EViews® 10

Getting Started

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Getting Started

Congratulations on your purchase of EViews 10, the premier forecasting and analysis package for Windows-based computers. This guide will lead you step-by-step through the installation and registration procedure for EViews.

(The following discussion describes the installation and registration process for single user copies of EViews and seat licenses purchased under a Volume License Program. Setting up machines to use concurrent use licenses will require a different procedure; for details, please check with your IT support department.)

Installing EViews

32-bit or 64-bit?

Before installing, you should decide whether you wish to install 32-bit EViews, 64-bit EViews, or both.

EViews 10 is available in both 32-bit and 64-bit versions. If you are using 64-bit Windows, you have the option of installing the 64-bit version of EViews in addition to the 32-bit version. Your EViews serial number allows you to have both versions installed on the same 64-bit machine.

Using 64-bit EViews allows you to create and use workfiles that are much larger in size than before. Workfiles can now contain up to 120 million observations and the number of objects is only limited by the amount of memory you have available details). However, if you plan on sharing these workfiles with others, they will need to have 64-bit EViews installed in order to open your workfile.

Installing

To begin installation, simply click on the "EViews10Installer.exe" or "EViews10Installer(64-bit).exe" executable program file.

- First, you will be prompted to read and accept the License Agreement, and to designate a directory into which you wish to install your copy of EViews. If you wish to change the default installation directory, click on **Browse** and navigate to the desired directory. Click on **Next** to continue.

- Next, you will be asked to enter a name and serial number. You should have been provided with a 24-character serial number as part of your purchase. Those of you who have obtained your copy of EViews as part of a Volume License agreement should

obtain a serial number from your license administrator. Enter the serial number and your name as you wish it to appear in your copy of EViews, and click on **Next**.

- Select the components you wish to install and click on **Next**.

- Lastly, you will be asked about setting up a Start Menu folder containing shortcuts to the EViews example files folder and the EViews program executable. Clicking on **Next** starts the actual installation of files onto your computer.

You should note that as part of the installation procedure, EViews will prompt you to register files with the extensions ".WF1", ".PRG", ".EDB", ".AIPZ", and ".UIPZ". If these extensions are already registered, possibly by an earlier version of EViews, you will be prompted to allow EViews 10 to override the existing registration. Registering the extensions is not required, but doing so will allow you to double-click on files with these extensions to launch EViews.

Once the installation procedure is completed, click on **Finish**. If you have elected to create an EViews shortcut, the EViews Start Menu folder will open. To launch EViews, double-click on the EViews 10 icon. Subsequently, you may launch EViews using the shortcut on your desktop or by selecting EViews from the Start Menu shortcuts, if present, by double-clicking on EViews registered file types, or by navigating to the EViews installation directory and double-clicking on the EViews icon.

Registering EViews

What is Registration?

To use EViews 10 on a specific computer, you must first register the program using the serial number obtained with your purchase or obtained from your license administrator. EViews registration is the one-time process of assigning a serial number to a specific machine, sending a unique machine ID number to IHS Global Inc., and writing some information to your Windows registry or Mac application support directory. This is a simple process that can be performed in a few seconds.

The first time EViews is run on a new machine, you will be prompted to register your copy for that machine. On a Windows machine, you may choose to do so immediately, or you can put off registration to a later date, but you must register the copy within 30 days of installation. If you delay registration, you will be prompted to register the copy every time you launch EViews. After 30 days, an unregistered copy of EViews will no longer run.

The EViews single user and standalone licenses allow for a single individual to have exclusive use of copies of EViews residing on multiple machines, or for multiple users to have exclusive access to a copy of EViews residing on a single machine. For example, a single user may install and register EViews on his or her office computer, home computer and a laptop com-

puter, provided that the use of EViews is exclusive. Note, specifically, that the license terms do not allow two users to share copies of the same license of EViews residing on two machines.

To facilitate the legitimate use of EViews on multiple machines, we allow each EViews single user serial number (one beginning with "10A" or "10B") or standalone serial number (one beginning with "10S") to be used in registering up to three machines.

Under the terms of the EViews Volume License agreement, "10C" (volume) license serial numbers may not be used to register multiple machines. Each volume licensed machine running EViews must be assigned a distinct serial number. Thus, licensing an office computer, home computer and laptop computer of a single user will require three distinct Volume License serial numbers.

Once registered on a given machine, EViews will run indefinitely.

The copy of EViews may be uninstalled and reinstalled on a registered machine, updated, or moved to a different directory without reregistering the copy for that machine. In the special case where a machine's hard disk is wiped clean, but no other changes are made to the system, you may simply reregister your copy of EViews. Note that in this circumstance, reregistration on the machine will *not* count as an additional registration.

If an entire machine or a machine's hard disk is replaced, you should contact our office to unregister your previous installation prior to reregistering.

How Do I Register?

Before starting the registration process, you should first locate your EViews serial number. You most likely will need to enter this number into EViews during the registration procedure.

If the copy of EViews is not registered, EViews will display a warning dialog. The dialog will inform you that EViews is not registered for this machine and, *if applicable,* will indicate the number of additional days the unregistered copy will continue to run.

On a Windows machine, if the copy of EViews is not registered, EViews will display a warning dialog. The dialog will inform you that EViews is not registered for this machine and, *if applicable,* will indicate the number of additional days the unregistered copy will continue to run.

You may choose to register in one of two ways: you may use the EViews auto registration features (by clicking on **Auto Registration...**), or you can manually register (by clicking on **Manual Registration...**). Selecting either of the these two options will open a dialog prompting you for additional information.

(To delay software registration click on the **I will register later** button. If you select this option and the grace period has not expired, EViews will close the dialog and will operate in the usual fashion. In this way you can use your unregistered copy of EViews as though it were fully registered. If, however, the grace period has expired, your copy of EViews will not run until registered.)
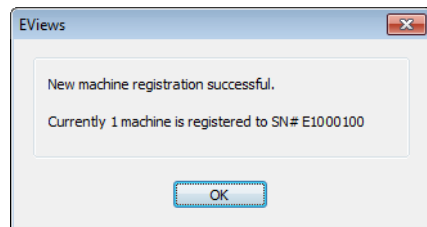
Auto Registration

If your computer is connected to the Internet, auto registration makes registering EViews a snap. Simply click on the **Auto Registration...** button to display a dialog for entering your registration information.

EViews will fill out as many fields in this dialog as possible. If you wish to continue with the auto registration process, make sure that the entries in the **Serial #** and **Name** fields are filled in with the relevant information. When you click on the **Register now** button, EViews will attempt to contact one of our registration servers and, if successful, will transmit the information contained in the dialog to the server. The server will process the information and the machine will be registered to run EViews.

You should see a message indicating that registration was completed successfully, along with the number of machines that have been registered to the serial number.

If you do not wish to continue with auto registration, click on the **Exit without registering** button and you will be returned to the main registration screen.

Note that there are some circumstances in which auto registration will fail. Obviously, auto registration will not work if the computer is not connected to the Internet. If registration fails, you should first verify that you have Internet access. Second, your computer may be behind a firewall which does not allow the required communication between your computer and our servers. Furthermore, while unlikely, it is possible that all of our registration servers are temporarily unresponsive.

If you continue to have problems with auto registration, you can choose to register manually as described in the next section, or you can contact us for assistance.

Manual Registration

If auto registration fails or if you prefer not to use the automatic registration features, you may elect to register manually. From the main registration page, click on **Manual Registration...** to display the manual registration portion of the dialog:

You must fill in the three fields in the dialog: the 2-character serial number, your name, and a 36-character registration key you must first obtain via web browser, phone, or email. EViews will help you by filling in as many fields as possible.

The easiest method of retrieving the registration key is via web browser. If you have access to an Internet connected browser, navigate to

http://www.eviews.com/register/

which will direct you to our registration servers. Follow the links to the registration page, and fill in the form. Enter your name, serial number, and the machine ID number as displayed in this registration dialog into the form. Click on the **Submit the form** button. You will be provided with the 36-character registration key.

Once you have obtained the key, return to the registration dialog in EViews. If necessary, select **Help/EViews Registration...** from the EViews main menu to display the registration page.

Make certain that you have entered your name and serial number *exactly* as provided when you obtained the registration key, and enter the key in the registration key box. Click **OK** to finish the registration process. Note that you should be able to copy-and-paste the registration key information from your browser into the dialog edit fields.

If all of the information is entered correctly, you will be informed that your registration is complete.

If you do not have access to a working web browser, you can contact our office via email, phone, or standard post to obtain the key:

> IHS Global Inc.
> Attn: Registration
> 4521 Campus Drive, #336
> Irvine, CA 92612
> Email: register@eviews.com
> Phone: 949-856-3368

Please provide a registration name, full 24-character serial number, and the machine ID number. We will then provide you with the 36-character registration key.

If you receive the key via email, you should be able to copy-and-paste the key information into the dialog edit fields.

Contact Information

Once registration is completed, EViews will display an optional contact page form. You may submit this form to send name, address, phone number, and email information to IHS Global Inc. This information is for our records only and will not be redistributed to others.

Frequently Asked Questions about Registration

While the registration procedure should be straightforward, we understand that you may still have questions. The following are answers to the most frequently asked questions:

- *How do I find my serial number and other information about my copy of EViews?*

  Your copy of EViews contains information about your registration status, as well as the product version and build date of the program. To obtain this information, simply select **Help/About EViews** from the main EViews menu.

- *I contacted you and received a key, but the key doesn't seem to work. What could be wrong?*

  The most common registration problem results from entering a name or serial number which does not match the key. You should make certain that the name and serial number both match those provided when obtaining a key. Note that while the name is not case-sensitive, it should otherwise be entered *exactly* as originally provided. If you still experience problems, do not hesitate to contact our office.

- *My copy of EViews does not appear to have the features for the edition that I purchased. Do you have to send me a new CD-ROM?*

No. Simply contact our office. Once we verify the edition of EViews that you have purchased, you should be able to reregister and upgrade your copy to enable the features.

- *I've replaced my computers and no longer have available registrations. What should I do?*

  If there are special circumstances where you need to register an additional machine, please contact our office.

- *How do I change the name in which my copy is registered?*

  Your copy of EViews contains the name in which it was first registered. If you wish to change the registration name, please contact our office.

- *What if I have trouble registering?*

  We do not anticipate that you will have problems registering your copy of EViews using one of the available methods (auto-registration, manual using our web servers, or manual using email or phone). Please feel free to contact our office if you encounter difficulties.

Updating Your Copy of EViews

EViews 10 offers an automatic updating feature that can check for new updates every day, and install an updated version if available. (The automatic update feature can be enabled or disabled from the **Options/EViews Auto-Update from Web** menu item.)

Alternately, you may manually check for updates from within EViews at any time by selecting **Check now...** under the **EViews Auto-Update from Web** menu item, or by selecting **EViews Update** from the **Help** menu.
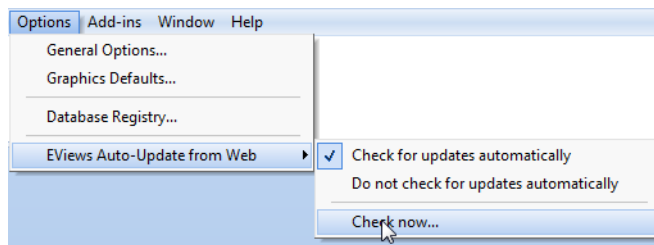
You may also visit the EViews website to check for updates to the EViews program and other components (documentation, sample data, and sample programs). Use your browser to go to:

> http://www.eviews.com

and navigate to the downloads area. Downloading updates *will not* require re-registration of EViews on any previously registered computer. Simply download the update, run the installer, and you will have the latest shipping copy of your software.

Where to Go For Help

Your EViews installation includes documentation in the form of an interactive Help System and PDF versions of the manuals. You may also access the EViews documentation online at

http://www.eviews.com/help/helpintro.html

User-provided online support is available via the EViews Forum.

The Help System

All of the EViews documentation may be viewed from within EViews using the help system. To access the EViews help system, go to the main menu and select **Help/EViews Help Topics...** or click on **Help/Quick Help Reference** and select a topic to jump directly to relevant subsections.

The EViews Manuals (PDF Files)

Your EViews installation includes copies of the EViews manuals in Adobe Portable Document Format (.PDF) file format.

If you elected to include the electronic versions of the manuals in your EViews installation, you may access the PDF files from within EViews by clicking on **Help** in the main EViews menu and selecting the file of interest. Alternately, you may navigate to the "Docs" subdirectory of your EViews installation directory to access the files directly.

Tutorials

To get you started, we have provided a set of PowerPoint tutorials illustrating the basics of EViews. These tutorials are a great way of seeing EViews in action.

http://www.eviews.com/Learning/index.html

The EViews Forum

To supplement the information provided in the manuals and the help system, we encourage you to visit the EViews Online Forum, where you can find answers to common questions about installing, using, and getting the most out of EViews. The EViews Forum is an ideal place to ask questions of and share information with other EViews users.

The forum address is:

http://forums.eviews.com

New Features in EViews 10

EViews 10 features a wide range of exciting changes and improvements. The following is an overview of the most important new features in Version 10.

Note that in some cases, entries will appear in more than one section as they might otherwise be overlooked by those who may find them of interest.

General EViews Interface

- Automatic and user-controlled workfile histories and backup ("Workfile Backup Snapshots," on page 11).

- Enhanced logging and message windows ("Enhanced Logging Abilities," on page 13).

- Live statistics display for data in the spreadsheet view ("Live Statistics Display," on page 14).

- Support for 300-character object names ("Long Object Names," on page 17).

- Improved R connectivity ("Improved R Connectivity," on page 17).

Data Handling

- Improved support for reading and writing R data ("Improved R Data Support," on page 19).

- Custom attribute import and export ("Attribute Import and Export," on page 21).

- Direct access to online SDMX databases for Eurostat, ECB, and U.N. data ("Eurostat, ECB, UN, and IMF," on page 366).

- Import SDMX-ML format data files ("SDMX-ML Files," on page 26).

- Direct access to online World Bank data ("World Bank Data," on page 28).

- Export data in Tableau and JSON formats ("Exporting Data in Tableau and JSON Formats" on page 30).

- STL and MoveReg Seasonal Adjustment Methods ("STL Decomposition and MoveReg Seasonal Adjustment" on page 63).

Graphs and Tables

- Bubble plots ("Bubble plots" on page 30).

- Series updating in graphs ("Updating Series in Graph Objects" on page 33).

- Interactive observation annotation ("Interactive Observation Annotation" on page 37).

- Text annotation of graph views ("Graph View Text Annotation" on page 35).

- New graph templates and settings ("New Graph Settings" on page 38).

- Table row sorting ("Table Row Sorting" on page 41).

Econometrics and Statistics

Estimation

- Smooth Threshold Regression Estimation ("Smooth Threshold Regression Estimation" on page 43).

- Bias Corrected Heteroskedasticity-Consistent Covariances ("Finite-Sample Adjusted Heteroskedasticity-Consistent Covariances" on page 46).

- Cluster Robust Covariance Estimation ("Cluster-Robust Covariances" on page 47).

- Estimation of VARs with Linear Restrictions ("VARs with Linear Restrictions" on page 49).

- Enhanced Structural VAR Estimation ("SVAR Specification and Estimation" on page 51).

Testing and Diagnostics

- New Linearity and Constancy Testing ("Linearity and Constancy Tests" on page 54).

- VAR Tools for Structural Residuals ("VAR Tools for Structural Residuals" on page 57).

- Improved VAR Serial Correlation Testing ("Improved VAR Serial Correlation Testing" on page 58).

- VAR Historical and Improved Variance Decomposition ("VAR Historical and Variance Decomposition" on page 59.

Computation

- Nonlinear Equation Dynamic Forecasting Simulation ("Nonlinear Dynamic Forecasting Simulation" on page 62).

- STL and MoveReg Seasonal Adjustment Methods ("STL Decomposition and MoveReg Seasonal Adjustment" on page 63).

- Model Solution Variable Bounds Checking ("Model Bounds Checking" on page 65).

- Improved Distribution Function and Special Function Calculations ("Improved Distribution Function and Special Function Calculations" on page 66).

Other Features

- New functions for use in series generation ("Series Generating Functions" on page 67).

- Added matrix language tools ("Matrix Functions" on page 69).

- New programming support functions ("Programming Support Functions," on page 70).

- New object data members ("Object Data Members," on page 70).

- List of new or updated global commands ("Updated Command List" on page 71).

