RATS 9

Fast, Easy, Flexible, and Reliable Time Series and Cross-Sectional Data Analysis
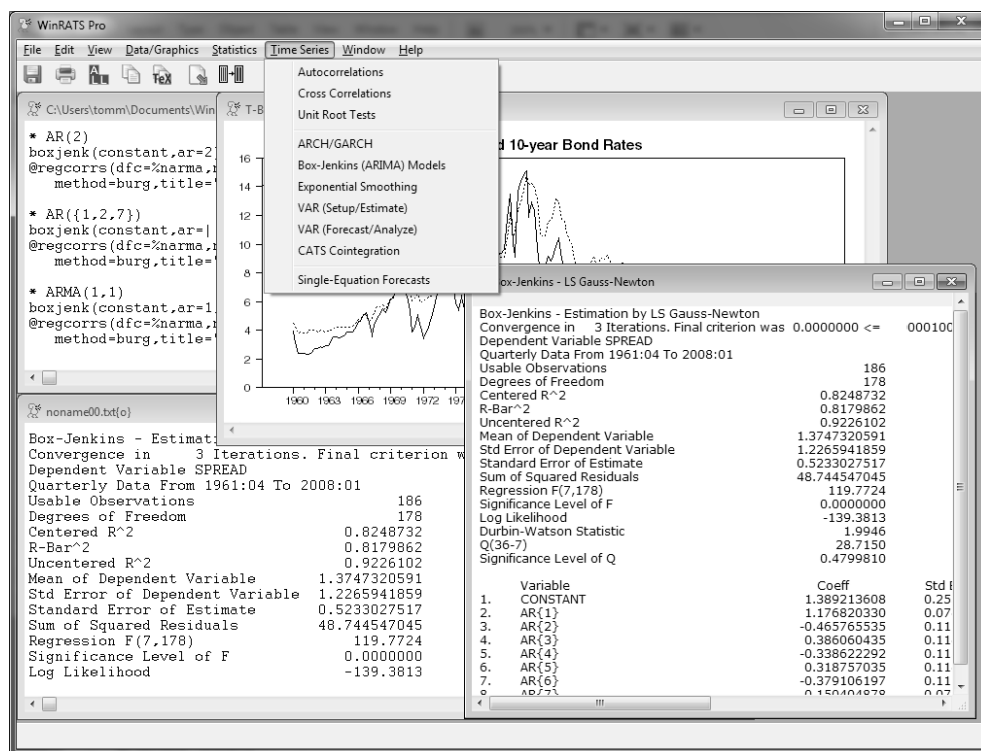
RATS provides all the basics, including linear and non-linear least squares, forecasting, and ARIMA models, but goes far beyond that with support for techniques like GMM, ARCH and GARCH, vector autoregressions (VARs), spectral analysis, state space models and DSGEs, and much more.

It can handle time series of virtually any frequency, including daily and weekly, as well as panel data, and produces publication-quality graphs for printing or importing directly into word processors.

Menu-driven "Wizards" provide a point-and-click interface for many common tasks, making RATS an ideal tool for new users and for educational settings.

Meanwhile, the powerful command-driven language at the heart of the program remains easy to learn and use for simple jobs, while also allowing users to automate complex or repetitive tasks and even write sophisticated menu- and dialog-driven end-user applications.

RATS is available for Windows, Macintosh, UNIX, with complete compatibility across platforms.

The RATS v.9 interface. Here, the sequence of commands appear in one text window, with the output directed to another window. This makes it easy to save commands as a complete program, which you can rerun later with a couple of mouse clicks. Also visible are a report window showing the output from a Box-Jenkins estimation, a graph window, and a look at the wizards on the Time Series menu.

Major Improvements Since Version 8.0 Include:

❐ Revised and expanded manuals.

❐ Multi-threaded execution for better performance.

❐ New editor with many new features.

❐ "Find in Files" operations locates useful examples.

❐ More point-and-click Wizards.

❐ Many new built-in functions.

❐ Option to compute more accurate numerical derivatives.

❐ Estimates of completion time for long operations.

❐ HASH and LIST types for flexible handling of "vector" information.

❐ Ability to pass functions to procedures.

RATS Version 9 Features

Statistical Methods

Estimation Techniques

- ❏ Multiple regressions including stepwise
- ❏ Regression with autoregressive errors
- ❏ Heteroscedasticity/serial-correlation correction, including Newey-West
- ❏ Non-linear least squares
- ❏ Two-stage least squares for linear, non-linear, & autocorrelated models
- ❏ Seemingly unrelated regressions and three-stage least squares
- ❏ Non-linear systems estimation
- ❏ Generalized Method of Moments
- ❏ Maximum likelihood estimation
- ❏ Constrained optimization
- ❏ Extensive built-in hypothesis testing, with procedures for a huge variety of unit-root, stability, and other tests
- ❏ Limited and discrete dependent variable models: logit, probit, censored/truncated data (Tobit), count models
- ❏ Panel data support, including fixed and random effects estimators
- ❏ Non-parametric regressions
- ❏ Kernel density estimation
- ❏ Robust estimation
- ❏ Recursive least squares
- ❏ State-space models, including Kalman filtering and smoothing, simulations, and optimal control models
- ❏ DSGE models
- ❏ Neural network models
- ❏ Linear and quadratic programming

