

The RATSletter



Volume 24, No. 1

September, 2011

RATS Version 8.1

We're pleased to announce the availability of RATS Version 8.1. Many of the improvements in this new version are due to our work with four new or updated textbooks (see the story on page 2). The new editions of Greene and Wooldridge included quite a bit of additional coverage for techniques involving panel data and data with more general groupings, and the Baltagi book included some methods which were not as easily done with RATS as we would have liked.

The principal changes made for the examples from those three books are to the **PREGRESS** and **PANEL** instructions. **PANEL**, **PREGRESS** (and **PSTATS**) all include a new **GROUP** option, which allows estimation of individual effects with arbitrary groupings that aren't really "panel" data. **PREGRESS** has many other new options, allowing instrumental variables estimation with fixed or random effects, a **VCOMP** option to allow a wide variety of choices for estimating the component variances in a random effects model, and **ROBUST** and **CLUSTER** options for computing clustered standard errors for fixed or random effects estimators.

PANEL adds **EFFECTS**, **VRANDOM**, **VINDIV** and **VTIME** options (similar to those already in **PREGRESS**) to compute standard panel data transformations for inputs to more complicated techniques (Hausman-Taylor for instance) that can't be done directly with **PREGRESS**.

With the **GLS** option, you can choose how those transformations are done. In particular, **GLS=FORWARD** uses only the "forward" means, so the transformed data at time t uses only data from time t on. This can be useful in dealing with the bias problem in dynamic regressions in small panels. The new **ID** and **IDENTRIES** options are used extensively in the textbook examples to organize calculations in unbalanced data that require some form of integration or summing across time for individuals.

Interface Features

A new *File* menu operation lists "Recent Directories" used with RATS.

You can now create "scratch" windows, which are text windows that are both "input" and "output". If you need a quick calculation or want to test an alternative regression without either the instructions or output getting inserted into your main work windows, the scratch window is the way to do that.

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Panel Data E-Course

We have now scheduled an e-course on Panel and Grouped Data, which will run from January 26 to March 8. This will be based largely on Baltagi's *Econometrics of Panel Data, 4th edition*. We added quite a few new capabilities to RATS version 8.1 for handling panel and grouped data and this course will go over them carefully.

Among the topics will be organizing data, handling balanced vs unbalanced (or generally grouped) data, panel data transformations, issues with dynamic models (lagged dependent variables and panel VAR's), unit roots and cointegration, fixed and random effects in non-linear models like probits.

We'll use the system that we've employed for other courses, which had weekly posts of lessons in PDF format, programs, procedures and data files. The course participants can then post questions which can be answered directly on the forum or handled through additional materials.

Although the formal presentations won't start until January, we'll set up the course forums and post programs as we get them ready. The registration fee is \$125.

Structural Breaks and Switching Models Course Materials

This is the newest in our set of course materials. It treats a broad range of subjects, including tests for structural breaks and threshold effects, and estimation of threshold autoregression (TAR) and smooth transition (STAR) models. More than half the course is devoted to the topic of Markov Switching models, with applications to regressions, VAR, State-Space, and ARCH and GARCH models. It covers both maximum likelihood (EM where appropriate) and Bayesian estimation techniques.

The course includes a 230 page book in PDF form, with 36 executable programs. The examples are the heart of the course. The book includes enough theory to make sense of the examples, but mainly explains in detail the calculations done in the examples. The price for the course materials is \$50.

See www.estima.com/courses_completed.shtml for more information. While you're there, you might also want to check out the materials for our other courses: (*Bayesian Econometrics, State-Space Models and DSGE*, and *Vector Autoregressions*),

RATS 8.1 Interface Features, continued

INFOBOX with a progress indicator will now estimate the time until completion if it will take more than a few seconds.

Edit-Find and *Edit-Replace* now have popup boxes with past find and replace strings.

New Functions

%BLOCK(entry, blocksize) returns the block number of entry in dividing data into blocks of equal size.

%PANELSIZE() returns the number of individuals in the current **CALENDAR** with the **PANEL** option. (The already existing **%PANELOBS**() gives the number of time periods).

%LOGDIRICHLET(x, d) gives the log of the Dirichlet density for the **VECTOR** of probabilities x given **VECTOR** of shapes d.

%MODELLAGMATRIX(model, k) returns the $N \times N$ matrix of lag k of the dependent variables of a model.

%SLIKE(template) returns a vector of series handles matching a name template.

%SROW(S, row) returns a vector of series handles for a row out of a matrix of series.

%SCOL(S, col) returns a vector of series handles for a column out of a matrix of series.

Changes to Other Instructions

BOOT

Now has a **PANEL** option to shuffle entire individual records in (balanced) panel data.

BOXJENK

Allows missing data with the **MAXL** option and differenced data.

DATA

The Pro versions of RATS now include a new option **FORMAT=FRED**, which pulls data directly off the St. Louis Federal Reserve's FRED database into RATS.

DATA will now set the end-of-data automatically based upon full list of series read. This used to do this based upon the first series read, which might not be correct if you are reading data from different original sources.

ENTER

Adds the **SEQUENCE** option to allow use with **LIST** and **CARDS**.

