mean” is then created. When you double-click on this object the value of the scalar is given at the very left-bottom part of the Eviews window, in the grey status line. This way the descriptive statistics is saved into the workfile.

Descriptive statistics

- Variance and standard deviation: Type “scalar d1d12lipc_var=@var(d1d12lipc)” and “scalar d1d12lipc_stdev=@stdev(d1d12lipc)”, respectively for the variance and standard deviation.
-
- The preceding way to compute the variance is also called the “population variance” and should not be confused with the “sample variance” where the sum of the squared mean deviations is divided by T-1. In Eviews the sample variance is obtained with the following command: “scalar d1d12lipc_vars=@vars(d1d12lipc)”.

Descriptive statistics

- Variance and standard deviation: Type “scalar d1d12lipc_var=@var(d1d12lipc)” and “scalar d1d12lipc_stdev=@stdev(d1d12lipc)”, respectively for the variance and standard deviation.

- The preceding way to compute the variance is also called the “population variance” and should not be confused with the “sample variance” where the sum of the squared mean deviations is divided by T-1. In Eviews the sample variance is obtained with the following command: “scalar d1d12lipc_vars=@vars(d1d12lipc)”.

Descriptive statistics

- The descriptive statistics window: you can obtain these descriptive statistics using the “View” menu of the “Series” window. Double-click the series “D1D12LIPC”, click “View”, “Descriptive Statistics & Tests” then “Histograms and Stats”.

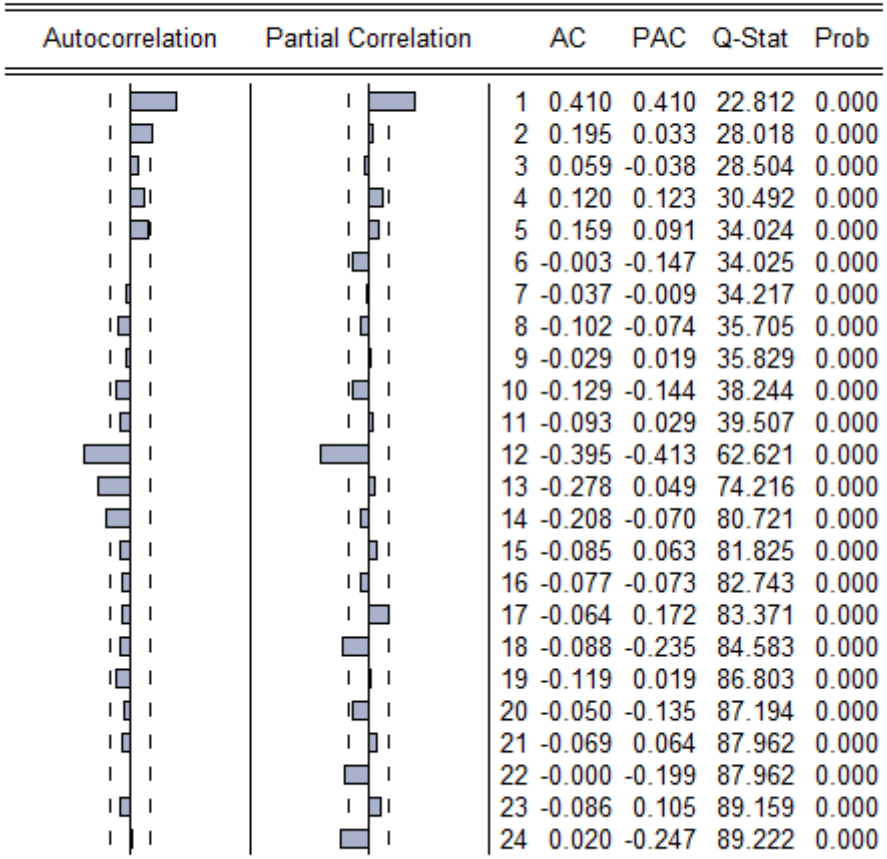
- Along with the mean, variance and standard deviation, Eviews presents the histogram, other descriptive statistics such as the skewness and the kurtosis, and a test for normality of the distribution sample, the Jarque-Bera test (bottom right).

