

The RATSletter



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RATS Version 7.0

We're pleased to announce that RATS Version 7.0 will begin shipping in early October. Version 7 continues our efforts to make RATS both easier to use *and* more powerful. The new release almost doubles the number of "wizards" compared with what we had just a few years ago, now covering almost half the instructions with these handy helpers.

We introduced a simpler notation for the date scheme for a workspace with version 6.35, and have updated the documentation and examples to reflect this. For version 7, we have made major changes to standardize the format of instructions and the names of options. With few exceptions, instruction parameters are now used only for input or output series and entry ranges. Other types of information (whether input or output) are provided using options. Options have names and can be input in any order, making them easier to remember, use, and read than parameters, which need to be in a very specific order. Note, however, that we still support the older syntax—RATS is largely backwards compatible to Version 4.

Other Changes in v7

- a new DSGE instruction for analyzing linear and non-linear models with expectational terms (see page 3).
- dozens of new functions, including several for working with models and equations as well as new random draw functions (page 2).
- improvements to the appearance of graphs and much more user control (page 3).
- expansion of the instrumental variables/Generalized Method of Moments capabilities. We now use a common set of options across all the relevant instructions, and the SUR instruction (seemingly unrelated regressions) now supports GMM.
- New matrix operators for concatenation and exponentiation.

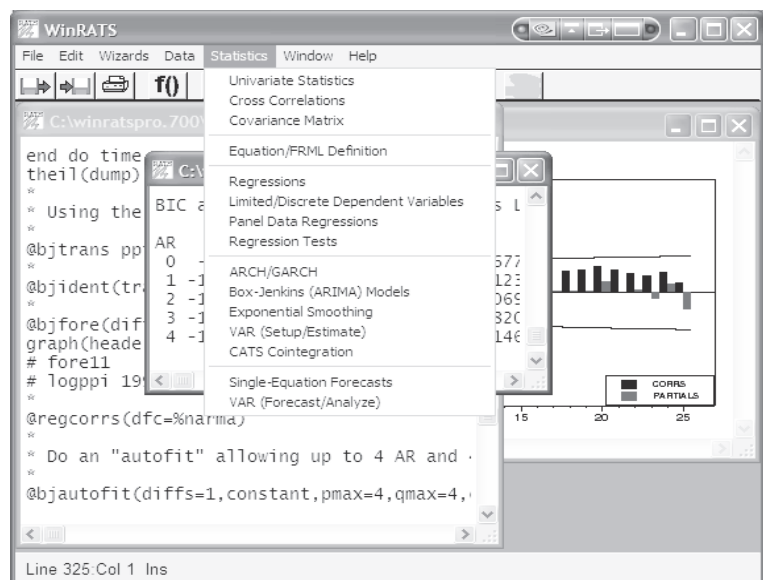
Each copy of the software ships with completely updated and revised copies of the user manuals. You will also find dozens of example programs taken from the RATS manuals, worked examples from eighteen textbooks ranging from introductory to advanced, and replication files for many important articles—all told, almost 1000 complete examples, demonstrating a wide range of techniques. You also get more than 150 procedures for doing hypothesis tests, model selection, and much more with a single command.

The price for an update to Version 7 is \$150 for *any* existing single-user Windows, Macintosh or DOS version of RATS. So, even if you have an ancient "PC RATS" license from the early 1990's, you can upgrade to Version 7 for just \$150.

Haven't Updated in a While?

The six updates released between versions 6.0 and 7.0 included many major improvements. If you haven't been keeping up to date, here are a few of the highlights that you'll find if you update to version 7:

- Significantly expanded support for State Space models through major additions to the DLM instruction.
- The new SWEEP instruction: a multi-purpose tool for regressing one set of variables on another.
- Many improvements to the built-in GARCH instruction. For example, multivariate models support GARCH-M, additional regressors, and asymmetry.
- Support for ODBC/SQL (Professional version only)
- Graphing enhancements include a new "spike" style, footer labels, and the ability to nest SPGRAPH blocks.
- New options on BOOT for doing block bootstrapping.



