Inforum Software Development in 2015

Ronald Horst*

August 2015

Abstract

This brief document reviews recent development of key software programs that are provided by Inforum. In particular, it describes development of the *G7* and *Compare* programs since the 2014 Inforum World Conference in Alexandria, Virginia[2]. Much of the work involved fixing bugs and and extending and polishing existing features. In addition, several new features were introduced for *G7*, Inforum's regression, data development, and model-building software. Additional details are provided in the software documentation and Help files[1].

Inforum research depends heavily on data and economic models. Specialized software is required to manage the data and to construct and assemble the models. Furthermore, additional software is required to present data and results in useful forms. Inforum has developed such software that is well-suited to building macroeconomic and macroeconomic-interindustry models and to develop and manage the associated time-series data sets.

Origins of this work can be traced to the 1960s. Currently-employed software has taken shape over the past couple of decades, but it steadily evolves to meet new requirements. Daily use provides extensive real-world testing that has helped to identify and ultimately to fix many bugs, vulnerabilities, and other problems. This report describes recent developments to the primary tools employed at Inforum and by others users around the world.

1 Software Documentation

Several years ago, Inforum software documentation was consolidated from a variety of sources. This material includes documentation for *G7*, *Compare*, *Build*, *IdBuild*, *Fixer*, *MacFixer*, and *Banker*. The documentation is available in three forms. First is a document in book layout in the PDF file format. This format is best for printing or when reading the complete document. The second form is HTML. These files are available on the Inforum web site and may be viewed with any web browser. Finally, the complete set of documentation also

---

*Inforum- University of Maryland, Department of Economics, Tydings Hall, Ronald.Horst@gmail.com.

is available in a compiled Help system that is linked to the latest versions of *G7*. All documentation types have full indexing and cross referencing, though work on cross references remains incomplete. Search is available in each document format.

New material has been added for recent changes to the software. Changes are summarized in the New for 2015 page of the Introduction. Included on this page is a list of new features, modifications and extensions to existing features, and bug fixes for *G7* and *Compare*. For most of these, links lead to additional details that are provided in the *G7* or *Compare* User Guides or the *G7* Reference Manual.

2 *G7*

G7 is used to construct and analyze data, to estimate econometric equations, and to build large-scale structural econometric models and report the results in text, graphs, and spreadsheets. We summarize here some of the most significant changes completed in the past year. See the G7: New for 2015 page in the Help files for additional details. The *G7* Help files may be launched from the main menu at the top of the main window, or they may be launched by pressing F1 in the main window or an editor window. The same material is available on the Inforum web site to allow online browsing.

2.0.1 Graphical Interface Improvements

Several minor but useful improvements have been made to the graphical interface. First is the addition of a *Run-To-Here* shortcut (F11) for the *G7* editor. This feature is similar to the F10 shortcut, for which a selection of script will be processed. The new feature instead will process the script from the beginning of the file to the cursor position.

A second set of changes is the addition of keywords for the *G7* scripting language that will recover a variety of main window and editor font and background settings. For many of these same settings, new commands have been introduced to the scripting language that allow the fonts and colors to be changed. In the past, these settings could be controlled and viewed only through the graphical interface. The full list of capabilities is provided in the Help file, but they include reading or setting the typeface, pitch, text color, background color, italic, underline, strikeout, and bold settings.

Two final small changes are the addition of a Close shortcut (Esc) for the gridtype window and a few revisions were made to the Bank Open interface.

2.0.2 Excel Interface Improvements

G7 can read data from Excel spreadsheets, and *G7* also can modify or create new spreadsheet documents and fill them with data and formulas. The reading techniques provide key tools for the development of databases for Inforum's

EconData and other uses. The set of features again has been extended to simplify the reading of dates and of irregular time series.

G7 now can read single date or a range of dates with the *xl read* command. Reading of a single date may be useful in itself. The date may be recovered with a new keyword, and a similar keyword will recover the date in the *G7* date format. In addition, various components of the date may be recovered, including the year, quarter, and month.

Reading of a range of dates can be quite important for the efficient reading of irregular time series, particularly when the dates of the observations are not known when the script is written. *G7* now can read a range of dates and then read a corresponding range of data. The data will be stored in a time series according to the specified dates, even if there are gaps in those dates. Previously, only contiguous blocks of time series data could be read and stored.

This feature required introduction of a corresponding feature to eliminate ambiguity between Excel dates and *G7*-style dates. For example, there is no "quarterly" date format in Excel. Instead, quarterly data typically are specified according to the first day of the first month of the quarter. To store these data as a quarterly series in *G7*, the *xl setfrequency* command will clarify the intended frequency of the dates that have been read with the *xl read* command, and a subsequent call of *xl read* to recover the data will store data in the intended quarterly time series format.