GARCH

The new **HADJUST** and **UADJUST** options allow "on-the-fly" calculations using current variances or residuals. This simplifies the coding for many types of GARCH-M models and related models.

PFORM

Adds an **INPUT** option to allow combining series into a balanced panel when your input has separate series for each time period.

PRJ

Adds the **COEFFS** option to override coefficients from the estimated equation, and the **RESIDS** option to compute and save residuals.

PSTATS

Adds the **GROUP** option as described above for general groupings. Most of the statistics it computes are now accessible.

READ

8.1 implements the **SHEET**, **TOP**, **LEFT**, **BOTTOM** and **RIGHT** options that were already available on **DATA**. These allow you to isolate the data from other information. You can also read complicated array forms (such as **VECTORS** of **VECTORS**).

SET and SSTATS (CSET, GSET as well)

These add the **PANEL** option (actually the **NOPANEL** option) to suppress panel data handling of lags. This makes it easier to do panel bootstrapping.

New Textbook Examples

We have updated our collection of textbook example programs. You'll find programs for the 6th edition of Greene's *Econometric Analysis* and the 2nd edition of Wooldridge's *Econometric Analysis of Cross Section and Panel Data*. Both books add quite a bit more coverage of panel data including random effects estimation of non-linear models (which requires numerical integration).

We have also added examples for three additional titles: Baltagi's *Econometric Analysis of Panel Data, 4th edition* Kim and Nelson's *State-Space Models with Regime Switching: Classical and Gibbs-Sampling Approaches with Applications*, and Novales, Fernandez, and Ruiz's *Economic Growth: Theory and Numerical Solution Methods*.

Most of the examples from Baltagi's book, and many from Greene and Wooldridge, require features added with RATS version 8.1. Many of Kim and Nelson's examples require some of the updated Markov Switching procedures described on page 3. The Novales et al book offers a number of examples of DSGE models.

With these additions, we now have worked examples from 26 textbooks across a wide range of subjects and levels, and over 1,000 up-to-date examples of RATS programs. These are included with Version 8.1 of RATS, and are also available in the "Resources" section of our website.

New Examples and Procedures

New Replication and Example Programs

We've added example programs replicating results from the following papers.

Bjørnland and Leitemo (2009)

"Identifying the Interdependence Between U.S. Monetary Policy and the Stock Market", *Journal of Monetary Economics*, vol. 56, pp. 275–282. Examines a VAR model using short- and long-run restrictions, including Monte Carlo integration of the impulse response functions.

Chan, Karolyi, Longstaff and Sanders (1992)

"Comparison of Models of the Short-Term Interest Rate", *Journal of Finance*, vol. 47, no. 3, pp. 1209–1227. Estimates several competing models for movement of short-term interest rates using GMM.

den Haan (2000)

"The Comovement Between Output and Prices," *Journal of Monetary Economics*, vol. 46, no. 1, pp. 3–30. This analyzes the comovement of series using multi-step forecast errors in a VAR.

Diebold and Yilmaz (2009)

"Measuring Financial Asset Return and Volatility Spillovers, with Application to Global Equity Markets," *Economic Journal*, vol. 119, no. 534, pp. 158–171. Analyzes spillovers in a multi-country VAR.

Dueker (1997)

"Markov Switching in GARCH Processes and Mean-Reverting Stock-Market Volatility," *Journal of Business & Economic Statistics*, vol. 15, no. 1, pp. 26–34. Markov Switching GARCH models.

Dueker (2005)

"Dynamic Forecasts of Qualitative Variables: A Qual VAR Model of U.S. Recessions", *Journal of Business & Economic Statistics*, vol. 23, no. 1, pp. 96–104. Estimates a VAR including a binary choice endogenous variable.

Elder and Serletis (2010)

"Oil Price Uncertainty", *Journal of Money, Credit, and Banking*, vol. 42, no. 6, pp. 1137–1159. Estimates a VAR-GARCH-M model and computes error bands for impulse response functions.

Enders and Siklos (2001)

"Cointegration and Threshold Adjustment," *Journal of Business & Economic Statistics*, vol. 19, no. 2, pp. 166–76. Presents an error correction model with threshold adjustments.

Ehrmann, Ellison, Valla (2003)

"Regime-dependent Impulse Response Functions in a Markov-switching Vector Autoregression Model", *Economics Letters*, vol. 78, pp. 295–299. Markov-switching VAR with error bands for the IRF's.

Faust and Leeper (1997)

"When Do Long-Run Identifying Restrictions Give Reliable Results", *Journal of Business & Economic Statistics*, vol. 15, no. 3, pp. 345–353. Examines small SVAR's with short- and long-run restrictions.

Gregory and Hansen (1996)

"Residual-based Tests for Cointegration in Models with Regime Shifts," *Journal of Econometrics*, vol. 70, no. 1, pp. 99–126. Example using the **GREGORY-HANSEN** procedure.

Hamilton and Susmel (1994)

"Autoregressive Conditional Heteroskedasticity and Changes in Regime," *Journal of Econometrics*, vol. 64, pp. 307–333. Implements Markov Switching ARCH models.