- List of new or updated object commands ("Updated Object List" on page 72).

EViews 10 Compatibility Notes

- Compatibility notes for users of EViews 10 ("EViews 10 Compatibility Notes" on page 74).

General EViews Interface

EViews 10 offers important interface improvements, highlighted by a new, full-featured snapshot backup system for your workfiles.

Workfile Backup Snapshots

EViews 10 offers a new workfile backup feature, which we term "snapshots." The snapshot system may be used to save the current state of the workfile, to roll back a workfile to a prior state, or to investigate the changes made to your workfile between different vintages.
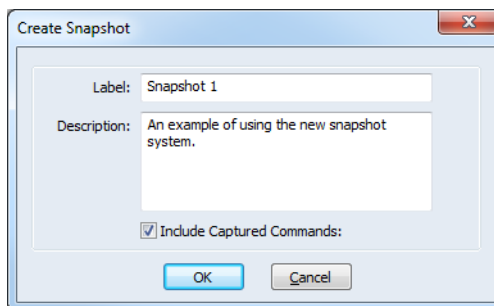
You may configure EViews to automatically take snapshots at periodic intervals, and snapshots may also be taken manually whenever you want to save the current state of the workfile.
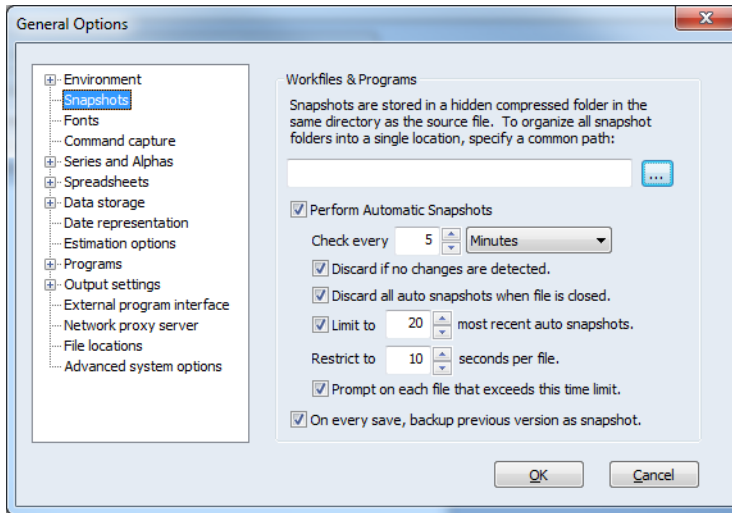
You may use the snapshot system to display properties of your backups and to revert to a particular version of your data:
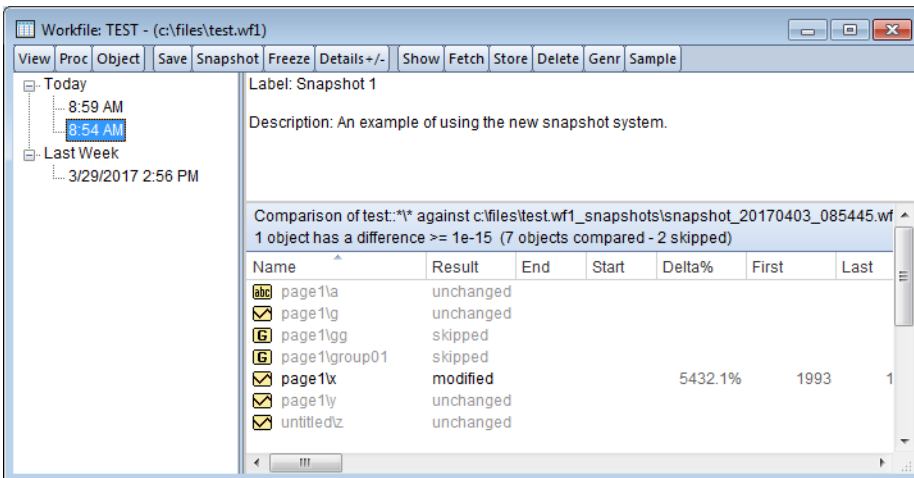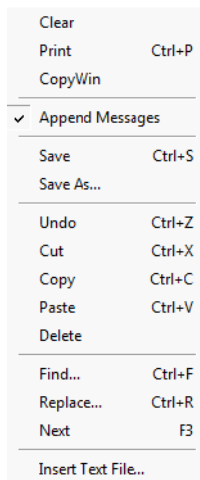

- See "Snapshot Backups" on page 78 in *User's Guide I* for additional detail.

- See also the command `wfsnapshot` (p. 546) in the *Command and Programming Reference*.

Enhanced Logging Abilities

EViews 10 offers enhanced control over your log and message windows. EViews 10 now allows all program log windows to appear as tabbed windows, and you may rearrange positions of each window. Additionally, you have the ability to specify a name for the log window and direct the messages to the log window with the specified name. If no name is specified, the messages are directed to a window with the name of the program. This was the default behavior in previous versions of EViews.

EViews 10 expands considerably your control over these windows. You may now direct messages to specific windows, appending or clearing any existing content. You may save logs to a text file or freeze the log into a text object. All of these actions can be accessed by a popup menu that appears when right-clicking on a message log window.

	Clear	
	Print	Ctrl+P
	CopyWin	
✓	Append Messages	
	Save	Ctrl+S
	Save As...	
	Undo	Ctrl+Z
	Cut	Ctrl+X
	Copy	Ctrl+C
	Paste	Ctrl+V
	Delete	
	Find...	Ctrl+F
	Replace...	Ctrl+R
	Next	F3
	Insert Text File...	

Once created, the log windows appear as tabbed windows and can be rearranged by the user as desired.
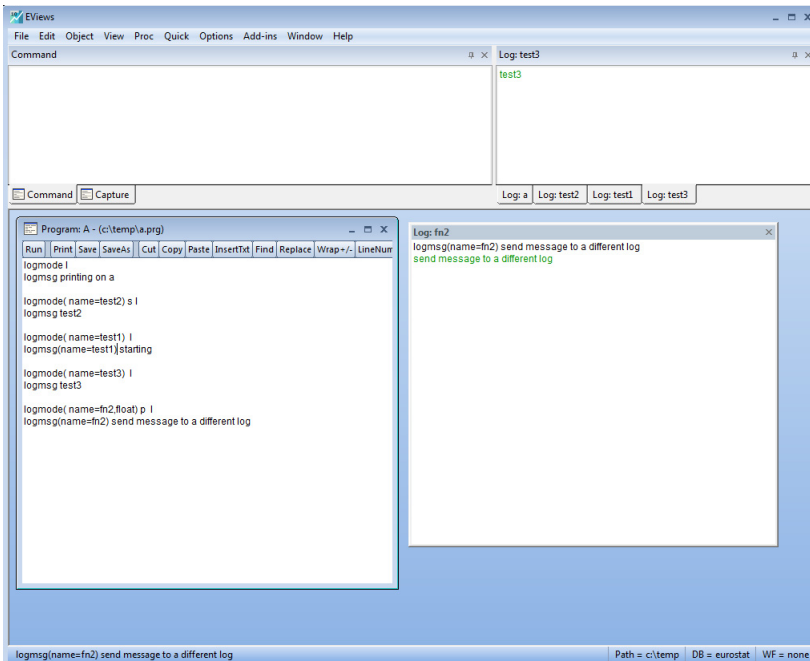
There are several types of messages which can be logged: program lines, status line messages, user log messages, and program errors. When displayed in a log message, each type will appear in a different color, making it easier to differentiate one type from another.

For additional information, see

- "Logging Options," on page 140 in the *Command and Programming Reference*.
- See logmode (p. 414), logmsg (p. 416), logclose (p. 413), and logsave (p. 417) in the *Command and Programming Reference*.

Live Statistics Display

The series and group spreadsheet views now display interactive statistics. When a spreadsheet is first opened the statistics are computed using all of the data in the spreadsheet.
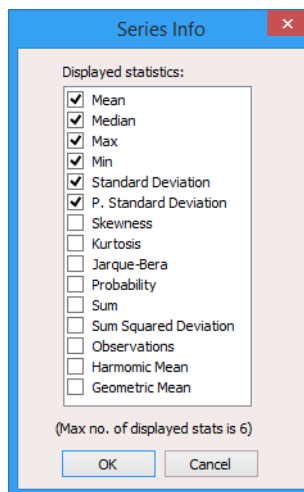
Double-clicking on the bottom bar brings up a menu where the statistics shown can be changed. A maximum of six statistics may be displayed at once.
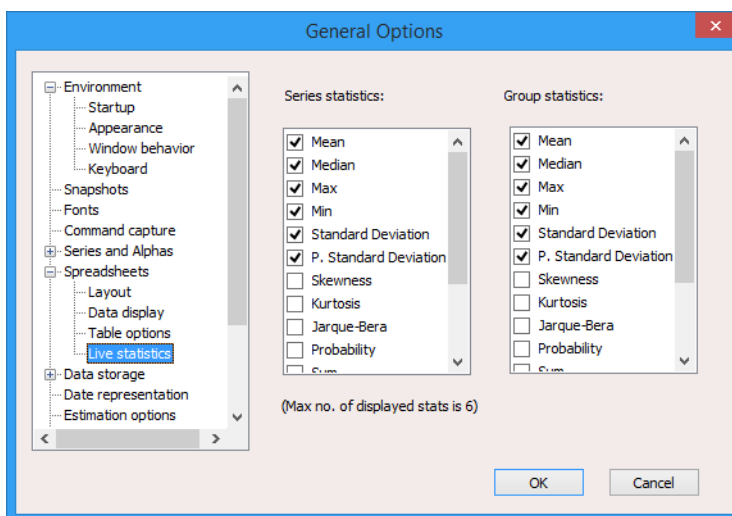

The statistics are recalculated every time a group of cells is highlighted.

The statistics displayed can also be set by going to **Options/General Options...** from the main menu and then the **Spreadsheets/Live statistics** page.

Long Object Names

EViews 10 increases the maximum object name length from 24 to 300 characters.
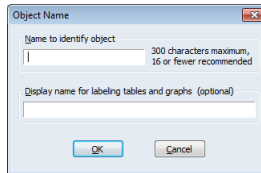
Note: you may experience difficulties when trying to open a workfile with object names longer than 24 characters in previous versions of EViews.

Improved R Connectivity

Previous versions of EViews connected to R through a third-party program. We found that some users encountered difficulty in configuring this software to work in their computing environment.

EViews now supports R integration directly, eliminating the need for third-party software. Simply install both EViews 10 and R on the same computer (EViews was developed and tested with R version 3.2.3. You must have version 3.2.3 or newer installed on the machine running EViews).

Installing R

EViews was developed and tested with R version 3.2.3. You must have version 3.2.3 or newer installed on the machine running EViews.

If you do not currently have R installed, simply go to the following site and download the latest version:

https://cran.r-project.org

Verifying EViews R Connector

Verify that the new EViews R Connector Interface components are properly registered by running the EViews command REGCOMPONENTS:
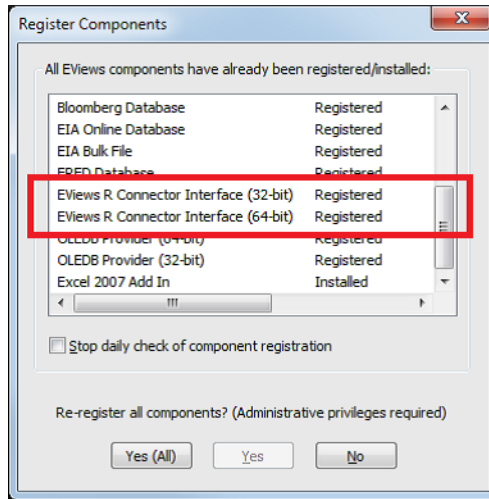
In the Register Components dialog, make sure that the EViews R Connector Interface objects have been properly registered. If not, click the **Yes (All)** button to re-register these components on your local machine, then re-run REGCOMPONENTS to verify the registration. Note: Registration of these components will require local administrator rights. If you do not have these admin rights, please contact your IT department for support.

Next, go to the External Program Interface dialog under the **Options menu/General Options/External Program Interface**:
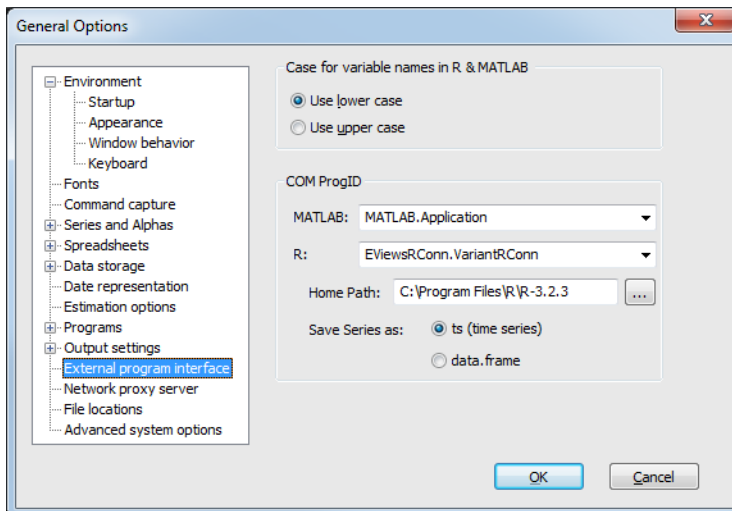
In COM ProgID group, make sure that EViewsRConn.VariantRConn is selected for R.

Next, if **Home Path** is blank, click the […] button and navigate to your local R installation. Select the version-specific R folder (*e.g.,* "R-3.2.3") under the parent R folder as your home directory.

Optionally, you can also select your **Save Series** as preference when pushing EViews series objects into R. If you select "ts (time series)", series objects that have a compatible R ts frequency will be pushed as R ts objects. Otherwise, an R data.frame structure will be created instead.

Now we're ready to begin using R.

See also:

- "EViews COM Automation Client Support (MATLAB and R)," beginning on page 181 in the *Command and Programming Reference*.
- See also the xpackage (p. 556) command in the *Command and Programming Reference*

Data Handling

EViews 10 offers a variety of new features for working with data.

Improved R Data Support

EViews now supports R integration directly, eliminating the need for third-party software. Simply install both EViews 10 and R on the same computer (EViews was developed and tested with R version 3.2.3. You must have version 3.2.3 or newer installed on the machine running EViews) and perform the configuration steps as in "Improved R Connectivity" on page 17.

Once you install R, you may use previously existing EViews commands, such as XRUN and XGET to move data between EViews and R.

More importantly, EViews 10 now offers native RDATA workspace file support. This support means that you can save an EViews workfile (one page at a time) directly to a new RDATA workspace file using the standard EViews database and file interface.

You may use the standard workfile **Proc/Save As** interactive interface to save an RDATA workspace, or you can use the wfsave or pagesave commands to perform the operation:

```
wfsave(type=rdata) c:\files\tq.rdata
```

Each simple object (series, alpha, matrix, vector, and scalar) on the current workfile page will be converted to an appropriate R data structure and saved into the new RDATA file.

You may also open an RDATA file as an EViews workfile or as an EViews database. As with saving data, you may use the interactive interface, by selecting **File/Open/Foreign Data as Workfile...** or **File/Open/Database...**, or you may issue commands.

For example, the command

```
dbopen(type=rdata) c:\files\data.rdata
```

will open the RDATA file in its own EViews database window. You can view all the R objects found in this database and individually FETCH the objects you want into your workfile:
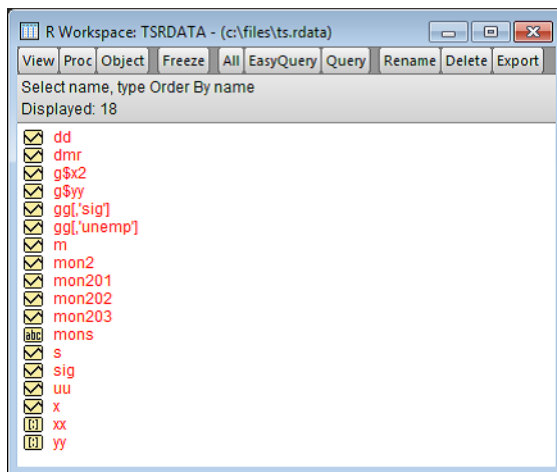
Note: R data structures that could have multiple columns/elements (such as data.frame, list, and mts objects) are listed once per column/element with the appropriate R name.

