CHAPTER 1

Introduction to EViews 10

CHAPTER OUTLINE

Keywords

@cor	freeze	preview series
@mean	frequency conversion	Quick/Empty Group
@round	function reference	Quick/Generate Series
@sqrt	generate series	Quick/Graph

@stdev	genr	Quick/Group Statistics
@sum	graph options	Quick/Sample
arithmetic operators	grid lines	Quick/Series Statistics
basic graph	group	Quick/Show
command window	help	sample
common sample	histogram and stats	save
copying a table	if condition	scalars
copying a graph	import Excel data	scatter diagram
correlation	individual samples	series
Ctrl+C	internet data	series: rename
Ctrl+V	line & symbol	spreadsheet view
data definition files	math functions	startup window
data export	multiple graphs	text object
data import	name	unstructured/undated
data range	new object	vector
dated-regular frequency	object menu	workfile structure
descriptive statistics	object name	workfile: open
EViews functions	open group	workfile: save
EViews prompts	open series	workfiles
frame & size	path	

1.1 USING EVIEWS FOR PRINCIPLES OF ECONOMETRICS, 5E

This manual is a supplement to the textbook *Principles of Econometrics*, *5th edition*, by Hill, Griffiths and Lim (John Wiley & Sons, Inc., 2018). It is not in itself an econometrics book, nor is it a complete computer manual. Rather it is a step-by-step guide to using EViews 10 for the empirical examples in *Principles of Econometrics, 5th edition*, which we will abbreviate as *POE5*. We imagine you sitting at a computer with your *POE5* text and *Using EViews for Principles of Econometrics, 5th edition* open, following along with the manual to replicate the examples in *POE5*. Before you can do so you must ensure you have access to EViews, either from a site license held by your university or by buying and installing your own personal copy. You will also need to obtain the EViews "*workfiles*" for *POE5* which are the files that contain the data for the *POE5* examples and exercises.

1.1.1 Accessing and installing EViews 10

If you plan to use EViews via a site license held by your university, your instructor will give you details about how to access EViews. It is, however, advantageous to own your own personal copy to ensure you have access when and where you want it, and to have your results from using EViews stored conveniently on your computer. If you plan to obtain your own copy of EViews, rather than relying totally on your university's site license, there are three possible versions of EViews 10 you might like to consider. The home webpage for accessing details about a wide range of product versions of EViews is

www.eviews.com

The three versions likely to be of interest are (i) the Academic EViews 10 Standalone Edition for Windows, (ii) EViews 10 University Edition for Windows or Mac, and (iii) EViews 10 Student Version Lite for Windows or Mac. We recommend the University Edition.

The Windows standalone version is the most powerful, but also the most expensive. For students of universities who have a site license, it is available at a greatly reduced price. The University Edition is only slightly less versatile than the standalone version and is more than adequate to handle all text examples and exercises in *POE5*. Its license expires after six months; it is only available to enrolled students. The Student Version Lite is free, but it has the severe disadvantage that results cannot be saved for future use when the EViews workfile is closed. It also has limits on the numbers of series and observations, and it does not accept EViews programs. Its license expires after one year. Both the University Edition and the Student Version Lite require connection to the Internet once every 10 days. A full comparison of the three versions and instructions for purchasing/downloading can be found at

www.eviews.com/EViews10/EViews10Univ/evuniv10.html

For details of all EViews academic licenses, go to

www.eviews.com/BuyNow/Academic.html

Once you have downloaded EViews you can install it by double clicking on the EViews Installer .exe file, and following the prompts. When EViews is started – see the next section – you will be prompted to register EViews on your computer using a serial number provided to you. For the various steps and instructions that we describe, we are following Windows conventions.

1.1.2 Obtaining data workfiles

The **EViews data workfiles** (with extension *.wf1) and other resources for *POE5* can be found at principlesofeconometrics.com/poe5/poe5.html. In addition to the EViews workfiles, there are **data definition** files (*.def) that describe the variables and show some summary statistics. The definition files are simple text files that can be opened with utilities like Notepad or Wordpad, or using a word processor. These files should be downloaded as well.

1.1.3 Chapter 1 and the way forward

Except for Chapter 1, the chapters in this manual correspond to chapters in *POE5*. From Chapter 2 onwards, we describe how to use EViews to replicate the empirical examples in *POE5*. We also include EViews instructions for the Monte Carlo simulations that appear in some of *POE5*'s chapter appendices. Appendices A, B and C at the end of this manual correspond to the same book appendices in *POE5*. They are a useful resource, explaing many of the EViews functions.

In Chapter 1 we introduce you to some of the basic features of EViews. Learning these features will save you time when you embark on the examples in the remaining chapters. However, Chapter 1 is a long chapter. You are unlikely to remember everything in it. You may wish to read it selectively, reserving some sections as a reference to which you can return later. Many of the instructions in Chapter 1 are repeated in later chapters, for reinforcement, and in recognition that not all students, particularly those who are already have some familiarity with EViews, will begin their *POE5*-EViews adventure at a later chapter.

1.1.4 Font conventions

Throughout this manual we have adopted several font conventions for referring to various objects, EViews commands, and items in pull-down menus and toolbars. Here is a summary of those conventions. This summary is unlikely to be meaningful to you at this time, but it can be used for later reference.

File names and programs: times new Roman, lower case, italic, bold; e.g., ***utown.wf1***.

Series: times new Roman, upper case, italic; e.g., *PRICE*.

Other workfile objects: arial, lower case, bold; e.g., **house_data**

Pull-down menus, toolbar items and dialog boxes: times new Roman, first letter upper case, bold; e.g., **Genr** and **Quick/Series Statistics/Histogram and Stats**

Commands for the command window: indented new line, arial, lower case, bold; e.g.,

```
series dinc = inc – inc(-1)
```

1.2 STARTING AND EXPLORING EVIEWS

If you have installed EViews by following the default prompts, the EViews 10 icon will appear on your desktop. It should resemble

Double-clicking on this icon reveals the following start-up window.

Notice the three general headings. Under **EViews Workfiles**, we can create a new workfile or open an existing file, which can be an EViews workfile or some other data file. Under **Recent Files** are a list of workfiles that this author had recently used at the time of making the

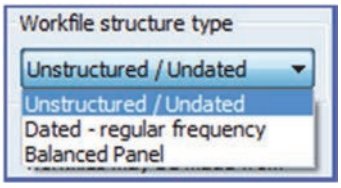
screenshot. Clicking on the name of one of these workfiles will open it. Under **Support** are three ways of getting help, each of which can be accessed by clicking on the relevant item.

Let's examine some of these things in more detail.

1.2.1 Creating a new workfile: workfile structures

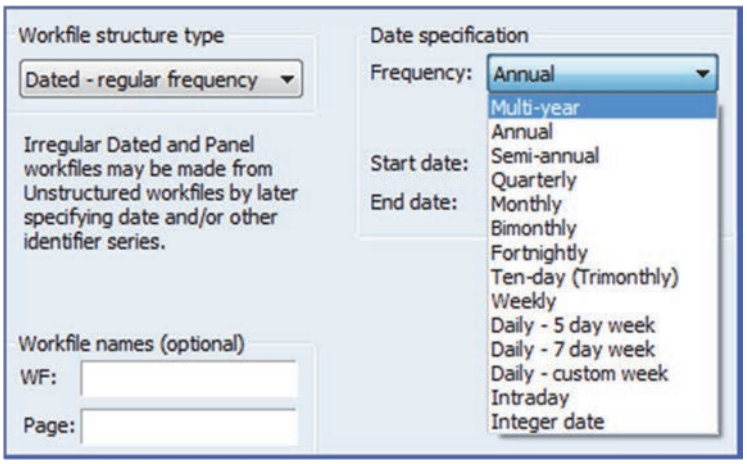
If you plan to use only the *POE5* EViews workfiles, or workfiles provided from some other source, then you will not need to create a new workfile; you can focus on instructions for opening an existing workfile. In *POE5*, creation of new workfiles is limited to the Monte Carlo simulations, graphing of functions in Appendix A, and illustrating probability distributions in Appendix B. However, it is convenient at this point to consider how to create a new workfile to introduce you to EViews workfile structures.

From the start-up window, click on **Create a new EViews workfile**. A dialog box appears, asking you to specify a structure for the workfile. You have three main choices: **Unstructured/Undated**, **Dated - regular frequency** and **Balanced Panel**.



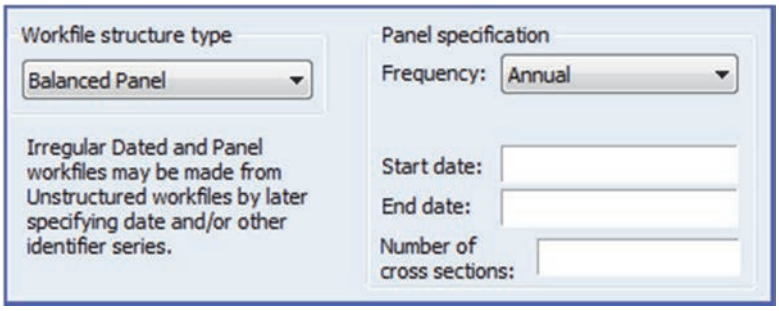
These three choices correspond to the datatypes described in Section 1.5 of *POE5*, namely, cross-section data, time-series data and panel data, respectively. If you choose **Unstructured/Undated** you will be asked to provide the number of observations

For a **Dated - regular frequency** workfile structure you will need to specify the start date, the end date, and the frequency.

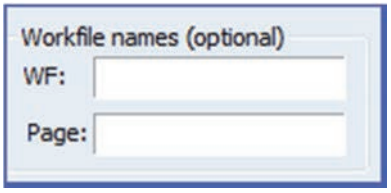


With a **Balanced Panel**, you are required to specify the start date, the end date, the frequency, and the number of cross sections. As the note about **Irregular Dated and Panel**

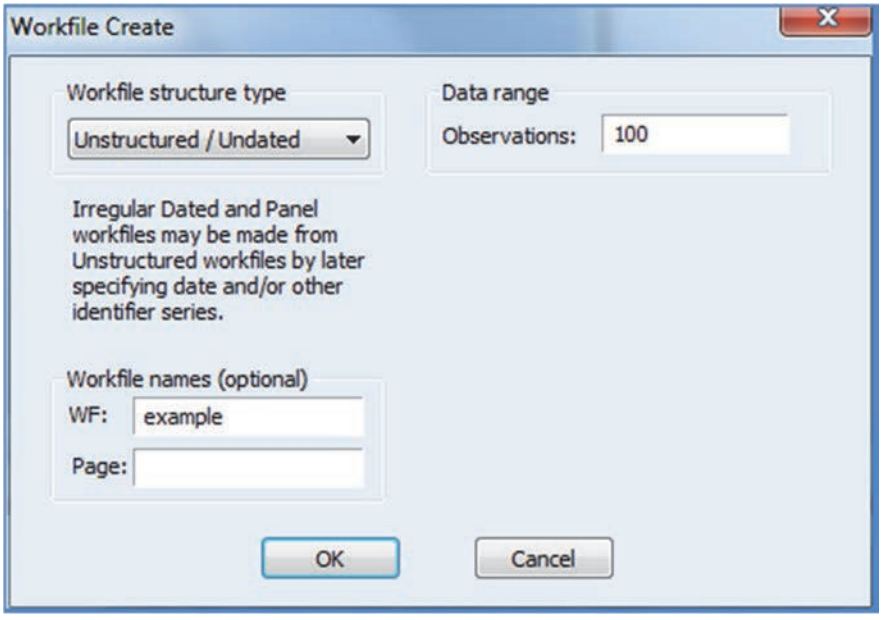
workfiles suggests, more complex structures such as irregular frequencies or unbalanced panels are possible, but it is too early in the book for us to consider such complications.



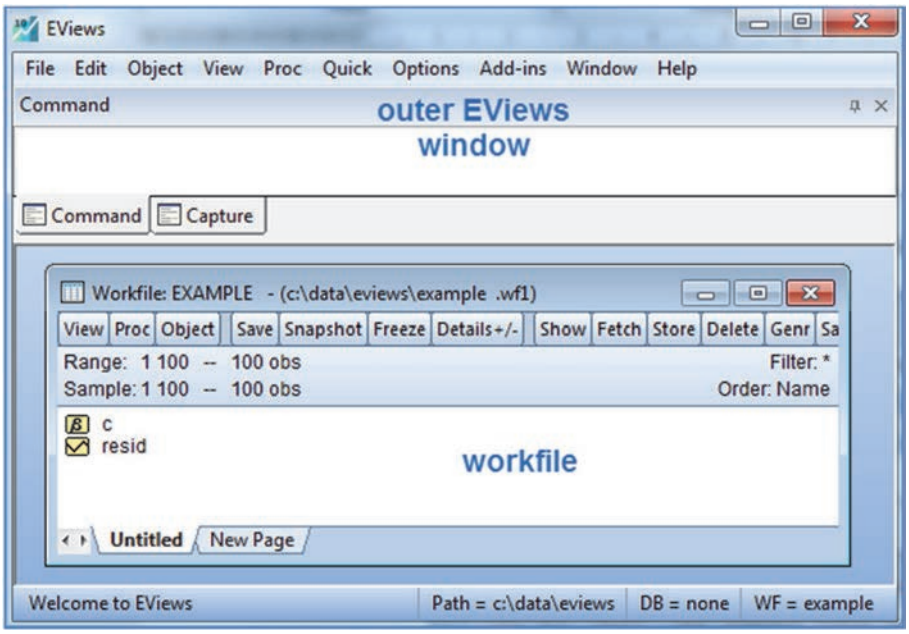
The remaining request for information in the start-up window is for a workfile name and a page name. EViews has capacity for using multiple pages with different structures within the same workfile. This facility can be useful for different types of calculations, but we will almost always use just a single page.



Suppose we wish to create an **Unstructured/Undated** workfile with 100 observations, then the **Workfile Create** dialog box, with the workfile named ***example.wf1***, is completed as follows.



The workfile ***example.wf1*** then appears within an outer EViews window.



At this stage you will be wondering what all these things mean. In Section 1.2.2, we provide some introductory remarks about the outer EViews window after explaining how to open an existing workfile. In Section 1.2.3, we introduce you to EViews help system that can be accessed via **Help** on the outer EViews window or through the items under **Support** in the start-up window. Workfile fundamentals are considered in Section 1.3; in Section 1.4 we discuss the **Command** window that appears within the outer EViews window.

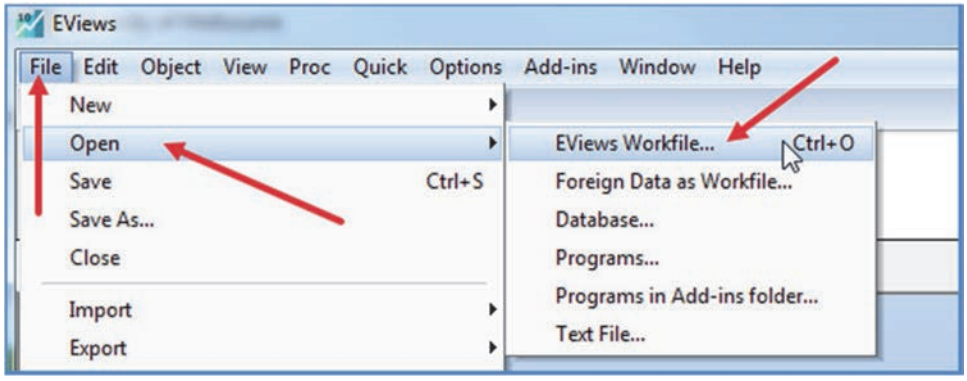
1.2.2 Opening an existing workfile

Your first encounter with EViews will most likely be one where you wish to open a workfile that has been provided by your instructor or downloaded from the *POE5* website. Suppose, for example, that you wish to open the workfile ***utown.wf1*** that contains observations on selling prices of houses in a university town, and other related variables. The companion definitional file ***utown.def***, which is a simple text file, contains the following information about the data series in ***utown.wf1***.

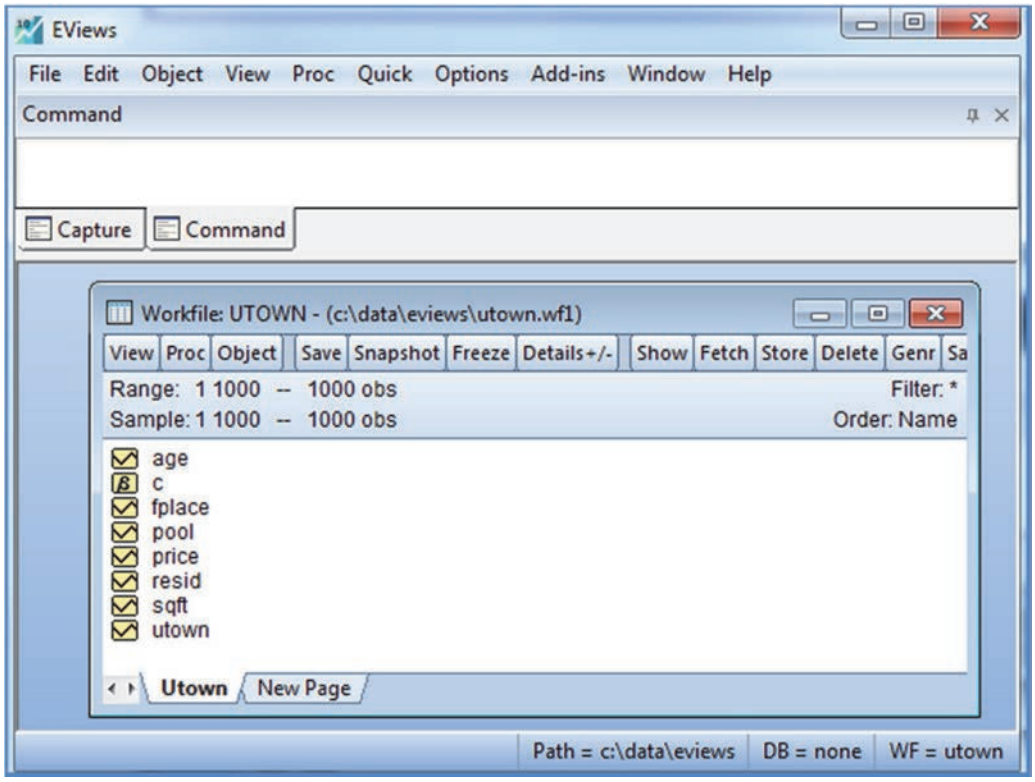
```
utown.def

   price sqft age utown pool fplace

  obs:   1000 observations

   price        house price, in $1000
   sqft         square feet of living area, in 100's
   age          house age, in years
   utown        =1 if close to university
   pool         =1 if house has pool
   fplace       =1 if house has fireplace

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       price |      1000    247.6557    42.19273    134.316    345.197
        sqft |      1000    25.20965     2.91848      20.03         30
         age |      1000       9.392    9.426728          0         60
       utown |      1000        .519    .4998889          0          1
        pool |      1000        .204    .4031706          0          1
-------------+--------------------------------------------------------
      fplace |      1000        .518    .4999259          0          1
```

These details are self-explanatory except perhaps for the binary (dummy) variables *UTOWN*, *POOL* and *FIREPLACE* which are equal to 1 if a house has the specified characteristic, and zero otherwise.

There are several ways to open an existing EViews file. If you have already started EViews, and you have the start-up window in front of you, you can click on **Open an existing EViews workfile**. From there, you can browse and select ***utown.wf1***. Alternatively, if the outer EViews window is open, but the start-up window is not displayed, you can go to **File/Open/EViews Workfile** and then browse to select ***utown.wf1***.

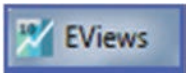


There are easier ways to begin, however. You can simultaneously start EViews, and open the workfile ***utown.wf1***, by double-clicking on the file name, or by simply dragging the file onto the EViews icon on the desktop. The following window will appear.

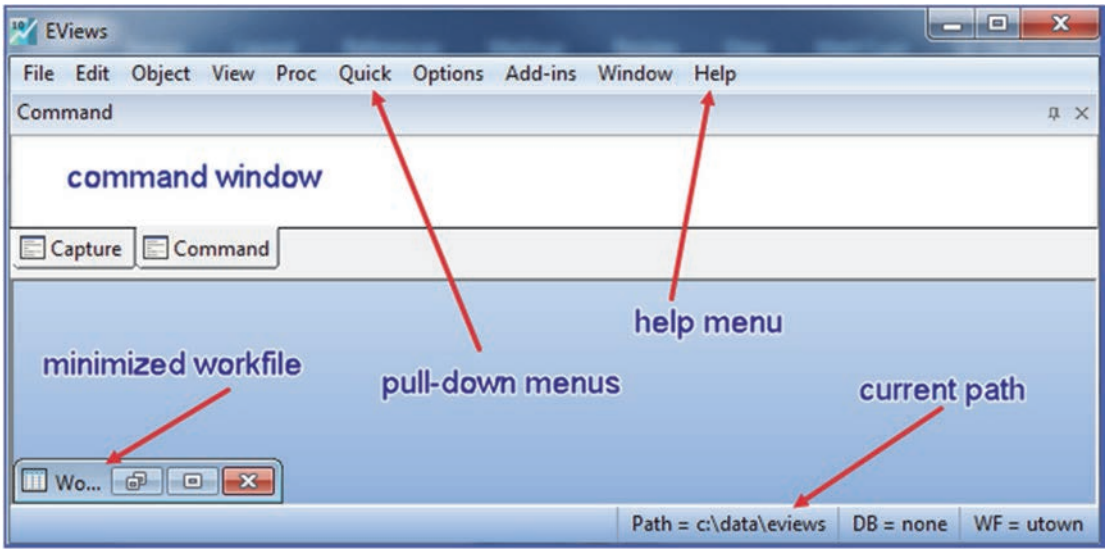


The inner window headed

is the workfile. It sits within the EViews software outer window which is headed



Before examining the workfile components in Section 1.3, we minimize the workfile and focus on the EViews outer window.



There are two items in the top toolbar that are worth mentioning at this time. One is the pull-down menu under **Quick**, and the other is the help menu under **Help**. We introduce the help system in the next section. The options under **Quick** will be explained as we travel through the book; they make implementing EViews procedures relatively simple. Below the top toolbar is a **Command window**. It can be used as an alternative to the "point-and-click" menus, once you become familiar with basic commands and syntax. The **Capture** tab opens a **Capture** window that will contain equivalent commands corresponding to instructions given via menu items. Across the bottom is the **Current Path** for reading data and saving files. To change this, double-click the **Path** name and browse for a new folder. Throughout this manual we assume the EViews data files are located in the default path **c:\data\eviews**. If ***utown.wf1*** is located in your default path, an alternative way to open it is to type

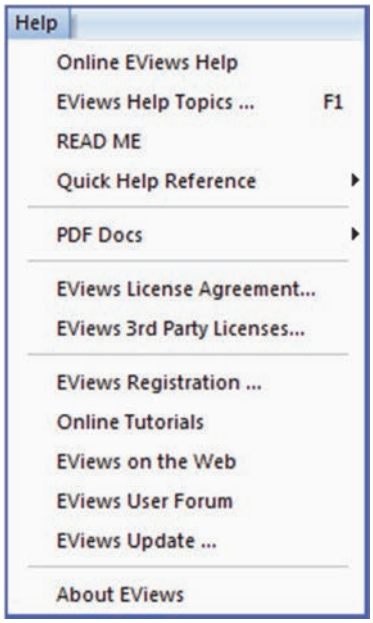
```
wfopen utown.wf1
```

in the **Command** window.

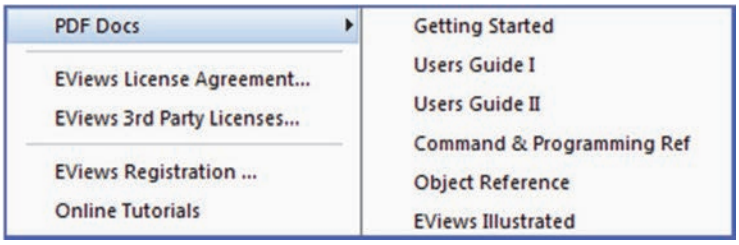
We return to the workfile ***utown.wf1*** in Section 1.3. First, it is useful to make you aware of the EViews help system.

1.2.3 The help system

The EViews **Help Menu** is going to become a close friend. After clicking on **Help** in the top EViews tool bar you get the following menu.