Hansen (1997)

"Approximate Asymptotic P-Values for Structural Change Tests", *Journal of Business and Economic Statistics*, vol. 15, no. 1, pp. 60–67. **APBREAKTEST** procedure, with Hansen's approximate *p*-values.

Hansen (1999)

"Threshold Effects in Non-dynamic Panels: Estimation, Testing and Inference", *Journal of Econometrics*, vol. 93, pp. 345–368. Example using the new **PANELTHRESH** procedure for estimation of threshold effects in a panel data set.

Papell and Prodan (2006)

"Additional Evidence of Long Run Purchasing Power Parity with Restricted Structural Change", *Journal of Money, Credit, and Banking*, vol. 38, no. 5, pp. 1329–1349. Does unit root tests with one and two breaks using the **PerronBreaks** procedure.

New Procedures

The following new procedures are included with version 8.1. Again, many of these are for use with Markov switching models.

Standard Markov Switching Routines

The following contain some standard routines useful in many Markov switching model applications:

mssetup.src

This replaces the **MARKOV.SRC** file. It's easier to use as it includes a callable "setup" function and supports models that require lagged regimes.

msregression.src

This handles the setup and most of the calculations for Markov Switching linear regressions.

mssysregression.src

This handles the setup and most of the calculations for Markov Switching linear systems with identical explanatory variables.

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Examples and Procedures, *continued*

msemsetupstd.src

This handles the setup for EM estimation of Markov Switching models.

bppaneltests.src

Tests the residuals from a least squares regression for presence of random effects using variants of the Breusch-Pagan LM test.

enderssiklos.src

Does various types of unit root regressions with threshold breaks on the residuals from an Engle-Granger cointegrating regression. Used in Enders and Siklos (2001) replication program cited earlier.

gausshermite.src

Returns the points at which $f(x)$ needs to be evaluated and the corresponding weights for Gauss-Hermite numerical integration.

halton.src

Generates an n -vector of the Halton sequence for the given base. Halton sequences are deterministic “low-discrepancy” sequences which fill the unit cube relatively uniformly allowing numerical integrals to be estimated more accurately for a given number of function evaluations than would be possible with truly random numbers.

lpunit.src

Implements the Lumsdaine-Papell unit root test, allowing for two breaks in the intercept, the trend or both at unknown locations. From Lumsdaine and Papell (1997), “Multiple Trend Breaks and the Unit Root Hypothesis”, *Review of Economics and Statistics*, vol. 79, pp. 212–218.

mvarchtest.src

Performs an LM test for ARCH effects in a set of series by regressing the crossproducts of the series ($u_{it}u_{jt}$ for all i and j) on a constant and its lag(s) and testing the coefficients on the lags.

olshodrick.src

Computes a least squares regression with covariance matrix proposed by Hodrick (1992) “Dividend Yields and Expected Stock Returns: Alternative Procedures for Inference and Measurement”, *Review of Financial Studies*, vol. 5, no. 3, pp. 357–386.

panelthresh.src

Tests a fixed effects regression for one or two breaks in a single regressor, with breaks determined by the values of another variable. This is used in the Hansen (1999) example described earlier.

whittletest.src

Written by Graham Giller. Implements the Whittle test for independence of regime sequences vs a Markov Chain.

Prices and Ordering

Users with current update subscriptions will automatically receive version 8.1 on CD. Users with single-user licenses for version 8.0 who don't have update subscriptions can update to 8.1 for just \$25.

If you have an older license (7.3 or older), the price to update a single-user license from *any* older version of RATS is just \$150. This includes the software plus a new set of documentation. You don't have to have the older software still installed in order to get an update. You *do* need to have the serial number. If you cannot find your serial number, contact us at sales@estima.com or 800-822-8038 before placing your order.

Shipping is free for destinations in the contiguous U.S. Please contact us, or see our online ordering page, for shipping costs to other destinations. We also offer an electronic download option if you would prefer to avoid the shipping charges (the software ships with PDF versions of all of the manuals).

If you have the standard version of RATS, you can upgrade to the Professional version for an additional \$150. The Pro version gives you the X12 seasonal adjustment capability, ODBC/SQL support, support for reading and writing FAME data files, and the ability to read CRSP and FRED databases.

The prices for updating a single-user license for Windows or Macintosh are shown below. Please contact us if you have questions, or need to update multi-user or UNIX/Linux licenses.

	What you want:	
What you have:	8.1 Std	8.1 Pro
RATS Pro v. 8.0	—	\$25
RATS Standard v. 8.0	\$25	\$150
RATS Pro (7.3 or earlier)	—	\$150
RATS Std. (7.3 or earlier)	\$150	\$300

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. We offer two forms of update subscriptions: Version and Annual.

Most (current) multi-user licenses are on annual subscriptions. These provide all updates for one year. The expiration date is shown on the CD envelope label. If you (think you) need to renew yours, please contact us for pricing.

Single-user licenses are generally handled using Version subscriptions, which provide all updates up to and including the next major release.

If you have version 8 or are updating to 8.1, a version update subscription is just \$150 (plus shipping for customers outside the U.S.) and would give you all updates up to and including version 9.0.