New and Improved Wizards

With version 7, we've added many new "wizards" and improved the design of previously existing ones. New wizards cover the instructions **CROSS** (cross correlations), **VCV** (covariance matrix of series), **GRPARM** (graph settings), **MVSTATS** (moving window statistics) and **UFORECAST** (univariate forecasting). One new wizard handles the specification and estimation of a VAR, with priors and without, while another helps with the VAR analysis instructions, such as **IMPULSE** and **ERRORS**. There's also a wizard which executes the CATS procedure with a basic set of options.

Many of these require that the user input a set of series; for instance, the *VAR (Setup/Estimate)* wizard needs a list of the endogenous variables, and the *Regressions* wizard needs lists of the explanatory variables and (possibly) the instruments. These are now handled by a text field which can be edited directly, combined with a button which pops up a browse dialog which lets you select from the list of series.

You can choose which method is simplest; if you'd rather not have to type in series names like `canexpgdpchs` and `canexpgdpds`, you can use the browse button. This was first used in the *Panel Data Regressions* wizard in version 6.3, and is now included in all the wizards that involve series lists.

Changes to Documentation

The documentation has been revised to reflect the many changes made to the program since RATS 6 was released. We highlight here the most significant changes.

The section that received the most attention was the chapter in the *User's Guide* on Simulations and Bootstrapping, which has been almost completely rewritten to keep pace with the fast-moving branch of computationally-intensive statistics.

This includes new sections on the use of "convenience functions" for drawing from standard posteriors, Metropolis-Hastings, griddy Gibbs and several new examples, including the use of importance sampling for a GARCH model.

The state-space modelling instruction (**DLM**) was redesigned for version 6.35, and adds some additional features with 7.0. We have new examples which demonstrate the new capabilities.

We've added a discussion of the use of combinations of short and long run restrictions in structural VARs. The popular ShortAndLong procedure has been improved to provide greater flexibility.

RATS is a popular tool for analyzing Markov-switching models, and we've added descriptions of the new procedure for handling Markov-switching VARs.

New Functions

We have added almost ninety functions to RATS since 6.0 was released; 7.0 alone adds thirty. The main additions have been new random draw functions, particularly "convenience functions" for drawing from standard posteriors. An example of this is

```
%RANMVPOST(H1, B1, H2, B2)
```

which combines two multivariate Normal densities parameterized by their means (B1 and B2) and precisions (H1 and H2) and draws from the posterior produced from combining the densities.

This can be a "hot spot" for a Markov Chain Monte Carlo procedure (particularly if the dimensions are high), so we've optimized the calculation to make it quite a bit faster than the equivalent calculation done using a sequence of direct matrix computations.

The new %RANGRID function deals with another potential hot spot in a "Griddy Gibbs" analysis. This draws from a distribution approximating on a grid.

RATS includes high-level objects such as equations (descriptions of linear relationship) and models (combinations of equations). These are important for organizing statistical calculations (particularly with time series data), but can't easily be represented with matrices. As a result, programs written for math packages often require a complete rearrangement of a data set in order to make modest changes in a specification.

By contrast, RATS has a very rich collection of functions and operations which can be applied to these types of objects. Typical of this is the new

```
%MODELFIND(model, series)
```

which locates in a `model` the equation which has `series` as its dependent variable.

```
%MODELPOKE(model, slot, new equation)
```

could then be used to replace that equation with one generated in a completely different manner.