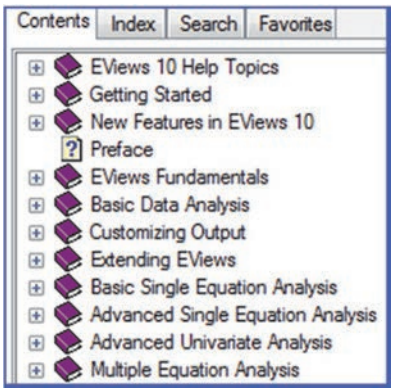


It is useful to explore some of these options so that you are aware of what is available when needed at a later time. We will focus on just a few. Choosing **PDF Docs** reveals



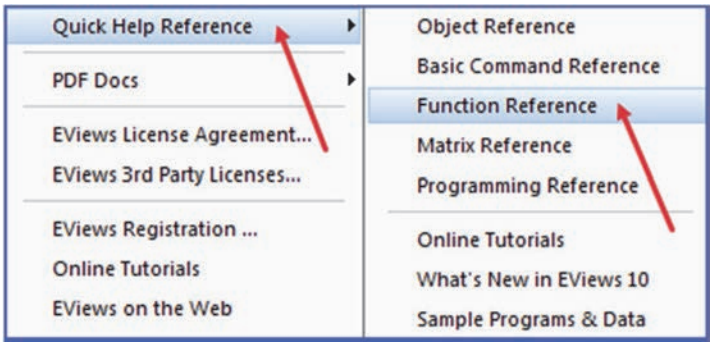
Getting Started contains information on EViews installation and registration and on what features are new in EViews 10, relative to earlier versions. Complete documentation is provided in **User Guides I and II**, **Command & Programming Ref**, and **Object Reference**. While it is a good idea to be aware of where to find this complete documentation, reading a User Guide is a tough way to learn software. **EViews Illustrated,** a book written by Richard Startz from the University of California, Santa Barbara, is designed as a fun way for learning EViews. At this point in time, it is written for EViews version 9, but its content is also relevant for EViews 10. Similarly, by guiding you through the essentials of EViews 10 that are needed to replicate the examples in *POE5*, our book, *Using EViews for POE5*, provides a softer introduction to EViews than is obtained by following the User Guides.

Two of the items in the **Help** menu provide a productive and efficient way to use material from the **User Guides**. They are **EViews Help Topics** and **Quick Help Reference**. Clicking on **EViews Help Topics** gives you the options of **Contents**, **Index**, **Search** and **Favorites**.



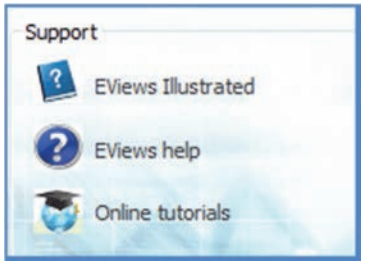
To find information on a particular topic or procedure you can scroll through the contents or index or ask EViews to search for the item of interest. If you are likely to return repeatedly to a particular item, you can add it to your own list under **Favorites**.

Quick Help Reference is a convenient way of checking for EViews commands and functions. It contains the following options.

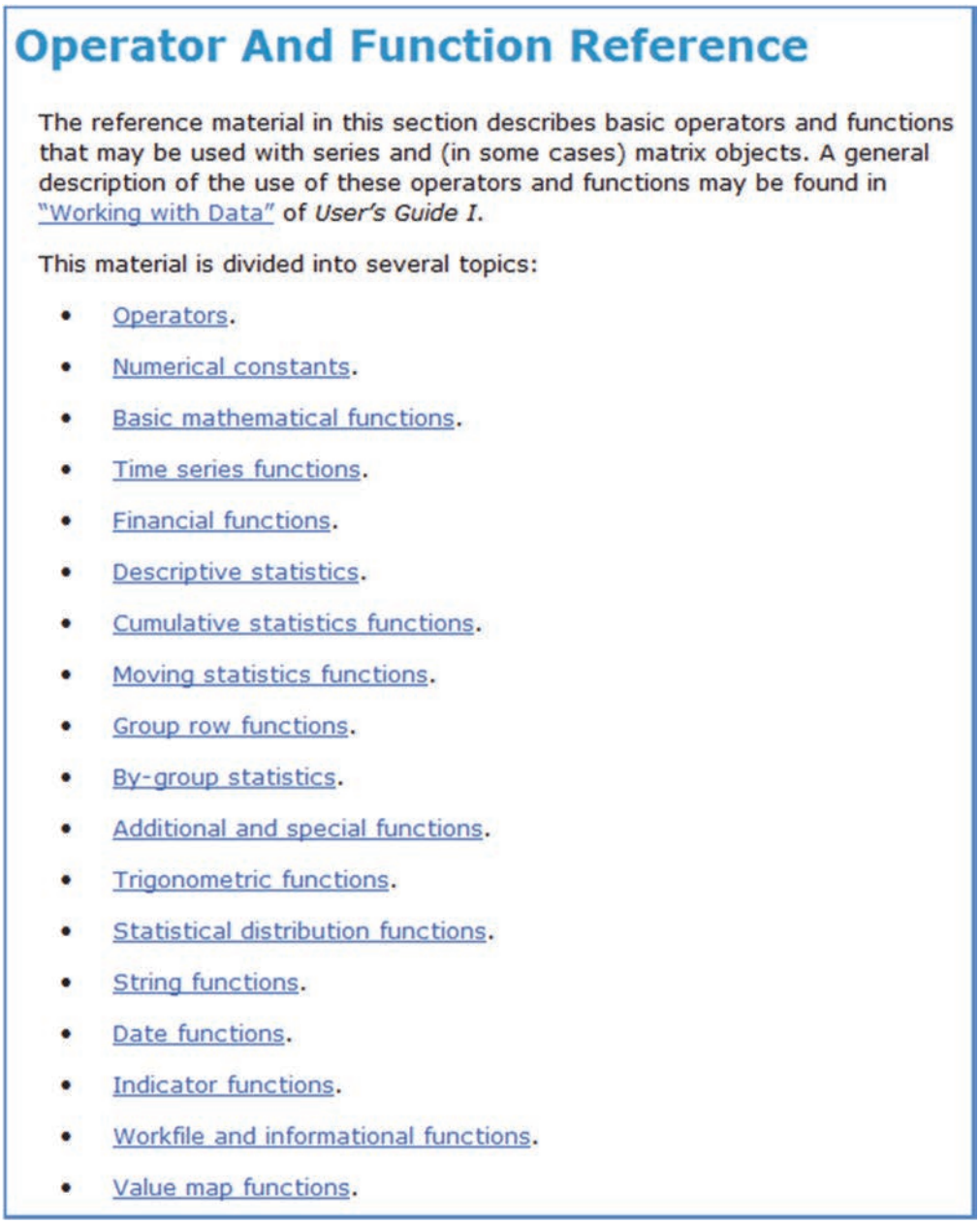


Keep in mind these options as we work through the book. At present you should take a moment to click on **Function Reference**, and, from the resulting list that appears on the following page, examine the **Operators** (basic addition, multiplication, etc.) and the **Basic mathematical functions** (square roots, logarithms, absolute value, etc.). This **Function Reference** help is one that you will use very frequently, and to which we will refer a great deal.

Recall that the start-up window also includes some help items under **Support**.



EViews Illustrated is the book by Richard Startz. **EViews help** takes you to **EViews Help Topics**. The third option is a set of **Online Tutorials**. You should explore the various options as you need them. A more extensive discussion is given in Chapter 2.11.



Operator And Function Reference

The reference material in this section describes basic operators and functions that may be used with series and (in some cases) matrix objects. A general description of the use of these operators and functions may be found in "Working with Data" of *User's Guide I*.

This material is divided into several topics:

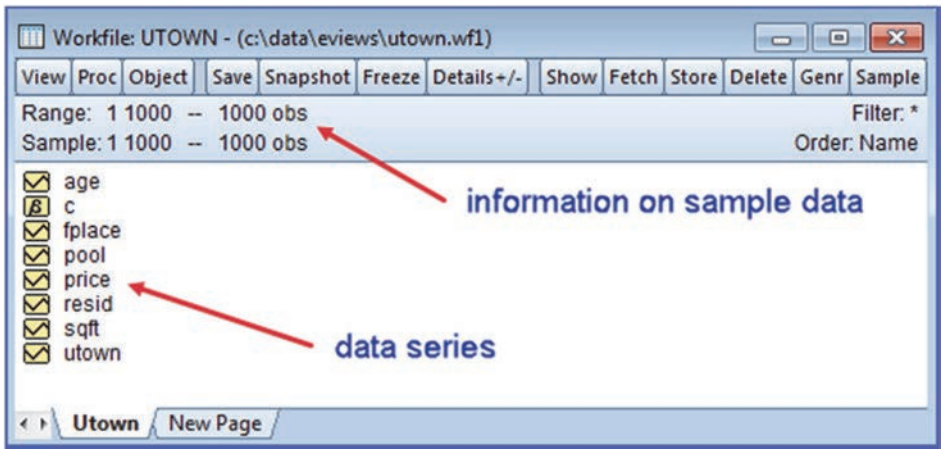
- Operators.
- Numerical constants.
- Basic mathematical functions.
- Time series functions.
- Financial functions.
- Descriptive statistics.
- Cumulative statistics functions.
- Moving statistics functions.
- Group row functions.
- By-group statistics.
- Additional and special functions.
- Trigonometric functions.
- Statistical distribution functions.
- String functions.
- Date functions.
- Indicator functions.
- Workfile and informational functions.
- Value map functions.

1.3 USING A WORKFILE

Now it is time to return to the workfile ***utown.wf1*** that we minimized in Section 1.2.2.

The way in which information about the data range and sample is displayed depends on the workfile structure. For **Unstructured/Undated** workfiles such as ***utown.wf1***, the range and sample display the observation numbers for the first and last observations, as well as the number of observations. Sometimes the full range of the data is not used for analysis, in which case the sample is restricted to a subset of the range.

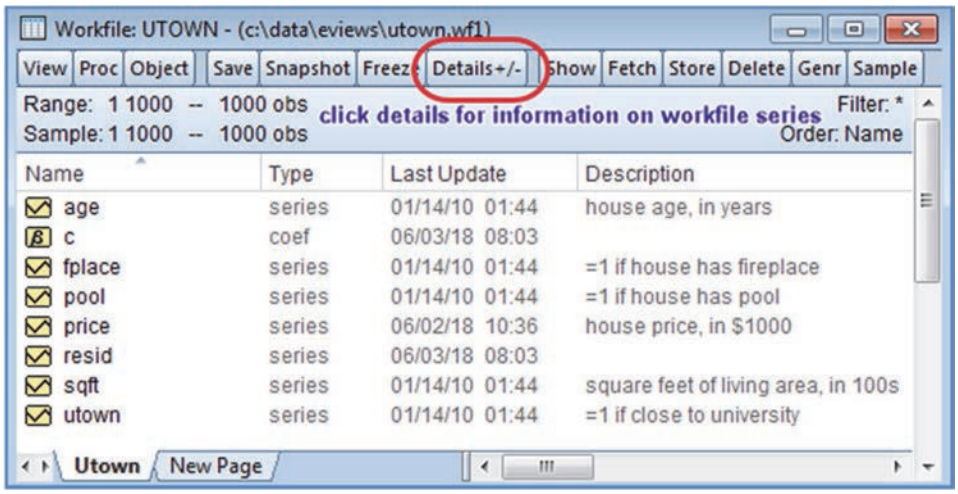
Located on the left side are data series that are indicated by the icon . EViews calls the elements of the workfile **objects**. As you will discover, there are many types of objects that EViews can save into the workfile—not only series but tables, graphs, equations, and so on. As Richard Startz says, an object is a little "thingie" that computer programmers talk about. Each little icon "thingie" in the workfile is an object.



In this workfile the data series, or variables, are:

- *AGE*—house age in years
- *FPLACE*—binary variable equal to 1 if a house has a fireplace and 0 otherwise
- *POOL*—binary variable equal to 1 if a house has a pool and 0 otherwise
- *PRICE*—house price in thousands of dollars
- *SQFT*—square feet of living area in hundreds
- *UTOWN*—binary variable equal to 1 if a house is close to university and 0 otherwise

This information can be revealed in the workfile by clicking **Details +/-**.



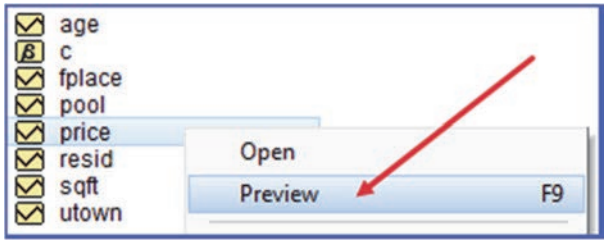
To hide the information, click **Details +/-** again.

The series *RESID* and the icon labeled β are always present in EViews workfiles (even new ones with no data) and their use will be explained later. In addition to the **Details +/-**

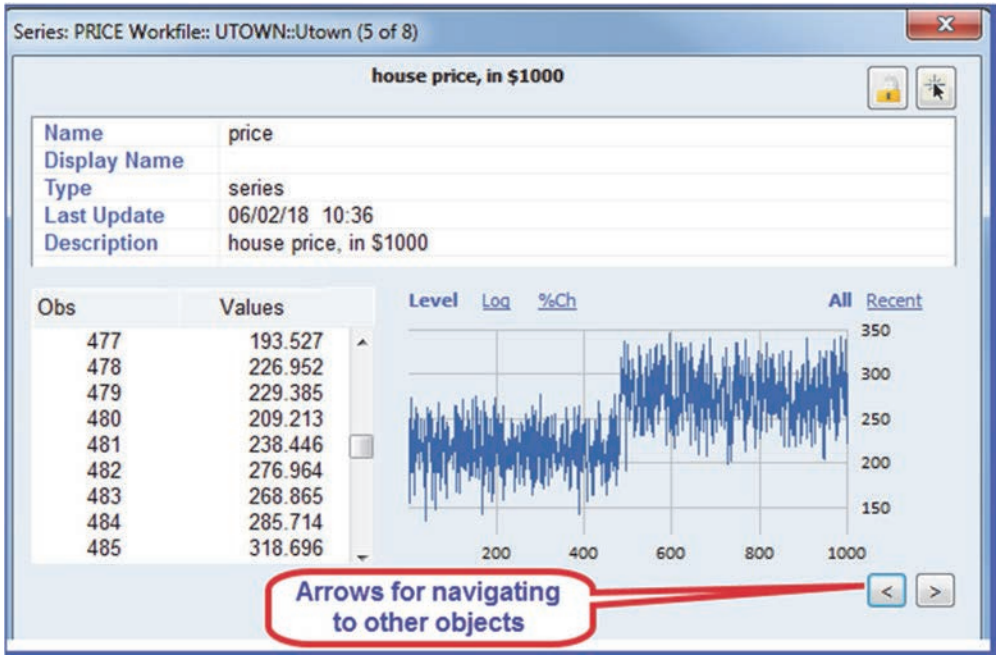
button, across the top of the workfile are various buttons that initiate tasks in EViews; these too will be explained later.

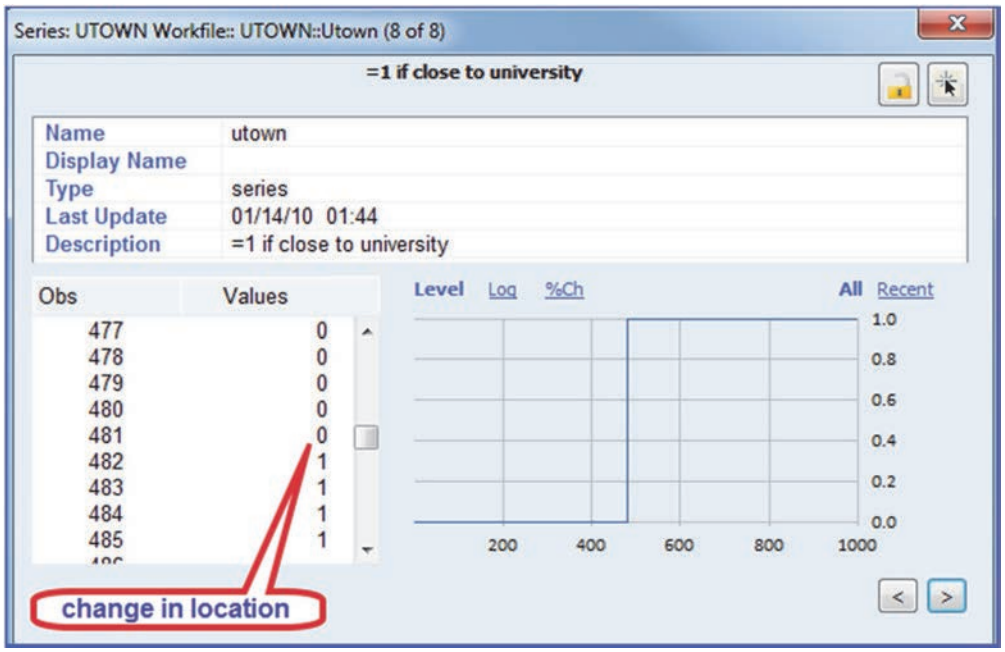
1.3.1 Previewing series in the workfile

It is a good idea each time you open a workfile to examine the series to verify that the data are what you expect. One way to check for any anomalies is to use EViews' **Preview** option. You can also use it to examine other objects that you later create. To illustrate, highlight *PRICE*, right click, and go to **Preview**.



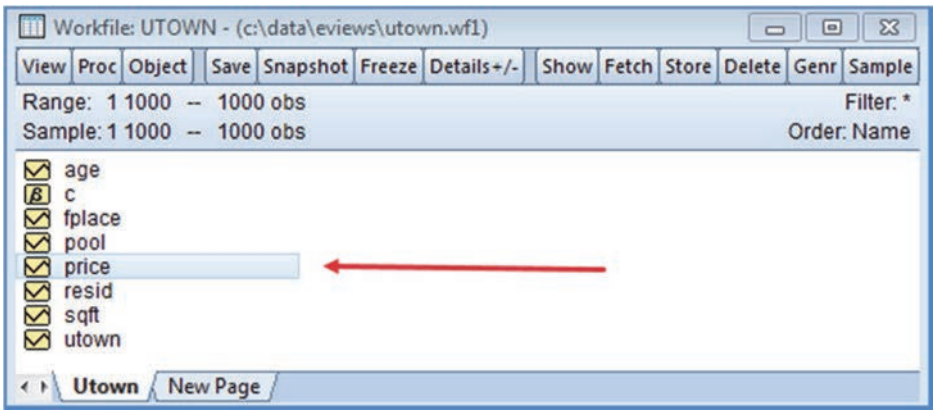
In the resulting window, you will find a spreadsheet of the observations, a graph of the observations, and some summary information about the series. What do we notice about the graph? The first half of the observations seem to fluctuate randomly around a mean which is somewhere between 200 and 250, whereas the second half of the observations fluctuate randomly around a higher mean, somewhere between 250 and 300. A check of the series *UTOWN* reveals that observations 1 to 481 correspond to those for houses not close to the University, whereas the remainder are for houses close to the University. At the bottom right corner of the window are two arrows that can be used to navigate to previews of other workfile objects. In addition to the preview for *PRICE*, we also depict that for *UTOWN* so that you can see when it changes from 0 to 1.



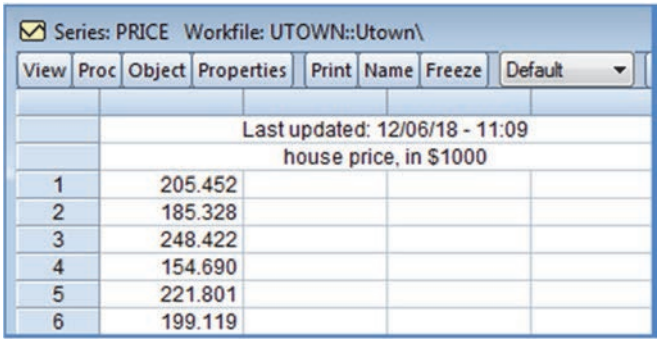


1.3.2 Examing a single series

To examine a single series in more detail, select that series, say *PRICE*

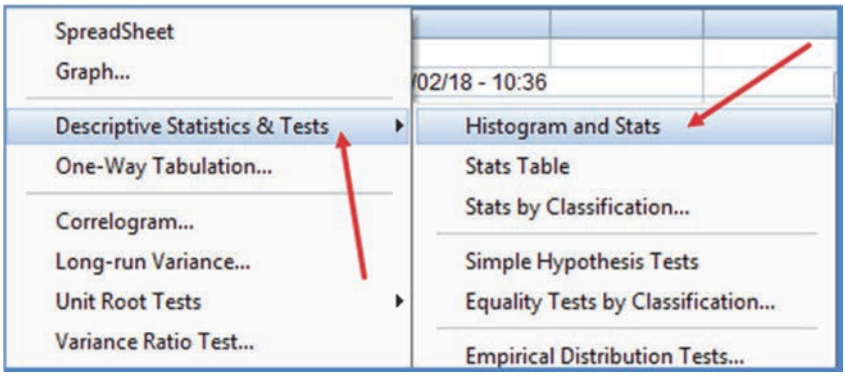


Double-click in the blue area, which will reveal a spreadsheet view of the data.

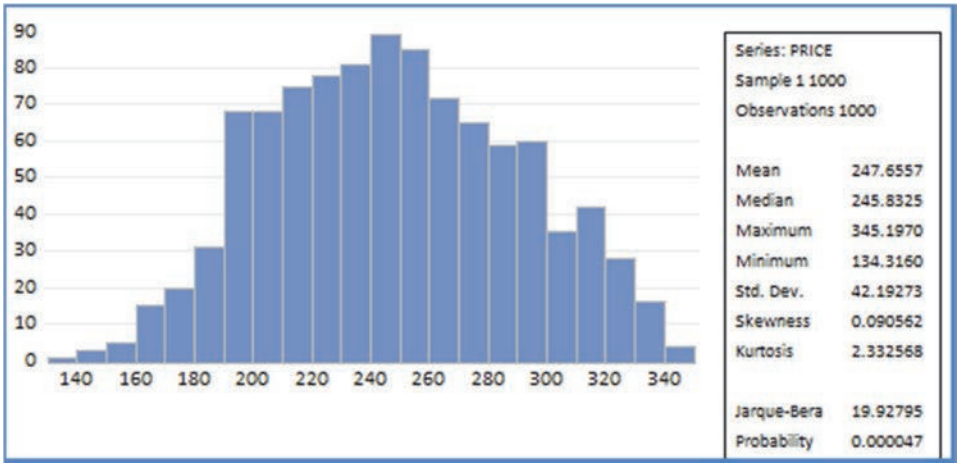


In the upper left-hand corner is a button labeled **View**

This opens a drop-down menu with a number of choices. Select **Descriptive Statistics & Tests/ Histogram and Stats**.



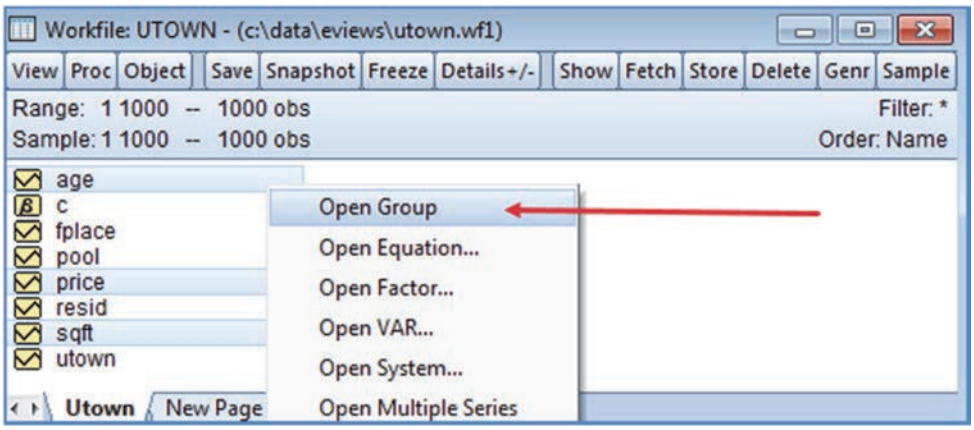
The result is



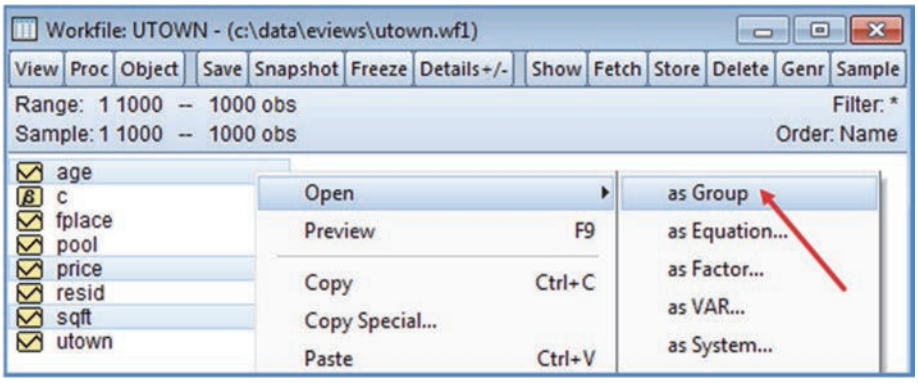
This histogram is shown with various summary statistics on the side. This display is a convenient way for you to get a "feel" for the data and to check that it is as expected.

1.3.3 Examing several series: a group

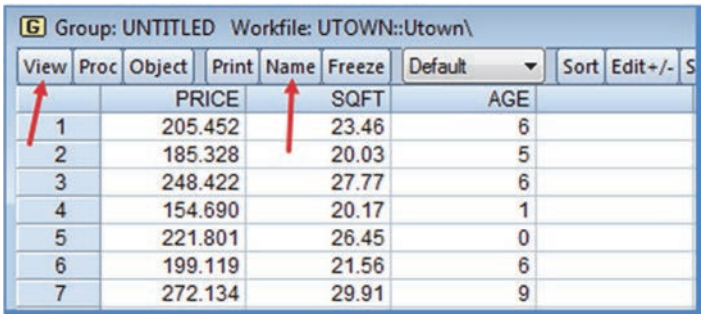
We can also examine several series at the one time by creating a **Group**. For example, suppose we wish to create a group with the variables *PRICE*, *SQFT* and *AGE*, and we want them to appear in the group in that order. We begin by highlighting those three series, selecting them in the same order as wanted in the group. First select *PRICE*, then, while holding down the **Ctrl**-key, select *SQFT* followed by *AGE*. Then double click on the blue area and select **Open Group**.