As an EViews Database, you can use both FETCH and STORE to read and write data to the RDATA file and even link EViews series objects back to their source R structure to allow for simple data refreshes.
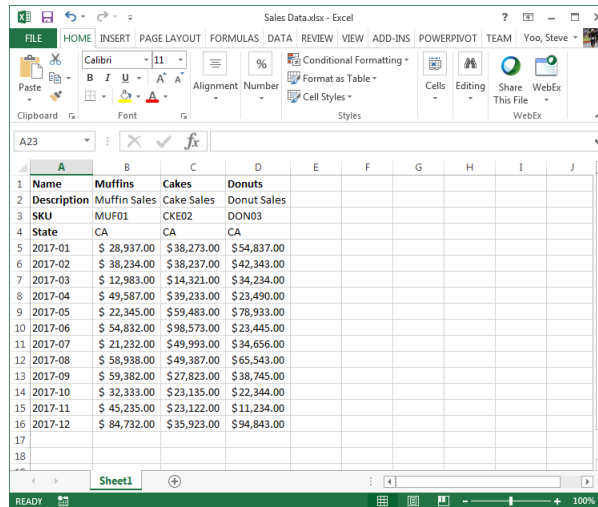
For further discussion, see

• "Sending EViews Data to R," on page 186 in the *Command and Programming Reference*.

• "Retrieving R Data into EViews," on page 187 in the *Command and Programming Reference*.

• See also the xput (p. 557) and xget (p. 551) commands in the *Command and Programming Reference*
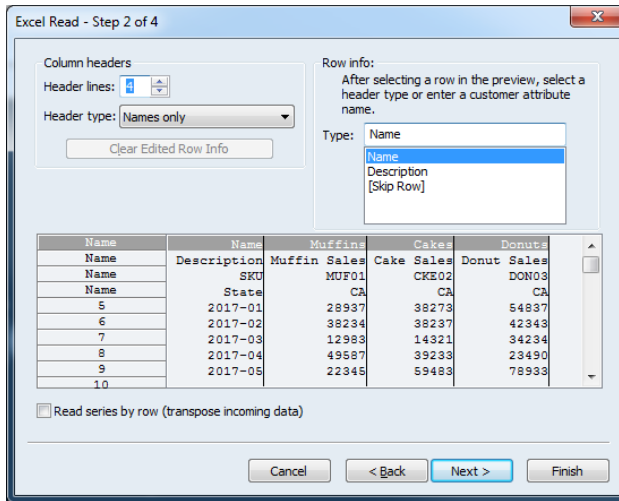
Attribute Import and Export

Data are often accompanied by varying types of metadata. EViews now supports reading in custom series attributes (along with the series data) during an import from Excel and text files.

The EViews 10 import wizard has been modified to support reading in custom series attributes that are specified as header rows. For example, the following Excel spreadsheet has custom attributes for Description, SKU, and State specified in header rows:

When we drag and drop this file onto EViews 10, the new Import Wizard dialog appears. On the second page (Step 2), we now allow you to change how each header row is used:

By default, EViews will treat every header row as a Name field, but you can change the row type for each header by selecting (or specifying a custom value for) the attribute name:
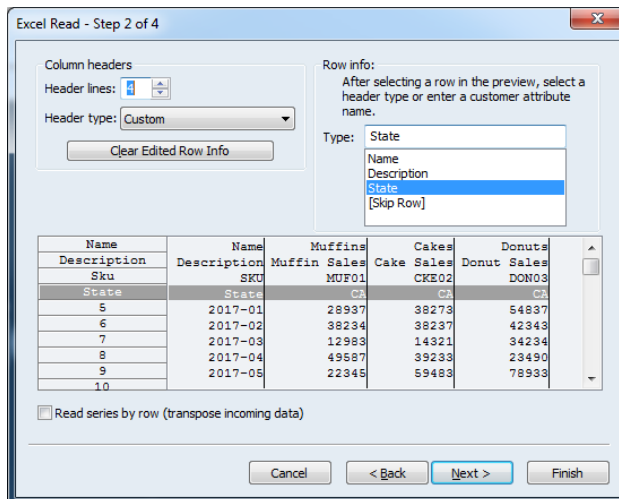
You can now complete the import and verify that all custom attributes have been read in correctly:

Both the `wfopen` and `import` commands have been modified to support new values for the "namepos = " argument and a new "colheadnames = " argument to specify individual attribute names for each column.

Correspondingly, EViews 10 also supports saving series object attributes when the destination is an Excel spreadsheet file or a text file. Attributes will be saved as extra header rows as specified above. See WFSAVE reference for more details on the new "attr", option.

See also:

- `wfopen` (p. 526), `pageload` (p. 449), and `import` (p. 387) in the *Command and Programming Reference*.

- `wfsave` (p. 542) and `pagesave` (p. 451) in the *Command and Programming Reference*.

Eurostat, ECB, and UN

SDMX Databases provide access to a list of datasets that offer a large range of publicly available data.

Both the Standard and Enterprise versions of EViews offer access to Eurostat, ECB (European Central Bank), and UN (United Nations) data using SDMX Web Services.
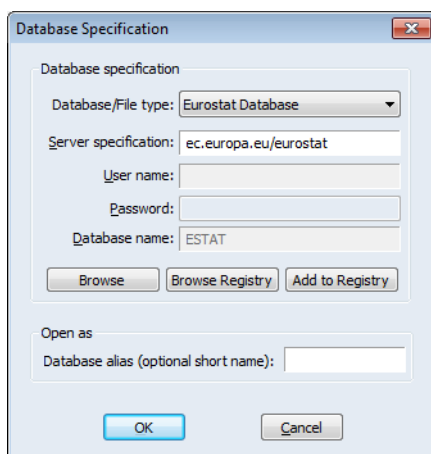
Please note that an internet connection will be required to obtain SDMX online data. For more information on the datasets, please see

http://ec.europa.eu/eurostat/data/database

https://ec.sdw-wsrest.ecb.europa.eu

http://data.un.org/WS/

EViews offers a custom interface to the SDMX databases. The interface includes a custom browser for navigating and retrieval of available data. To start, you must open a database window to SDMX database by selecting **File/Open Database…** from the main EViews menus, then selecting **Eurostat SDMX Database**, or **ECB SDMX Database**, or **UN SDMX** Database from the **Database/File type** dropdown menu. A dialog of the following form will be displayed:

Click on **OK** to open the online database. You will be presented with a standard EViews database representing a connection to the data. Click on **Browse** or **Browse-Append** to open an all new custom database.

Here we see the interface to the Eurostat data:
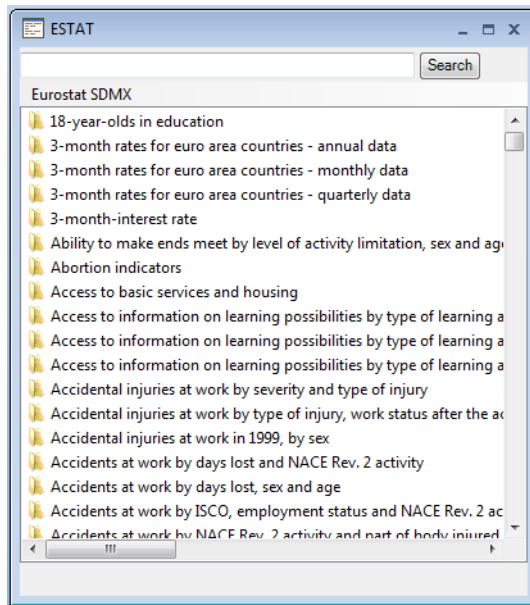
The browser allows you to find data available within datasets by navigating through a set of folders. Click on any folder to move inside it. A dialog with a list of filters will be shown, which will allow you to filter and customize the search results of the available series objects in the selected dataset:

Click on **Get** to show the results.
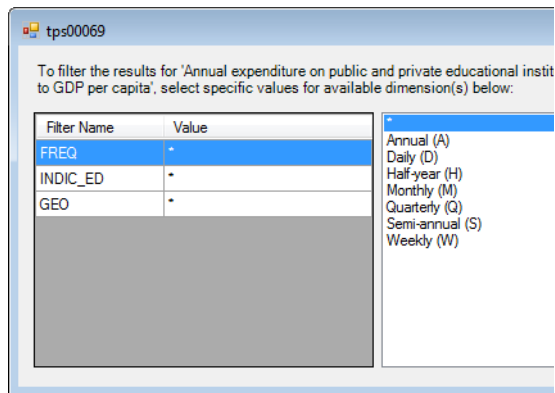
The browser interface to SDMX online data offers a number of useful tools for working with your database. Once you have found the series of interest, you may drag-and-drop (or copy-and-paste) the series directly into an EViews workfile in the usual fashion.

For additional detail, see

- "Eurostat, ECB, UN, and IMF" on page 366 in *User's Guide I*.
- See also dbopen (p. 349) in the *Command and Programming Reference*

SDMX-ML Files

SDMX (Statistical Data and Metadata eXchange) standardizes the processes for the exchange of statistical data among international organizations.

EViews offers an interface to SDMX data where the user has the ability to read SDMX datasets and data structure definitions (DSD) in structured XML documents (SDMX-ML), using the standard EViews database interface.

EViews allows you to work offline with data from organizations like EUROSTATA, ECB, IMF, UN, BIS, and OECD. Both the Standard and Enterprise versions of EViews offer reading of SDMX data. Please note that the EViews SDMX-ML interface requires that data were previously downloaded in SDMX XML format.

To start, you must open a database window to SDMX-ML by selecting **File/Open Data-
base…** from the main EViews menus, then selecting **SDMX-ML files** from the **Database/
File type** dropdown menu. The following dialog should appear:
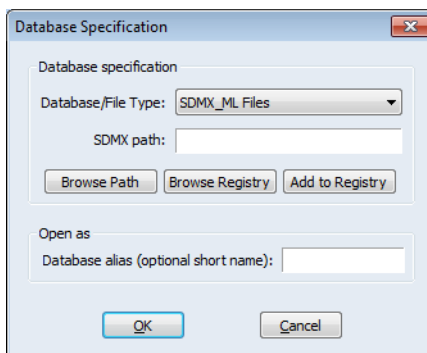
Click on **Browse Path** to select the folder/path on disk where the SDMX data and data defi-
nitions files are located.
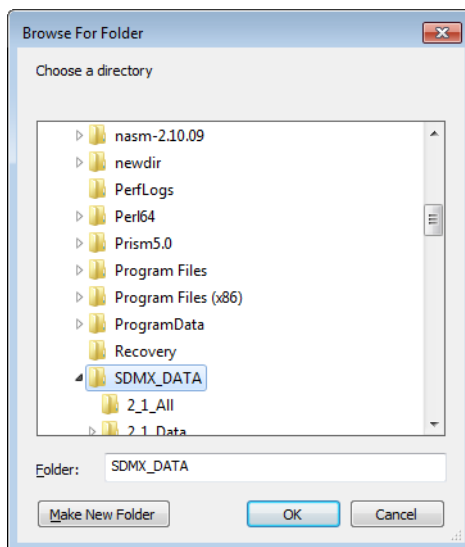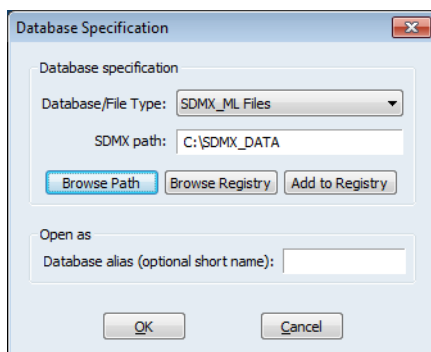
Click on **OK** to open the database. You will be presented with a standard EViews database with the **All**, **Query** and **Easy Query** search interface, to view all or a selection of the data series:

Once you have found the series of interest, you may drag-and-drop (or copy-and-paste) the series directly into an EViews workfile in the usual fashion.

- See "SDMX-ML Files" on page 383 in *User's Guide I*.
- See also dbopen (p. 349) in the *Command and Programming Reference*

World Bank Data

EViews 10 offers a custom interface to World Bank data. World Bank Open Data provides access to a list of datasets that offer access to global development data. These databases offer a wide variety of freely available indicators about development in countries around the world.

For more information on the World Bank datasets, please see http://data.worldbank.org.

Both the Standard and Enterprise versions of EViews offer World Bank access. Please note that an internet connection is required to obtain World Bank data.

EViews offers a custom interface to the World Bank. The interface includes a custom browser for navigating and retrieval of World Bank data. To start, open a database window to the World Bank by selecting **File/Open Database…** from the main EViews menus, then select **World Bank Database** from the **Database/File type** dropdown menu. The following dialog should appear:
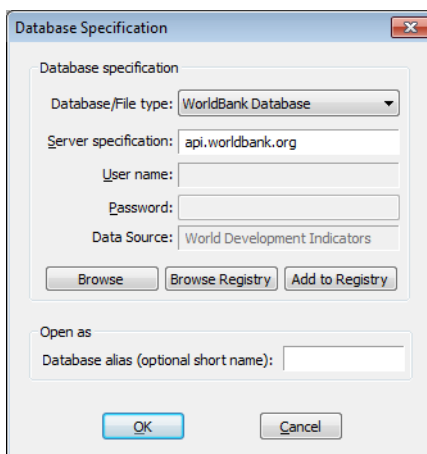
The default data source selected is World Development Indicators (a collection of development indicators that includes global development data). Click on **Browse** to view and select another data source. Click on **OK** to open the online database.
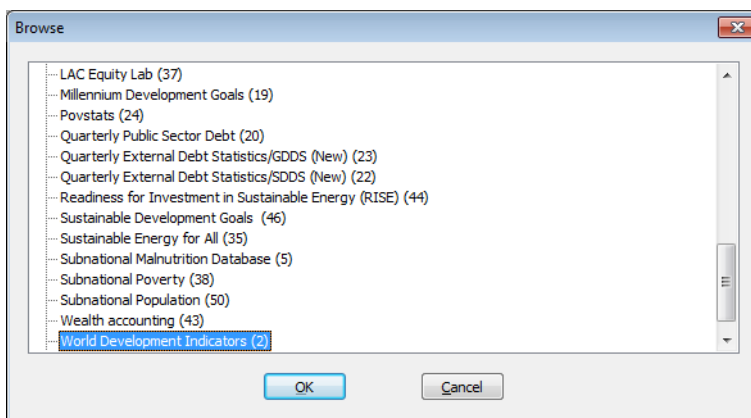
You will be presented with a standard EViews database window. Click on **Browse** or **Browse-Append**, which opens a new custom World Bank database. Click on the folder icons to drill down into subtopics or use the search feature to find the desired data:
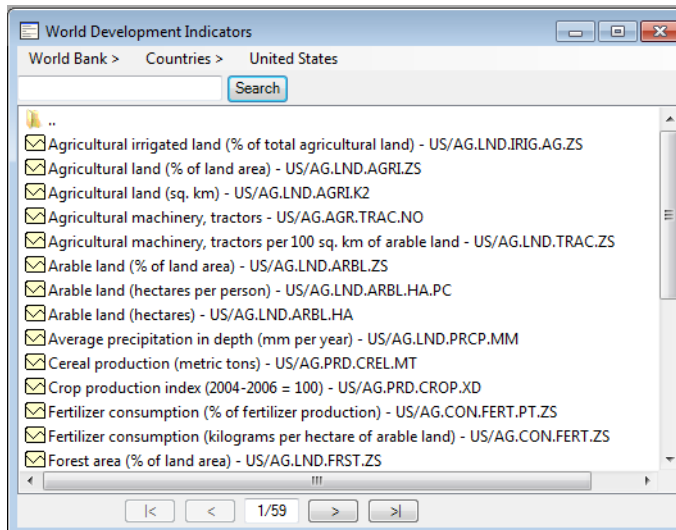
Once you have found the series of interest, you may drag-and-drop (or copy-and-paste) the series directly into an EViews workfile in the usual fashion.

For additional discussion, see

- "World Bank Data" on page 386 in *User's Guide I*.

- See also dbopen (p. 349) in the *Command and Programming Reference*

Exporting Data in Tableau and JSON Formats

EViews 10 Enterprise Edition now supports saving series objects in a workfile page to a Tableau Data Extract file (.tde) or in JSON format. The TDE file can be used by Tableau Desktop or exported to a Tableau Server.

- See wfsave (p. 542) and pagesave (p. 451) in the *Command and Programming Reference*

Graphs and Tables

EViews 10 offers several improvements to graphs and tables, including new graph types, tools for graphing multiple series, new customization tools, and the ability to sort the rows of a table.