Descriptive statistics

- When looking at two series you might want to have a measure of association such as the covariance and the correlation.
- You can select two series clicking each of them separately and holding the “Ctrl” key down on your keyboard. Then right click your selection and select “open” and “as group”. In the new opened window, choose “View”, “Covariance Analysis”, making sure both “Covariance” and “Correlation” are ticked in the “Statistics” menu.
- Always graph the data and transformations of it and look at the descriptive statistics before starting any empirical work. Make sure series are in comparable units before putting them of the same graph

Model Specification

Date: 04/07/14 Time: 11:28
Sample: 2002M01 2014M02
Included observations: 133



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.410	0.410	22.812	0.000
		2	0.195	0.033	28.018	0.000
		3	0.059	-0.038	28.504	0.000
		4	0.120	0.123	30.492	0.000
		5	0.159	0.091	34.024	0.000
		6	-0.003	-0.147	34.025	0.000
		7	-0.037	-0.009	34.217	0.000
		8	-0.102	-0.074	35.705	0.000
		9	-0.029	0.019	35.829	0.000
		10	-0.129	-0.144	38.244	0.000
		11	-0.093	0.029	39.507	0.000
		12	-0.395	-0.413	62.621	0.000
		13	-0.278	0.049	74.216	0.000
		14	-0.208	-0.070	80.721	0.000
		15	-0.085	0.063	81.825	0.000
		16	-0.077	-0.073	82.743	0.000
		17	-0.064	0.172	83.371	0.000
		18	-0.088	-0.235	84.583	0.000
		19	-0.119	0.019	86.803	0.000
		20	-0.050	-0.135	87.194	0.000
		21	-0.069	0.064	87.962	0.000
		22	-0.000	-0.199	87.962	0.000
		23	-0.086	0.105	89.159	0.000
		24	0.020	-0.247	89.222	0.000

There is not an unique interpretation of the correlogram.

It seems there is exponential decay at the regular and seasonal lags in the simple correlogram. Besides, there is a cut-off at lags 1 and 12.

I suggest a model

AR(1) AR(12)

However, it would be interesting to compare with other models.

ESTIMATION

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: D(LOG(IPC),1,12)
Method: Least Squares
Date: 04/07/14 Time: 11:33
Sample (adjusted): 2004M02 2014M02
Included observations: 121 after adjustments
Convergence achieved after 2 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.364617	0.070367	5.181630	0.0000
AR(12)	-0.532794	0.075808	-7.028179	0.0000

R-squared	0.414438	Mean dependent var	-0.000190
Adjusted R-squared	0.409517	S.D. dependent var	0.003835
S.E. of regression	0.002947	Akaike info criterion	-8.799492
Sum squared resid	0.001034	Schwarz criterion	-8.753281
Log likelihood	534.3693	Durbin-Watson stat	1.914031

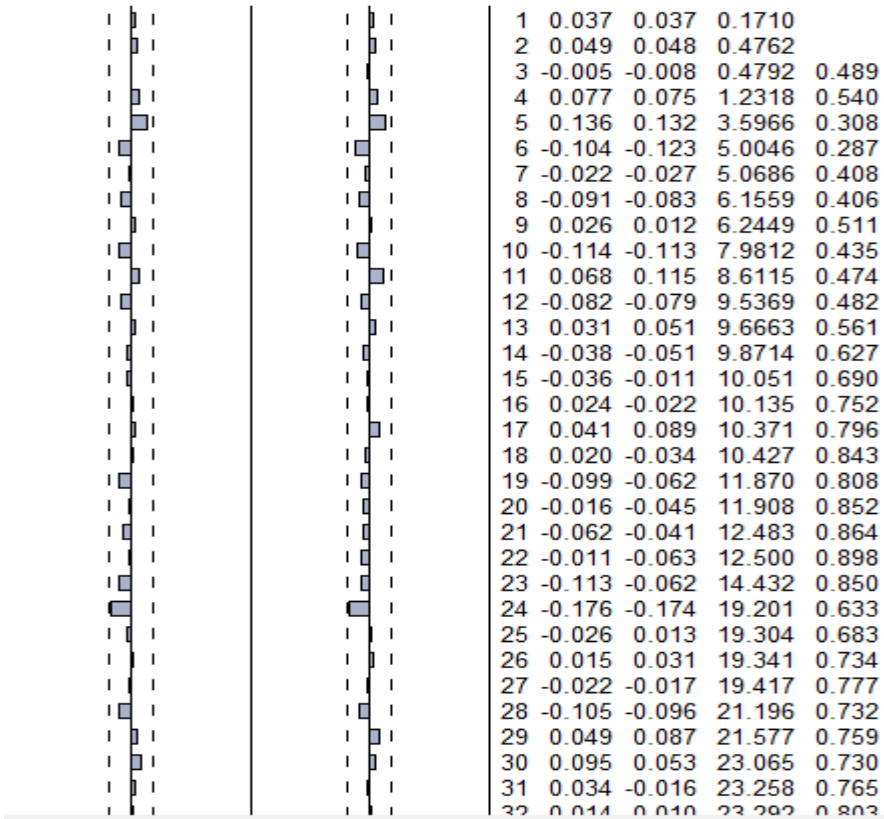
Inverted AR Roots	.95+.24i	.95-.24i	.70-.67i	.70+.67i
	.28+.91i	.28-.91i	-.22+.91i	-.22-.91i
	-.64+.67i	-.64-.67i	-.89-.24i	-.89+.24i

Estimated parameters are significant at the 1% confidence interval.