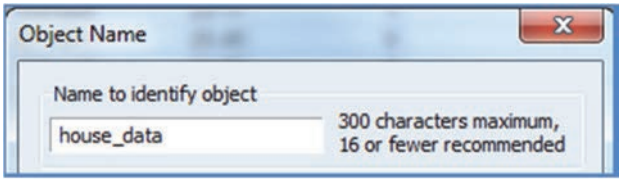
Alternatively, you can right click on the blue area and select **Open Group**.



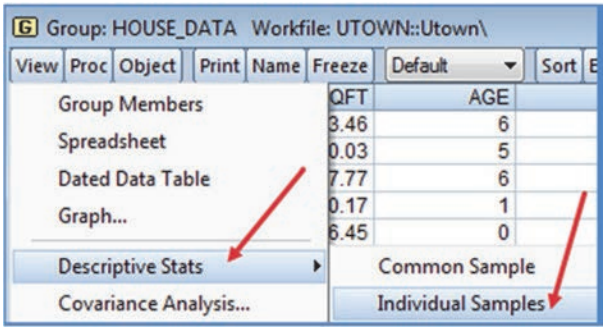
A spreadsheet view of the data will open.



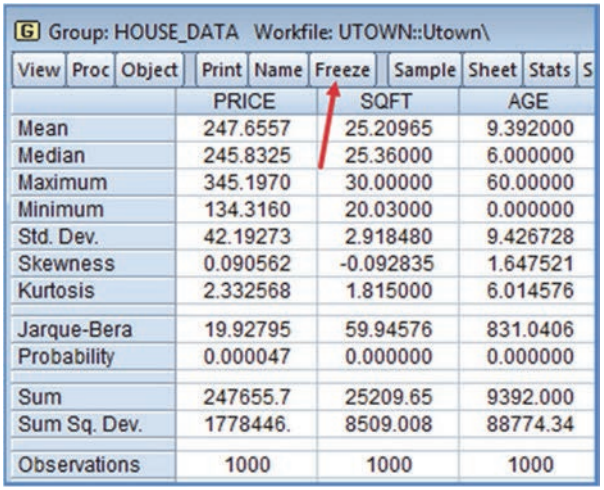
Notice that the **Group** is labelled as **Untitled**. By clicking on **Name**, you can give the group a name and save it in your workfile. We call it **house_data**. We have included an underscore between **house** and **data** because names for EViews' objects cannot contain spaces.



To examine the summary statistics for all three variables, we can select the **View** button from the spreadsheet, followed by **Descriptive Stats/Individual Samples**. When each series has the same number of observations, there is no difference between choosing **Common Sample** and **Individual Samples**; if the number of observations for each series differs, **Common Sample** restricts the statistics to the observations common to all series.



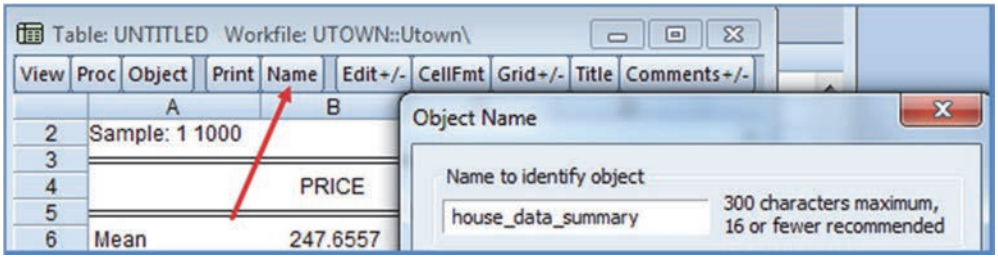
The result is a table of summary statistics is created for the three series (variables) in the group.



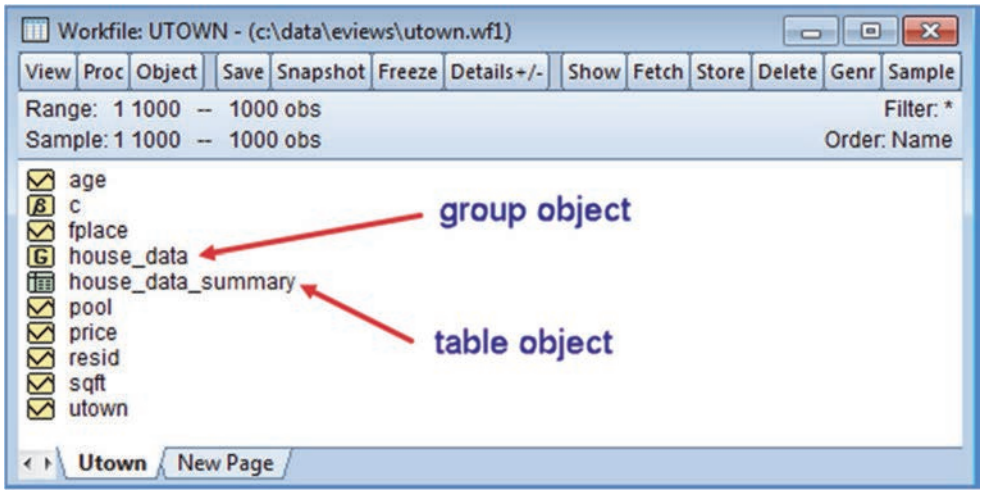
	PRICE	SQFT	AGE
Mean	247.6557	25.20965	9.392000
Median	245.8325	25.36000	6.000000
Maximum	345.1970	30.00000	60.00000
Minimum	134.3160	20.03000	0.000000
Std. Dev.	42.19273	2.918480	9.426728
Skewness	0.090562	-0.092835	1.647521
Kurtosis	2.332568	1.815000	6.014576
Jarque-Bera	19.92795	59.94576	831.0406
Probability	0.000047	0.000000	0.000000
Sum	247655.7	25209.65	9392.000
Sum Sq. Dev.	1778446.	8509.008	88774.34
Observations	1000	1000	1000

1.3.4 Freezing a result

One way to save results of any kind is to **Freeze** them. To save the summary statistics for the series in the **house_data** group, we select the **Freeze** button which creates an image of the table. Within this table image, select the **Name** button and enter a name in the resulting dialog box – we chose **house_data_summary**.



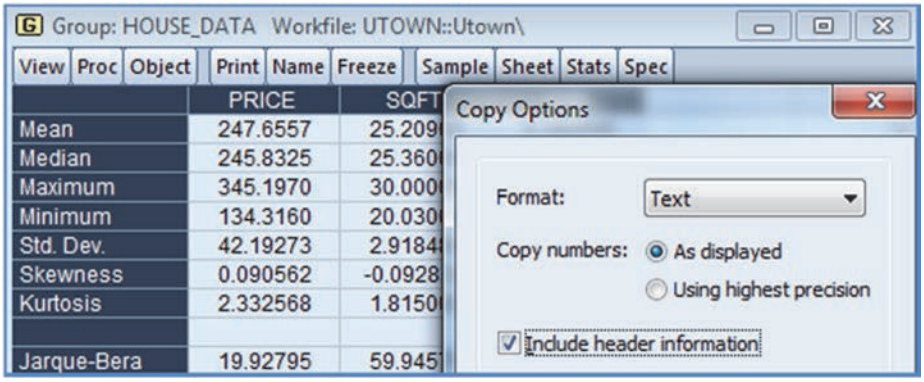
Click **OK**, then close the **Object** by clicking on the . Now check your workfile. You will find two new objects, with their distinguishing icons. One is the group **house_data** and the other is the table **house_data_summary**.



The table can be recalled at any time by double clicking its icon.

1.3.5 Copying and pasting a table

To copy the summary statistics into a document directly, highlight the table of results (drag the mouse while holding down its left button), enter **Ctrl+C**. In the resulting box click the **As displayed** radio button, check the box to **Include header information**, and click **OK**. This copies the table to the Windows clipboard, which then can be pasted (**Ctrl+V**) into an open document.

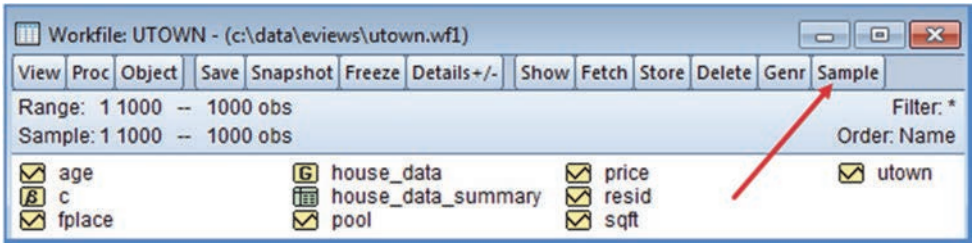


The table, as it will appear in your document is displayed on the following page. This same method can be used for any table in EViews. As you will discover, it can be particularly useful for pasting estimation results into a document. Similarly, if desired, the histogram for *PRICE* considered in Section 1.3.2 can be frozen and/or pasted into a document.

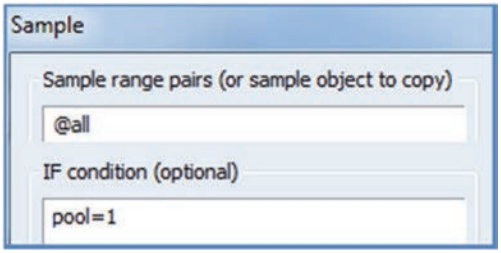
	PRICE	SQFT	AGE
Mean	247.6557	25.20965	9.392000
Median	245.8325	25.36000	6.000000
Maximum	345.1970	30.00000	60.00000
Minimum	134.3160	20.03000	0.000000
Std. Dev.	42.19273	2.918480	9.426728
Skewness	0.090562	-0.092835	1.647521
Kurtosis	2.332568	1.815000	6.014576
Jarque-Bera	19.92795	59.94576	831.0406
Probability	0.000047	0.000000	0.000000
Sum	247655.7	25209.65	9392.000
Sum Sq. Dev.	1778446.	8509.008	88774.34
Observations	1000	1000	1000

1.3.6 Changing the sample

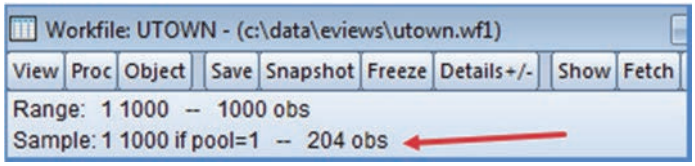
Suppose that we wish to consider only houses that have a swimming pool. Recall that these are the houses where $POOL = 1$. To change the sample, we click on the **Sample** button



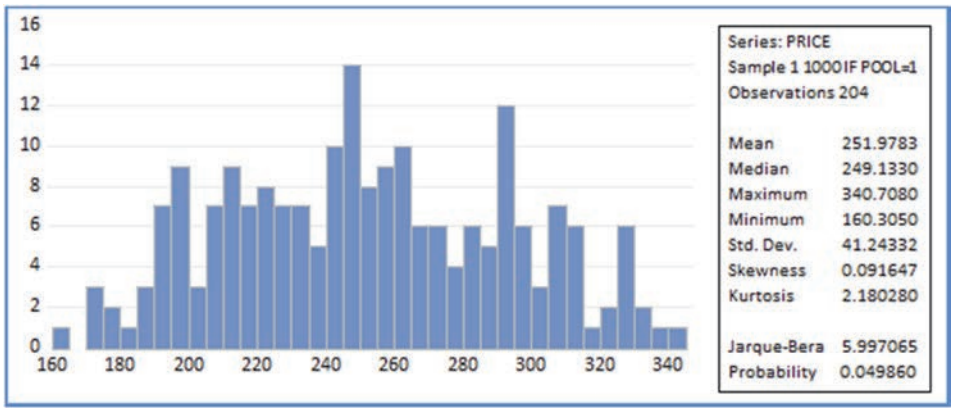
In the resulting **Sample** box **@all** means include all observations. The **IF condition pool = 1** modifies it to include only observations where $POOL = 1$. In this example where there are 1000 observations, instead of **@all** we could write **1 1000** which means include all observations from observation 1 to observation 1000.



Notice how the sample specification changes in the workfile. The **Range** remains the same at **1 1000**, but the sample has the **if pool = 1** condition. There are now only 240 active observations, those for houses who have a pool.

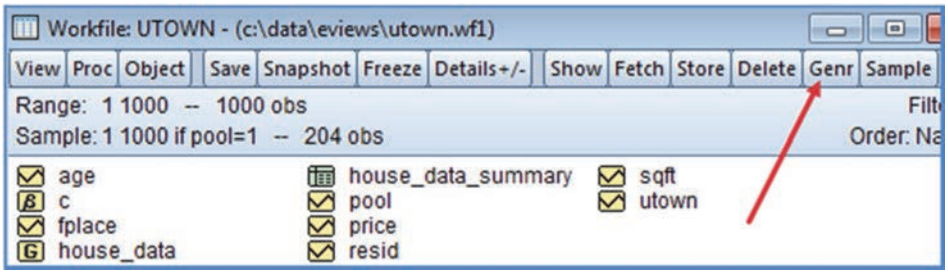


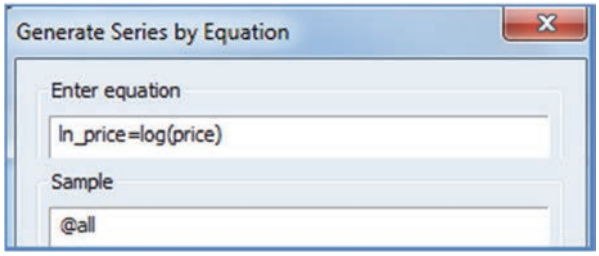
Now check the histogram and summary statistics for *PRICE* and compare them with those in Section 1.3.2. You will notice that the shape of the histogram and the statistics have changed. Also, if you open the group **house_data** that you created earlier, and check its summary statistics, they will now be calculated for the 240 houses with a pool. However, the table **house_data_summary** will not change. Because it was created using **Freeze**, it is retained as a record of those results.



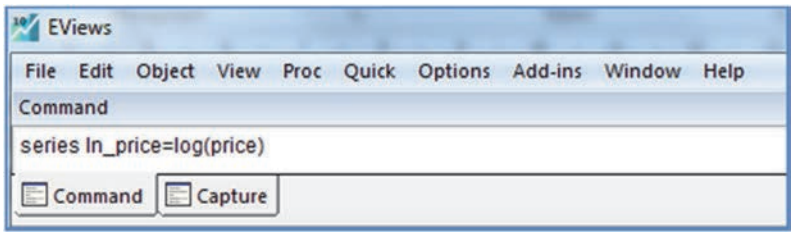
1.3.7 Generating a new series

In each problem we may wish to create new series from the existing series. For example, we can create the natural logarithm of the series *PRICE*. Select the **Genr** button on the workfile menu. This will open the **Generate Series** dialog box. Type in the equation **ln_price=log(price)**. To ensure we get the logarithms of all prices, not just those with a pool, we make sure the sample is set at **@all**. Then click **OK**. A new series will appear in the workfile. The function **log** creates the natural logarithm. All logarithms used in *Principles of Econometrics* are natural logs.





A second way of generating a new series is to type the command in the command window as shown below, and then press **Enter**.



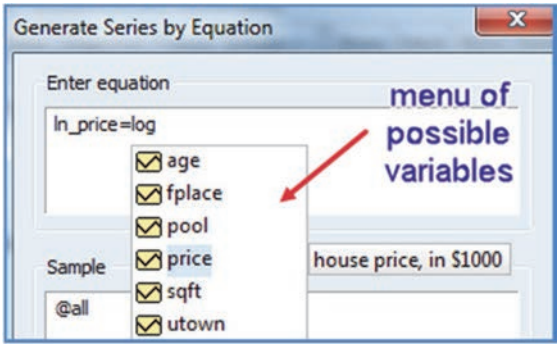
The command **series** creates the new series. It is also possible to write

genr ln_price=log(price)

As we travel through the book, we will discover how to use a number of commands as an alternative to pointing and clicking.

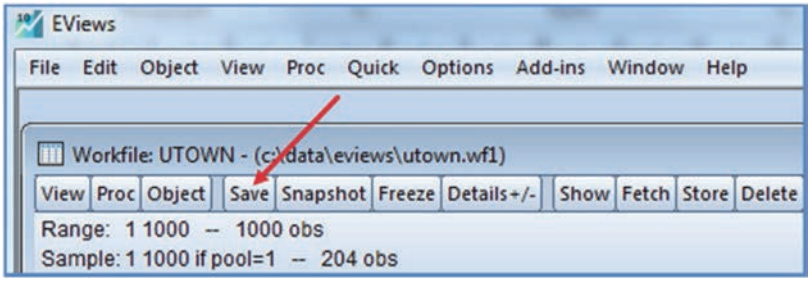
1.3.8 EViews prompts

As you were entering **ln_price=log(price)** into the **Generate Series** dialog box, you may have noticed a pop-up window appearing with a list of variables that are in the workfile. This pop-up window, displayed below, is prompting you to select one of the variables. Double clicking on the relevant variable will insert it into the **equation** window. This saves you having to type the variable name. However, after you insert one or more variables, you still need to be careful to make sure the equation you are using to generate a new series is correctly specified. The **Genr** option is not the only one where you will be prompted with a menu of possible variables. As you will discover, this menu also appears when you are estimating an equation.

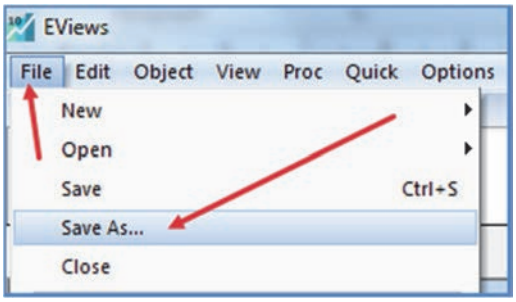


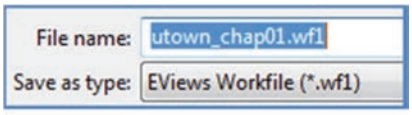
1.3.9 Saving the workfile

Now that you have put lots of work into creating new objects – a new series, a group, and a table – you can save what you have done by selecting **Save** on the workfile menu.



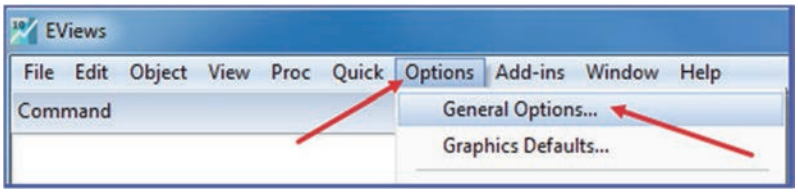
Selecting **Save** saves your work under the existing workfile name, in this case ***utown.wf1***. To save your work under a new name such as ***utown_chap01.wf1***, on the EViews menu (the outer window), go to **File/Save As**. If necessary, browse to the location where you wish to save the workfile, enter the new workfile name, and click **Save**.

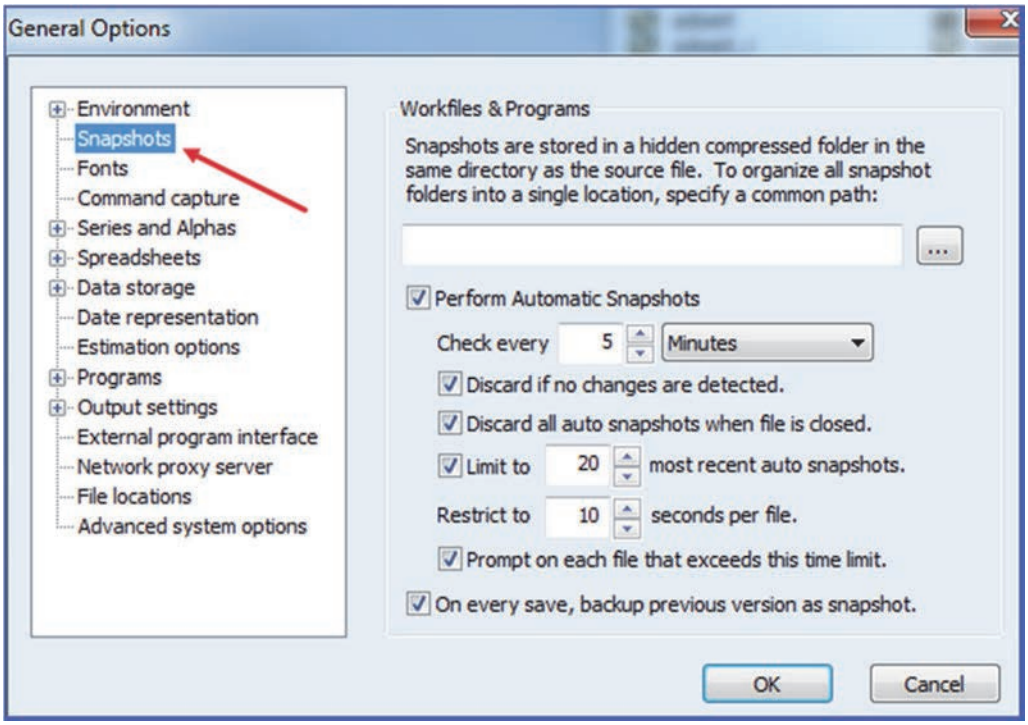




1.3.10 Snapshots

You may have noticed extra files labelled **snapshots** appearing in your directory of folders and files. These are backup-files automatically created and saved by EViews at particular points in time. They can be saved automatically or manually. The options for automatic saving are located in the upper EViews' toolbar. Go to **Options/General Options** and then select **Snapshots**.

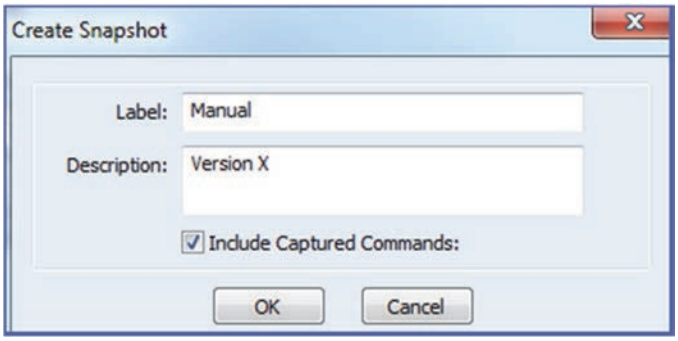




Notice the possible settings in the above screenshot. They give you an indication of how snapshots work. Saving a workfile at different points in time enables you to go back and check results you had in your workfile before you made changes. The options that are ticked are the default settings.

To manually save a version of a workfile at a given point in time, go to **Snapshot** in the workfile toolbar.

The following dialog box will appear. We have used the **Label Manual** and the **Description Version X**.

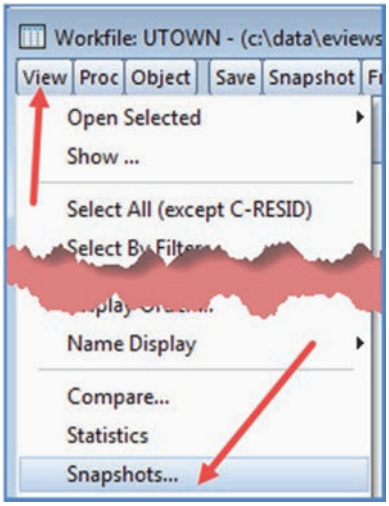


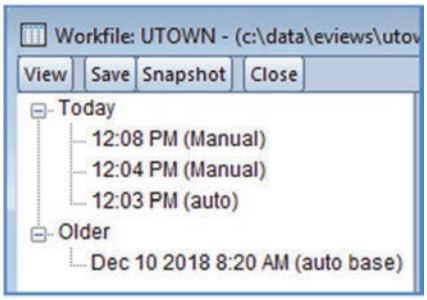
To retrieve a previously saved snapshot, in your workfile go to **View/Snapshots**. A list of the saved snapshots will be displayed. At the time we chose for this demonstration, using the workfile ***utown.wf1***, there were 4 snapshots.

Today 12:04 PM (Manual) and **12:08 PM (Manual)** are snapshots created manually.