Bubble plots

EViews 10 offers support for various types of bubble plot. A bubble plot is an extension of a scatter plot where the third dimension may be used to specify the size of a data point.

Unlike traditional scatter plots, where bubble sizes are fixed, bubble plots allow for variable size bubbles.

To create a bubble plot, select **Bubble Plot** as your graph type:
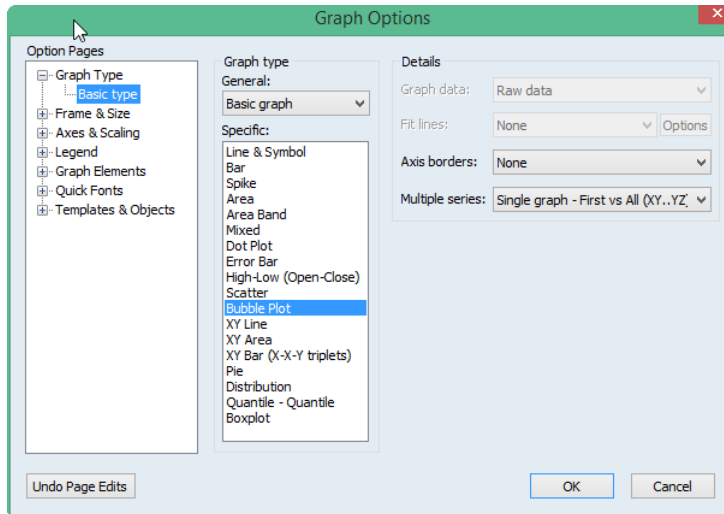
Bubble plots requires a minimum of three series (a series triplet). When creating a bubble plot from a group object, you have two ways of defining the triplet: **First vs All** or **XYZ triplets**.

First vs All assigns the first series of the group to the horizontal axis, uses the last series to determine the bubble size, and assigns all other series (from the second to the penultimate) to the vertical axis. Suppose, for example, we have a group consisting of the series X, Y1, Y2, Y3, and Z.

If we plot this as a bubble plot and select **Single graph - First vs All (XY..YZ)**, EViews will produce:
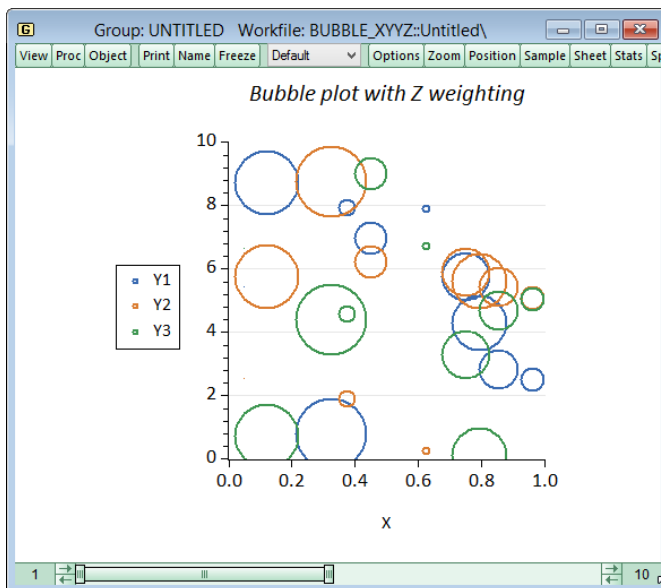
Alternatively, XYZ triplets uses successive series triplets in the group to create one plot. When using successive triplets, the first series of the triplet is assigned to the horizontal axis, the second series is assigned to the vertical axis and the last series of the triplet determines bubble size.

You may also choose to have all the triplets appear in one single graph or to create multiple graphs, with a single graph for each data triplet.

Below we have collected data on inflation, unemployment, and population from several European countries for 2016, and imaginary data for 2020.

We create a Phillips curve bubble plot for each year by selecting **Multiple graphs** - **XYZ triplet**.
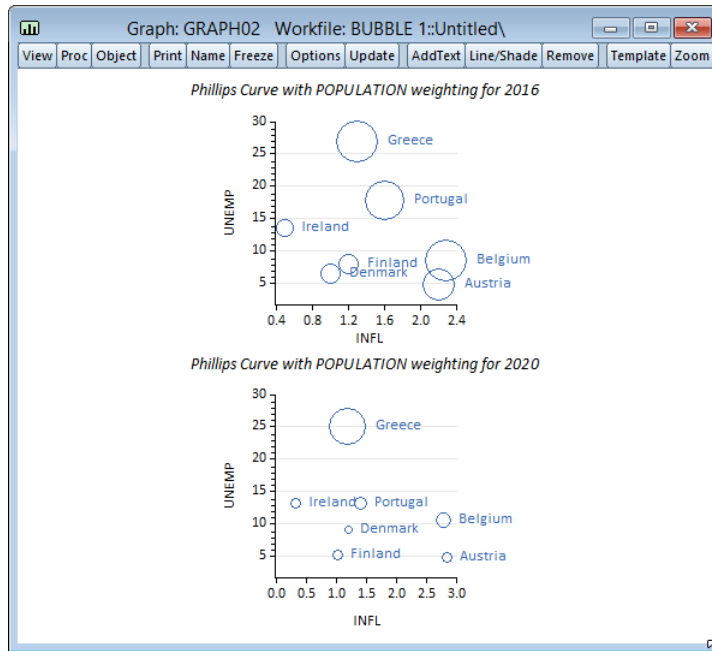
- See also bubble (p. 925) and bubbletrip (p. 926) in the *Object Reference*.

Updating Series in Graph Objects

EViews 10 offers tools for adding and removing series from an updating graph object via the mouse and keyboard.

Previously, the number and identity of series in an updating graph object was fixed. Adding or removing a series meant adding or removing the desired series from a group object, graphing the group, freezing the view to create a graph object, and then performing customizations as desired. If there was a particular graph that you wanted repeated for a number of series, this procedure quickly became cumbersome.

In EViews 10, updating graph objects may be modified by dragging and dropping the series from the workfile window to the graph.

To add series, simply select one or more series you want to add to the graph object in the workfile window and drag-and-drop them onto the updating graph object.
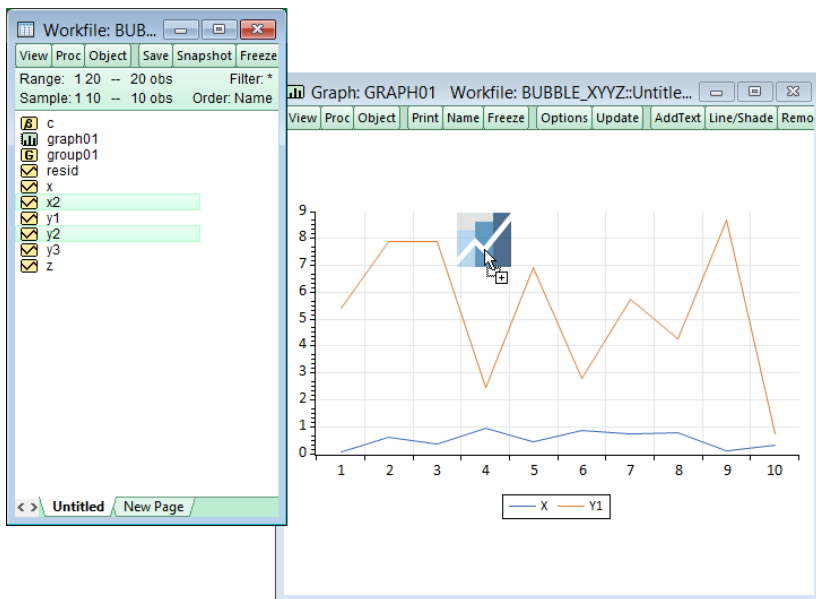
Both the graph and legend will update to reflect the added series.
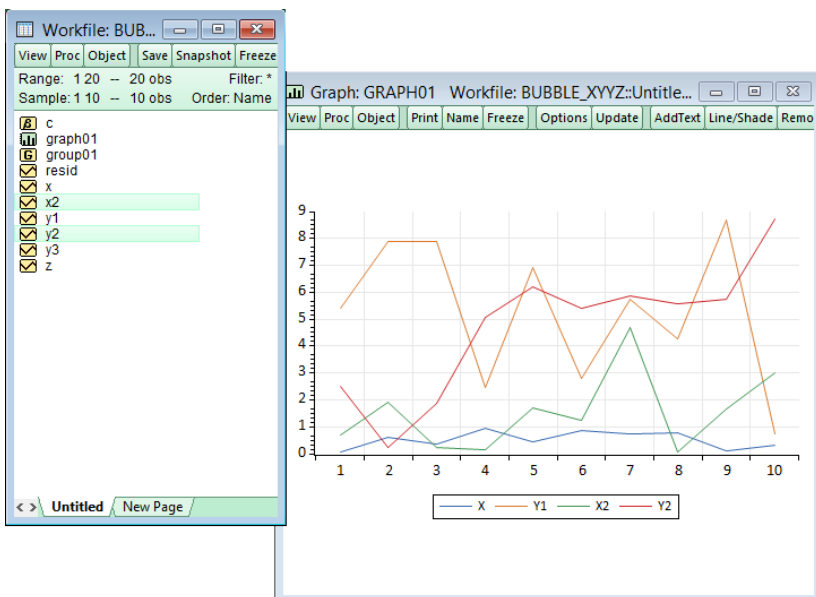
Series may also be removed from updating graph objects. Select the series you wish to remove by clicking on its graph (multiple series can be selected at the same time).
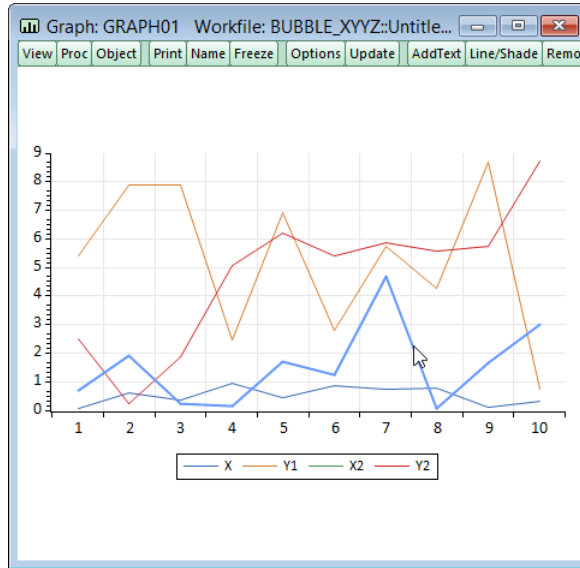
After hitting the delete key, the series is removed from the graph.
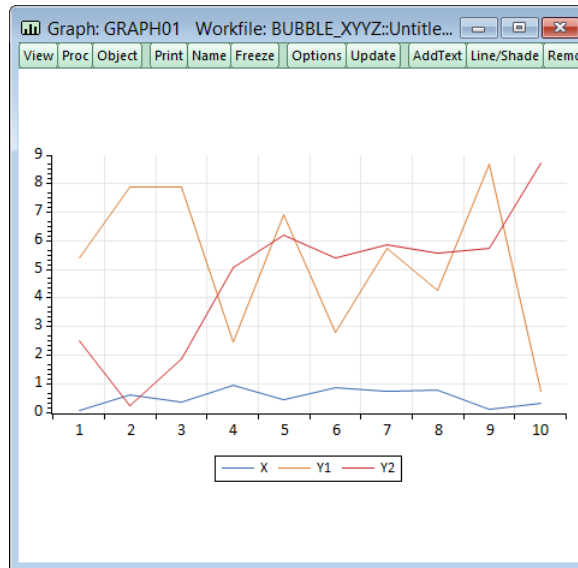
Graph View Text Annotation
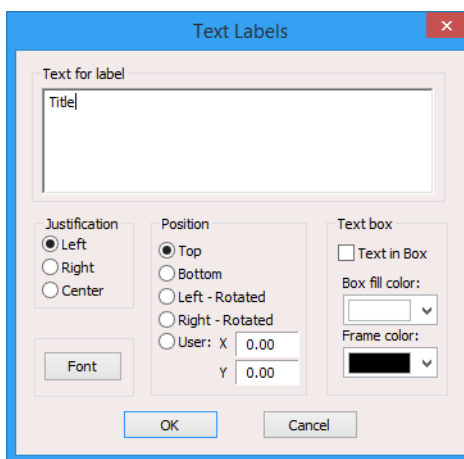
Previously, only graph objects could be customized using text labels. Thus, a graph view of a series object would need to be frozen before text could be added. This restriction is elimi-

nated in EViews 10. Note, however, that the labels will be lost if you change the object view so that if you wish to preserve the labels, the view still needs to be frozen.

Text labels can be added by right-clicking on the graph and selecting **Add text...**
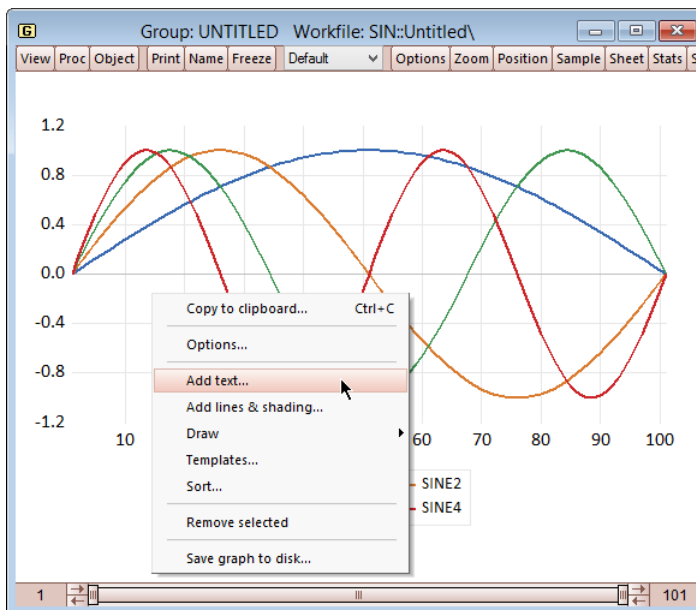
You will see the usual **Text Labels** window:

If you attempt to close your graph after adding text labels you will be warned that any text customizations will be lost unless the graph is frozen.
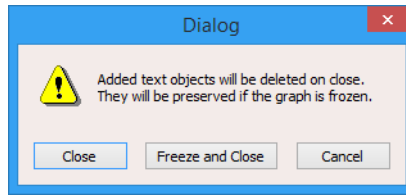
Interactive Observation Annotation

Previous versions of EViews allows you to identify observations in a graph using flyovers that appeared when you hovered your cursor over a point on the graph.
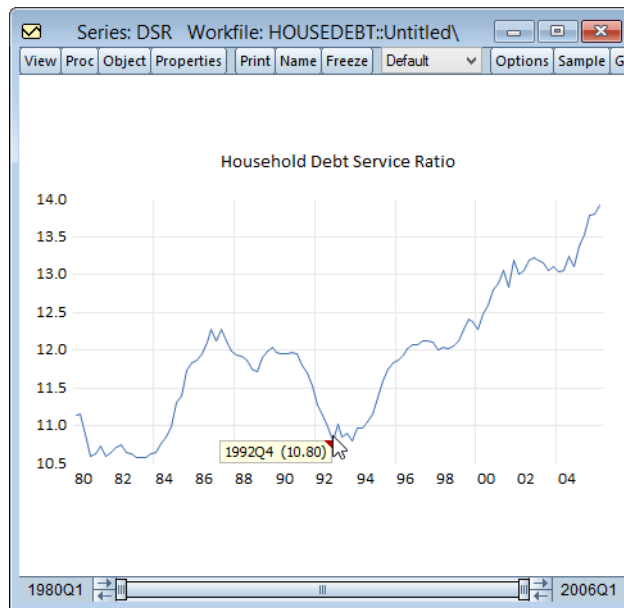
These flyovers, which contained information about the observation identifier and data value, were transitory, and vanished as soon as the cursor moved.