Apart from bug fixes and small improvements, the final change to note is that the *xl write* command now will print floating point values or integers to the spreadsheet when numbers are specified as text. Previously, any text that was printed to a spreadsheet was given the Excel text format, even if the "text" was a number. *G7* now reviews text specifications and recognizes strings that purely are numbers, and when appropriate it specifies an Excel number format. Note that the *xl write* command still can be forced to print numbers as text by adding an apostrophe before the number: "$' < number >$".

2.0.3 Miscellaneous Improvements

A number of other changes also are listed in the Help file. Details on a few are provided here.

G7 can create databases of vectors and matrices in the "Vam" file format. These data then may be employed in and inter-industry model using the *Inter-Dyme* modeling software. For many models, the solution of the model requires data only for the current period. After the model is solved for the current period, the data are stored and the model moves to the next period and the process is repeated. In some cases, solution of the model requires vector data for several periods in the past. This is made possible by specifying lags in the Vam configuration file that *G7* reads when first creating the database. Until now, this setting was not easily recovered in *G7*, and *G7* could not modify the original setting. The new *setveclag* command now allows both reading and setting of the parameter for any vector in the default Vam bank.

The *G7 coef* command is very useful for converting a flow matrix into a

coefficient matrix. In the past, the process was limited to division of each element in a *column* by the value in a corresponding element of a vector. At times, the needed operation is to divide each element of a *row* by a corresponding vector element. The *coef* command still operates on columns by default, but it now can be instructed to operate either on columns or rows.

G7 is a powerful tool for building models in part because it can estimate time series regressions and store the estimated equation in a form that can be compiled as part of the model code. Sometimes these estimated equations are not needed as part of a compiled model but instead as part of a *G7* script. Until now, the regression results were not stored in a format that *G7* could read. The default behavior has not changed, but *G7* now can be instructed to record regression results in a form that it can read and understand in subsequent operations.

The *pause* command now may be given a numerical argument that is the number of seconds to wait before proceding; note that this parameter is not limited to integers. The *mcopy* command, which copies vectors or matrices within or between Vam files, now performs more robust checks of frequency and date compatibility between sources and destinations. A variety of bug fixes and other minor improvements are listed in the "*G7*: New for 2015" page of the Help files. Notes with some additional information are available in the logs on the Download page of the Inforum web site.

The current version of *G7* may be found on the conference CD and on the Inforum web site. Full documentation may be found in the same locations, and the web site now provides online help.

3   Compare

Compare is a data presentation tool that principally is used to build tables and spreadsheets. *Compare* can create formatted spreadsheets in Excel format, including limited ability to create graphs. Additional features gradually are being added to provide greater capabilty.

Compare can print data from time series of matrices. *G7* can create matrices either by storing every element or by storing only nonzero elements in "packed" form. The Vam file format stores packed matrix data in a separate file, where these auxiliary files typically are given a .pmx extension. The file position of the .pmx file is stored in the Vam file, and typically the *relative* position of the .pmx file that is specified (i.e. not the full path). When files are moved, and particularly when the Vam file and .pmx files are not in the present working directory, *Compare* and *G7* sometimes have trouble locating the .pmx file. If *G7* cannot find a .pmx file of the given name at the expected position, it has the ability to look for .pmx files in several likely places before giving up. This capability now has been given to *Compare*.

A variety of problems were fixed with the matrix listing feature, where this feature prints a time series of matrices. Control over whether to print zeros was improved when dealing with multiple data banks, and problems were fixed

that plagued the writing of these data to Excel files. The reading of *Compare* configuration files was made more robust, and file path specifications such as "..\filename" now are permitted. Finally, the sort routine was improved and a variety of sanity checks and error messages were introduced, including checks for the maximum number of sectors to sort.

The current version of *Compare* may be found on the conference CD and on the Inforum web site. Full documentation may be found in the same locations, and the web site now provides online help.

References

[1] Inforum. *Software Documentation.*
www.inforum.umd.edu/software/documentation.html.

[2] Ronald Horst. (2014) *2014 IT Developments at Inforum.*
www.inforum.umd.edu/organization/conferences/iwcxxii/iwcxxi.html.

[3] Ronald Horst. (2013) *Inforum Software Development in 2013.*
www.inforum.umd.edu/organization/conferences/iwcxxi/iwcxxi.html.

[4] Ronald Horst. (2012) *Inforum in 2012: Information and Technology.* (Paper and slides)
www.inforum.umd.edu/organization/conferences/iwcxx/iwcxx.html.

[5] Troy Wittek and Ronald Horst. (2010) *New Features of G7, Compare, and the Inforum Website* (Slides)
www.inforum.umd.edu/organization/conferences/iwcxviii/iwcxviii.html.