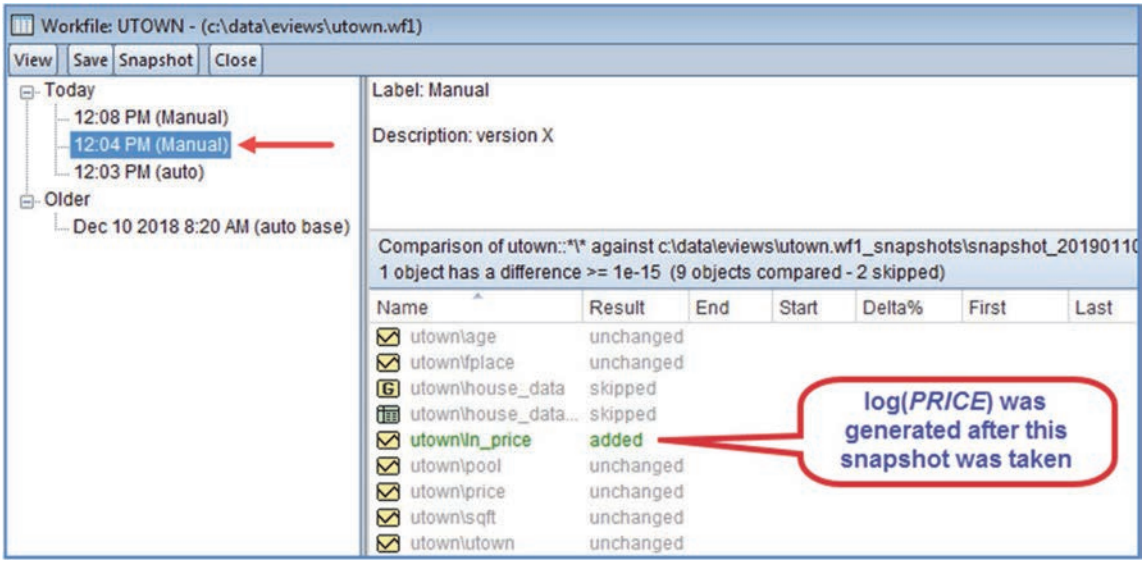
Today 12:03 PM (auto) is the version prior to the last save of the workfile.

Older Dec 10 2018 8:20 AM (auto base) is the last saved version, created when the file is opened. It will become the version prior to the last save if changes are made and saved.

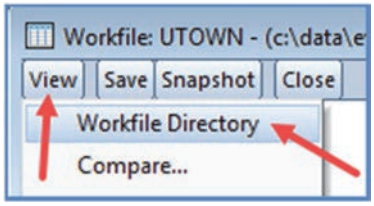




Double clicking on a snapshot name will open the workfile saved at the time the snapshot was taken. Highlighting a snapshot name, such as **Today 12:04 PM (Manual)**, will display changes that have been made since that snapshot was taken. After we manually created the snapshot called version X, the series *LN_PRICE* was generated.



To return to your current workfile – the one from which you began checking on snapshots – go to **View/Workfile Directory**.



1.4 USING COMMANDS

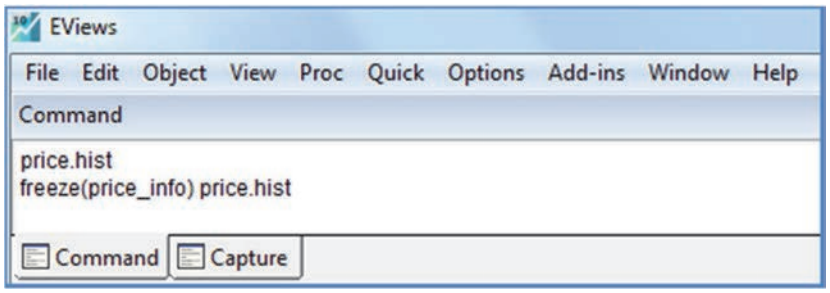
So far, we have focused on point-and-click menu items for giving EViews instructions. Corresponding to every point-and-click menu item is a command that can be entered in the **Command** window as an alternative way of instructing EViews. For example, to display the histogram and summary statistics for price that we considered earlier in Section 1.3.2, we type

```
price.hist
```

into the **Command** window and push **Enter**. To save the histogram and summary statistics in the workfile as a graph object called **price_info**, we enter the command

```
freeze(price_info) price.hist
```

These commands appear in the command window as follows



As we travel through the book, we will illustrate both alternatives: how to use the menu items, and their corresponding commands. Initially, your preference is likely to be the menu items. As you become more familiar with the commands, they are likely to become the preferred option. Commands that are equivalent to the menu items used in Section 1.3 are listed below. The explanatory comments in green are not part of the commands.

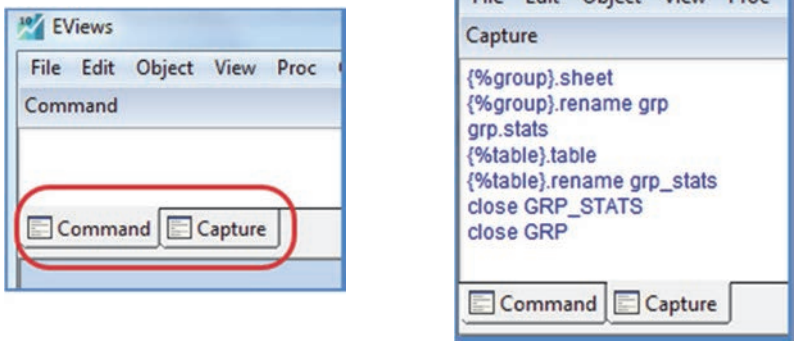
```
wfopen utown.wf1                'open worfile
wfdetails                       'display details of workfile objects
wfdir                           'return to workfile directory
preview price                   'previews PRICE
preview utown                   'previews UTOWN
price.sheet                     'view spreadsheet for price
price.hist                      'view histogram and statistics for price
group house_data price sqft age     'create a group called house_data containing
                                    the series that follow
freeze(house_data_summary) house_data.stats(i)     'create a table called
                                    house_data_summary that contains the summary
                                    statistics for the series in the group house_data;
                                    the option (i) refers to "individual" samples
smpl 1 1000 if pool=1           'change sample to observations with a pool
freeze(price_pool) price.hist       create a graph called price_pool with a
                                    histogram for prices for houses with a pool
smpl 1 1000                     'return to original sample
series ln_price=log(price)      'create a series equal to the log of price
wfsave(2) utown_chap01.wf1      'save file in double precision
```

At the end of this chapter these commands are collected together into what is known as an EViews program. The commands that are equivalent to the menu instructions provided for examples in the remainder of this chapter are also provided in programs at the end of the chapter. For more details about programs and how to run them, please refer to Chapters 3.6 and 5.11.

1.4.1 Command capture

Notice that there are two tabs at the bottom of the **Command** window: one called **Command** and the other called **Capture**. When the **Command** tab is selected, commands can be entered in the **Command** window as we described in the previous section. When the **Capture** tab is selected, the **Command** window changes to a **Capture** window. Instructions given to EViews by pointing and clicking appear as commands in the **Capture** window. For example,

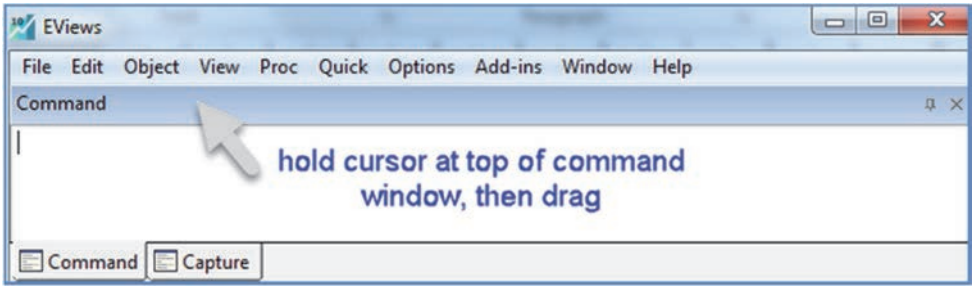
returning to the file ***utown_chap01.wf1***, if we (1) create a group, (2) name that group **grp**, (3) **View/Descriptive Statistics** for **grp**, (4) **Freeze** those statistics into a table called **grp_stats**, and (5) close **grp** and **grp_stats,** the corresponding commands caught by the **Capture** window are in the screenshot on the right.



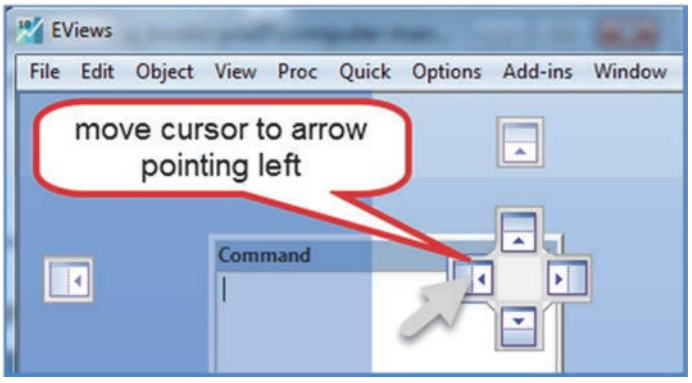
If you are wondering what the equivalent command is to a set of pointing-and-clicking steps, going to the **Capture** window can be a good way to find out. Commands in the **Capture** window can be copied and pasted into the **Command** window or a program.

1.4.2 Positioning the Command/Capture window

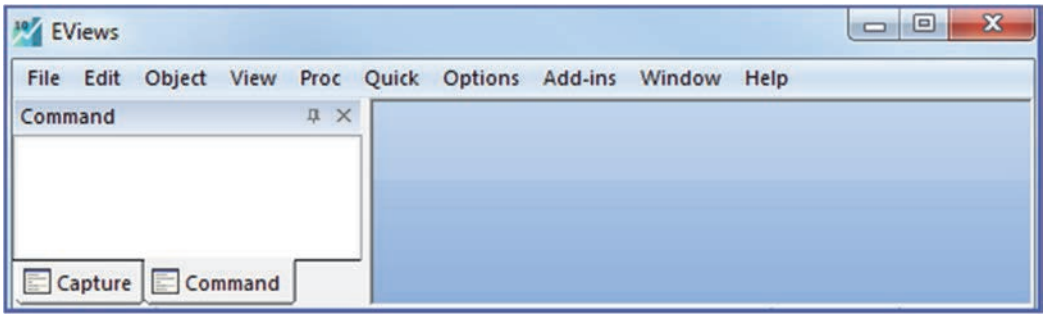
When EViews is first opened, the **Command/Capture** window is positioned horizontally at the top of the screen. Some users prefer a vertical window to the left of the screen. To change its position, hold the cursor down at the top of the command window.



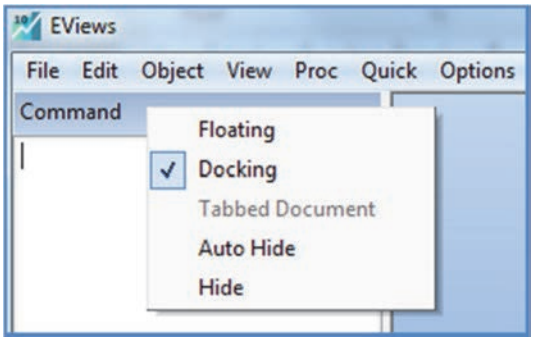
Then, holding the cursor down, move the command window so that the cursor touches the arrow pointing left.



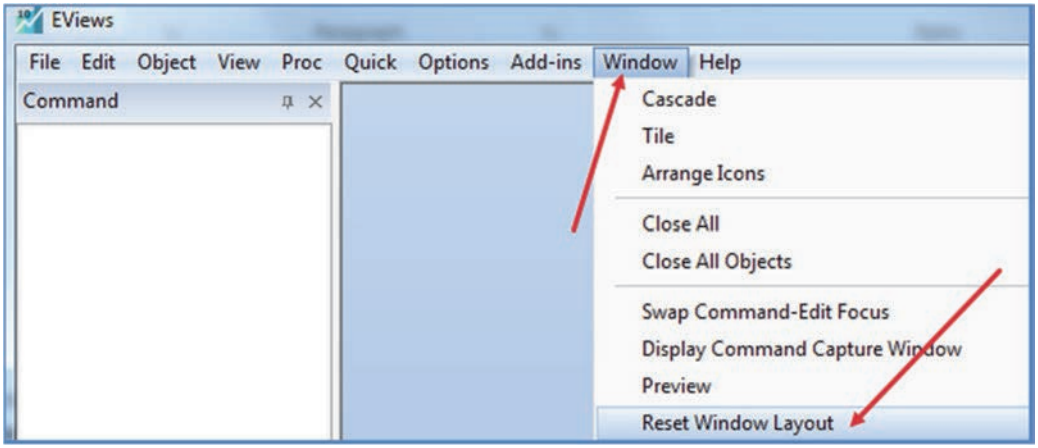
The command window will appear on the left.



Moving the command window puts it in **floating** mode. Choosing one of the arrows puts it into **docking** mode. These options are displayed by right clicking on the top of the command window.



To return the command window to its default position at the top of the workfile, go to **Window/ Reset Window Layout**. EViews will then ask you to confirm that you want to proceed with the **Reset**. Click **Yes**.

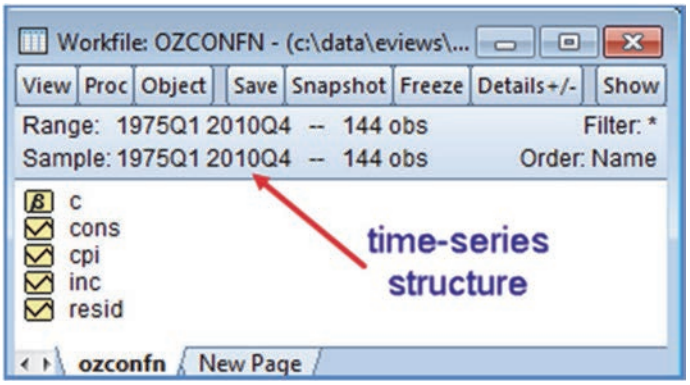


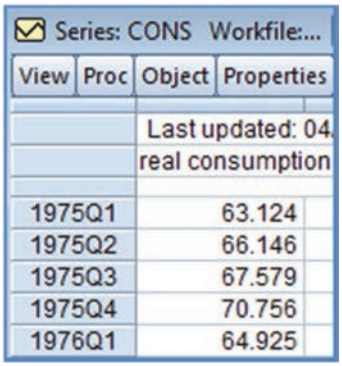
1.5 A TIME-SERIES WORKFILE

In this section we explore further some of the capabilities of EViews, focusing particularly on creating graphs. We do so within the context of the workfile ***ozconfn.wf1*** that contains quarterly time-series observations from quarter 1, 1975 to quarter 4, 2010 on the following Australian macroeconomic variables.

- *CONS*—real consumption expenditure, $billions
- *CPI*—consumer price index
- *INC*—real net national disposable income, $billions

After opening ***ozconfn.wf1*** you will notice the different structure. Under **Range** and **Sample**, the dates for the first and last observations are specified. Also, if one of the series is opened, say *CONS*, you discover that the observations are identified by their date, not by observation number, as was the case for the **Unstructured/Undated** workfile structure in ***utown.wf1***.

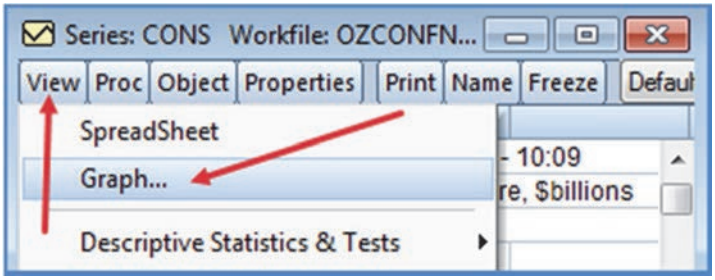




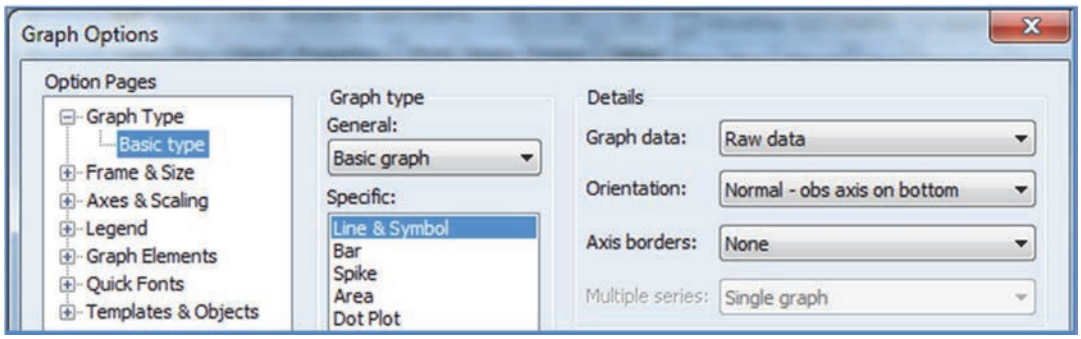
All the procedures we followed in the previous section with the workfile ***utown.wf1*** can be applied in a similar way to ***ozconfn.wf1***. Now we consider some other options.

1.5.1 Graphing a series

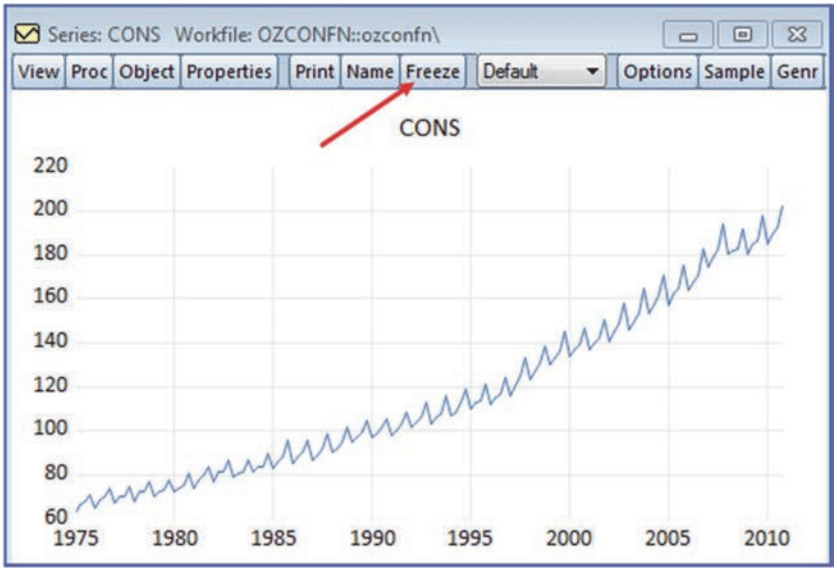
The first step with any time-series analysis is to graph the series. To graph the series *CONS*, we open the series and then go to **View/Graph**.



There you will see many options. The default graph type is a **Basic Graph** with the **Line & Symbol** plotted. Select **OK**.

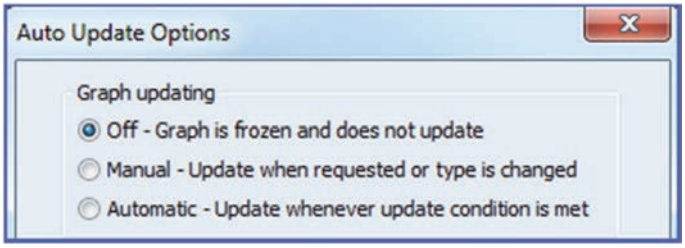


The result is a line graph. The dates are on the horizontal axis and *CONS* is on the vertical axis. The consumption series displays a marked seasonal pattern, typical of series that have not been seasonally adjusted.

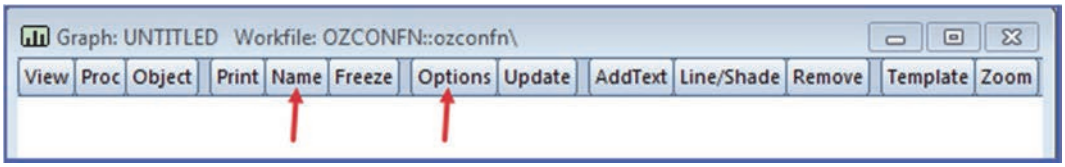


You may not be totally comfortable with the presentation of the graph. For example, no axes have been drawn, and it has grid lines. There are many options for changing the presentation of the graph. You can access these options through Options on the top tool bar menu. Alternatively, if you first **Freeze** the graph, a new tool bar with more options will appear, and, as well as changing the presentation to suit your needs, you can **Name** and save the graph.

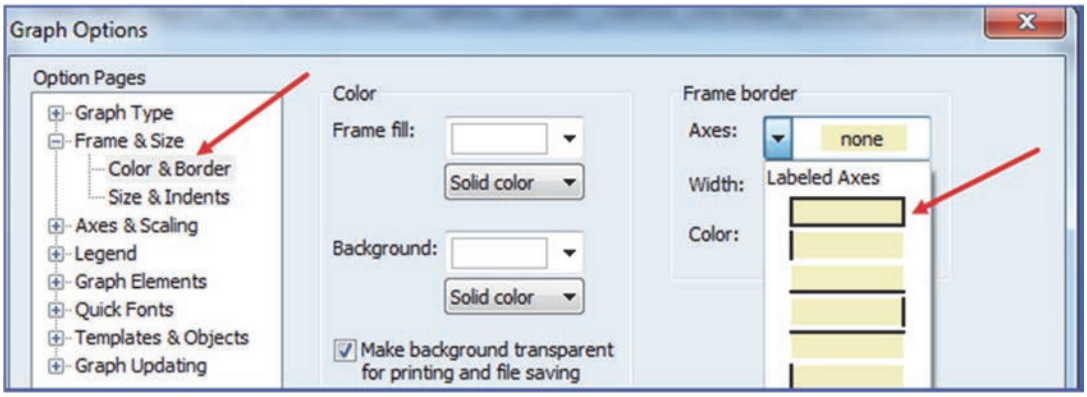
After you select **Freeze**, the following **Auto Update Options** will appear. Because we are only changing the presentation, and not the type of graph or the data used to create the graph, we choose **Off** for **Graph updating**.



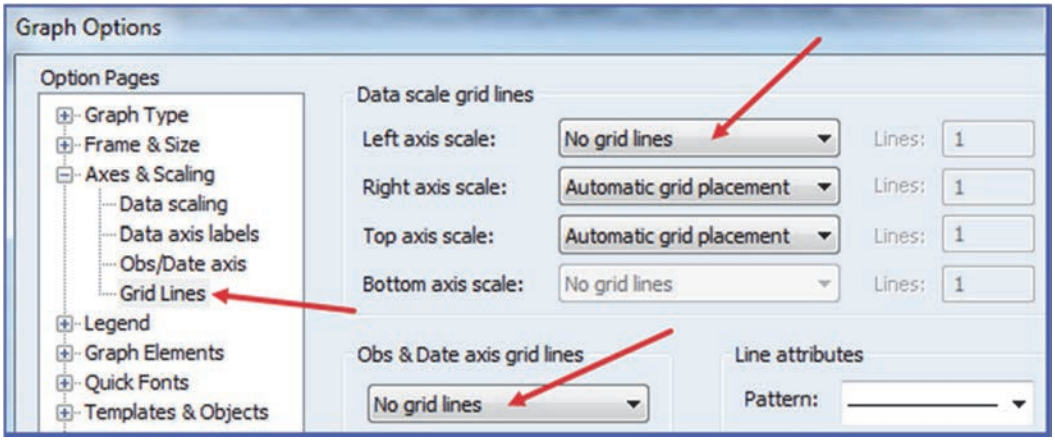
The graph will reappear, but notice the change in the top of the window. A **Graph** object has been created and the top toolbar has changed. Now, select **Name** and in the resulting dialog box, type in a name. We chose **cons_graph**. Then select **Options**.



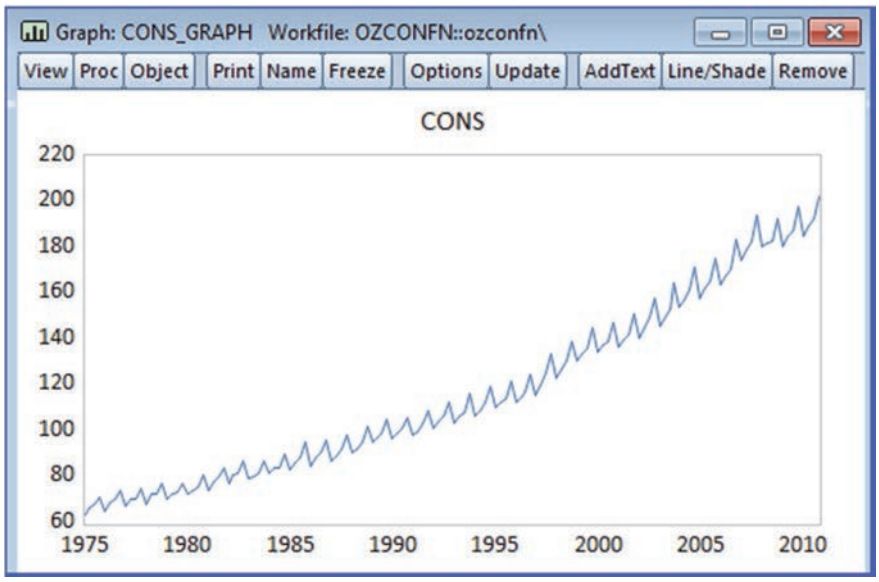
There are a great many options that can be considered. When convenient, it is a good idea to explore these options, and experiment with them until the presentation of a graph is to your liking. At present, we will take steps to create axes and eliminate the grid lines. Go to **Frame &Size/Color & Border/Frame border/Axes** and choose the desired axes. We have chosen to insert axes on all four sides of the graph. Then click **Apply** that you will find at the bottom of the window.