EViews 10 now allows you to create a text object at the flyover location, making it easy for you to identify and describe specific observations in your graph. With the flyover displayed, simply right-mouse click and select **Pin flyover**:
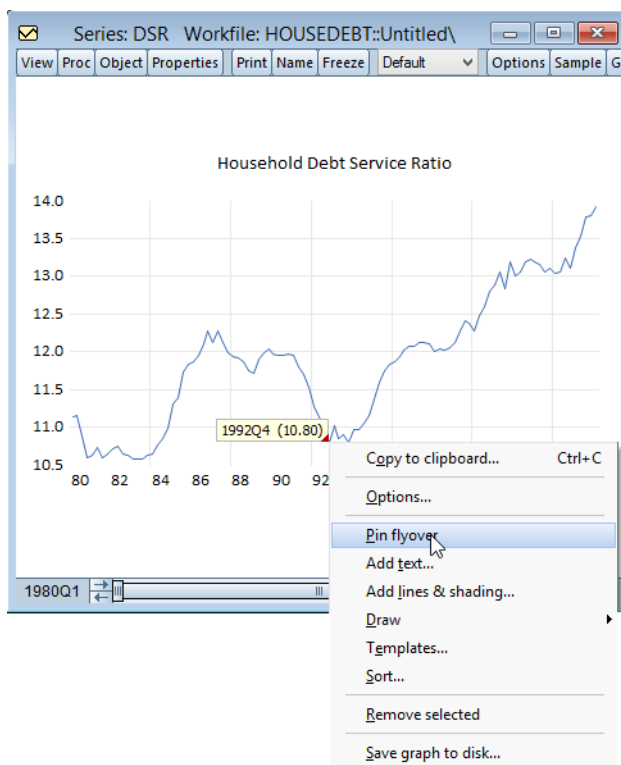
Once pinned, the flyover text may be modified, and the text box may be customized in the usual fashion. Simply double click on the text box to bring up the settings dialog.

New Graph Settings

EViews 10 offers a number of new graph templates and settings which offer more flexible customization for your graph views and objects.

New Templates

EViews 10 includes a number of new graph templates for use in customizing the look of your graphs. Some of the new design elements in these template include a different aspect ratio, white background, grid lines, and thicker lines in line graphs.

In addition, we have changed the default graph views to use a new templates.
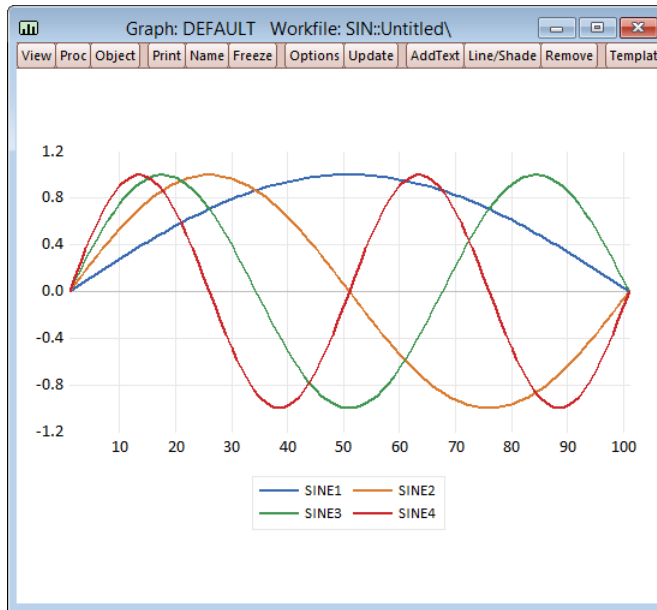
You may, of course, change the default template back to the previous one, or select an alternative from the list of those provided, or one that you have designed.

New Preset Graph Element Colors

To aid you in customizing your graphs, we have defined a number of new preset line and bar colors. These colors can be viewed in **Graphics Defaults/Lines & Symbols** and **Fill Areas**.
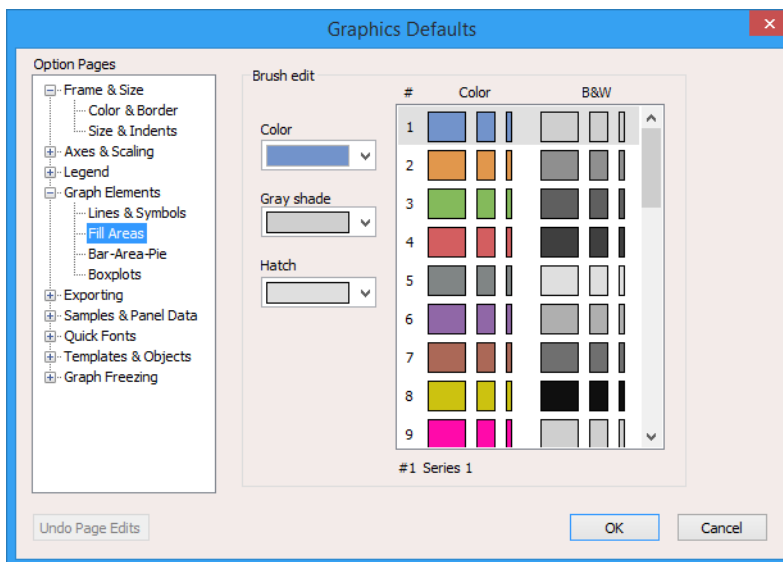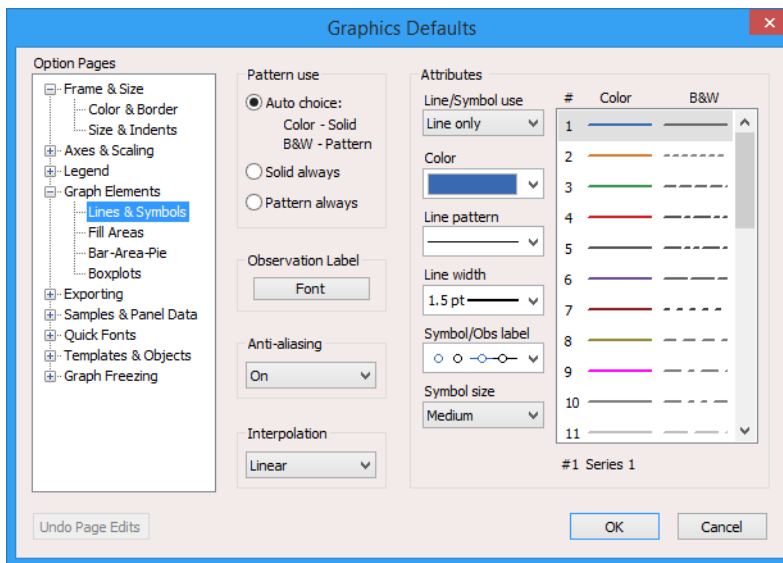
Minor ticks

You may now add minor ticks to the data axis of a graph. The tick scaling can be set by going to **Graphics Defaults.../Axes & Scaling/Data axis**.
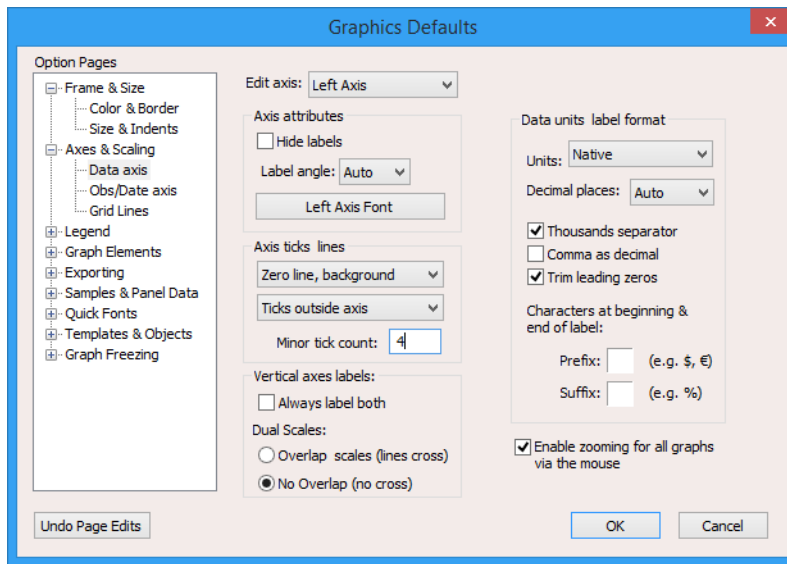
The minor tick count is the number of ticks that appears between each set of major ticks.

Table Row Sorting
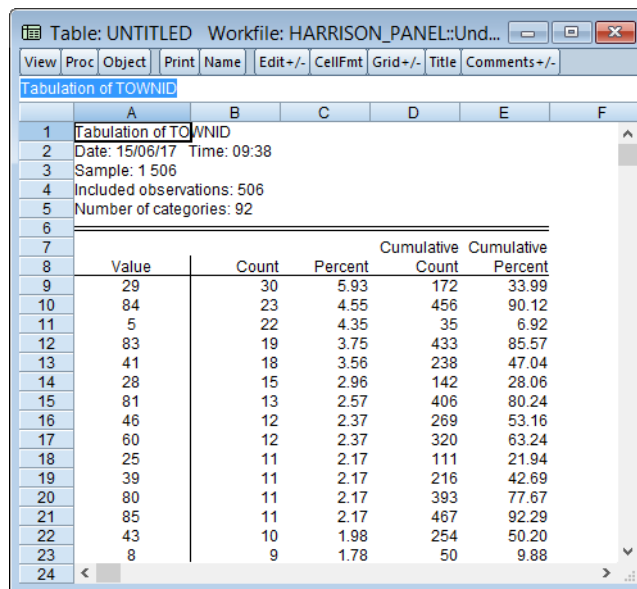
In EViews 10 you may easily sort the rows of a table using values in one or more columns. To sort, you must be in table edit mode. Highlight the data you wish to sort (note that the sort keys must also be selected), then right-click and select **Sort…** in the pop-up menu:
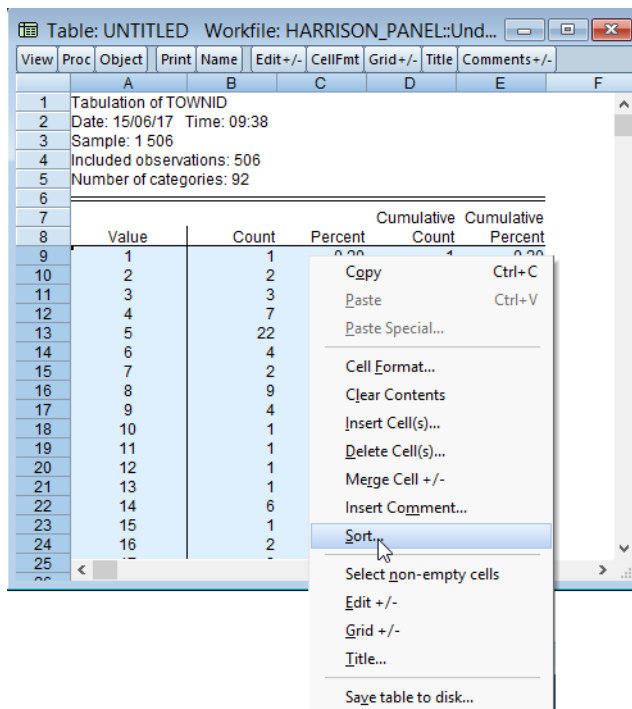
EViews will display the sort dialog prompting you to specify your sort keys and direction
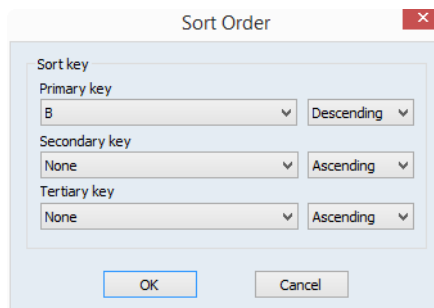
You may use the dialog to choose the columns on which to sort, and whether to use ascending or descending order. The rows will first be sorted on the basis of the primary key, and ties will be broken using the secondary and tertiary keys. Note that you may remove any existing sorting using the **None** option. Click on **OK** to sort the selection.

Table: UNTITLED Workfile: HARRISON_PANEL::Und...						
View Proc Object Print Name Edit+/- CellFmt Grid+/- Title Comments+/-						
Tabulation of TOWNID						

	A	B	C	D	E	F
1	Tabulation of TOWNID					
2	Date: 15/06/17 Time: 09:38					
3	Sample: 1 506					
4	Included observations: 506					
5	Number of categories: 92					
6						
7				Cumulative	Cumulative	
8	Value	Count	Percent	Count	Percent	
9	29	30	5.93	172	33.99	
10	84	23	4.55	456	90.12	
11	5	22	4.35	35	6.92	
12	83	19	3.75	433	85.57	
13	41	18	3.56	238	47.04	
14	28	15	2.96	142	28.06	
15	81	13	2.57	406	80.24	
16	46	12	2.37	269	53.16	
17	60	12	2.37	320	63.24	
18	25	11	2.17	111	21.94	
19	39	11	2.17	216	42.69	
20	80	11	2.17	393	77.67	
21	85	11	2.17	467	92.29	
22	43	10	1.98	254	50.20	
23	8	9	1.78	50	9.88	
24						

Note when sorting both numeric and alphabetic data in a given column that numbers will be treated as smaller than letters.

- See "Sorting Rows" on page 792 of *User's Guide I*.
- See also `Table::sort` (p. 810) in the *Object Reference*.

Econometrics and Statistics
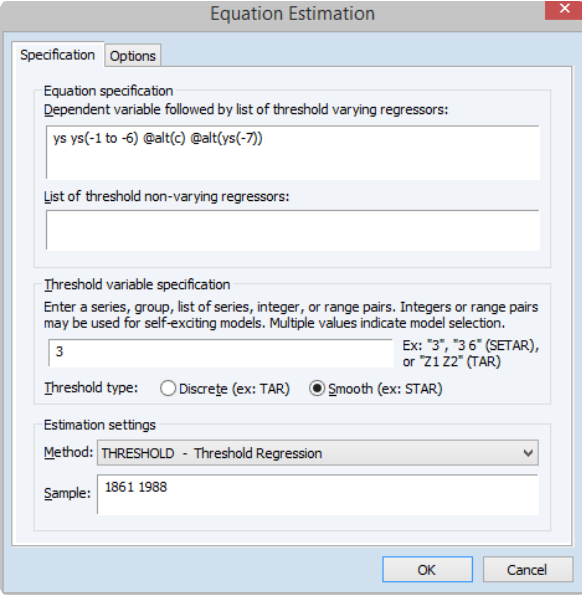
EViews 10 offers a exciting new additions and improvements to its set of econometric and statistical features. The following is a brief outline of the most important new features, followed by additional discussion and pointers to full documentation.

Smooth Threshold Regression Estimation

Smooth Transition Autoregressive (STAR) modeling (Teräsvirta, 1994) is an extremely popular approach for nonlinear time series analysis. STAR models, which are a special case of Smooth Transition Regression (STR) models, embed regime-dependent linear auto-regression specifications in a smooth transition nonlinear regression framework.

EViews tools for estimation of two-regime STR models with unknown parameters for the shape and location of the smooth threshold. EViews estimation supports several different transition functions, provides model selection tools for selecting the best threshold variable from a candidate list, and offers the ability to specify regime varying and non-varying variables and variables that appear in only one regime.

To estimate a smooth transition model, **Quick/Estimate Equation...** from the main EViews menu, select **THRESHOLD - Threshold Regression** from the main **Method** dropdown menu near the bottom of the dialog, and click on the **Smooth** radio button in the **Threshold type** setting.