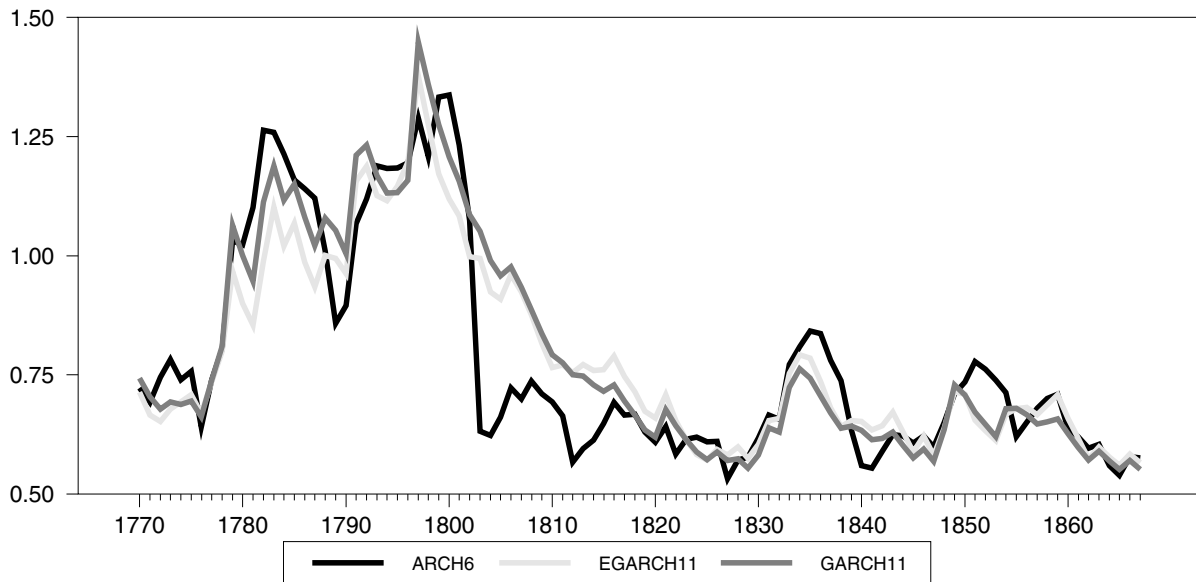
Nonlinear Parameter Sets

The RATS **NONLIN** instruction offers an unparalleled flexibility for dealing with sets of free parameters for non-linear estimation. You can easily add parameters to and drop them from the parameter space; estimate with and without restrictions. Version 7 adds an additional feature: you can now include in your parameter set a vector or matrix of matrices. This makes it much easier to estimate vector time series models, such as Markov-switching VAR's, as you can include all the lag parameters as a single `VECTOR` of $N \times N$ matrices.

Improved Graphics

Version 7 provides much better looking graphs, particularly when rendered in black and white. It also offers the user much more control over the graph appearance. For lines, you can now choose the thickness, color or gray scale, and dash pattern; for fills, you can choose the color or gray scale and the hatching pattern; and for symbols, the shape and color or gray scale. There are now 30 different style numbers, with each having both a representation for a color device and one for black and white. With the aid of a toolbar button, you can switch between these two representations, so you can see how your graph will look if it needs to be exported in a black and white format.

For instance, the following uses thicker lines in shades of gray to represent the three series. Because the series cross each other so frequently, the dash patterns that are the standard for black and white lines wouldn't look as good.



New DSGE Instruction

The new instruction **DSGE** analyzes linear and non-linear models with expectational terms, solving for a set of matrices which can be input into the **DLM** (state space model) instruction. The model is input using standard formulas, with expectations included as leads. For instance, in the following, the f2 formula represents the condition

$$1 = \beta \gamma^{1-\eta} E_t R_{t+1} (C_t / C_{t+1})^\eta$$

DSGE does a log-linear expansion around the steady state solution, producing a representation of the form

$$\mathbf{X}_t = \mathbf{A}\mathbf{X}_{t-1} + \mathbf{Z} + \mathbf{F}\mathbf{w}_t$$