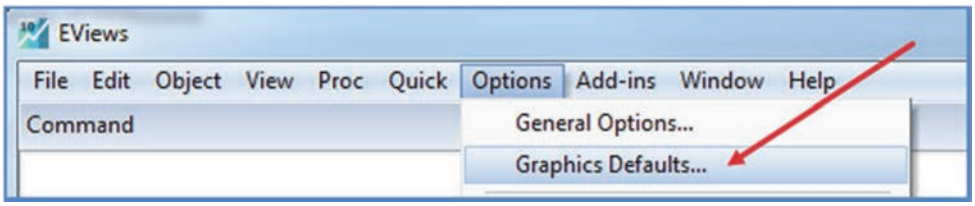
To eliminate the grid lines, go to **Axes & Scaling/Grid Lines** and select **No grid lines** as indicated below. Those selected are the grid lines for the **left axis** and for the **Date axis**. Then click **Apply**, followed by **OK**.



The following graph will then be saved in your workfile with the name **cons_graph**.



If you prefer all your future graphs to have the characteristics of this graph – a border for all four axes and no grid lines – you can go to the upper EViews toolbar and choose **Options/Graphics Defaults**. A window will open with the same graph options that we have just considered.

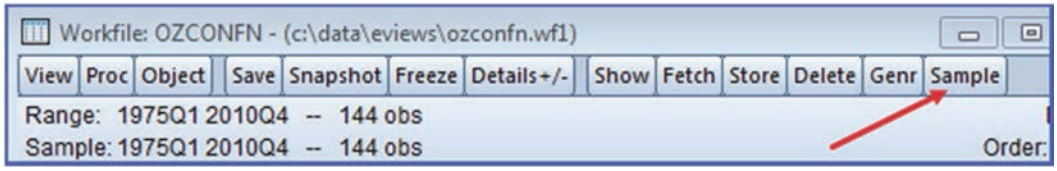


1.5.2 Copying a graph into a document

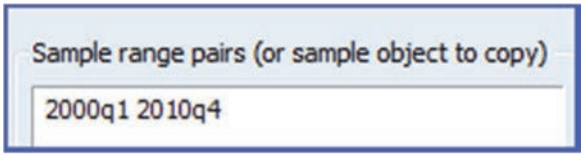
Copying the graph into a Word document is easy. Open the graph and click on its inside. Press **Ctrl+C**. This is the Windows keystroke combination for **Copy**. It copies the graph into the Windows clipboard (memory). Open a document in your word processor and enter **Ctrl+V** which will **Paste** the figure into your document. An example of a pasted graph appears in the next Section.

1.5.3 Changing the sample

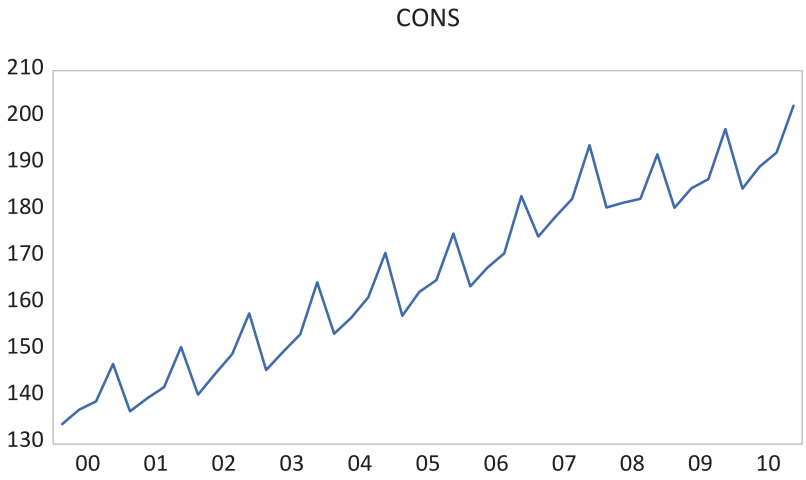
If you wish to view the graph or summary statistics for a different sample period, click on the **Sample** button. This feature works the same in all EViews windows.



To change the dates, we write the new beginning and ending dates in the resulting window. Suppose we want observations from quarter 1 in the year 2000. We insert **2000q1 2010q4**, then click **OK**.

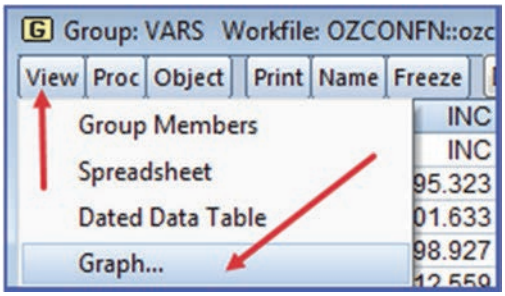


At the top of your workfile, the **Sample** changes accordingly, but the **Range** remains the same. If you open *CONS*, and then go **View/Graph/Graph Type/Basic type/Line & Symbol**, the following graph appears. Compare its date axis with that in Section 1.5.1.

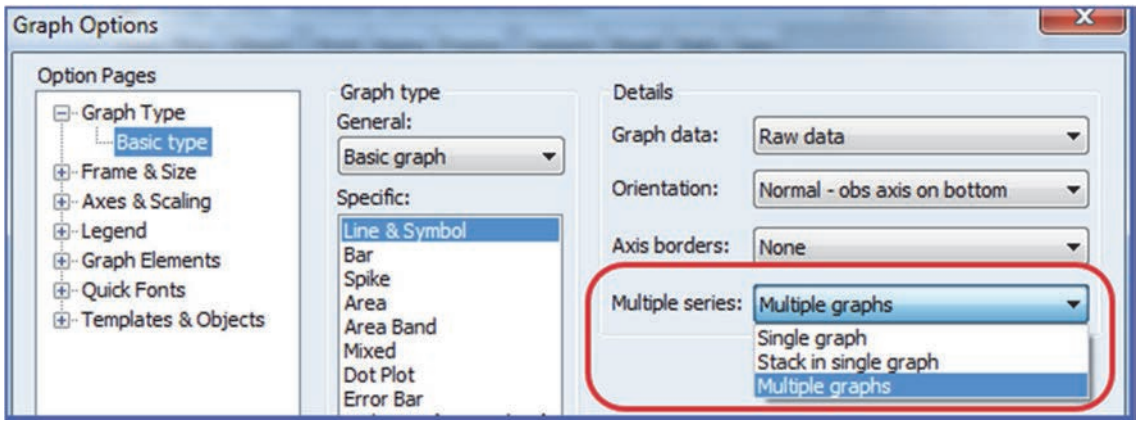


1.5.4 Plotting two series

To investigate how to plot two series, we first change back the **Sample** to include all observations. Go to **Sample** and insert **@all** in the upper dialog box. Then, so that we can plot both *CONS* and *INC*, create a group containing these variables – see Section 1.3.3 – and give the group a name, say **vars**. Open the group and go to **View/Graph**.



In the resulting dialog box, find the **Multiple series** menu. You have a choice between three options, **Multiple graphs**, **Stack in a single graph** and **Single graph**.

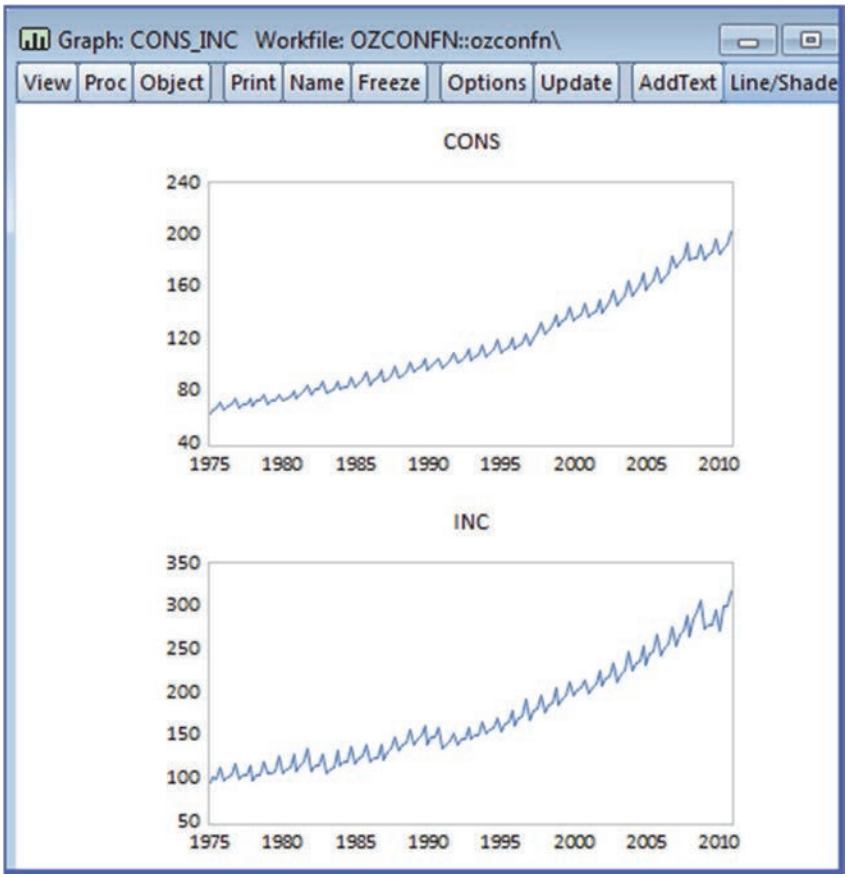


Single graph: The two series are plotted on a single graph.

Stack in single graph: Two series are plotted on a single graph. One is the original series, the other is the sum of the two series.

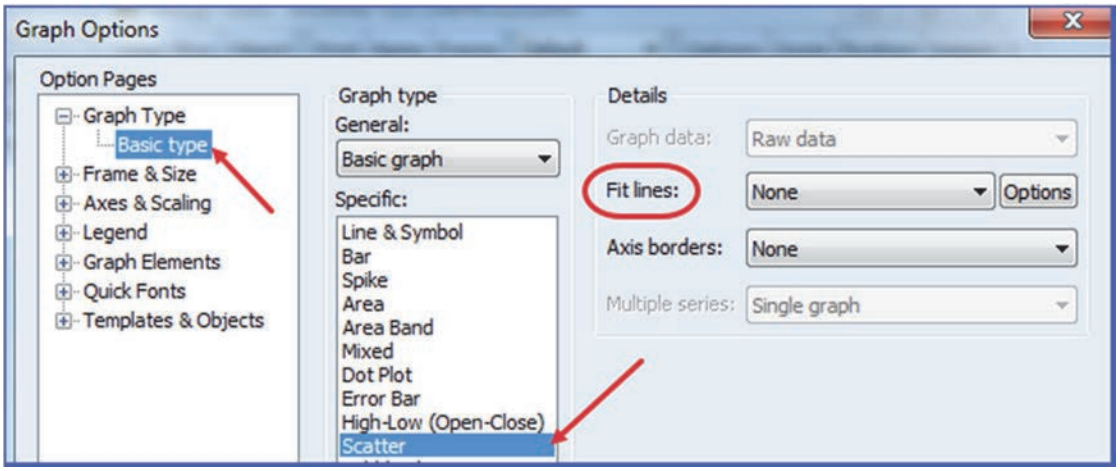
Multiple graphs: Each series is plotted on a separate graph.

We will illustrate multiple graphs. After choosing multiple graphs, freezing the result, giving it the name **cons_inc**, and tidying it up so that it includes axes and no grid lines, we obtain:

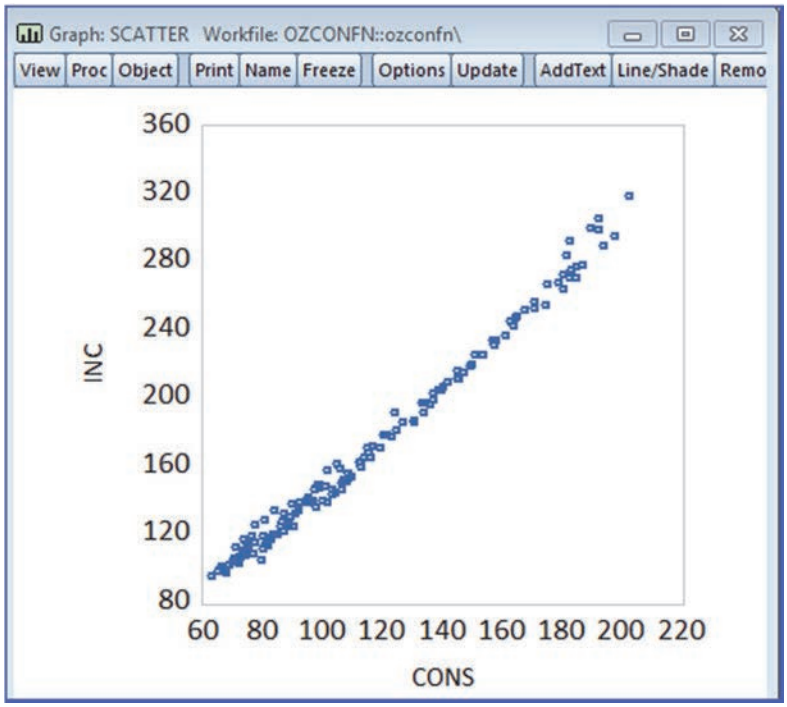


1.5.5 A scatter diagram

A scatter diagram is a plot of data points with one variable on one axis and the other variable on the other axis. To create a scatter diagram for the observations on *CONS* and *INC*, open the group **vars** and go to **View/Graph**. For **Specific Graph type**, select **Scatter**.

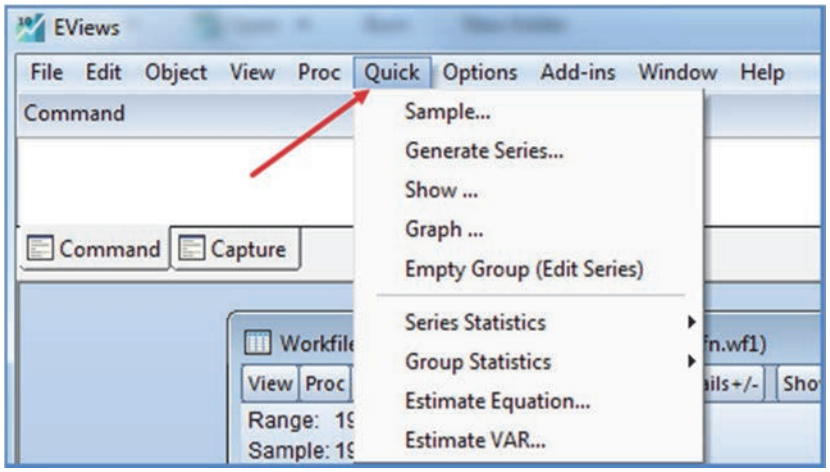


The resulting graph appears below. We have frozen it, named it **scatter**, inserted the axes, and eliminated the grid lines. Notice how the scatter of points almost traces out a straight line. The first variable in the group **vars** is placed on the *x*-axis, and the second one on the *y*-axis. If desired, you can ask EViews to fit a regression line to the scatter by going to the **Fit lines** drop-down menu which is circled in the above screen shot.



1.6 USING THE QUICK MENU

Another way to initiate several of the EViews options or commands is via the **Quick** menu which is located on the EViews 10 outer toolbar. Where to locate the **Quick** menu and its options are



1.6.1 Using Sample from the Quick menu

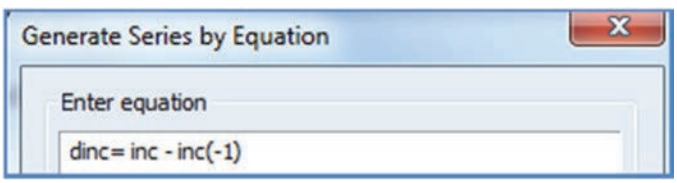
The **Sample** option opens the dialog box for changing the active observations, in the same way as selecting **Sample** from the workfile toolbar. Check back to Section 1.5.3 for an example of changing the active time-series observations, and Section 1.3.6 for an example where observations with a special characteristic are excluded for a cross-section sample.

1.6.2 Using Generate from the Quick menu

The **Generate series** option opens the dialog box for generating a new series, in the same way as selecting **Genr** from the workfile toolbar. See Section 1.3.7 for an example where we defined a new variable as equal to the log of an existing variable. Let's consider two more examples. In the first we take the first difference or change in the national income variable *INC*. That is, $\Delta INC_t = INC_t - INC_{t-1}$. Suppose we call the new change variable *DINC*. When typed in the **Command** window, the following two commands are alternative ways of calculating $DINC = \Delta INC$.

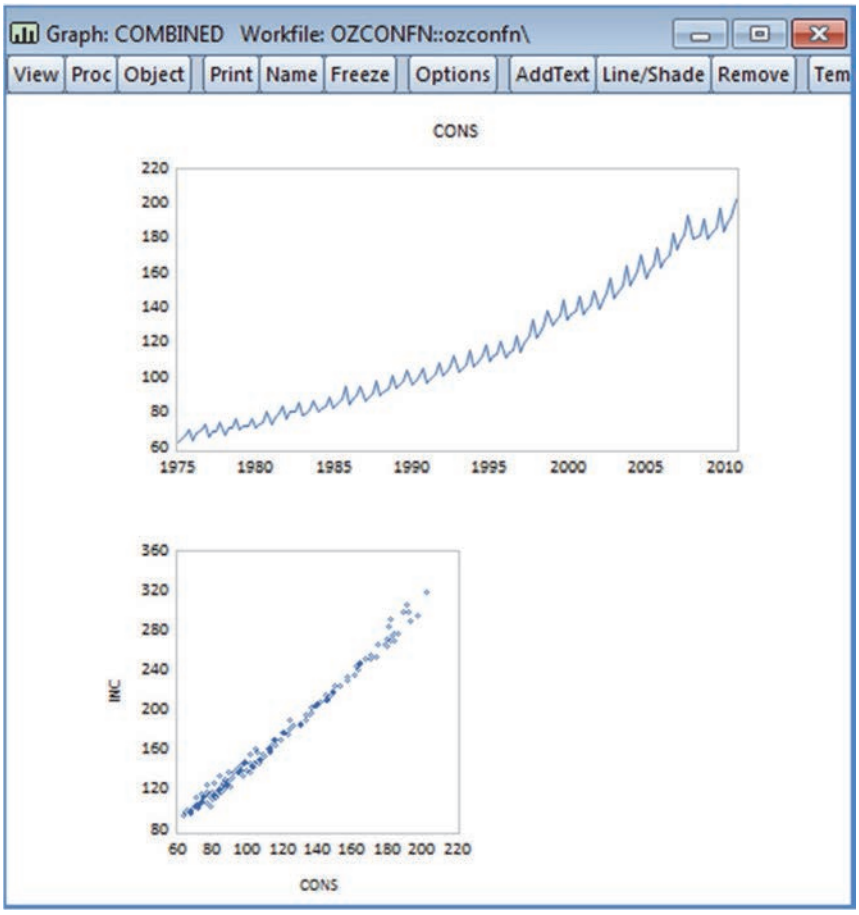
```
series dinc = inc - inc(-1)
series dinc = d(inc)
```

Writing **inc(-1)** is EViews' shorthand for INC_{t-1}; **d(inc)** is shorthand for $INC_t - INC_{t-1}$. In the **Generate** dialog box, the first of the above two commands is written as follows. The second one could be written in a similar way.

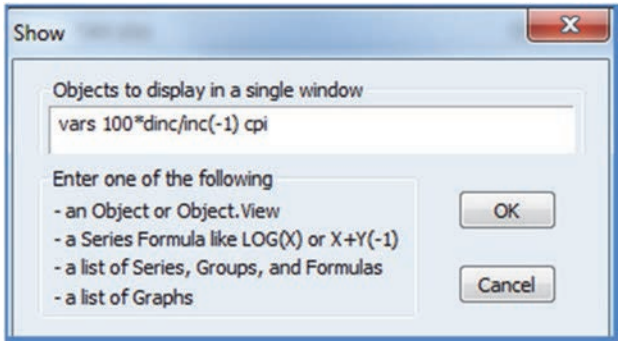


1.6.3 Using Show from the Quick menu

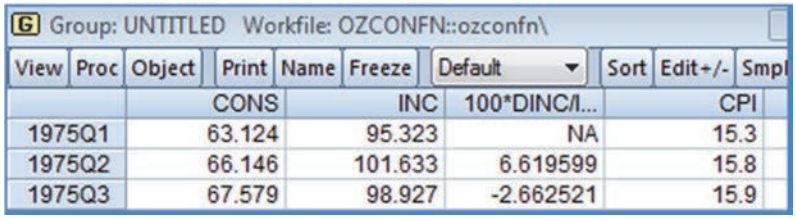
Show is a powerful device which can be used to display existing objects in the workfile, generate new series, create new groups, and combine graphs. Suppose, for example, that we wish to display the two graphs **cons_graph** and **scatter** together in the one graph. Inserting these two names into the **Show** dialog box leads to the following new graph that we called **combined**.



For a second example, suppose that we wanted to create a new group containing the variables in the existing group **vars**, the percentage change in income defined as $100 \times \Delta INC_t / INC_{t-1} = 100\left(INC_t - INC_{t-1}\right)/INC_{t-1}$, and the series *CPI*. After selecting **Show**, we fill in the dialog box as follows.



The following spreadsheet for a new group is displayed.

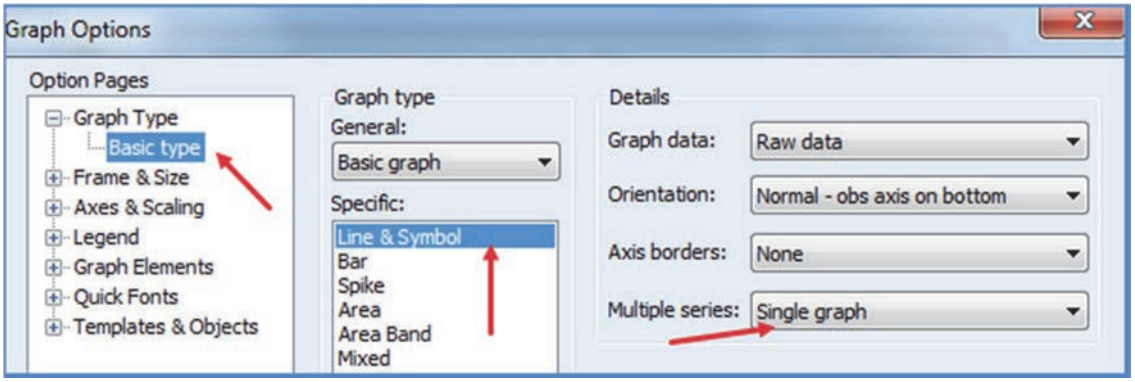


Naming this group – we called it **new_group** – will save it in your workfile.

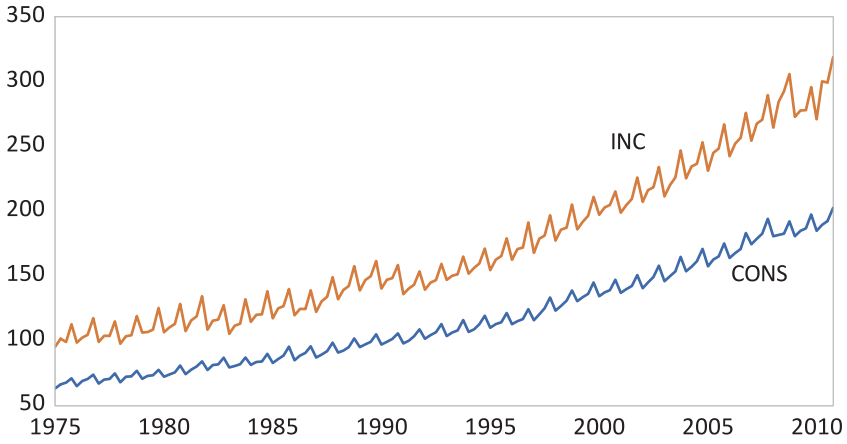
1.6.4 Creating a graph from the Quick menu

After selecting **Graph** from the **Quick** menu, a dialog box will appear. If you wish to plot a single series, you can simply enter that series. For plotting more than one series, you can do so without first creating a group by listing the series in the dialog box. For example, for graphing *CONS* and *INC*, we have

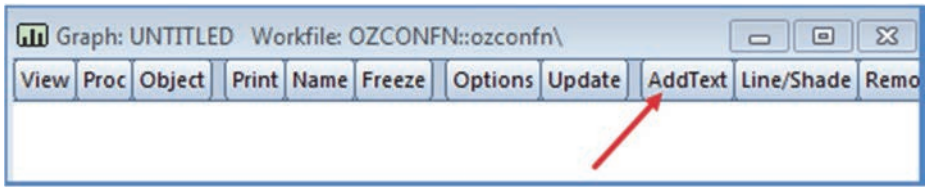
The graph dialog box that we encountered earlier will open. We again choose **Graph Type/Basic type/Line & Symbol**, but under **Multiple series**, we choose **Single graph**.