The options page allows you specify the transition function, covariance estimation method (including various robust estimators), and optimization settings.
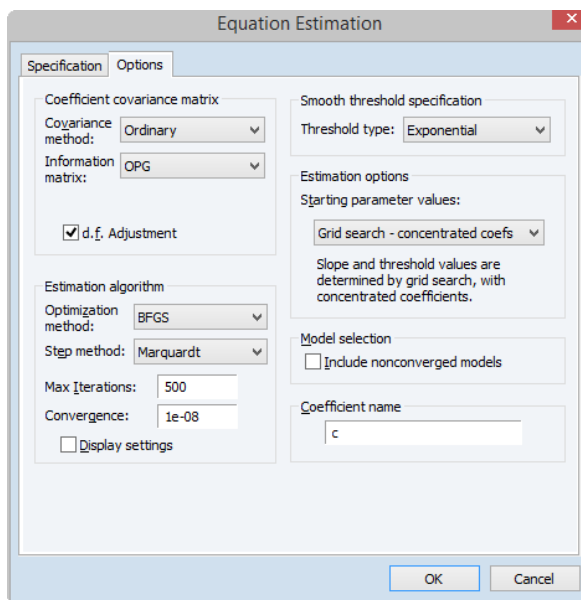
Following estimation, EViews offers specialized views for the transition function and weights along with support for tests for linearity against STR alternatives and tests of no remaining nonlinearity and parameter constancy, alongside conventional tests for heteroske-dasticity and serial correlation.
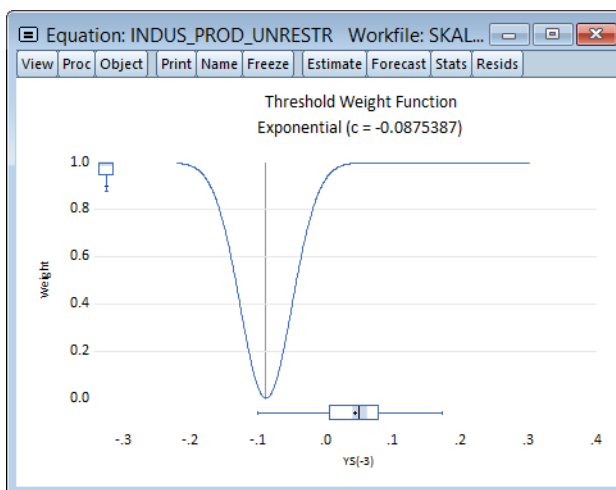
- See "Smooth Transition Regression" on page 477 of *User's Guide II* for discussion and additional features.

- Also see `Equation::threshold` (p. 169) in the *Object Reference* and `threshold` (p. 503) in the *Command and Programming Reference*

Finite-Sample Adjusted Heteroskedasticity-Consistent Covariances

EViews 10 offers support for several new heteroskedasticity robust coefficient covariances in least squares regression. These alternatives provide different approaches to accounting for bias in finite samples by adjusting the weights given to residuals on the basis of leverage (Long and Ervin, 2000; Cribari-Neto and da Silva, 2011).

This general class of heteroskedasticity consistent sandwich covariance estimators may be written as:

$$\hat{\Sigma}_{HC} = (X'X)^{-1}\left(\sum_{t=1}^{T} (d_t \hat{\epsilon}_t)^2 X_t X_t' \right)(X'X)^{-1} \tag{0.1}$$

where d_t are observation-specific weights that are chosen to improve finite sample performance.

EViews allows you to estimate your covariances using several choices for d_t. In addition to the standard White covariance estimators (HC0, HC1), EViews supports the bias-correcting HC2, pseudo-jackknife HC3 (MacKinnon and White, 1985), and the leverage weighting HC4, HC4m, and HC5 (Cribari-Neto, 2004; Cribaro-Neto and da Silva, 2011; Cribari-Neto, Souza, and Vasconcellos, 2007 and 2008).

The full range of these estimators is available for equations estimated by linear least squares.
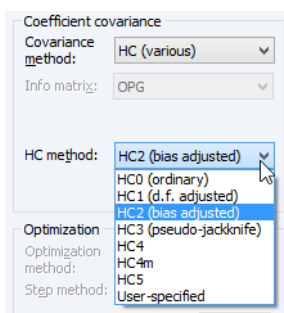
Select a method, enter any required parameters, and click on **OK** to proceed to estimation.

```
Dependent Variable: LOG(WAGE)
Method: Least Squares
Date: 31/05/17   Time: 12:11
Sample: 1 526
Included observations: 526
Cribari-Neto et al. (H5) heteroskedasticity-consistent standard errors
      & covariance (k=.7)
```

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.321378	0.110175	2.916988	0.0037
MARRMALE	0.212676	0.057869	3.675129	0.0003
MARRFEM	-0.198268	0.059220	-3.347974	0.0009
SINGFEM	-0.110350	0.057236	-1.927970	0.0544
EDUC	0.078910	0.007502	10.51918	0.0000
EXPER	0.026801	0.005147	5.206623	0.0000
EXPER^2	-0.000535	0.000107	-4.995281	0.0000
TENURE	0.029088	0.009312	3.123691	0.0019
TENURE^2	-0.000533	0.000387	-1.378837	0.1685

R-squared	0.460877	Mean dependent var	1.623268
Adjusted R-squared	0.452535	S.D. dependent var	0.531538
S.E. of regression	0.393290	Akaike info criterion	0.988423
Sum squared resid	79.96799	Schwarz criterion	1.061403
Log likelihood	-250.9552	Hannan-Quinn criter.	1.016998
F-statistic	55.24559	Durbin-Watson stat	1.784785
Prob(F-statistic)	0.000000	Wald F-statistic	51.54430
Prob(Wald F-statistic)	0.000000		

- See "Alternative HC Estimators" on page 36 of *User's Guide II* for discussion and additional detail.

- See `Equation::ls` (p. 117) in the *Object Reference* and `ls` (p. 418) in the *Command and Programming Reference*.

Cluster-Robust Covariances

In many settings, observations may be grouped into different groups or "clusters" where errors are correlated for observations in the same cluster and uncorrelated for observations in different clusters (Liang and Zeger, 1986; Wooldridge, 2003; Cameron and Miller, 2015). EViews offers support for consistent estimation of coefficient covariances that are robust to either one and two-way clustering.

When estimating an equation using LS, the **Covariance method** dropdown on the Options may be used to select **Cluster robust** covariance estimation.
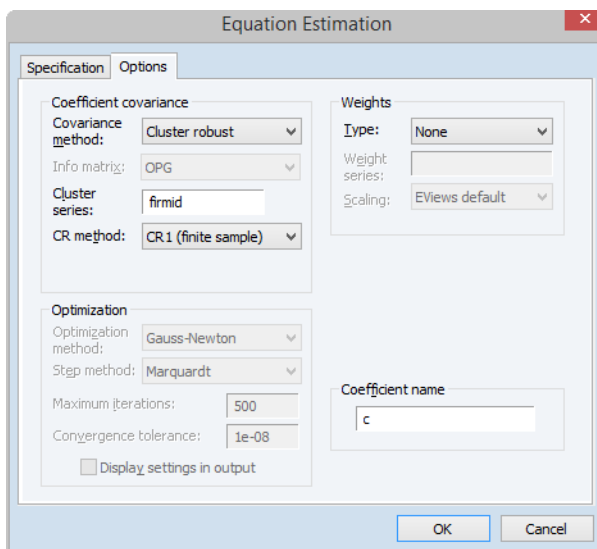
You will then be prompted to enter the name of one or two series in the **Cluster series edit field**, and to select the (cluster robust) **CR method** from among approaches ranging from d.f. corrected to methods using finite sample corrections based on the leverage for observations.

Dependent Variable: Y
Method: Least Squares
Date: 30/05/17   Time: 15:50
Sample: 1 5000
Included observations: 5000
CR1 (finite sample adjusted) cluster-robust standard errors &
    covariance
Cluster series: FIRMID (500 clusters)
Standard errors and t-statistic probabilities adjusted for clustering

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.029680	0.067013	0.442897	0.6580
X	1.034833	0.050596	20.45298	0.0000

R-squared	0.207766	Mean dependent var		0.035238
Adjusted R-squared	0.207607	S.D. dependent var		2.252704
S.E. of regression	2.005277	Akaike info criterion		4.229841
Sum squared resid	20097.64	Schwarz criterion		4.232448
Log likelihood	-10572.60	Hannan-Quinn criter.		4.230755
Durbin-Watson stat	1.096121	Wald F-statistic		418.3244
Prob(Wald F-statistic)	0.000000			

- See "Cluster-Robust Covariances" on page 39 of *User's Guide II* for discussion and additional detail.

- See Equation::ls (p. 117) in the *Object Reference* and ls (p. 418) in the *Command and Programming Reference*.

VARs with Linear Restrictions

The basic k-variable VAR(p) specification has $k(pk + d)$ coefficients so that even moderate sized VARs require estimation of a large number of parameters. When VARs are applied to macroeconomic data with limited sample sizes, model over-parameterization is a frequent problem as there are too few observations to estimate precisely the VAR parameters.

EViews now offers support for the linear restriction approach to handling this over-parameterization problem.

Select **Quick/Estimate VAR...** or type var in the command window to display the estimation dialog. Click on the **VAR Restrictions** tab to specify your restrictions:
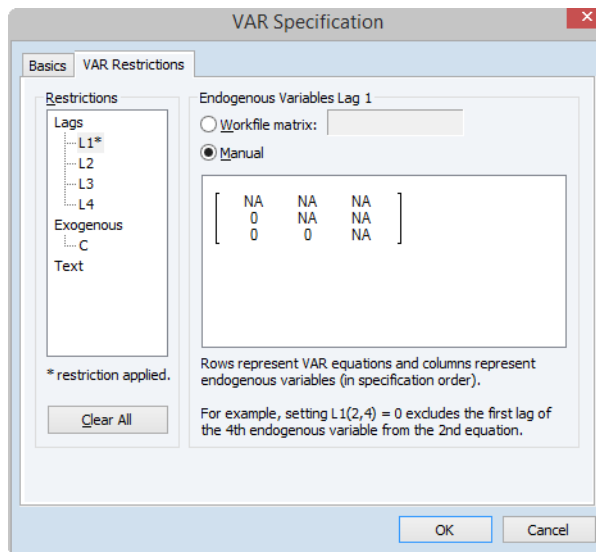
The **Restrictions** section on the left should be used to select the VAR elements that you wish to restrict. You may click on the entries for the lag matrices (**L1**, **L2**, **L3**, **L4**) and the vectors of coefficients associated with each exogenous variable (**C**) to select an element to restrict. The right side of the dialog will change to show the current settings for the selected element.

In settings where restricting a large number individual elements is inconvenient, or where you wish to impose restrictions across lag or exogenous variable coefficients, you may find it

more convenient to specify restrictions using text expressions. In this case, click on the **Text** node of the **Restrictions** tree to display the **Restriction Text** edit field.

When restrictions have been applied, the **Basics** tab of the dialog will change to offer additional options. In the newly displayed **Restriction estimation section** in the bottom left o the dialog, you will be prompted to specify the method of estimating your restricted coefficients:
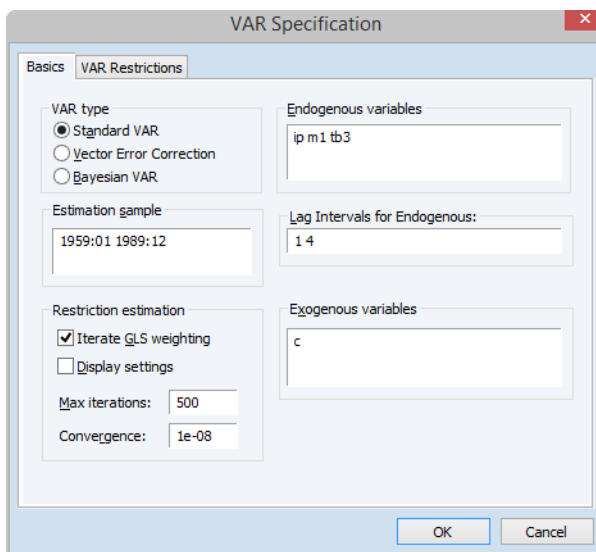
In you do not select the **Iterate GLS weighting** option, EViews will estimate the parameters of the model using one-step GLS estimation.

If you do select **Iterate GLS weighting you will be prompted** to specify the iteration and convergence properties of the estimation. To estimate with OLS, you may select **Iterate GLS weighting** and specify a **Max Iterations** of 0.

Click on **OK** to estimate restricted VAR specification.

For additional discussion, see

- See "Estimating a VAR with Linear Restrictions in EViews" on page 695 of *User's Guide II* for discussion and additional detail.

- See `Var::ls` (p. 867) in the *Object Reference*.

SVAR Specification and Estimation

A structural VAR (SVAR) uses additional identifying restrictions and estimation of structural matrices to transform VAR errors into uncorrelated structural shocks. Obtaining structural shocks is central to a wide range of VAR analysis, including impulse response, forecast variance decomposition, historical decomposition, and other forms of causal analysis. See, for example, Amisano and Giannini (1997), Martin, Hurn, and Harris (2013).

Prior versions of EViews supported estimation of SVARs that employed either short-run A-B restrictions or long-run F restrictions for identification, but not models that included both. Further, the interface for specification of the SVAR restrictions was somewhat cumbersome.

EViews 10 introduces an entirely new SVAR estimation engine following Rubio-Ramirez, Waggoner, and Zha (2010) that allows for models that combine short and long-run restrictions. In addition the new specification interface is a much more intuitive method of imposing your restrictions.

As before, estimation of a SVAR may be performed by selecting **Proc/Estimate Structural Factorization...** from the menu of an estimated VAR. The all new **Identifying Restrictions** tab allows you to specify your SVAR restrictions.
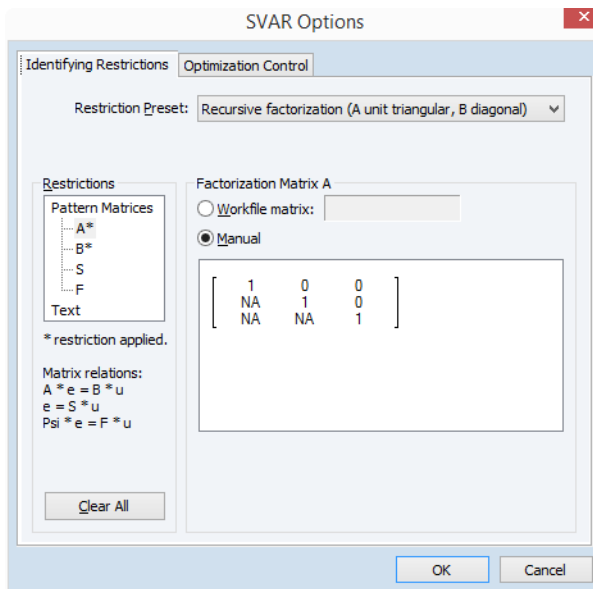
The **Restriction Preset** drop-down menu provides a variety of pre-built restriction templates that can be applied to the SVAR model. Several of the presets can be used as is, while others require additional restrictions to meet the order condition.

Alternately, the selection area on the left of the dialog allows you to view the current pattern matrices for any and all of the four canonical matrices as well as the current collection of text expression restrictions. Selecting a matrix element will change the dialog display to show the current restrictions for that matrix.

As before, you may use the **Text** selection to enter your restrictions in text. Text entry will be required for more complicated that restrictions that involve more than one canonical matrix element. In addition, there are a number of special functions that make it easy to specify common restrictions such as lower triangular or diagonal.

The top portion of your SVAR output will show the restrictions, parameterization, and estimated coefficients,

```
Structural VAR Estimates
Date: 06/15/17   Time: 16:15
Sample: 1955Q1 1987Q3
Included observations: 131
Estimation method: Least squares via Gauss-Newton (analytic derivatives)
Convergence achieved after 16 iterations
Structural VAR is just-identified
```

```
Model: Ae = Bu where E[uu']=I
A =
        C(1)          C(5)          C(9)          C(13)
        C(2)          C(6)          C(10)         -C(10)
        C(3)          C(7)          C(11)         C(14)
        C(4)          C(8)          C(12)         C(15)
B =
         1            0             0             0
         0            1             0             0
         0            0             1             0
         0            0             0             1
@F(1,2) = 0
@F(1,3) = 0
@F(1,4) = 0
@S(1,2) = 0
@S(1,3) = 0
@A(2,3) + @A(2,4) = 0
@DIAG(B) = 1
including the restriction(s)
```

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.938016	0.059131	15.86337	0.0000
C(2)	0.141273	0.101338	1.394080	0.1633
C(3)	-0.240158	0.102263	-2.348425	0.0189
C(4)	0.569856	0.092085	6.188399	0.0000
C(5)	-0.614865	0.045403	-13.54246	0.0000
C(6)	0.590929	0.195760	3.018647	0.0025
C(7)	0.768293	0.146066	5.259897	0.0000
C(8)	0.928173	0.094779	9.793037	0.0000
C(9)	0.275181	0.019167	14.35711	0.0000
C(10)	0.178343	0.036007	4.953047	0.0000
C(11)	0.154229	0.056652	2.722407	0.0065
C(12)	-0.415401	0.037699	-11.01892	0.0000
C(13)	-0.081105	0.007293	-11.12095	0.0000
C(14)	0.187028	0.030663	6.099560	0.0000
C(15)	0.122432	0.017324	7.067029	0.0000

Objective value	-952.9302

while the bottom portion shows the structural matrix estimates,

Estimated A matrix:			
0.938016	-0.614865	0.275181	-0.081105
0.141273	0.590929	0.178343	-0.178343
-0.240158	0.768293	0.154229	0.187028
0.569856	0.928173	-0.415401	0.122432
Estimated B matrix:			
1.000000	0.000000	0.000000	0.000000
0.000000	1.000000	0.000000	0.000000
0.000000	0.000000	1.000000	0.000000
0.000000	0.000000	0.000000	1.000000
Estimated S matrix:			
0.760158	0.000000	0.000000	0.503565
-0.176944	0.628329	0.339939	0.278754
0.924631	0.517439	1.547698	-0.998017
0.940489	-3.007808	2.674070	0.324515
Estimated F matrix:			
1.236121	0.000000	0.000000	0.000000
-0.127932	-0.520269	-0.027516	0.654769
5.272415	7.150987	4.518060	-2.794496
7.864187	4.919853	6.432775	-7.228512

For additional discussion, see

- See "Structural (Identified) VARs" on page 714 of *User's Guide II* for discussion and additional detail.