Let's look at the residual to check if they are white noise.

Diagnosis of the model

Date: 04/07/14 Time: 11:36
Sample: 2004M02 2014M02
Included observations: 121
Q-statistic probabilities adjusted for 2 ARMA term(s)



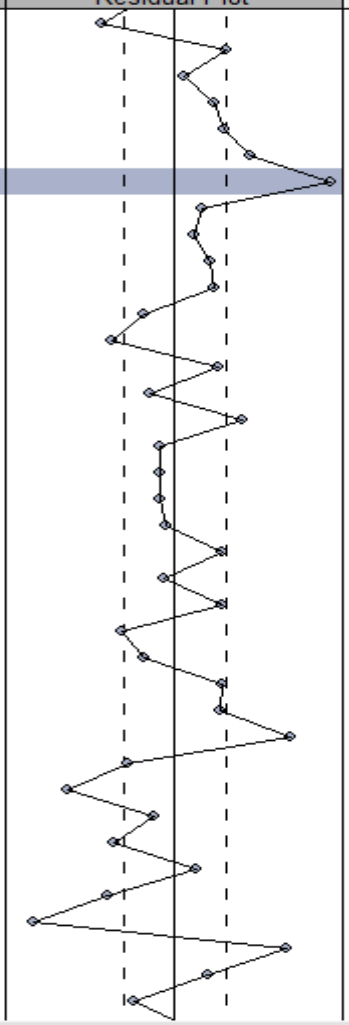
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.037	0.037	0.1710	
		2	0.049	0.048	0.4762	
		3	-0.005	-0.008	0.4792	0.489
		4	0.077	0.075	1.2318	0.540
		5	0.136	0.132	3.5966	0.308
		6	-0.104	-0.123	5.0046	0.287
		7	-0.022	-0.027	5.0686	0.408
		8	-0.091	-0.083	6.1559	0.406
		9	0.026	0.012	6.2449	0.511
		10	-0.114	-0.113	7.9812	0.435
		11	0.068	0.115	8.6115	0.474
		12	-0.082	-0.079	9.5369	0.482
		13	0.031	0.051	9.6663	0.561
		14	-0.038	-0.051	9.8714	0.627
		15	-0.036	-0.011	10.051	0.690
		16	0.024	-0.022	10.135	0.752
		17	0.041	0.089	10.371	0.796
		18	0.020	-0.034	10.427	0.843
		19	-0.099	-0.062	11.870	0.808
		20	-0.016	-0.045	11.908	0.852
		21	-0.062	-0.041	12.483	0.864
		22	-0.011	-0.063	12.500	0.898
		23	-0.113	-0.062	14.432	0.850
		24	-0.176	-0.174	19.201	0.633
		25	-0.026	0.013	19.304	0.683
		26	0.015	0.031	19.341	0.734
		27	-0.022	-0.017	19.417	0.777
		28	-0.105	-0.096	21.196	0.732
		29	0.049	0.087	21.577	0.759
		30	0.095	0.053	23.065	0.730
		31	0.034	-0.016	23.258	0.765
		32	0.014	0.010	23.292	0.803

Residuals do not have any structure and seem to be generated by a white noise process.

Let's check for outliers.

Diagnosis of the model

obs	Actual	Fitted	Residual
2010M06	-0.00261	0.00166	-0.00426
2010M07	0.00409	0.00105	0.00303
2010M08	-0.00097	-0.00151	0.00054
2010M09	0.00305	0.00079	0.00225
2010M10	0.00200	-0.00084	0.00284
2010M11	-1.0E-06	-0.00442	0.00442
2010M12	0.00639	-0.00260	0.00899
2011M01	0.00274	0.00109	0.00164
2011M02	0.00309	0.00202	0.00107
2011M03	5.7E-05	-0.00194	0.00199
2011M04	0.00178	-0.00044	0.00222
2011M05	-0.00256	-0.00072	-0.00183
2011M06	-0.00319	0.00046	-0.00364
2011M07	-0.00090	-0.00334	0.00244
2011M08	-0.00127	0.00019	-0.00146
2011M09	0.00175	-0.00208	0.00384
2011M10	-0.00125	-0.00043	-0.00082
2011M11	-0.00136	-0.00045	-0.00091
2011M12	-0.00482	-0.00390	-0.00093
2012M01	-0.00372	-0.00322	-0.00050
2012M02	-0.00022	-0.00300	0.00278
2012M03	-0.00075	-0.00011	-0.00063
2012M04	0.00158	-0.00122	0.00280
2012M05	-0.00115	0.00194	-0.00308
2012M06	-0.00046	0.00128	-0.00174
2012M07	0.00305	0.00031	0.00274
2012M08	0.00437	0.00179	0.00259
2012M09	0.00735	0.00066	0.00669
2012M10	0.00061	0.00334	-0.00273
2012M11	-0.00529	0.00095	-0.00624
2012M12	-0.00060	0.00064	-0.00124
2013M01	-0.00179	0.00176	-0.00355
2013M02	0.00068	-0.00053	0.00121
2013M03	-0.00319	0.00065	-0.00384
2013M04	-0.01021	-0.00200	-0.00821
2013M05	0.00331	-0.00311	0.00642
2013M06	0.00335	0.00145	0.00189
2013M07	-0.00283	-0.00040	-0.00243
2013M08			