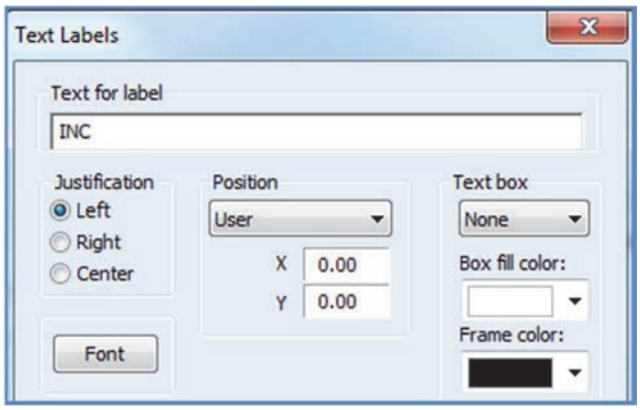
The resulting graph follows. Like before, its presentation can be improved, it can be named and saved, as well as copied into a Word document, as we have done before. We name it **graph1_6_4**.



Notice how the two series have been labelled as *INC* and *CONS*. To see how this was done, we introduce the **Graph** option **AddText**. First, we deleted the original legend that was provided by EViews. Then, we select **AddText** from the **Graph** toolbar.



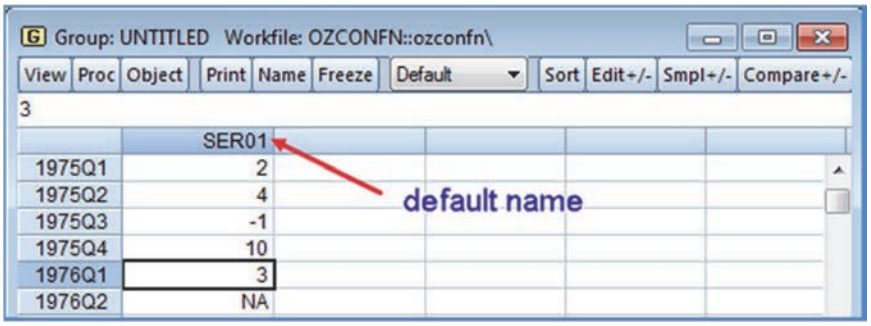
The desired label, in this case *INC*, is entered in the **Text Labels** dialog box. After you click **OK** it will appear in your graph; you can then drag it to desired position on the graph. Also, the **Text Labels** dialog box has several options that you can explore at your leisure.



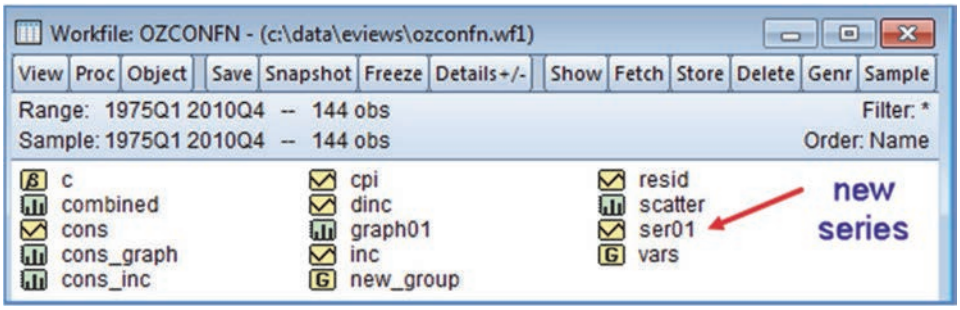
1.6.5 Opening an empty group

The next option on the Quick menu is **Empty Group (Edit Series)**. This option can be used to enter data manually on one or more new variables (series). After selecting it a spreadsheet will open into which you can enter new data. The default name for a new series is *SER01*

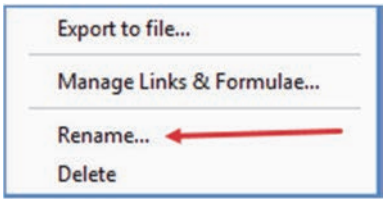
that we will change. As you enter a number press **Enter** to move to the next cell. You can add new data in as many columns as you like.

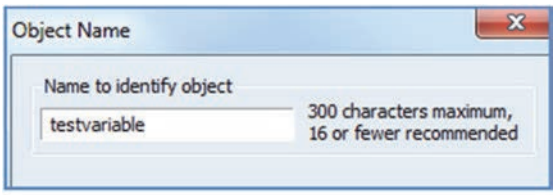


When you have finished entering the data you wish, click in the upper right corner of the active window. You will be asked if you want to **Delete Untitled GROUP?** Select **Yes**. In the workfile ***ozconfn.wf1*** you will now find the new series labeled *SER01*.

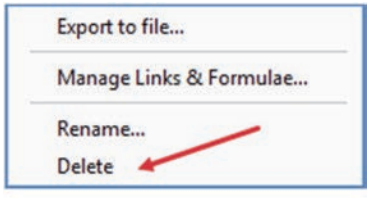


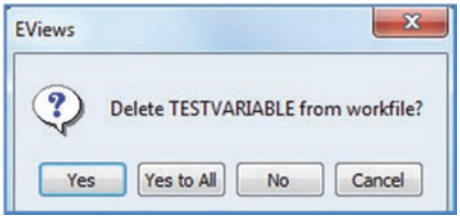
To change this name, select the series then **right-click** in the shaded area. A box will open in which you can enter a new name for the "object" which in this case is a data series. Press **OK**.





You can go through these same steps to delete an unwanted variable, such as the one we have just created. Select the series *TESTVARIABLE* in the workfile, and right click. Select **Delete**. In the resulting window you will be asked to confirm the deletion. Select **Yes.**

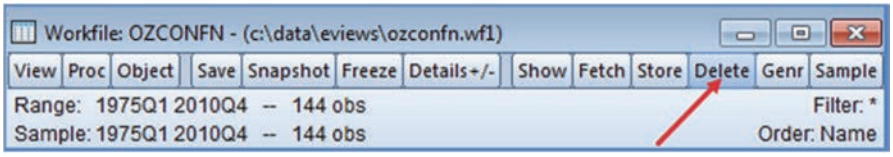




The commands for renaming and deleting are

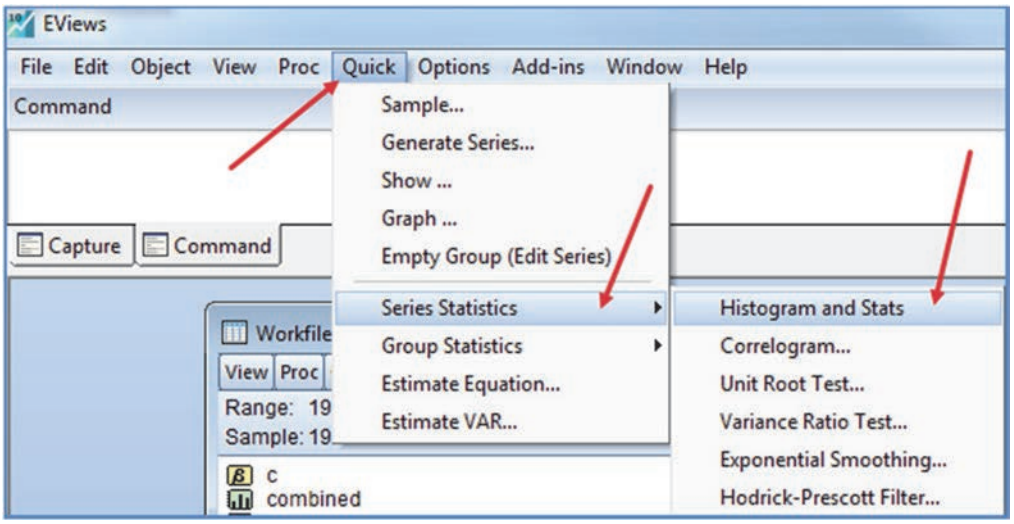
```
rename ser01 testvariable
delete testvariable
```

More than one series or objects can be selected for deletion by selecting one, and then holding down the **Ctrl**-key while selecting others. To delete all these selected objects **right-click** in the blue area, and repeat the steps above. Alternatively, after selecting the objects marked for deletion, click on **Delete** from the workfile toolbar.

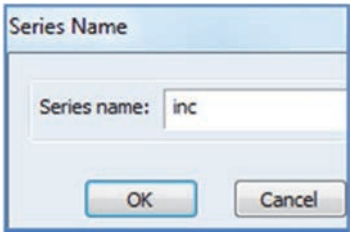


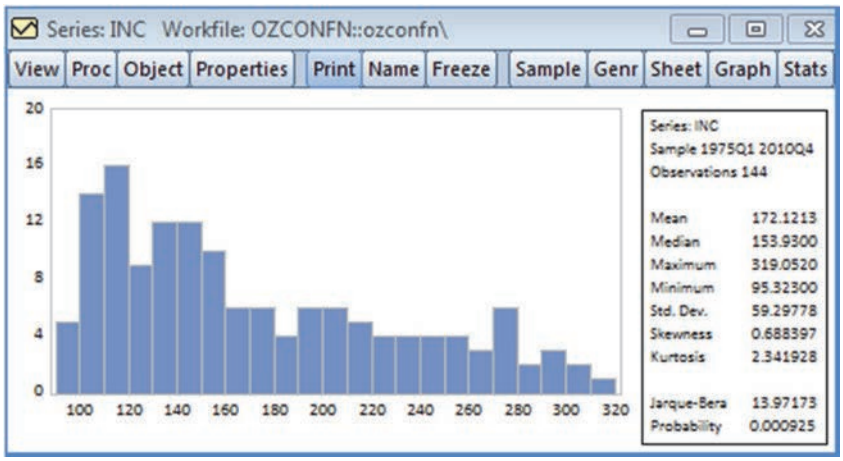
1.6.6 Quick/Series statistics

The next item on the EViews Quick menu is **Series Statistics**; it provides an alternative way of viewing the sample statistics for a particular series. In Section 1.3.2 we discovered that one way to examine sample statistics for a series is to open that series, select **View**, and then choose from the resulting menu. When using **Quick/Series Statistics**, the resulting menu has a number of different options, some of which we encounter later in the book. For the moment we choose **Histogram and Stats**, as we did in Section 1.3.2.



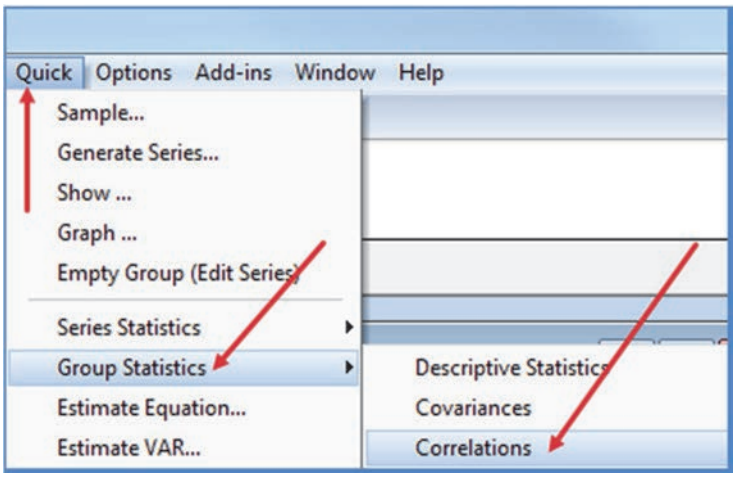
In the resulting window you can enter the name of the series (one) for which you desire the summary statistics. Then select **OK**. We chose the series *INC*.



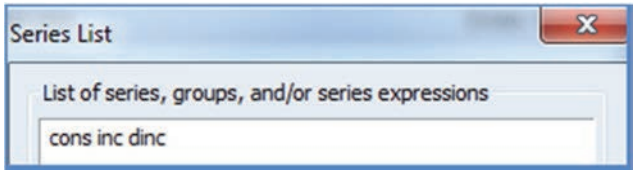


1.6.7 Quick/Group statistics

In Section 1.3.3, we explained how to create a group of variables (series) and examine the sample statistics for all variables within that group. Choosing **Quick/Group Statistics** provides an alternative way of creating a group and, at the same time, viewing sample statistics for the variables in the group. Choosing **Descriptive Statistics** from the **Group Statistics** menu will display a table like that in Section 1.3.3. To illustrate another option, this time we choose **Correlations**.



A dialogue box will appear into which you can enter the names of the series for which you want the correlations. We have asked for the correlations between *CONS*, *INC* and *DINC*.



A group containing the variables *CONS*, *INC* and *DINC* is formed, and their correlations are displayed. Note that consumption and income are highly correlated, but the change in

income is not highly correlated with consumption, nor income. If you wish to retain the group, you can select **Name**, and give the group a name. If you wish to keep the correlations in your workfile, select **Freeze**, and give the resulting table a name, say **cor1_6_7**.

Group: UNTITLED Workfile: OZCONFN::ozconfn\

View | Proc | Object | Print | Name | Freeze | Sample | Sheet | Stats

Correlation

	CONS	INC	DINC
CONS	1.000000	0.995311	0.142596
INC	0.995311	1.000000	0.183656
DINC	0.142596	0.183656	1.000000

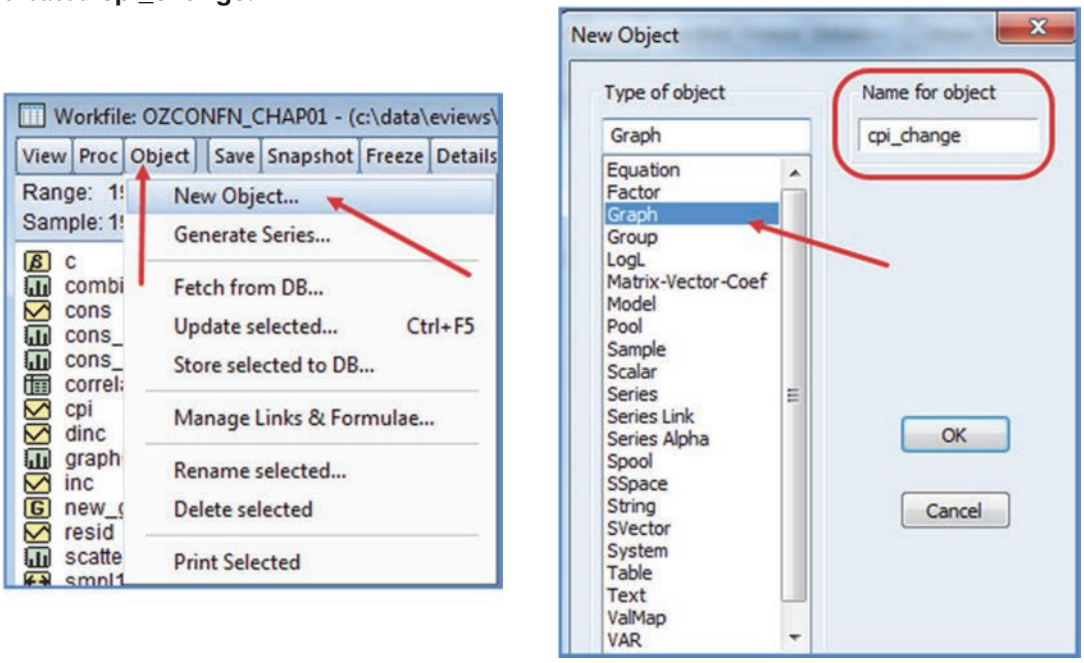
It is convenient at this point to save the workfile; using **Save As** (see Section 1.3.9), we call the saved file ***ozconfn_chap01.wf1***.

1.6.8 Other Quick menu items

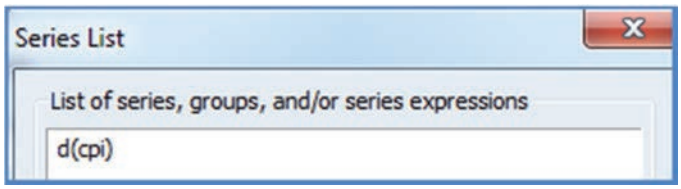
The remaining items on the **Quick** menu are **Estimate Equation** and **Estimate VAR**. These items will be introduced in Chapters 2 and 13, respectively.

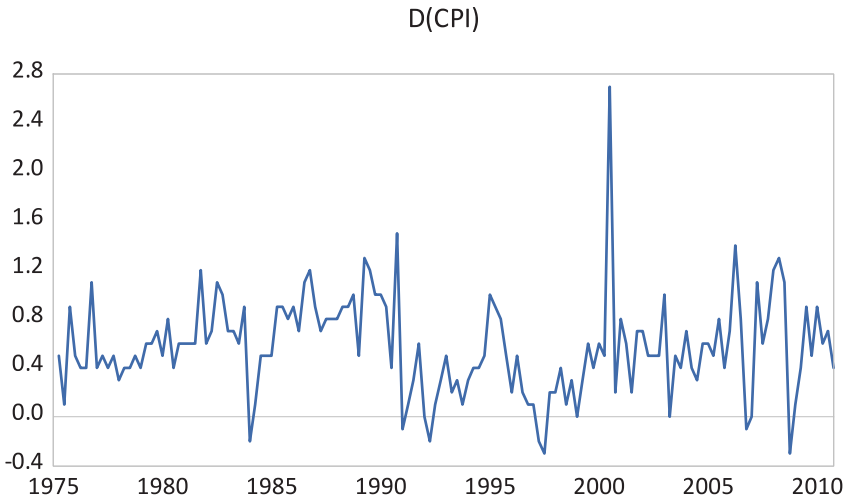
1.7 USING THE OBJECT MENU

A large variety of objects can be created from the **Object/New Object** menu. At this point in time only a limited number of these options are likely to be familiar, namely, **Graph**, **Group** and **Series**. In the screenshot that follows, we choose **Graph** and call the new graph that is to be created **cpi_change**.



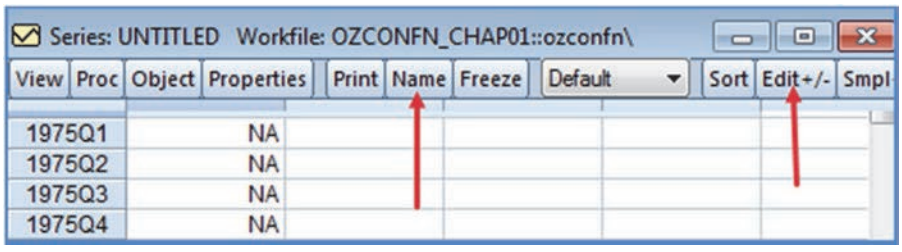
Clicking **OK** returns a dialog box where you can enter one or more series to be graphed. To plot the change in the consumer price index from quarter to quarter, $\Delta CPI_t = CPI_t - CPI_{t-1}$, we insert **d(cpi).** The big spike just after the year 2000 is when Australia introduced a sales tax.





Choosing **Group** from the **New Object** menu opens a dialog box where you can list the series you want included in the group.

Choosing **Series** from the **New Object** menu opens a spreadsheet where you can insert values of a new series, either by typing in those values or copying and pasting from another data source. To insert values first click **Edit**, then, after inserting all of the values, click **Edit** again. The series should be named if it is to be retained.



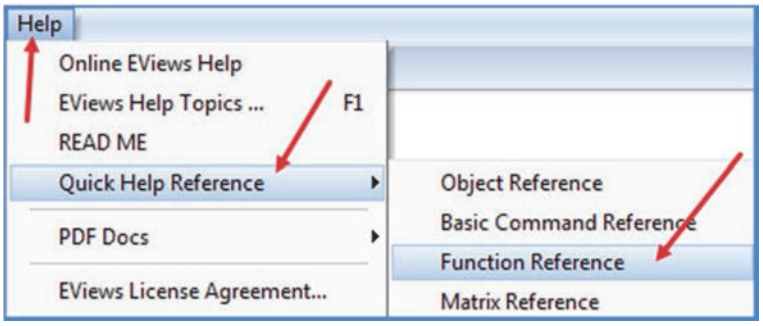
We learn how to create many of the other objects as we travel through the book. You should keep the **Object/New Object** menu in mind each time you encounter a new challenge.

1.8 USING EVIEWS FUNCTIONS

Now we return to EViews' **Operator and Function Reference** that we introduced in Section 1.2.3 and examine some of the frequently-used operators and functions. To illustrate their use, we download the workfile ***london5.wf1***. Here is the summary of its contents from the file ***london5.def***.

```
london5.def
        Obs: 850

        wfood wcloth totexp age nk

        wfood   =       budget share for food expenditure
        wcloth  =       budget share for clothing expenditure
        totexp  =       total household expenditure in UK pounds sterling per week
        age     =       age of household head
        nk      =       number of children

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       wfood |       850    .3647391    .1031599      .0652       .789
      wcloth |       850    .1029179    .0910146          0      .5035
      totexp |       850    94.61176    40.01357         30        360
         age |       850    35.76118    7.900628         19         60
          nk |       850    1.604706    .4892016          1          2
```

To preserve the data file, and create a new file that will contain the changes we make, we save the file as ***london5_chap01.wf1***. The operators and functions we consider can be accessed through **Quick Help Reference/Function Reference**.



1.8.1 Basic arithmetic operations

To view basic arithmetic operators, choose **Operators** from the **Operator and Function Reference**.

A list of operators is given in the following table.

Basic Arithmetic Operations

Expression	Operator	Description
+	add	x+y adds the contents of X and Y.
-	subtract	x-y subtracts the contents of Y from X.
*	multiply	x*y multiplies the contents of X by Y.
/	divide	x/y divides the contents of X by Y.
^	raise to the power	x^y raises X to the power of Y.
>	greater than	x>y takes the value 1 if X exceeds Y, and 0 otherwise.
<	less than	x<y takes the value 1 if Y exceeds X, and 0 otherwise.
=	equal to	x=y takes the value 1 if X and Y are equal, and 0 otherwise.
<>	not equal to	x<>y takes the value 1 if X and Y are not equal, and 0 if they are equal.
<=	less than or equal to	x<=y takes the value 1 if X does not exceed Y, and 0 otherwise.
>=	greater than or equal to	x>=y takes the value 1 if Y does not exceed X, and 0 otherwise.

These operators can be used when creating new series or scalars. Scalars can be created using the command window. Illustrations are given in Section 1.8.3. New series can be created using the command window or in the dialog box that opens after selecting **Genr** from the workfile toolbar, or **Quick/Generate Series** from the EViews toolbar. Some examples of commands follow.

```
series f_c_exp = (wfood + wcloth)*totexp
```

Creates a series called *F_C_EXP* equal to total expenditure on food and clothing.

```
series totexp2 = totexp^2
```

Creates a series called *TOTEXP2* equal to the square of total expenditure, potentially useful for quadratic functions.

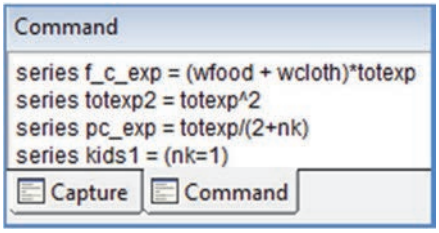
```
series pc_exp = totexp/(2+nk)
```

Creates a series called *PC_EXP* which is equal to per capita household expenditure, assuming all households have 2 adults.

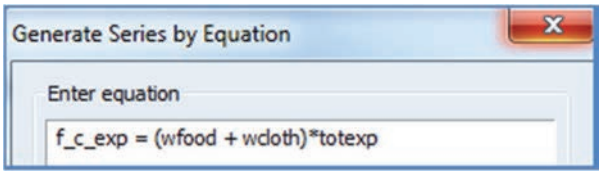
```
series kids1 = (nk=1)
```

Creates a series called *KIDS1* which is equal to 1 for all households who have 1 child, and equal to 0 for other households.

After entering these commands, the command window will appear as:

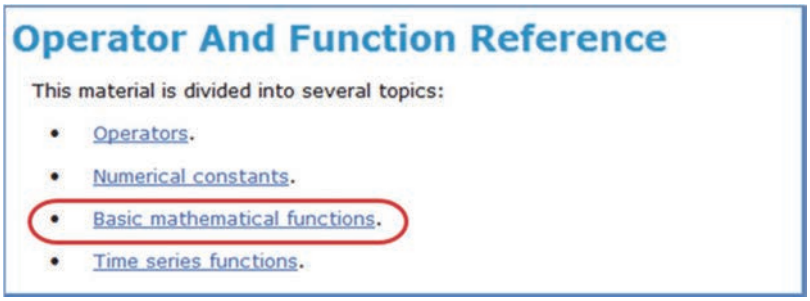


If the **Genr** dialog box is used as an alternative, "**series**" is omitted. For example, for *F_C_EXP*:



1.8.2 Basic math functions

We now investigate some of EViews basic math functions. A complete list can be found from the **Operator and Function Reference**. The table that follows contains a selection of those functions.



Selected Basic Math Functions

Name	Function	Examples/Description
@abs(x), abs(x)	absolute value	@abs(-3)=3.
@exp(x), exp(x)	exponential, e^x	@exp(1)=2.71813.
@fact(x)	factorial, $x!$	@fact(3)=6, @fact(0)=1.
@inv(x)	reciprocal, 1/x	inv(2)=0.5
@mod(x,y)	floating point remainder	returns the remainder of x/y with the same sign as x. If y=0 the result is 0.
@log(x), log(x)	natural logarithm, $\log_e(x)$	@log(2)=0.693..., log(@exp(1))=1.
@round(x)	round to the nearest integer	@round(-97.5)=-98, @round(3.5)=4.
@sqrt(x), sqr(x)	square root	@sqrt(9)=3.

Note how the functions begin with the "**@**" symbol. Common ones like the absolute value (**abs**), the exponential function (**exp**), the natural logarithm (**log**) and the square root (**sqr**) can be used with or without the **@** sign.