- `Var::append` (p. 843) and `Var::svar` (p. 878) in the *Object Reference*.

Testing and Diagnostics

Linearity and Constancy Tests

EViews has provided tests of equations for linearity and testing for parameter constancy for many years as represented by the existing Ramsey reset linearity tests, and the Chow break-point, Quandt-Andrews, Bai, Bai-Perron, and CUSUM tests.

EViews 10 adds several new tests of linearity and parameter constancy against smooth threshold alternatives (see Teräsvirta (1994), Eitrheim and Teräsvirta (1996), Escribano and Jorda (1999), van Dijk, Teräsvirta, and Franses (2002)). As all of these tests involve a smooth transition regression (STR) alternative, they are implemented within EViews as tests of model specification for an estimated STR, but they are generally applicable as alternatives to the existing tests.

Linearity Tests

To perform a test of linearity, you will first estimate a STR equation ("Smooth Threshold Regression Estimation" on page 43). The linearity and parameter constancy tests are then available as views off of your equation.

For linearity testing against the smooth transition alternative, click on **View/Stability Diagnostics/Linearity Tests**:

Smooth Threshold Linearity Tests
Date: 05/06/17   Time: 10:28
Sample: 1861 1988
Included observations: 120
Test for nonlinearity using YS(-3) as the threshold variable
Taylor series alternatives: b0 + b1*s [+ b2*s^2 + b3*s^3 + b4
      *s^4]

| | Linearity Tests | | |
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	2.719220	(30, 84)	0.0002
H03: b1=b2=b3=0	2.854853	(23, 91)	0.0002
H02: b1=b2=0	3.039417	(16, 98)	0.0004
H01: b1=0	3.257240	(9, 105)	0.0016

The H0i test uses the i-th order Taylor expansion (bj=0 for all
      j>i).

| | Terasvirta Sequential Tests | | |
Null Hypothesis	F-statistic	d.f.	p-value
H3: b3=0	1.957734	(7, 91)	0.0695
H2: b2=0	b3=0	2.375368	(7, 98)	0.0276
H1: b1=0	b2=b3=0	3.257240	(9, 105)	0.0016

All tests are based on the third-order Taylor expansion (b4=0).
Linear model is rejected at the 5% level using H03.
Recommended model: first-order logistic.
   . Pr(H1) <= Pr(H2)

| | Escribano-Jorda Tests | | |
Null Hypothesis	F-statistic	d.f.	p-value
H0L: b2=b4=0	1.394541	(13, 84)	0.1792
H0E: b1=b3=0	2.456645	(12, 84)	0.0085

All tests are based on the fourth-order Taylor expansion.
Linear model is rejected at the 5% level using H04.
Recommended model: first-order logistic with zero threshold.
   . Pr(H0L) >= Pr(H0E) with Pr(H0L) >= .05 and Pr(H0E) <
      .05).

EViews computes the Luukkonen, Saikkonen, and Teräsvirta linearity tests of the joint hypothesis test for significance of the elements of the Taylor approximation, Teräsvirta tests are a sequential set of general-to-specific tests, and Escribano-Jorda tests which test for nonlinearity and to discriminate between alternative choices for the transition function.

Remaining Nonlinearity Tests

Given estimation of a two-regime STR model we may wish to test for whether there is additional unmodeled nonlinearity. One popular approach is to test the estimated model against a model with additional regimes. EViews follows van Dijk, Teräsvirta, and Franses (2002) in distinguishing between two forms of the test, the additive and the encapsulated tests, which offer different specifications of the multiple regime alternative.

Click on **View/Stability Diagnostics/Remaining Nonlinearity Test/Additive Nonlinearity Test** or **View/Stability Diagnostics/Remaining Nonlinearity Test/Encapsulated Nonlinearity Test** to perform the test.

Parameter Constancy Test

One interesting variant of the STR model is the time-varying coefficient specification which is obtained by choosing time to be the threshold variable. This model allows for structural instability in which regression parameters evolve smoothly over time.

To perform this test, select **View/Stability Diagnostics/Parameter Constancy Test**:

```
Smooth Threshold Parameter Constancy Test
Date: 05/06/17   Time: 10:29
Sample: 1861 1988
Included observations: 120
Encapsulated nonlinearity test using trend as the threshold
     variable
Taylor series alternatives: b0 + b1*s [ + b2*s^2 + b3*s^3 + b4
     *s^4 ]
```

Parameter Constancy Tests			
Null Hypothesis	F-statistic	d.f.	p-value
H04: b1=b2=b3=b4=0	0.962281	(56, 48)	0.5576
H03: b1=b2=b3=0	0.911618	(42, 62)	0.6204
H02: b1=b2=0	1.443235	(28, 76)	0.1063
H01: b1=0	2.164006	(14, 90)	0.0152

The H0i test uses the i-th order Taylor expansion (bj=0 for all
     j>i).

- See "Stability Diagnostics" on page 489 of *User's Guide II*.
- See Equation::strconstant (p. 162) for constancy testing.
- See Equation::strlinear (p. 162) for linearity testing.
- See Equation::strnonlin (p. 162) for additional nonlinearity testing.

VAR Tools for Structural Residuals

Structural residuals play an important role in VAR analysis, and their computation is required for a wide range of VAR analysis, including impulse response, forecast variance decomposition, and historical decomposition.

While EViews has long computed these transformed residuals for internal use, EViews 10 now makes structural residuals available to users.

You may display the **Structural Residuals** views to examine these residuals in graph and spreadsheet form. If the $\hat{\epsilon}_t$ are the ordinary residuals, we display the structural residuals $\hat{u}_t$ based on factor loadings F,

$$\hat{\epsilon}_t \;=\; F\hat{u}_t \qquad\qquad (0.2)$$

or based on weights W,

$$W\hat{\epsilon}_t \;=\; \hat{u}_t \qquad\qquad (0.3)$$

When producing results for the **Structural Residuals** views, you will be prompted to choose a transformation.
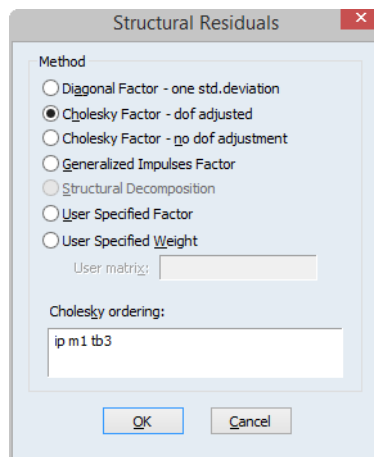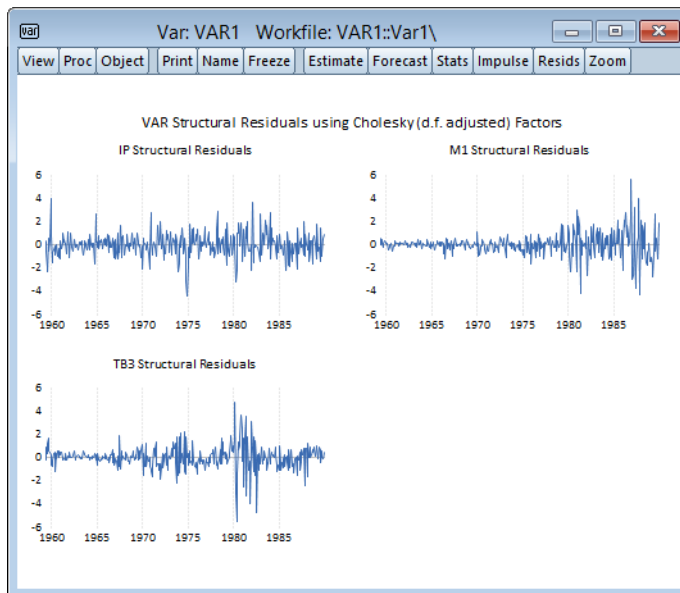
In addition, you may use the **Make Structural Residuals...** entry on the proc menu to save these series into the workfile.

- `Var::resids` (p. 876) and `Var::makeresids` (p. 872) in the *Object Reference*.

Improved VAR Serial Correlation Testing

Prior versions of EViews computed the multivariate LM test statistic for residual correlation at a specified order using the LR form of the Breusch-Godfrey test with an Edgeworth expansion correction (Johansen 1995, Edgerton and Shukur 1999).

EViews 10 offers two substantive improvements for testing VAR serial correlation.

- First, in addition to testing for autocorrelation at specified orders $s = 1, ..., h$, EViews now also tests jointly for autocorrelation for lags 1 to s. $s = 1, ..., h$.

- Second, EViews augments the Edgeworth LR form of the test with the Rao F-test version of the LM statistic as described Edgerton and Shukur (1999) whose simulations suggest it performs best among the many variants they consider.

To perform the tests, simply select **View/Residual Tests/Autocorrelation LM Test...** in your estimated VAR object window. EViews will prompt you for the lag order h. Enter a value and click on OK:

VAR Residual Serial Correlation LM
Tests
Date: 16/06/17   Time: 11:24
Sample: 1959M01 1989M12
Included observations: 368

	Null hypothesis: No serial correlation at lag h					
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	9.784958	9	0.3682	1.088985	(9, 852.0)	0.3682
2	32.46925	9	0.0002	3.661991	(9, 852.0)	0.0002
3	12.33745	9	0.1949	1.375111	(9, 852.0)	0.1950
4	12.47893	9	0.1876	1.390995	(9, 852.0)	0.1876
5	40.05849	9	0.0000	4.538158	(9, 852.0)	0.0000

	Null hypothesis: No serial correlation at lags 1 to h					
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	9.784958	9	0.3682	1.088985	(9, 852.0)	0.3682
2	44.74279	18	0.0005	2.522191	(18, 981.9)	0.0005
3	57.45826	27	0.0006	2.162411	(27, 1005.3)	0.0006
4	89.49583	36	0.0000	2.554652	(36, 1008.3)	0.0000
5	97.37132	45	0.0000	2.222224	(45, 1004.9)	0.0000

*Edgeworth expansion corrected likelihood ratio statistic.

- See `Var::arlm` (p. 845) in the *Object Reference*.

VAR Historical and Variance Decomposition

Historical Decomposition

One method of innovation accounting is to decompose the observed series into the components corresponding to each structural shock. Burbridge and Harrison (1985) propose transforming observed residuals to structural residuals, and then for each observation beyond some point in the estimation sample, computing the contribution of the different accumulated structural shocks to each observed variable.

EViews 10 adds built-in support for computing historical decompositions. To obtain the historical decomposition, select **View/Historical Decomposition...** from the var object toolbar:
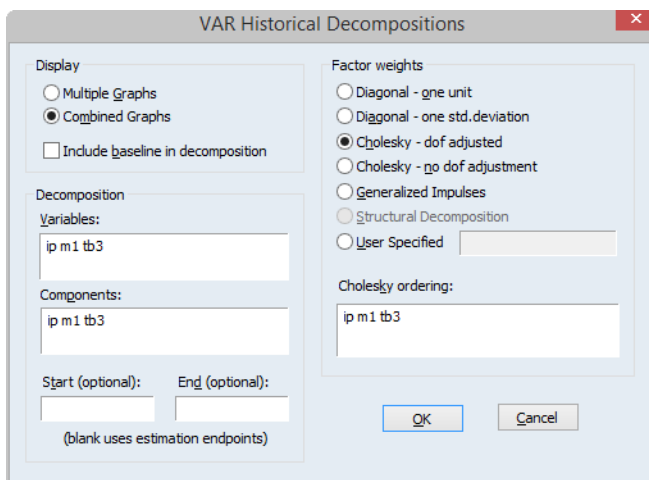
As with impulse response analysis, you may choose between various weighting methods such as Cholesky or generalized residual weights, and you can customize the display to show subsets of forecast errors and components, and only the error decomposition or the decomposition inclusive of the baseline forecasts.

A multiple graph decomposition of the stochastic component will look something like:

while the corresponding combined graph is given by

Historical Decomposition using Cholesky (d.f. adjusted) Weights
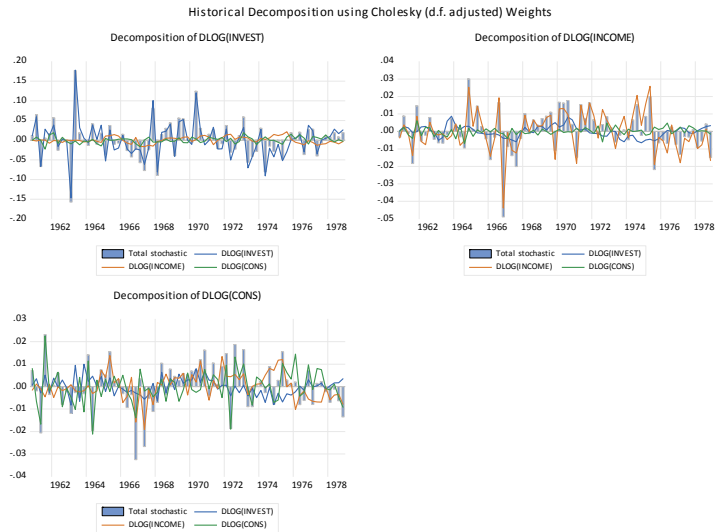
Including the baseline in the combined graph gives

Historical Decomposition using Cholesky (d.f. adjusted) Weights
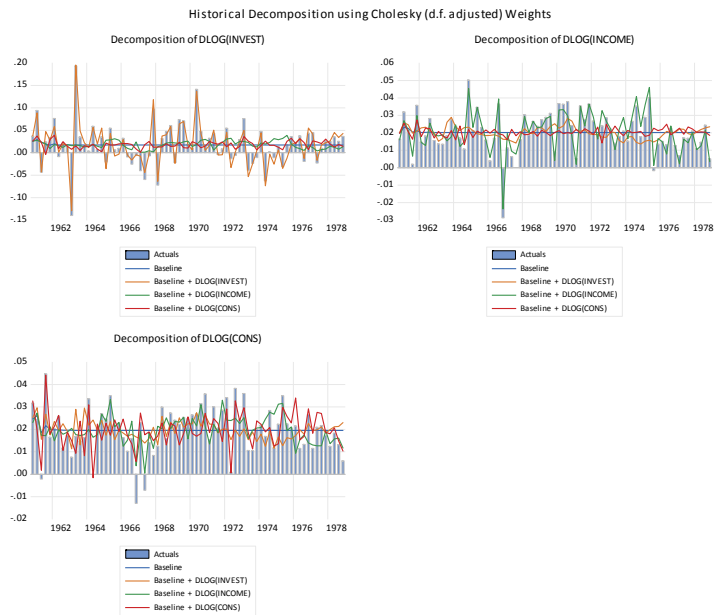
- See "Historical Decomposition" on page 711 and of *User's Guide II* for discussion.

- See `Var::hdecomp` (p. 860) in the *Object Reference*.

