A G7 Update for Inforum World Conference XIII

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Abstract

This paper documents developments in G7 since the last Inforum World Conference. In addition to typical debugging efforts, considerable attention has been paid to making G7 more user-friendly. Several routines have been altered to enhance the capability of G7 to perform complex tasks. Finally, G7 now offers several new commands that allow increased efficiency and reliablity in the task of data management and model building.

0.1   Introduction

Work over the past year has produced model-building software that is more reliable, more powerful, and easier to use. Enhanced reliability for G7 comes in the form of bug fixes and new routines that simplify standard tasks to reduce the probability of human errors. New and extended routines allow the user to perform complex tasks that before were impossible or more difficult. Finally, new interfaces and error handling methods help the user to understand the demands G7 makes, to enter correctly the data G7 expects, and to detect and interpret the complaints of G7 when things go wrong. Hopefully, these developments will make the process of building economic models faster and more enjoyable.

0.2   G7 Reliability

While G7 now is more reliable than ever before, bugs still appear occasionally. Real effort is made to correct bugs when they are found. This section describes some of the problems that were fixed in the past year.

At the Inforum conference last year, a new set of functions for handling matrices was presented. A summary of these commands may be found at www.inforum.umd.edu/IWCXII.html. In particular, the new `mcopy` command allows vectors and matrices to be copied either within or between Vam banks. Unfortunately, a few problems were discovered since the conference. All known problems have been fixed. In addition, the `mcopy` command now handles dates somewhat more intelligently. If no date is specified in the script, then by default G7 will copy the vector or matrix for all periods within the `fdate` range. This range is restricted further as needed, depending on the range of dates specified in the configuration file of each Vam bank.

A minor bug sometimes prevented a data bank from being loaded when selected from the G7 main menu. This problem has been fixed so that banks now can be loaded reliably from the menu. Another problem experienced too frequently in recent years caused difficulty with printing data. Several such problems with the `matty` command have been fixed, and so this command again should allow data to be printed easily.

In the past, G7 often seemed too eager to do its job. When the program detected a problem with the data or with the user's script, G7 frequently would display a brief error message and then would go to the next command. Unfortunately, even alert and experienced G7 users easily could miss the reported errors. The same problem made it difficult to stop a script once processing began. For example, often it was impossible to stop a presentation of graphs within a `do` loop, even when the "Stop" button was selected. While such problems have not been eliminated entirely, they now are rare. G7 usually will stop processing a script once an error has been detected, and usually execution of scripts may be terminated with the `pause` command (by selecting "Cancel") or with the `graph` command (by selecting "Stop").

0.3 Ease of Use

The first thing seen by G7 users has been an uninformative, rather unfriendly File Open window. Experienced users knew to look for a file called `g.cfg`, but no instructions were offered for the novice. Even many who otherwise were familiar with G7 struggled with the appropriate content for these mysterious configuration files. The new version of G7 features an alternative that surely will be welcomed by the novice and hopefully also will be appreciated by experts. When G7 is launched, a configuration utility is displayed. Lines from the `g.cfg` file in the current directory are loaded. If no configuration file is present in the current directory, then default values are loaded. The user may search for a file and load it. The data may be edited, and changes may be saved in a new `g.cfg` file. Guidance is offered in an attached help file. The utility is displayed in Figure 1.

Figure 1.