Time Series Procedures

- ❏ Easy to specify lags and leads for time-series model estimation and analysis
- ❏ ARIMA and ARMAX models including multiplicative seasonal models; support for arbitrary lag structures
- ❏ Transfer function/intervention models
- ❏ Error correction models
- ❏ Kalman filter
- ❏ Spectral analysis

Forecasting

- ❏ Time series models
- ❏ Regression models
- ❏ Exponential smoothing
- ❏ Static or dynamic forecasts
- ❏ Simultaneous equation models (unlimited number of equations)
- ❏ Simulations with random or user-supplied shocks
- ❏ Forecast performance statistics, including Theil U statistics

Vector Autoregressions (VARs)

- ❏ Unmatched support for VAR models
- ❏ Error Correction models
- ❏ Structural VARs. Choice of factorizations, including estimation of a factor matrix from a covariance matrix model
- ❏ Impulse responses, with Monte Carlo and Importance Sampling techniques for standard error bands.
- ❏ Forecasting
- ❏ Variance decomposition
- ❏ Historical decomposition
- ❏ Extensive hypothesis testing tools
- ❏ CATS 2.0 add-on provides industry-leading cointegration analysis

ARCH and GARCH Models

- ❏ Univariate and multivariate, including BEKK, diagonal, CC, DCC, and VECH multivariate models
- ❏ Support for GARCH-in-mean models
- ❏ Additional exogenous variables in mean and/or variance equations
- ❏ Normal, t and GED distributions
- ❏ Exponential and Asymmetric models
- ❏ Robust standard errors

Working With Data

Data Entry

- ❏ Menu-driven Data Wizards for reading in data
- ❏ Reads and writes Excel files, text files, EViews®, Stata®, and other formats
- ❏ Pro version supports SQL/ODBC
- ❏ On-screen data viewer and editor, with point-and-click graphing and statistics tools
- ❏ Can handle virtually any data frequency, including daily, weekly, intra-day, and panel data
- ❏ Can automatically convert data to different frequencies
- ❏ RATS data file format is fast and easy, supports all frequencies, and allows you to store series of different frequencies on the same file

Data Transformations

- ❏ Flexible transformations with algebraic formulas
- ❏ Easy to create trend series, seasonal, and time period dummies
- ❏ Extensive filtering operations, including Hodrick-Prescott, Henderson, Spencer, and custom filters
- ❏ Supports regular, seasonal, and fractional differencing

Graphics

- ❏ High-quality time series graphics
- ❏ High-resolution X-Y scatter plots
- ❏ Dual-scale graphs
- ❏ Contour graphs
- ❏ Copy-and-paste graphs into other applications
- ❏ Export graphs to many formats, including PostScript and Windows Metafile
- ❏ User can customize attributes such as line thickness, colors and grayscale levels, and fill patterns

Interface

Interactive Mode Environment

- ❏ Text-editor based
- ❏ Point-and-click "wizards" for many tasks, greatly enhancing ease-of-use
- ❏ Saved programs can be re-run with just a few mouse clicks
- ❏ Designed so that you can reproduce results, output, and graphs easily *and* accurately—a critical but often overlooked requirement for producing reliable, publication-quality results
- ❏ True multiple window support. Simultaneously view your input commands and output, spreadsheet-style "report" windows, graphs, and more

Programmability

- ❏ Extensive looping capabilities and support for applying operations to lists of variables make it possible to automate many repetitive tasks
- ❏ You can write *procedures*, which can perform complex tasks with a single instruction, and write your own callable functions.
- ❏ A library of procedures written by RATS users from around the world is available free of charge on our web site
- ❏ A variety of interface-related instructions allow you to create your own drop-down menus, custom dialog boxes, and more

RATS Professional

The Professional versions of RATS add the following features not found in the Standard version:

- ❏ 64-bit version
- ❏ Support for CRSP and FRED databases
- ❏ ODBC/SQL database support
- ❏ Census Bureau X12 seasonal adjustment routine
- ❏ Support for FAME data files (for Windows and UNIX/LINUX)

CATS 2.0 Cointegration Analysis Procedure

CATS (Cointegration Analysis of Time Series) is a sophisticated set of RATS procedures which implement the popular Johansen and Juselius cointegration analysis techniques.