where the **X** vector includes the endogenous variables listed on the **DSGE** instruction, plus any variables required for handling additional lags.

```

frml(identity) f1 = $
    theta/(1-n)-c**(-eta)*alpha*y/n
frml(identity) f2 = $
    1-beta*gamma**(1-eta)*c/c{-1}*r{-1}
frml(identity) f3 = $
    gamma*r-(1-alpha)*y/k{1}-1+delta
frml(identity) f4 = c+invst-y
frml(identity) f5 = $
    gamma*k-invst-(1-delta)*k{1}
frml(identity) f6 = $
    y-z*k{1}**(1-alpha)*n**alpha
frml          f7 = log(z)- $
    (1-rho)*log(zbar)-rho*log(z{1})
group swmodel f1 f2 f3 f4 f5 f6 f7
dsge(model=swmodel,expand=loglinear,$
a=a,f=f,initial=||1.0,0.5,0.5,nbar,$
1+rq,1.0,1.0||) y c invst n r k z
    
```

RATS 7: Prices and Ordering

Pricing is provided below for the Windows and Macintosh versions of RATS. See our web site for pricing for the UNIX and Linux versions.

Note: If you have an **update subscription**, you do not need to send in an order form—your RATS 7 update will be shipped automatically. Do let us know if your address has changed recently.

Updates and Upgrades

Prices for updates of single-user licenses are provided below. The basic price to update to WinRATS or Macintosh RATS 7.0 from any earlier Windows, DOS or Mac version is \$150.

For an extra \$150, you can upgrade to the Professional version, which adds X11 seasonal adjustment, ODBC/SQL support, and the ability to read and write several other specialized data formats, including FAME format data files.

Product	Update to Version 7 of:	
	WinRATS	WinRATS Pro
WinRATS Professional	—	\$150
WinRATS (any other)	\$150	\$300
RATS386 (any)	\$150	\$300
MacRATS Professional	—	\$150
MacRATS (any other)	\$150	\$300

There are no shipping charges on orders shipped to locations in the contiguous U.S. Add \$30 for shipping to Alaska, Hawaii, Canada, and U.S. possessions, and \$50 for shipping to other countries.

Be sure to include your current serial number with your order. If you cannot find your serial number, please contact us at sales@estima.com or 800-822-8038 before placing your order. Please provide your full name and address, and any information on when and where you purchased RATS.

Please contact Estima if you have any questions, or if you need to update a multi-user or UNIX/Linux license.

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New Licenses

Prices for new single-user licenses are provided below. Please contact Estima if you need prices for multi-user licenses.

Product	First Copy	Addl. Copies
WinRATS Professional	\$650	\$500
WinRATS	\$500	\$350

Purchased a New License Recently?

If you purchased a *new* RATS license after July 1, 2007, you are eligible for a free update to Version 7.0. This applies to all serial numbers ending with Q779 and above (Q780, Q781, etc.). To receive your update, fill out and return the enclosed order form, include your serial number, and enter zero for the update cost.

Shipping charges as described on the order form will apply for all orders going outside the United States. So, if you are located outside the U.S., please be sure to include credit card information or another form of payment (check, money order) for shipping costs when placing your order.

Update Subscriptions

Update subscriptions provide a convenient way to budget your software expenditures, and are the easiest way to ensure that you receive all updates to RATS as soon as they are released.

For those of you with version-based update subscriptions, please note that your current subscription expires with the release of Version 7.0.

You can renew your update subscription for just \$150 for a single user license (plus shipping for customers outside the U.S.). This will provide you with all updates through Version 8, shipped to you automatically on CD.

For those of you with annual update subscriptions for multi-user licenses, the letter enclosed with your copies of RATS 7 will include information on the expiration date of your subscription.

Please contact our sales department if you would like to renew your subscription, or if you have any questions.

CATS 2.0 Cointegration Analysis

If you are interested in cointegration analysis but haven't yet purchased or updated to Version 2.0 of CATS, now is the perfect time to order—you can save on shipping costs by including a copy of CATS 2.0 with your order for RATS 7.0. A new license is \$175, while an update from CATS 1.0 is just \$100. Please see our website for details.