G7 now displays a list of files that recently have been opened in the G7 editor. After closing the editor, you will see the name of the file displayed under the File menu in the main G7 window. Click the menu item to reopen the file in the editor.
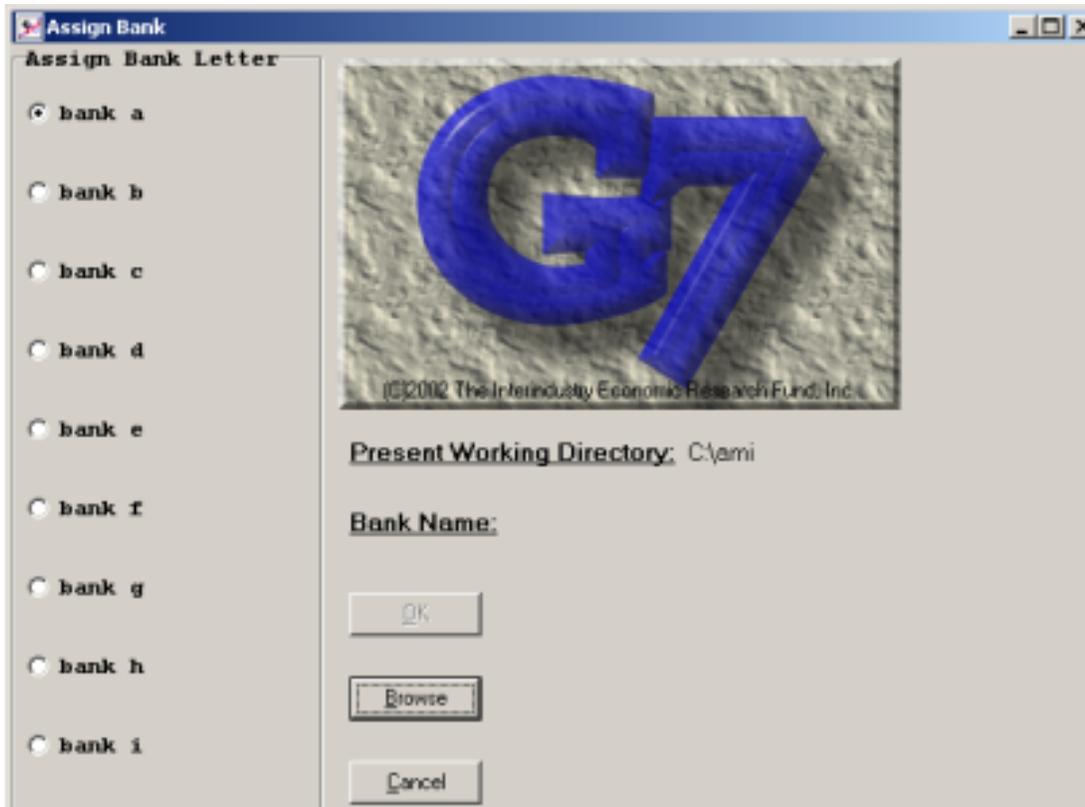
Figure 1: Figure 2.

When opening a data bank from the menu, the user now will find a form. This form allows the user to select a bank letter, to search for a data file, and to open it. In the past, banks always were opened in the first position; that is, banks always were opened as "bank a." It now is possible to choose an alternative bank position, so that multiple banks can be opened by assigning each bank from the menu.

It sometimes is desirable to use an editor other than the one offered with G7. If a file is open in the G7 editor, G7 now monitors the file for changes by another program. If the file has been altered, the user is offered the possibility of reloading the file. Several other changes also make the G7 editor more useful. First, selected text can be changed to all lower-case or all capital letters by selecting the appropriate item under the Edit menu. Second, the Find and Find and Replace utilities now will load selected text into the dialogue box.

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0.4 Extended Capabilities

It often is convenient to construct a set of functions that may be executed with a single command. The **add** command has offered this capability for many years. To employ this feature, a text file must be created to store the G7 script. The script is processed by specifying the file name after the **add** command. Several arguments may be passed to this file as it is processed. A new **function** command provides similar capability without creation of multiple files. The syntax is

```
function <function name> {
    [G7 script...]
    }
```

The function name is supplied by the user. A good practice is to use at least one capital letter in the name to avoid conflict with G7 keywords. Note that G7 script is surrounded by brackets: {}. The function is executed by providing the function name as you would any other G7 command. Arguments may be passed to the script contained in the function. In the following example, a function is created to convert two series from levels to growth rates. The new series are graphed with the title provided as a third argument.

```
# Creating a function.
function GR {
    f x1 = @gr( %1 )
    f x2 = @gr( %2 )
    ti %3
    gr x1 x2
    }
# Testing the function.
f y = @cum( xx, 1.0, 0.0 )
f z = y + @rand()
GR y z "Test Results"
```

Note that the function is specified before it is used. The name of the function, GR, is capitalized to avoid conflict with the **graph** command. Three arguments are passed to the function: the first two are the names of series, y and z, and the third is a graph title. Up to 100 such functions may be defined. If a second function is declared with a duplicate name, then it will replace the first function. G7 thus may be customized to individual preferences. A file containing standard functions may be specified as the last line of the G7 configuration file. In this way, such functions can be loaded automatically and will be available at all times.