The command to create a series *LN_TOTEXP* that is the natural logarithm of total expenditure is

```
series ln_totexp = log(totexp)
```

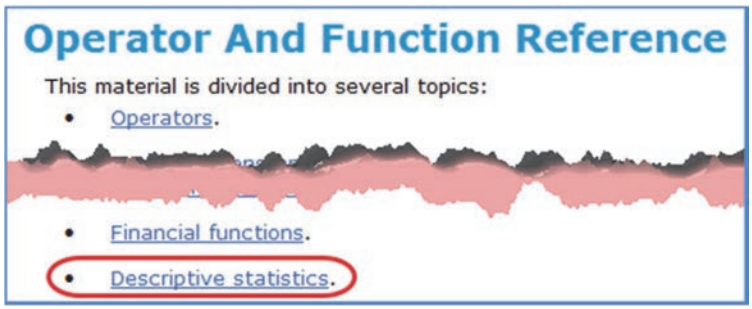
Notice that the series of proportions *WFOOD* and *WCLOTH* are reported to 4 decimal places. Suppose that we want to round off *WFOOD* to 2 decimal places and store the result as *WFOOD2*. We can use the command

```
series wfood2 = @round(wfood*100)/100
```

These commands can also be executed by typing them in the **Genr** dialog box, with **series** omitted.

1.8.3 Descriptive statistics functions

In this section we give examples of EViews functions that can be used to compute descriptive statistics and other scalars from the series in a workfile. A selection of such functions is provided on the next page. A complete list can be found from the **Operator and Function Reference**.



Look at the functions in the table on the next page. You will note that these functions begin with the "**@**" symbol. Also, they return a single number, which is called a **scalar**. In the commands the variables, or series, are called *X* and *Y*. The bracket notation **[,s]** is optional and we will not use it. These functions are used by typing commands into the **Command window** and pressing **Enter**. For example, to compute the sample mean of *TOTEXP* type

```
scalar expbar = @mean(totexp)
```

At the bottom of the EViews screen you will note the message

In the workfile window the new object is denoted with "#" that indicates a scalar.

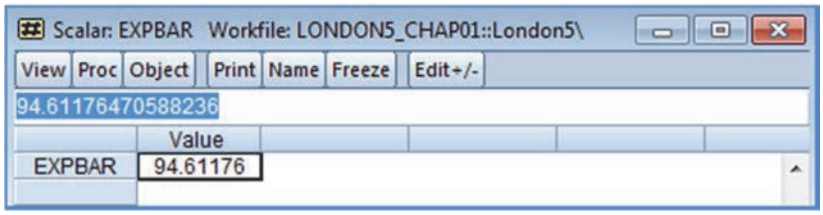
We called the sample mean **expbar** because sample means are often denoted by symbols like $\bar{x}$ which is pronounced "x-bar." We can think of it as "expenditure-bar". In the "text

messaging/ twitter" world in which you live, simple but meaningful names will occur to you naturally.

Selected Descriptive Statistics Functions in EViews 10

Function	Name	Description
@cor(x,y[,s])	correlation	the correlation between X and Y.
@covs(x,y[,s])	sample covariance	the covariance between X and Y (division by n–1).
@inner(x,y[,s])	inner product	the inner product of X and Y.
@kurt(x[,s])	kurtosis	kurtosis of values in X.
@mae(x,y[,s])	mean absolute error	the mean of the absolute value of the difference between X and Y.
@mape(x,y[,s])	mean absolute percentage error	100 multiplied by the mean of the absolute difference between X and Y, divided by Y.
@max(x[,s])	maximum	maximum of the values in X.
@mean(x[,s])	mean	average of the values in X.
@median(x[,s])	median	computes the median of the X (uses the average of middle two observations if the number of observations is even).
@min(x[,s])	minimum	minimum of the values in X.
@prod(x[,s])	product	the product of the elements of X (note this function is prone to numerical overflows).
@obs(x[,s])	number of observations	the number of non-missing observations for X in the current sample.
@rmse(x,y[,s])	root mean square error	the square root of the mean of the squared difference between X and Y.
@skew(x[,s])	skewness	skewness of values in X.
@stdev(x[,s])	standard deviation	square root of the unbiased sample variance (sum-of-squared residuals divided by n–1).
@sum(x[,s])	sum	the sum of X.
@sumsq(x[,s])	sum-of-squares	sum of the squares of X.
@theil(x,y[,s])	Theil inequality coefficient	the root mean square error divided by the sum of the square roots of the means of X squared and Y squared.
@vars(x[,s])	sample variance	sample variance of the values in X (division by n–1).

To view the scalar **expbar** double click on it; a spreadsheet view opens.



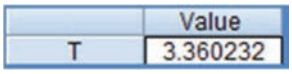
The sample mean of total expenditure is £94.61.

Scalars you have created can be used in further calculations. As an example, we will compute the value of the *t*-statistic for testing whether mean total expenditure is significantly different from £90. This *t*-statistic is given by

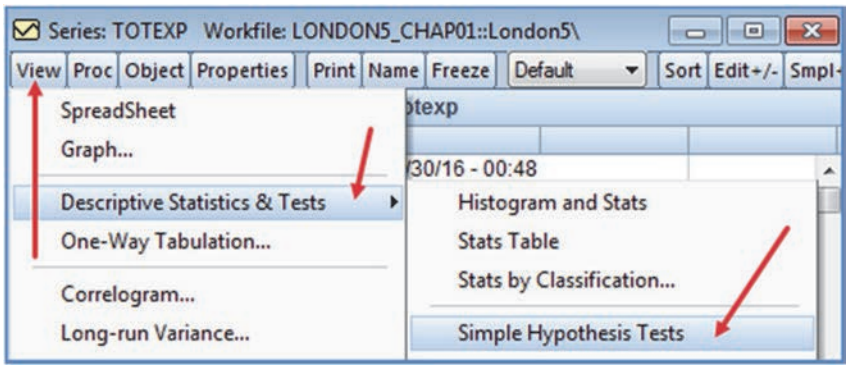
$$t = \frac{\bar{x} - 90}{s/\sqrt{N}}$$

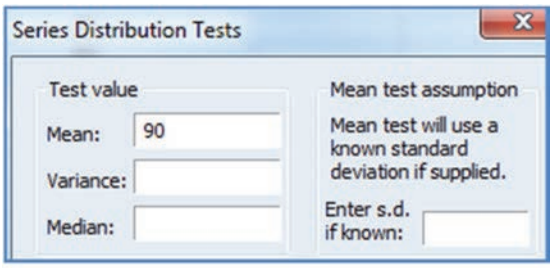
where $\bar{x}$ and s are the sample mean and standard deviation, respectively, for total expenditure, and $N = 850$ is the sample size. An extra two commands to compute *t* are:

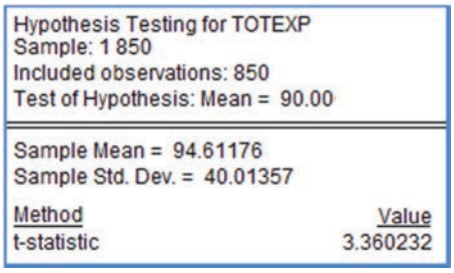
```
scalar expsd = @stdev(totexp)
scalar t = (expbar-90)/(expsd/@sqrt(850))
```



The same value can be obtained using the following EViews automatic "point and click" commands.





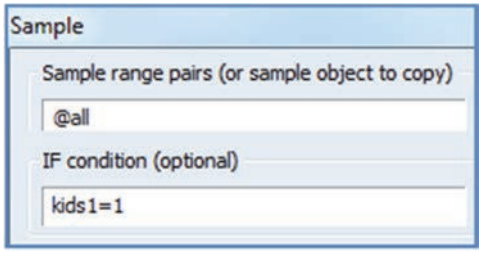


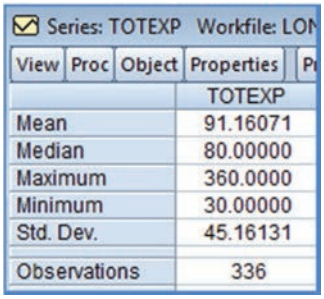
For another example, suppose we wanted the mean and standard deviation of total expenditure for those households with only one child. Go through the following commands carefully and figure out what they are doing.

```
series totexp1=kids1*totexp
scalar n1=@sum(kids1)
scalar xbar1=@sum(totexp1)/n1
scalar sd1=@sqrt((@sumsq(totexp1) - n1*xbar1^2)/(n1-1))
```

	Value		Value		Value
N1	336.0000	XBAR1	91.16071	SD1	45.16131

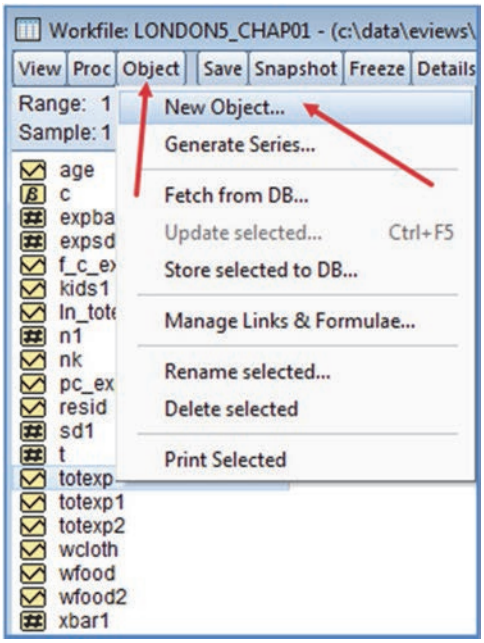
Mastering commands like these is good practice, but it's also good to be aware that these values can be obtained by simply adding an **IF condition** to the **Sample**, and then viewing the descriptive statistics for *TOTEXP*.

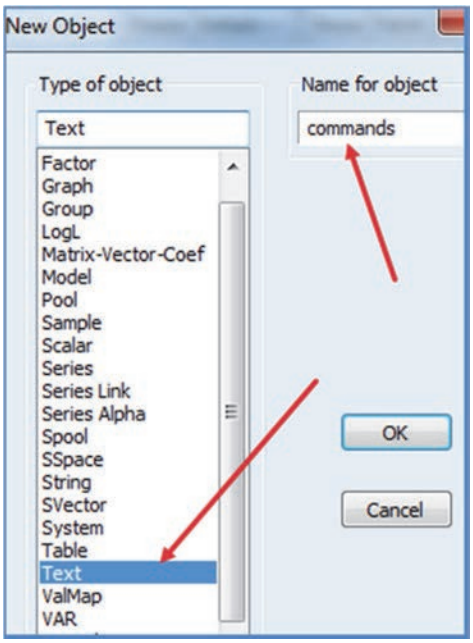




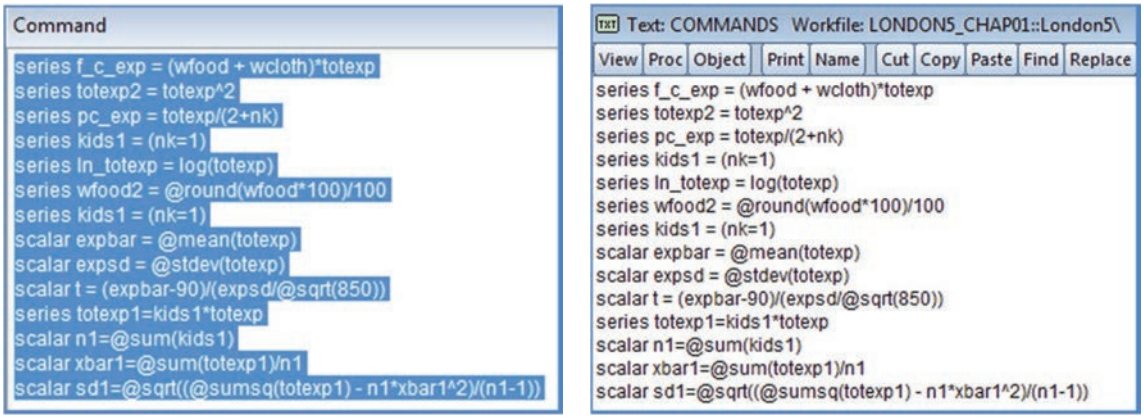
1.8.4 Saving commands in a text object

You have worked hard, and learnt several new functions and commands. It would be nice if you could store those commands and retrieve them later. To do so, go to **Object/New Object/Text**





We are going to store the commands in a text object that we name **commands**. After clicking **OK**, the next step is to highlight the commands in the Command window, and then push **Ctrl+C.** Go to the open text object and push **Ctrl+V**; the commands will then appear in that object.

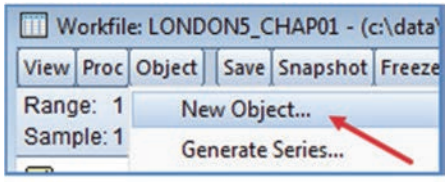


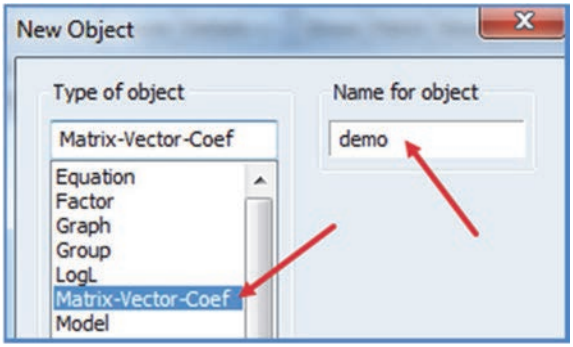
After closing, it will be stored in your workfile as follows. You can open it at a later date.

1.8.5 Using a storage vector

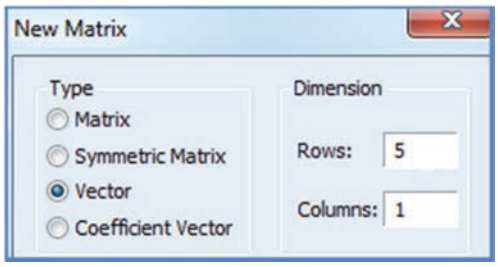
Sometimes it is convenient to store scalars in a vector so that they can be viewed simultaneously, or easily copied as a table into a document. We will create a vector of length five and in it store the means and standard deviations for the food and clothing budget shares, as well as the correlation between these shares.

From the workfile toolbar select **Object/New Object**. In the resulting dialog box select **Matrix-Vector-Coef** and enter an object name, say **demo**. Click **OK**.





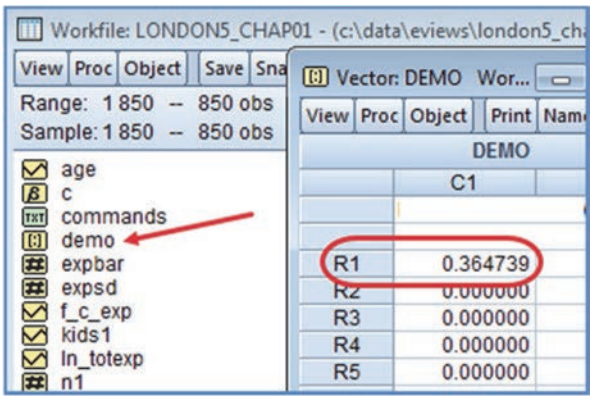
A dialog box will open asking what type of "new matrix" you want. To create a storage vector (an array) with 5 rows select the radio button **Vector**, enter 5 for Rows, and click **OK**.



A spreadsheet will open with rows labeled R1 to R5. Now type into the Command window the command

demo(1) = @mean(wfood)

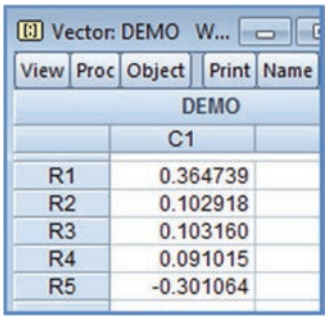
When you press **Enter** the value in row R1 will change to 0.364739, the sample mean of *WFOOD*.



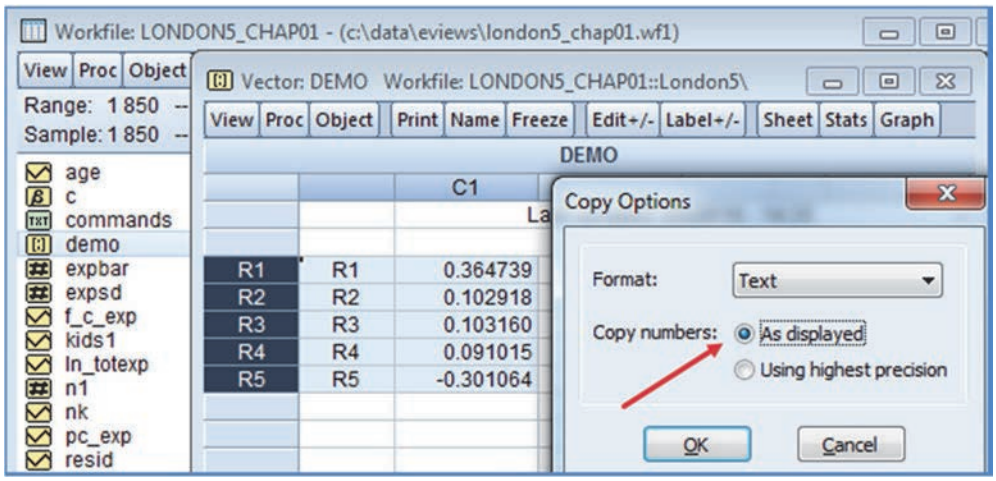
Now enter the series of commands, pressing **Enter** after each.

demo(2)=@mean(wcloth)
demo(3)=@stdev(wfood)
demo(4)=@stdev(wcloth)
demo(5)=@cor(wfood,wcloth)

Each time a command is entered a new item shows in the vector.



An advantage of this approach is that the contents of this table can be copied and pasted into a document for easy presentation. Highlight the contents, enter **Ctrl+C**. Choose the **As displayed** radio button and **OK**.



In an open document enter **Ctrl+V** to paste the table of results.

R1	0.364739
R2	0.102918
R3	0.103160
R4	0.091015
R5	-0.301064

You can now edit as you would any table.

Statistic	Value
$\bar{x}_{WFOOD}$	0.364739
$\bar{x}_{WCLOTH}$	0.102918
s_{WFOOD}	0.103160
s_{WCLOTH}	0.091015
$r_{WFOOD,WCLOTH}$	–0.301064

1.9 CREATING AND MANIPULATING WORKFILES

If you are fortunate enough to have your data in the form of an EViews workfile, then you can simply open that file and proceed with the various commands that we describe in the following chapters. The EViews workfile can be opened by double clicking the icon of the file name, or by selecting the file and, holding the left-mouse button, dragging it to the EViews icon on the desktop.

Suppose, however, that you need to collect your data, and the data are available in another format, such as an Excel file or a text file. How do you create an EViews workfile that contains the required data? We begin to answer this question by exploring how to download data from the Internet into an Excel file; then we examine ways of creating an EViews workfile from an Excel file or a text file.

1.9.1 Obtaining data from the Internet

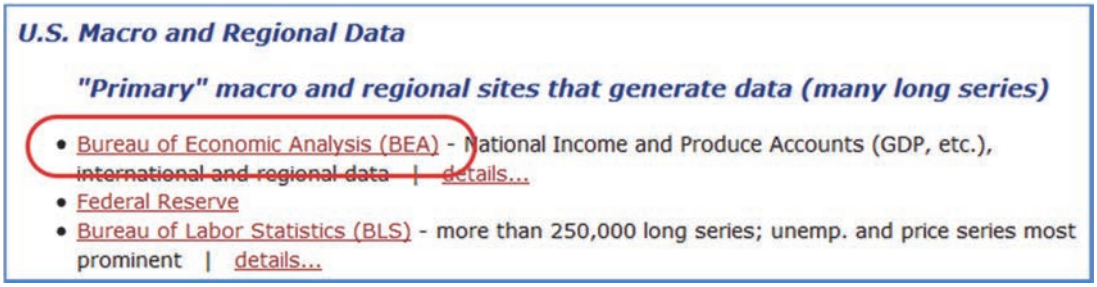
Getting data for economic research is much easier today than it was years ago. Before the Internet, hours would be spent in libraries, looking for and copying data by hand. Now we have access to rich data sources which are a few clicks away.

Suppose you are interested in analyzing the GDP of the United States. As suggested in Chapter 1 of *POE5*, the website **Resources for Economists** contains a wide variety of data, and in particular the macro data we seek. Websites are continually updated and improved. We shall guide you through an example, but be prepared for differences from what we show here.

First, open up the website www.rfe.org

Select the **Data** option; and then select **U.S. Macro and Regional Data**.

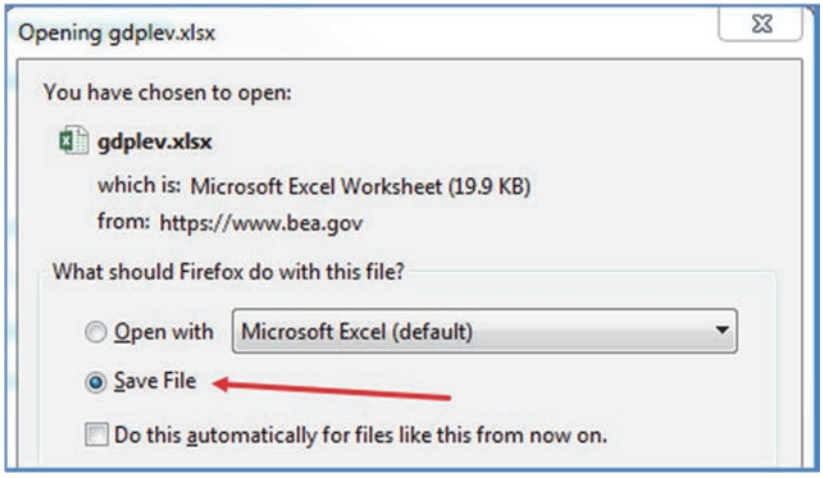
This will open up a range of sub-data categories. For the example considered here, select the **Bureau of Economic Analysis (BEA)-National Income and Produce Accounts** to get data on GDP.



From the screen below, select the **Gross Domestic Product** option.

Most websites allow you to download data conveniently in an Excel format.

Select **Current-dollar and "real" GDP** and a dialog box will open. **Save** the data as ***gdplev.xlsx***.



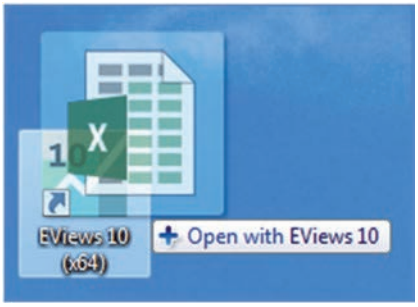
Once the file has been downloaded we can open the file; a sample of the data in Excel format is shown below.

	A	B	C	D	E	F	G
1		Current-Dollar and "Real" Gross Domestic Product					
2							
3		Annual			Quarterly		
4					(Seasonally adjusted annual rates)		
5							
6		GDP in billions of current dollars	GDP in billions of chained 2009 dollars			GDP in billions of current dollars	GDP in billions of chained 2009 dollars
7							
8							
9	1929	104.6	1,056.6		1947Q1	243.1	1,934.5
10	1930	92.2	966.7		1947Q2	246.3	1,932.3
11	1931	77.4	904.8		1947Q3	250.1	1,930.3
12	1932	59.5	788.2		1947Q4	260.3	1,960.7
13	1933	57.2	778.3		1948Q1	266.2	1,989.5
14	1934	66.8	862.2		1948Q2	272.9	2,021.9

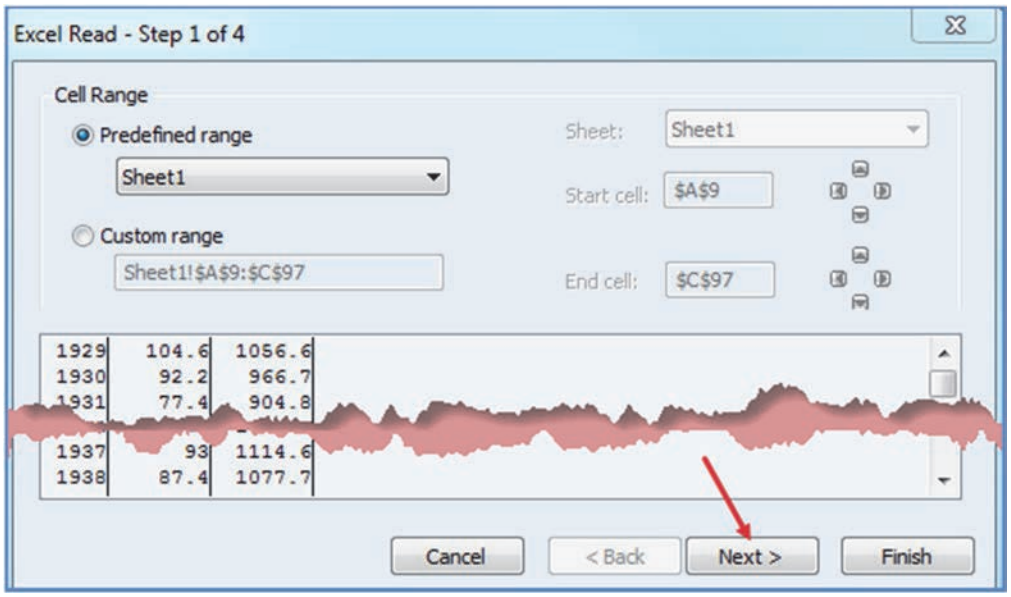
Let us now create the desired EViews file by importing the annual data (1929-2010) for nominal GDP (column B, first observation in cell B9) and real GDP (column C, first observation in cell C9) into an EViews workfile.