For example, there is a very strong outlier in December 2010 and another one in April 2013.

Two dummy variables can be specified to control for these two outliers.

Transforming and creating series

- How to create a dummy variable?
- To generate this new series click on “Quick” in the Eviews menu, then choose “Generate Series…”. In the dialog box type:
  - D12M12=0 for all the sample. Ok
  - D12M12=1 for the sample 2010m12 to 2010m12, This assigns value 1 to 2010m12 and zero to all the other observations.
- Do the same for April 2013.

RESTIMATING THE MODEL

EViews - [Equation: UNTITLED Workfile: UNTITLED\Untitled]

File Edit Object View Proc Quick Options Window Help

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: D(LOG(IPC),1,12)
Method: Least Squares
Date: 04/07/14 Time: 12:08
Sample (adjusted): 2004M02 2014M02
Included observations: 121 after adjustments
Convergence achieved after 7 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D10M12	0.005540	0.002319	2.388516	0.0185
D13M4	-0.009319	0.002585	-3.605558	0.0005
AR(1)	0.383091	0.068978	5.553842	0.0000
AR(12)	-0.531249	0.072444	-7.333279	0.0000

R-squared	0.495354	Mean dependent var	-0.000190
Adjusted R-squared	0.482414	S.D. dependent var	0.003835
S.E. of regression	0.002759	Akaike info criterion	-8.915150
Sum squared resid	0.000891	Schwarz criterion	-8.822727
Log likelihood	543.3665	Durbin-Watson stat	1.953902

Inverted AR Roots	.96-.24i	.96+.24i	.71-.67i	.71+.67i
	.28+.91i	.28-.91i	-.22+.91i	-.22-.91i
	-.64+.67i	-.64-.67i	-.89-.24i	-.89+.24i

The intervention in 2010 does not seem very significant.

For each intervantion , we must look the residual correlogram and study how to proceed in the new iteration.

Using programming in Eviews

- A more efficient way to use Eviews is to create programs. Programs contain a number of commands that are going to run successively.
- In order to create a new program, click “File” in the main Eviews menu, then choose “New” then “Program”. A new untitled window program is opening in the work area. This window has a selection of menus on the top: Run, Print, Save, SaveAS, Cut…
- NOTE: In Eviews programs you can write comments if they are preceded by the apostrophe symbol “ ‘ “.

Using programming in Eviews

- We will create a program that estimates an ARIMA model for the ipc and provides forecasts until December 2016.

- First we define the last observation (to start the forecast exercise) and tell the program wher the excell file is.

```
%OBS="2014:02"
'última obs Fichero de lectura de datos
%entrada="C:\Users\user\Desktop\Clases\Clases-CarlosIII\Doctorado\2\Primera_clase_practica\ipc_ipri.xls"
```

Using programming in Eviews

- Then, we create the workfile, import the data and create a destination file to put the forecasts

```
create prices m 2002:01 2016:12
' CARGANDO DATOS OBSERVADOS DE PRECIOS
smpl 2002:01 2014:02
read(b2 ,s=Hoja1) %entrada ipri ipc
%destino="C:\Users\user\Desktop\Clases\Clases-CarlosIII\Doctorado\2\Primera_clase_practica\forecast.xls"
'fichero de salida para leer
```

Using programming in Eviews

- Now, we create the dummy variables to be included in the model

```
smpl @all
series d10m12=0
series d13m4=0
smpl 2010m12 2010m12
series d10m12=1
smpl 2013m4 2013m4
series d13m4=1
smpl @all
```

Using programming in Eviews

- Finally, we estimate the model and generate forecasts

```
equation eq1.ls d(log(ipc),1,12) ar(1) ar(12) d10m12 d13m4

smpl %OBS+1  2016:12
eq1.forecast ipcf ipcse

WRITE(t=xls,a1,s=hoja1,nodates,nonemes) %destino ipcf
```