The `add` command and the new `function` command are related closely to the `do` command. This latter command has been upgraded significantly. The syntax of the `do` command is

```
do{
    [G7 script...]
    }<argument 1> [argument 2] [...]
```

Up to nine arguments are permitted on the last line. See the G7 help file for full details. The final set of arguments may contain groups of numbers. These numbers are passed to the G7 script upon each iteration of the loop. An example with two arguments

```
do{
    ic Iteration %1 %2
    }( 1-2 ) (3-4)
```

produces the output

```
Iteration 1 3
Iteration 1 4
Iteration 2 3
Iteration 2 4
```

In the past, G7 ignored the order of the argument and always looped through the arguments in increasing order. It now is possible to execute arguments in decreasing order. For example, if the arguments (1-2)(4-3) were specified instead in the loop above, then the following output would be produced:

```
Iteration 1 4
Iteration 1 3
Iteration 2 4
Iteration 2 3
```

This capability especially is helpful for sorting or rearranging data. The following code copies data from one vector to another, where the order of the industries is changed:

```
do{
    vf newvec%1 = b.oldvec%2
    }(1-5) (5 1 3-4 2)
```

A second new feature of the `do` command is that arguments may be passed to the last line; that is, the iteration limits themselves may be arguments. This is useful for loops that are contained in an `add` file, in a function, or for loops that are nested within another loop. The following is an example of nesting:

```
    do{
        ic Outer loop iteration %1
        do{
            ic Outer loop %1, Inner loop %2
            }( %1 ) ( 3-4 )
        }( 1-2 )
```

The resulting output will be

```
    Outer loop iteration 1
    Outer loop 1, Inner loop 3
    Outer loop 1, Inner loop 4
    Outer loop iteration 2
    Outer loop 2, Inner loop 3
    Outer loop 2, Inner loop 4
```

Note that an argument is passed from the outer loop to the inner loop. The last line of the inner loop, which sets the range of values for the variables, contains a variable that is set by the outer loop.

In the past, only two groups of numbers could be specified as iteration limits for the **do** command. This number has been increased. Currently, up to nine variables can be declared in a **do** loop with iteration limits specified as in the example above. At this time, the parallel matching option still supports only two such variables.

The number of series that G7 can store in a workspace bank has been increased to about 65,000. The maximum number of observations for each series has been increased to 1999 observations per series. The actual number will be less if the configuration file specifies a lower number. Note that other software, including Build, might not support the extended number of series or observations. Please report any problems that you experience.

G7 now interprets the arguments %time and %date. These arguments may be placed nearly anywhere that text is expected. They are replaced with the current time and date, respectively. They especially are useful for labeling data banks. For example, the script

```
    ic This sav file was created on %date at %time.
    bti Hist bank.  Created %date at %time.
    vti Hist Vam bank.  Created at %date at %time.
```

labels a **save** file, creates a title for a macro bank, and creates a title for a Vam bank. Each label contains the current date and time.

Perhaps the new feature with the greatest potential is the interface between G7 and Excel. At present, this interface allows G7 to read and edit Excel

spreadsheets, including those with multiple worksheets. The routine is proving useful in the construction of the new U.S. national model, since some statistical agencies now distribute their products primarily in the form of Excel files. More development and testing is required before this capability is ready for general release. If you urgently need to transfer data from Excel spreadsheets to G7, or if you otherwise would like to participate in the testing process, please contact me for details.

0.5   Conclusion

The Inforum web site www.inforum.umd.edu recently was updated with the current version of G7. To install Inforum software on a new machine, please obtain the installation program from the internet site. Other assorted documents and programs may be found on the FTP site at sartoris.umd.edu. To update your version of G7, download the file `G7.zip` and `G7_Help.zip` from the `/g7` directory on sartoris.umd.edu. Unzip the files in the `\PDG` directory on your machine.

We are in the process of updating the Inforum web site. Please check your information on the International Partners page and advise me of necessary changes. Note that the primary internet and FTP sites now are backed up at http://inforum2.umd.edu and ftp://inforum2.umd.edu. Data on Inforum2 may be overwritten, and so I encourage you to upload data to this secondary FTP site only if you cannot access Sartoris.

A mailing list will be created soon. If you would like to be notified of future software updates and developments, please notify me at Horst@Inforum.umd.edu.