1.9.2 Importing an Excel file

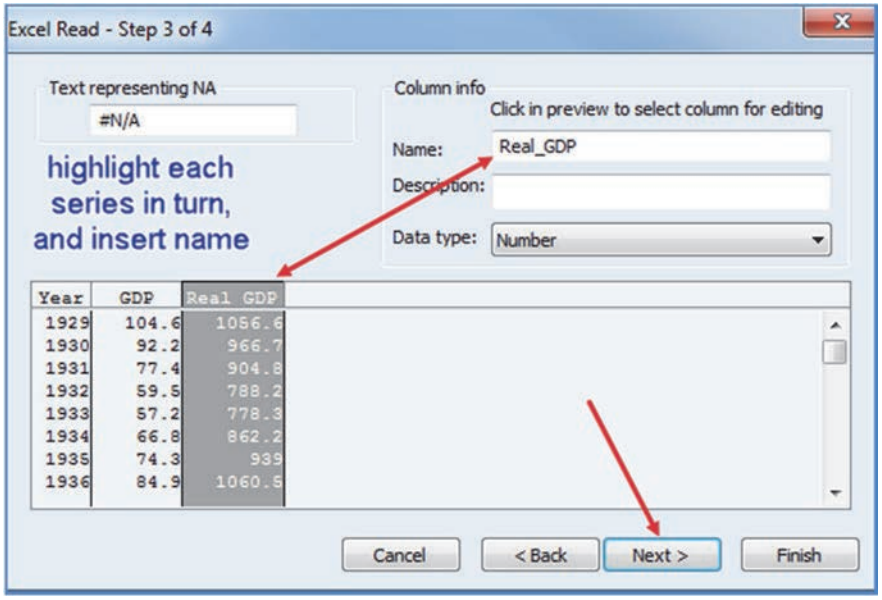
EViews makes it very easy to import data from a variety of formats. Highlight the file to be imported, hold down the left-mouse button, and drag the file icon onto the EViews icon on the desktop.



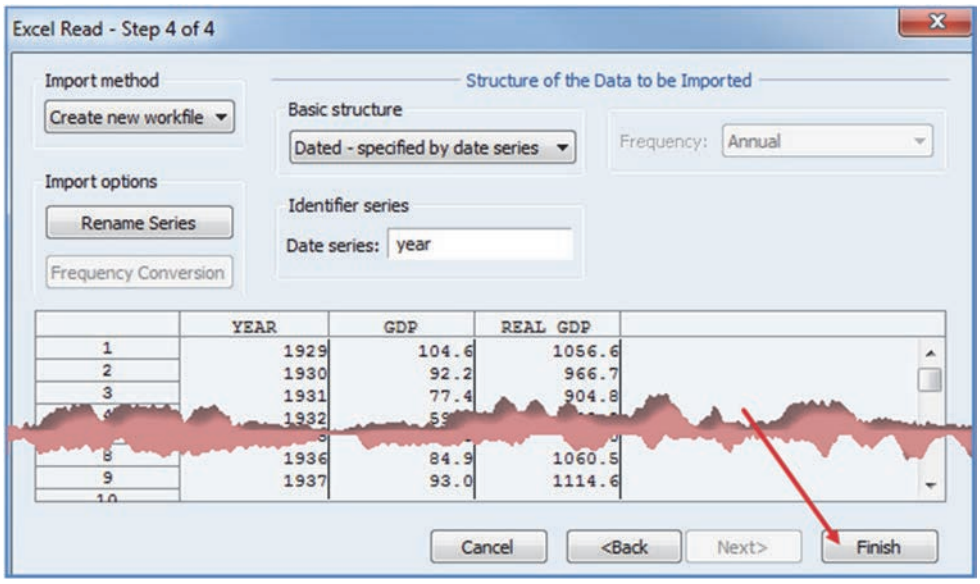
Then there will be a series of confirmatory screens. Usually the default settings are fine, and we just click **Next.** In the screen-shot below we have edited the image, cutting out some of the data lines to make it smaller.



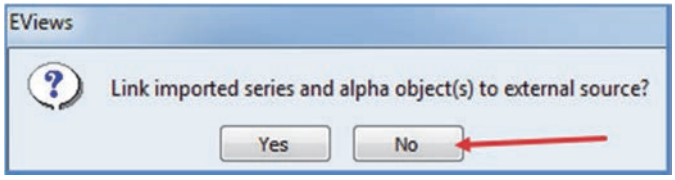
After clicking **Next**, you will reach **Step 2 of 4** where you can edit any headers. In this particular case, no headers appear and so, for step2, you can simply click **Next**. Then, in **Step 3 of 4**, you have an opportunity to give the series names. Highlight each series in turn, and provide a name where indicated. Then click **Next**. If you do not provide a name at this step, EViews will call the series *SERIES01*, *SERIES02* and *SERIES03*. You can then change these names later by right clicking on the series in the workfile or opening the series and selecting **Name**.



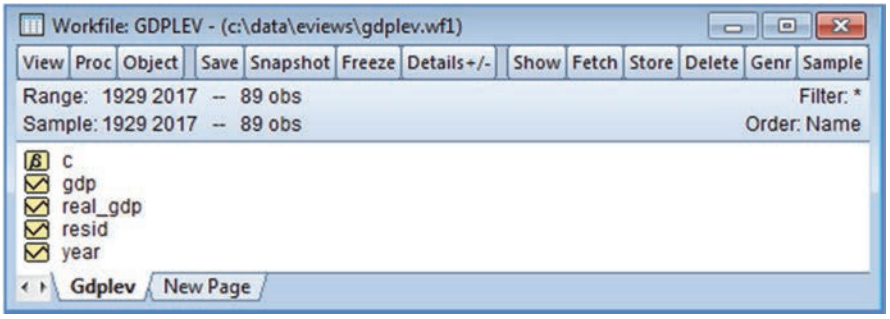
In Step 4 we can define the basic structure of the workfile – see Section 1.2.1 for a description of different workfile structures. In this case EViews has recognized that the data are annual time-series with dates specified by the series *YEAR*; and so we can simply click **Finish**.



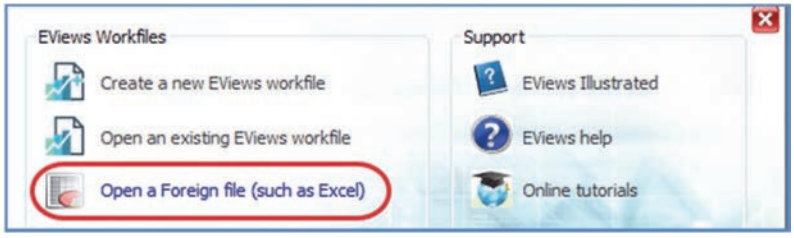
You will be asked whether to link the series to the external source. Select **No**.



Your EViews workfile is ready to use.

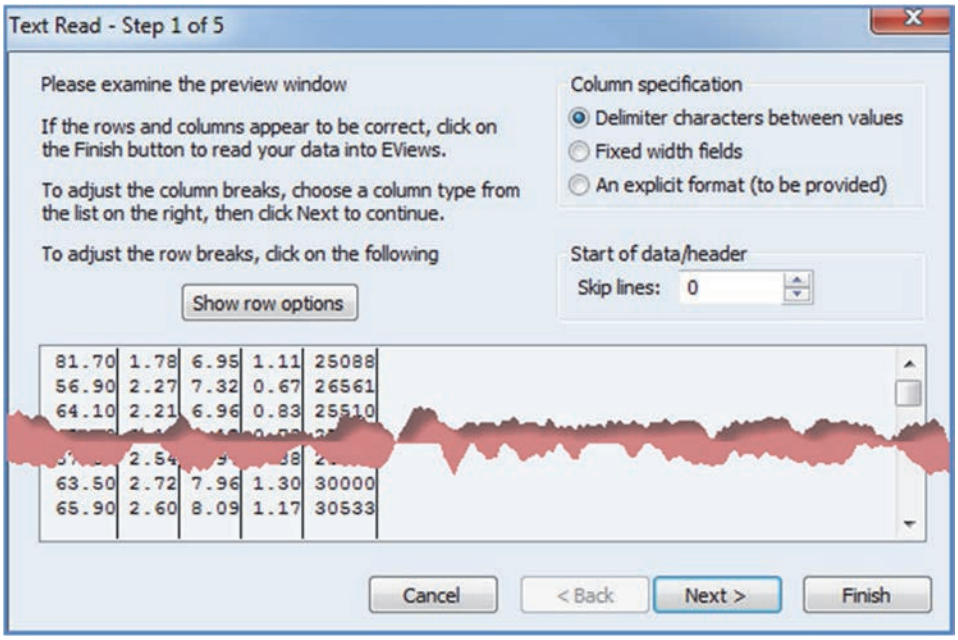


As we have seen, dragging the Excel file onto the EViews10 icon is one way to import the data from Excel into an EViews workfile. Another way is to open EViews, and select Open a Foreign file (such as Excel) from the start-up window. You will then be prompted by the same sequence of steps that we have just described.



1.9.3 Importing other foreign files

EViews has the capacity to import data from several different software formats. If your data come in a different format, experiment. Drag your file onto the EViews 10 icon and then see what happens. You will be prompted with a sequence of steps like those we described for an Excel file. For example, consider the text file ***beer.dat***. It can be downloaded from www.principlesofeconometrics.com/poe5/poe5dat.html. After dragging it onto the EViews 10 icon the following window appears.



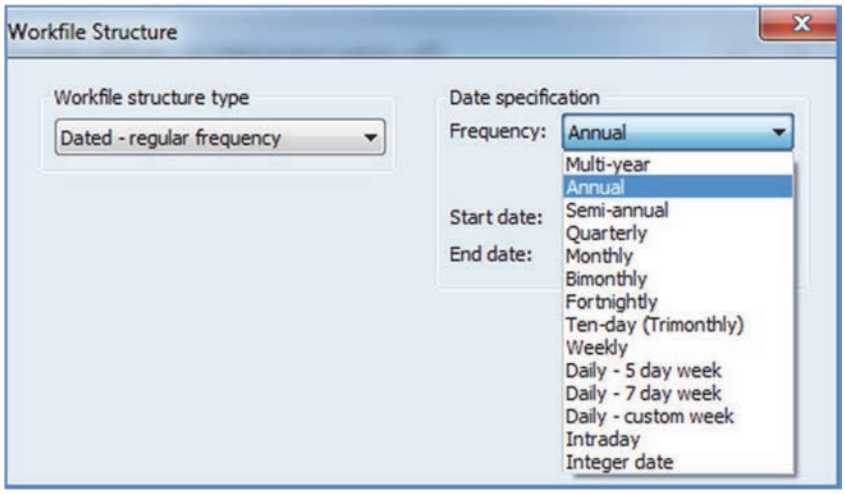
EViews will try to figure out how your data are set up in the text file. If the preview in this window suggests that it has done so correctly, you can click **Finish** and later name the series. Or, you can choose **Next**, and name the series when you get to the relevant step. If the previewed data are not set up correctly, you can use the Step 1 window to give EViews a more explicit description of the data format in the text file. Then, proceed through the remainder of the steps using them where necessary.

1.9.4 Frequency conversions

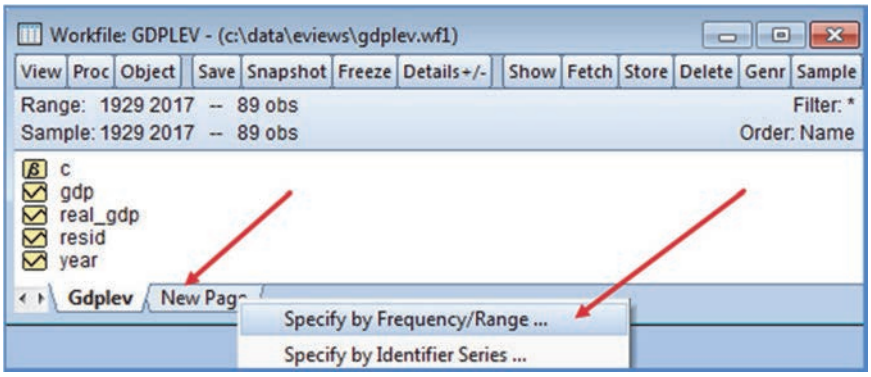
EViews offers a range of frequencies – annual, quarterly, monthly and so on. Examples of data conventions include:

- Annual: specify the year; for example, 1981, or 2007.
- Quarterly: the year, followed by a number or the quarter. Examples: 2007:3, 2007Q3.
- Monthly: the year, followed by a number or the month. Examples: 1956:11, 1956M11.
- Weekly and daily: by default, you should specify these dates as Month/Day/Year. Thus, August 15, 2007 is 8/15/2007.

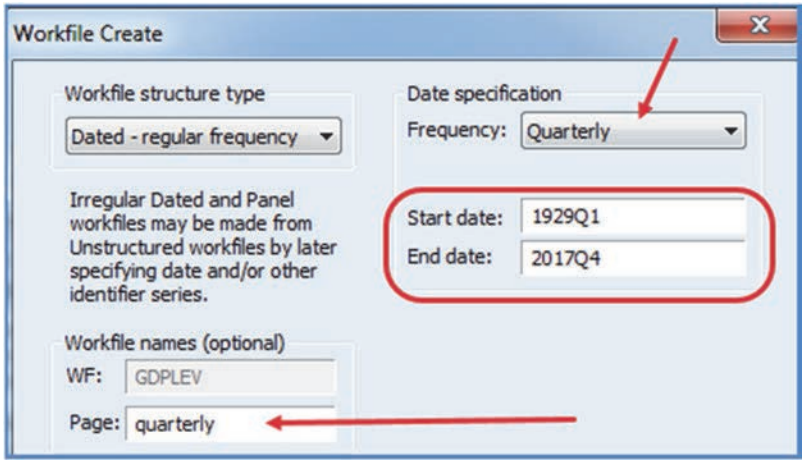
These and other possible frequencies can be found in the **Dated – regular frequency Workfile Structure**.



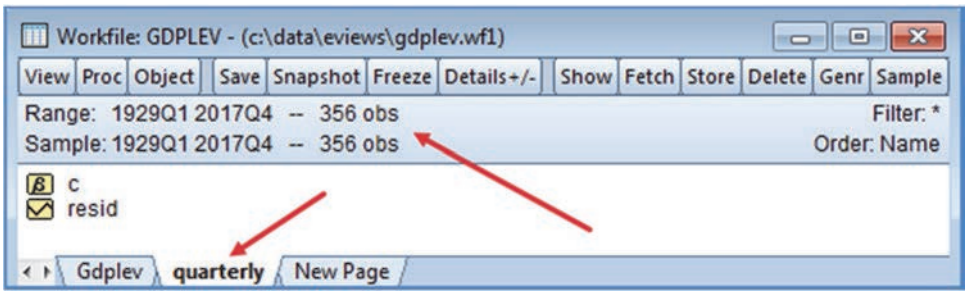
EViews also offers an easy way to convert from one frequency to another. Suppose we are interested in converting the annual data on GDP to their quarterly equivalents. To do so, first click on **New Page** and select **Specify by Frequency/Range**.



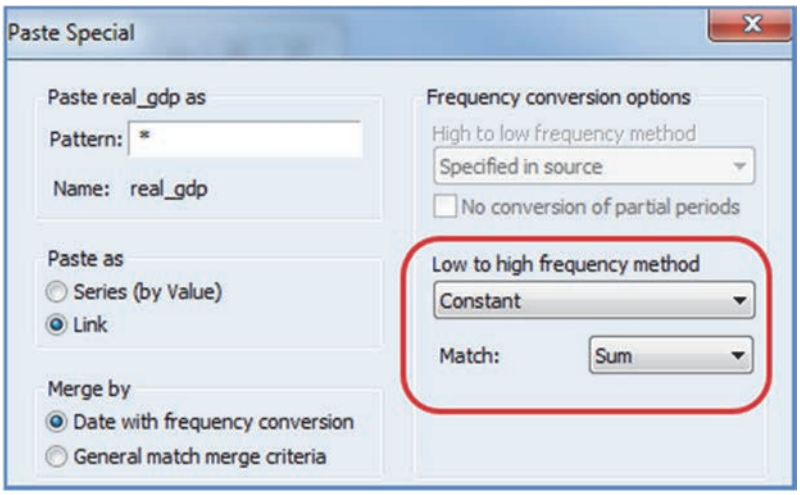
Specify the range of the quarterly data as shown, and name the page **quarterly**.



Click **OK.** The following page will open.



To transfer data from one frequency to another, highlight the variable on the page with the annual frequency (say *REAL_GDP*), then **right click** on that variable and drag it to the name of the page set up for quarterly data. The screen below will open.



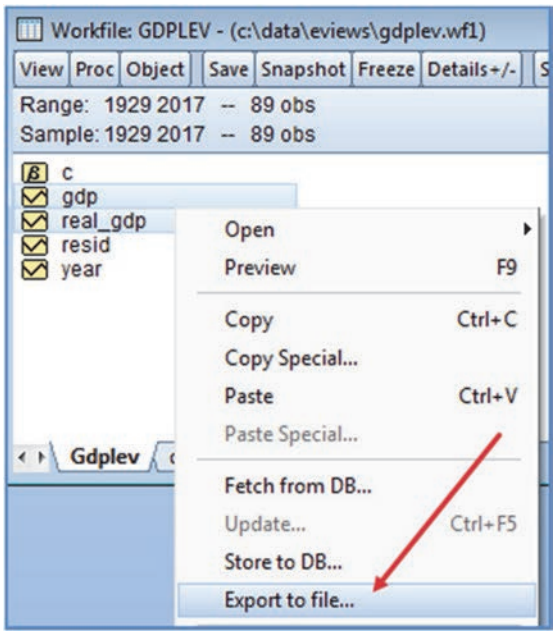
We are converting from a low to a high frequency and, in this example, we are selecting the **constant sum match** option. Clicking **OK** will create the new variable. For comparison, open the two series and you will note that the quarterly data is one-fourth of the annual.

	Real_GDP
1929Q1	264.1
1929Q2	264.1
1929Q3	264.1
1929Q4	264.1
1930Q1	241.7
1930Q2	241.7
1930Q3	241.7
1930Q4	241.7

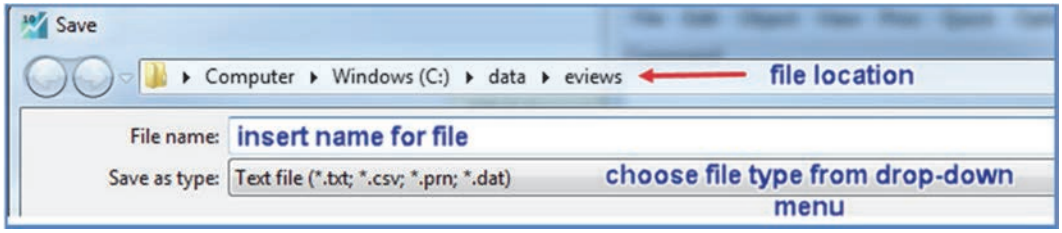
	Real_GDP
1929	1056.6
1930	966.7
1931	904.8

1.9.5 Exporting data from EViews

There may be times when you would like to export data from an EViews workfile. To illustrate, let us work with ***gdplev.wf1*** and export the two series *GDP* and *REAL_GDP*. To do so, highlight the two series, right click and choose **Export to file**.



The following window will open, enabling you to choose, a file type, a file name, and a location for the file.



POE5_PROGRAMS

In Section 1.4 we described how to use commands as an alternative to point-and-click menu items for issuing instructions to EViews. An EViews program is a collection of commands that are stored in a separate file with file extension ***.prg***. At the end of each chapter we provide programs with the commands necessary to produce the results of that chapter. These programs can be downloaded from the website

principlesofeconometrics.com/poe5/poe5.html

Instructions for running an EViews program are provided in Chapters 3.6 and 5.11.

POE5_CHAP01_UTOWN.PRG

The following commands can be used to reproduce the outcomes described for the file ***utown.wf1*** in Section 1.3. We assume that the file ***utown.wf1*** is stored in the EViews default directory.

```
'poe5_chap01_utown.prg
'program for Principles of Econometrics, 5e (2018) Wiley
'authored by R. Carter Hill, William E. Griffiths and Guay C. Llm
```

```
'program for instructions in Section 1.3
wfopen utown.wf1                                    'open worfile
wfdetails                                           'display details of workfile objects
wfdir                                               'return to workfile directory
price.sheet                                         'view spreadsheet for price
price.hist                                          'view histogram and statistics for price
group house_data price sqft age                     'create a group called house_data containing the
                                                    series that follow
freeze(house_data_summary) house_data.stats(i)      'create a table called house_data_summary
                                                    that contains the summary statistics for the
                                                    series in the group house_data
smpl 1 1000 if pool=1                               'change sample to observations with a pool
freeze(price_pool) price.hist                       'create a graph called price_pool with a histogram
                                                    for prices for houses with a pool
smpl 1 1000                                         'return to original sample
series ln_price=log(price)                          'create a series equal to the log of price
wfsave(2) utown_chap01.wf1                          'save file
```

Notice how the command **freeze** is used to save an object in the workfile. For example, summary statistics for the group **house_data,** and the histogram for prices of houses with a pool, have been saved. Commands such as **price.sheet** and **price.hist** will not save the resulting output unless they are used in conjunction with a **freeze** command. Since output from the **preview** command is not saved, it makes more sense to use **preview** in the **Command** window than in a program. In the **Command** window the **preview** commands can be written as follows.

```
preview price
preview utown
preview house_data
```

POE5_CHAP01_OZCONFN.PRG

The following program reproduces the results in Sections 1.5 and 1.6, using the workfile ***ozconfn.wf1***. We assume that the file ***ozconfn.wf1*** is stored in the EViews default directory.

```
'poe5_chap01_ozconfn.prg
'program for Principles of Econometrics, 5e (2018) Wiley
'authored by R. Carter Hill, William E. Griffiths and Guay C. Lim

'program for instructions in Sections 1.5 and 1.6
wfopen ozconfn.wf1                          'opens file with observations
freeze(cons_graph) cons.line                'graphs cons, saving it as cons_graph
smpl 2000q1 2010q4                          'changes the sample observations
freeze(cons_graph2) cons.line               'graphs cons for subset of observations
smpl @all                                   'returns sample to all observations
group vars cons inc                 'creates a group called vars for plotting both series in the group
freeze(cons_inc) vars.line(m)       'plots both series in var on separate graphs, saved as cons_inc
freeze(scatter) vars.scat                   'plots series in vars as a scatter diagram, saved as scatter
series dinc = d(inc)                        'creates the first difference of inc
show vars 100*dinc/inc(-1) cpi              'displays the new group in Section 1.6.3
group new_group vars 100*dinc/inc(-1) cpi       'saves and names the new group
show cons_graph scatter                     'displays the two graphs in Section 1.6.3, not saved
```

```
freeze(graph1_6_4) vars.line      'plots both series in var on the same graph, saved as graph1_6_4
inc.hist                          'displays histogram for inc, not saved
group grp1_6_7 cons inc dinc      'creates a group for getting correlations, Section 1.6.7
freeze(cor1_6_7) grp1_6_7.corr    'creates a table with the correlations in Section 1.6.7, saved
                                   as cor1_6_7
freeze(cpi_change) d(cpi).line    'graphs the first difference of cpi, saved as cpi_change
wfsave(2) ozconfn_chap01.wf1      'saves the file
```

POE5_CHAP01_LONDON5.PRG

This program collects together all the commands used in Section 1.7 to illustrate functions and basic arithmetic operations. The workfile used for the illustration is ***london5.wf1***. Except for the command to create a vector, all the commands are explained in the body of the chapter. We assume that the file ***london5.wf1*** is stored in the EViews default directory.

```
'poe5_chap01_london5.prg
'program for Principles of Econometrics, 5e (2018) Wiley
'authored by R. Carter Hill, William E. Griffiths and Guay C. Lim

'program for instructions in Section 1.7
wfopen london5.wf1
wfsave(2) london5_chap01.wf1
series f_c_exp = (wfood + wcloth)*totexp
series totexp2 = totexp^2
series pc_exp = totexp/(2+nk)
series kids1 = (nk=1)
series ln_totexp = log(totexp)
series wfood2 = @round(wfood*100)/100
scalar expbar = @mean(totexp)
scalar expsd = @stdev(totexp)
scalar t = (expbar-90)/(expsd/@sqrt(850))
series totexp1=kids1*totexp
scalar n1=@sum(kids1)
scalar xbar1=@sum(totexp1)/n1
scalar sd1=@sqrt((@sumsq(totexp1) - n1*xbar1^2)/(n1-1))
vector(5) demo                                    'creates a vector of length 5 called demo
demo(1) = @mean(wfood)
demo(2)=@mean(wcloth)
demo(3)=@stdev(wfood)
demo(4)=@stdev(wcloth)
demo(5)=@cor(wfood,wcloth)
wfsave(2) london5_chap01.wf1
```