Variance Decomposition

EViews 10 adds to the existing variance decomposition tools the ability to produce automatically the popular stacked graph showing the results for the decomposition.
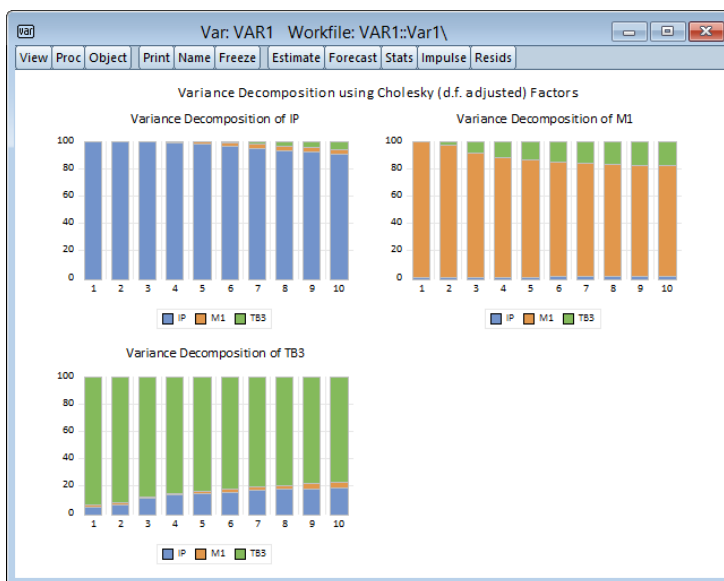
- See "Variance Decomposition" on page 710 of *User's Guide II* for discussion.

- See `Var::decomp` (p. 853) in the *Object Reference*.

Nonlinear Dynamic Forecasting Simulation

When forecasting from an equation object with a nonlinear dynamic specification, EViews 10 provides easy-to-use tools for performing stochastic simulation to obtain the mean and standard error of the forecast.

Simply click on the **Forecast** button as always, and click on the click on the **Stochastic simulation** checkbox and enter the number of **Repetitions** and **Failed reps prop. before halting** as desired:
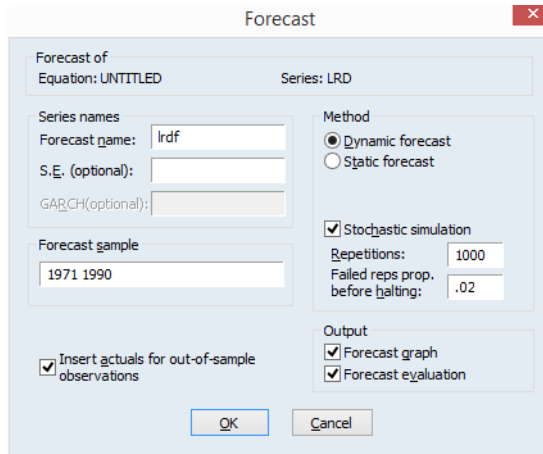
- See "Dynamic Forecasting" on page 160 of *User's Guide II* for discussion.

- See `Equation::forecast` (p. 92) in the *Object Reference*.

STL Decomposition and MoveReg Seasonal Adjustment

EViews 10 features two new seasonal adjustment methods: STL decomposition and MoveReg. To access these methods, from the series menu, select **Proc/Seasonal Adjustment**.

STL decomposition (Cleveland, Cleveland, McRae and Terpenning, 1990) assumes an additive relationship between the seasonal, trend and remainder components of a series. A filtering algorithm based upon LOESS regressions is used to estimate those three components.

STL offers two important advantages over other seasonal adjustment methods; it works on any frequency of data, and can be calculated on time series data with irregular patterns and missing values.

EViews 10 also provides a front-end interface to the MoveReg program, a weekly seasonal adjustment program developed by the U.S. Bureau of Labor. Most seasonal adjustment routines, including the U.S. Census Bureau's X-11, X-12 and X-13 packages, require the data be sampled at a monthly or quarterly frequency. However, many economic series are sampled on a weekly basis, meaning that these seasonal adjustment techniques cannot be used. MoveReg fills this void by offering a seasonal adjustment method aimed directly at weekly data.
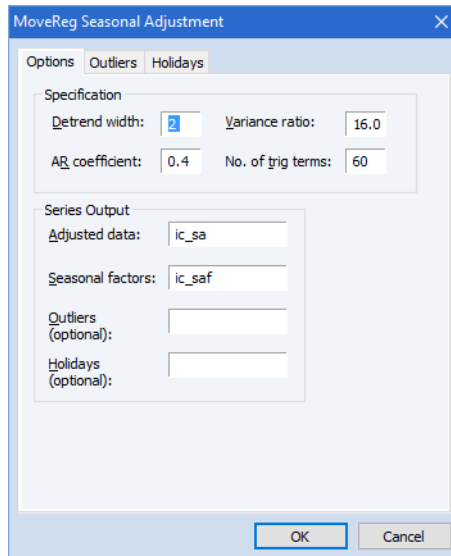
- See "STL Decomposition" on page 463 and "MoveReg Weekly Seasonal Adjustment" on page 472 of *User's Guide I* for additional discussion.

- See `Series::stl` (p. 608) and `Series::movereg` (p. 584) in the *Object Reference*.

Model Bounds Checking

EViews 10 lets you specify boundaries for endogenous variables in a model through a new **Boundaries** dialog page.
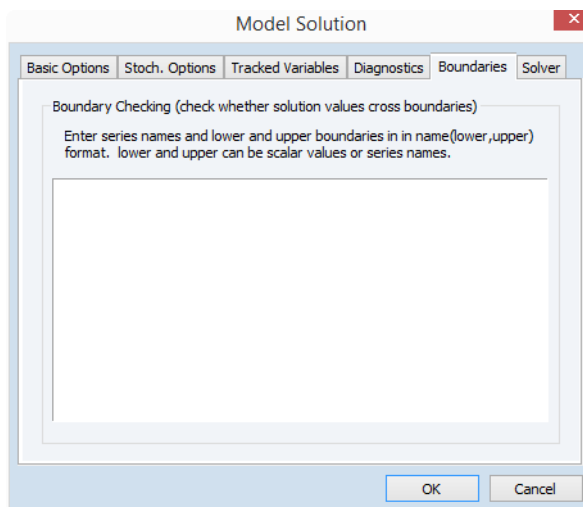
Although the solver will not enforce the boundaries while solving the model, EViews will warn you if any variable crosses its boundaries (*i.e.,* solves to a value higher than the upper boundary or less than the lower boundary) for any observation in the solve sample.

Boundary violations may be examined in detail using the **Check Solution Bounds** view after the solve is complete.

- See "Boundaries" on page 829 of *User's Guide II* for discussion.
- See Model::checkbounds (p. 428) in the *Object Reference*.
- See Model::setbounds (p. 451) in the *Object Reference*.

Improved Distribution Function and Special Function Calculations

EViews 10 offers new functions for numerically stable computation of tails of cumulative distribution functions, special functions, and expressions involving logs and exponentials when evaluated in regions where the standard functions will show a loss of precision:

- "Distribution Functions" on page 67.
- "Special Functions and Constants" on page 68.

Other Features

There are a number of other features and improvements that are not mentioned above.

Series Generating Functions

General Functions

You may also use the following new functions when generating a series:

- @sign(X) – returns -1, 0, 1 depending on the sign of the corresponding element of X
- @bounds(X, Y, Z) – returns X if X is between Y and Z and the boundary values Y and Z otherwise
- @pmax(X, Y) – returns the pairwise max of X and Y (for more than pairs, you may still use @rmax)
- @pmin(X, Y) – returns the pairwise min of X and Y (for more than pairs, you may still use @rmin)

The following previously existing functions now take an optional argument. Non-zero values for this argument refer to the number of decimal points to take account of when performing the operation:

- @round
- @floor
- @ceiling

For example, the `@round` function with an optional parameter of 2 will round to the nearest 100. `@round` with an optional parameter of -2 will round to the nearest 0.01.

Date Functions

- @dateceil – rounds date up to end of period (p. 634) in the *Command and Programming Reference*.
- @datenext – rounds date up to end of period (p. 636) in the *Command and Programming Reference*.

Distribution Functions

The following cumulative distribution functions now take an optional argument. Non-zero values for this argument instruct EViews to compute the upper tail of the CDF:

- @cnorm
- @claplace
- @cextreme
- @clogistic
- @cged

- @cexp
- @cchisq
- @ctdist
- @cbeta
- @cfdist
- @cgamma
- @cweib
- @clognorm
- @cpareto

In addition, the new function

- @logcnorm

offers a more numerically stable function for the computation of `@log(@cnorm(x))`.

Special Functions and Constants

EViews 10 offers new functions for numerically stable computation of expressions involving logs and exponentials in regions where the standard functions will show a loss of precision:

- @expm1(x) – computes $e^x - 1$ with accuracy in the neighborhood of $x = 0$.
- @log1p(x) – computes $\log(1 + x)$ with accuracy in the neighborhood of $x = 0$.
- @log1mexp(x) – computes $\log(1 - e^x)$ with accuracy for $x < 0$ in the neighborhood of $x = 0$.
- @powm1(x, a) – computes $x^a - 1$ with accuracy in the neighborhood of $x = 0$.
- @pow1pm1(x, a) – computes $(1 + x)^a - 1$ with accuracy in the neighborhood of $x = 0$.

    While similar to `@powm1`, this function supports a full double-precision "delta" from one. Among other things, `@pow1pm1` allows exponentiation of values extremely close to one that cannot be represented in double-precision, *e.g.*, $1 + 10^{-20}$. This function should only be used if the calculation of x naturally falls near zero. If the calculation of x naturally falls near one, `@powm1` should instead be used (supplying $x - 1$ to this function will produce less accurate results).

The previously existing special functions now take an optional argument. Non-zero values for this argument instruct EViews to compute the upper tail of the integral:

- @gammainc
- @betainc

The following numerical constants may now be used in expressions:

- @log2pi – $\log(2\pi)$.

- @pi – π.

Group Row Functions

EViews 10 adds new row functions that produce descriptive statistics for each observation across the series in the group:

- @rmedian(g) – row-wise median

- @rprod(g) – row-wise product (one should be careful of overflow)

- @rquantile(g, q) – where q is the quantile computed using the Cleveland quantile definition.

Matrix Functions

In addition to almost all of the "Series Generating Functions" on page 67 functions above which may be applied to matrix elements (the notable exceptions include `@pmax`, and `@pmin`, along with the "Group Row Functions" on page 69), EViews 10 offers several new matrix specific functions:

- @emax(X, Y) – returns the element max of the conformable matrices X and Y

- @emin(X, Y) – returns the element min of the conformable matrices X and Y

- @erecode(Z, X, Y) – returns the element recode using the conformable condition matrix Z and the matrices X and Y

In addition, EViews 10 expands the set of column functions that produce descriptive statistics for each column in a matrix.

- @cprod(m) – column product (one should be careful of overflow)

- @cquantile(m, q) – column quantile q using the Cleveland definition

- @csumsq(m) – column sum of squared values

- @cstdev(m), @cstdevs(m) – column sample standard deviation

- @cstdevp(m) – column population standard deviation

- @cvar(m), @cvarp(m) – column population variance

- @cvars(m) – column sample variance

- @cmedian(m) – column median

EViews 10 also adds to the existing economy singular value decomposition @svd function a full-size (non-economy) version:

- @svdfull(m1, m2, m3)) – full size singular value decomposition

Programming Support Functions

These are new functions for working with external applications from within EViews:

@xgetstr .... returns a scalar string value from the external application (p. 767) in the *Command and Programming Reference*.

@xgetnum .... returns a scalar numeric value from the external application (p. 767) in the *Command and Programming Reference*.

@xverstr .... returns the external application version number as a string (p. 768) in the *Command and Programming Reference*.

@xvernum .... returns the external application version number as a number (p. 768) in the *Command and Programming Reference*.

Object Data Members

EViews 10 offers an expanded set of object data members that provide access to information about the object.

Equation Data Members

Scalar Values

@**nbreaks**............. number of breaks in a breakpoint least squares equation.

@**nclusters** .... number of clusters in cluster-robust covariance calculation.

Vectors and Matrices

@**ardlcoint** .... returns a coef containing coefficients from the cointegrating relationship form of an ARDL estimation.

@**ardlsrcoefs**......... .returns a matrix where each row corresponds to an individual cross-section's short-run coefficients. Only applicable for PMG/ARDL estimation.

@**ardlsrses**............ .returns a matrix where each row corresponds to an individual cross-section's short-run coefficient standard errors. Only applicable for PMG/ARDL estimation.

String Values

@**ardlcointsubst** ... returns string representation of the cointegration form of an ARDL equation with substituted coefficients.

VAR Data Members

Vectors and Matrices

@**svarsmat** .... estimated S matrix for short-run impulse responses.

@**svarfmat**............ estimated F matrix for long-run impulse responses.

Scalar Values

    @nrestrict............number of restrictions in a restricted VAR.

Updated Command List

(Unless otherwise specified, all of the object views and procedures are in *Command and Programming Reference*.)

Commands

    dbopen.................open a database (p. 349).
    logclear...............clears the log window corresponding to the program (p. 412).
    logclose...............closes one or more or all message log windows *(new)* (p. 413).
    logmode..............set the log settings of specified message types (p. 414).
    logmsg................adds a line of text to the program log (p. 416).
    logsave................saves the program log to a text file (p. 417).
    pageload..............load one or more pages into a workfile from a workfile or a foreign data source (p. 449).
    pagesave.............save the active page in the default workfile as an EViews workfile (.WF1 file) or as a foreign data source (p. 451).
    preview...............preview objects contained in a database or workfile *(new)* (p. 464).
    wfcreate..............open a workfile (p. 521).
    wfopen...............reads in a previously saved workfile from disk, or reads the contents of a foreign data source into a new workfile (p. 526).
    wfsave................save the default workfile as an EViews workfile (.wf1 file) or as a foreign file or data source (p. 542).
    wfsnapshot..........takes a manual snapshot of the current workfile *(new)* (p. 546).
    xoff.....................turns off mode that sends all subsequent command lines to the external program *(new)* (p. 553).
    xon.....................turns on mode that sends all subsequent command lines to the external program *(new)* (p. 554).
    xpackage.............installs the specified R package in the current external R connection *(new)* (p. 556).

Graph Creation Commands

    bubble.................bubble plot specified using single area series *(new)* (p. 925) in the *Object Reference*.
    bubbletrip...........bubble plot specified as triplets *(new)* (p. 926) in the *Object Reference*.

Interactive Use Commands

    forecast...............dynamic forecast from an equation (p. 365).

ls .... equation using least squares or nonlinear least squares, including ARMA estimation (p. 418).

threshold .... threshold least squares and smooth threshold regression, including threshold autoregression and smooth threshold autoregression (p. 503).

Updated Object List

(Unless otherwise specified, all of the object views and procedures are in *Object Reference*.)

Equations

Equation Views

rgmprobs .... display the regime probabilities in a switching regression equation (p. 162).

strconstant .... tests for constancy of the base specification coefficients against a smoothly varying alternative in a smooth threshold regression *(new)* (p. 162).

strlinear .... tests for linearity of the base specification against the smooth threshold alternative in a smooth threshold regression *(new)* (p. 162).

strnonlin .... compute various tests for additional additive or encapsulated non-linearity in a smooth threshold regression *(new)* (p. 162).

strwgts .... display the transition weights in a smooth threshold regression *(new)* (p. 163).

Equation Procs

forecast .... compute dynamic forecast (p. 92).

makestrwgts .... save the smooth transition weights in a smooth threshold regression *(new)* (p. 131).

Graphs

Graph Procs

addarrow .... draw a line or arrow on a graph (p. 239).

addtext .... draw a text on a graph (p. 247).

Group

Group Views

bubble .... bubble plot specified using single area series *(new)* (p. 925) in the *Object Reference*.

bubbletrip .... bubble plot specified as triplet *(new)* (p. 926) in the *Object Reference*.

Matrix

Matrix Views

Models

Model Views

Model Procs

Series

Series Procs

Spools

Spool Procs

System

System Views

Table

Table Procs

VAR

Var Views

EViews 10 Compatibility Notes

The following discussion describes EViews 10 compatibility issues for users of earlier versions.

Workfile Compatibility

With few exceptions, EViews 10 workfiles are backward compatible with EViews 9. Note that the following objects are new or have been modified in Version 10:

- Estimation objects estimated with methods that employ new features (smooth threshold regression, ARDL models estimated with an unrestricted constqant and unrestricted trend (case 5) and those estimated with manual fixed lags, regression with new forms of heteroskedasticity-consistent and cluster robust standard errors, VARs with restrictions)

- SVARs specified using the new syntax and methods will not be loaded on earlier versions of the EViews. The original VAR object may sill be read, but will not have the associated SVAR results.

If you have saved workfiles containing any of the above objects and open them in EViews 8 or earlier, EViews will delete the incompatible object and notify you that one or more objects were not read. If you then save the workfile, you will lose the objects. We recommend that you make a copy of any workfiles that contain these objects if you would like to use these workfiles in earlier versions of EViews.