Version 2.0 was written by Jonathan Dennis, Katarina Juselius, Soren Johansen, and Henrik Hansen of the University of Copenhagen, and is distributed and supported by Estima.
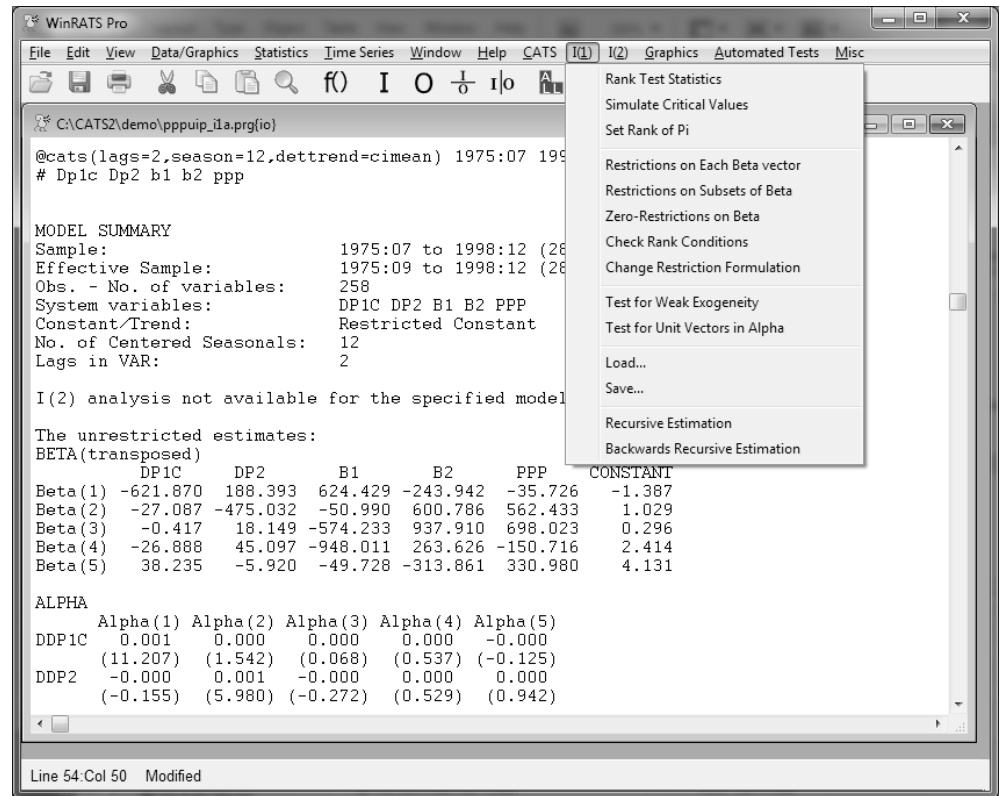
CATS is almost entirely a menu and dialog-driven procedure. You use standard RATS instructions to define the frequency, read in data, and do any necessary transformations. You then "source" in and execute the CATS procedures. From there, the rest of the analysis is done by selecting operations from the CATS pull-down menus, and entering information in pop-up dialog boxes.

The Johansen–Juselius approach to cointegration is based on the error-correction form of a Gaussian vector autoregression. In particular, they analyze the decomposition of the matrix of error-correction coefficients Π into $\alpha\beta'$. The I(1) procedure supports partial systems, and makes it easy to specify weakly exogenous variables. You can also include dummy variables, or stationary dummy-type variables.

To help you choose a model, CATS provides eigenvalues and trace test statistics for reduced rank (as well as 90% critical values if requested) and unrestricted estimates of α, β, and Π. You can check the model by calculating multivariate test statistics for residual autocorrelation, normality, and ARCH. Version 2 even provides an automated model selection routine.

Additional features include:

- Auxiliary procedures for multivariate tests of long-run exclusion, weak exogeneity and stationarity, and for calculating eigenvalues and trace statistics for five different hypotheses.

- Ability to set and reset the rank of Π throughout the analysis, and a variety of tests to help you determine the "correct" rank order.

- Graphical analysis tools, including plots of the β-vectors to check stationarity, and of residuals to locate possible problems with the Gaussian assumption, plus correlograms and autocorrelograms.

- Descriptive statistics include: residual correlation matrices, the short-run parameters and associated t-values, estimates of the **C**-matrix (with asymptotic t-values) in the common trends representation, and the long-run covariance matrix.

- Structural tests, including non-identifying restrictions on β, identifying restrictions on β, and weak-exogeneity hypotheses on α.

- Supports recursive cointegration analysis, with tests for the constancy of the eigenvalues, stability of the estimated cointegration space and the estimated parameters, and the adequacy of the predictions from the model.

The CATS package includes the CATS procedures on CD (or by download), a 200-page user's manual, and sample data and program files.

CATS requires Version 6.2 or later of RATS, and is available for Windows, Macintosh, UNIX, and Linux. Please contact us if you have any questions about CATS or RATS, or check out our website to order online.

https://estima.com/shopcart/webordercart.shtml

Also available: *The Cointegrated VAR Model: Methodology and Applications*, by Katarina Juselius. Written in conjunction with the development of CATS 2.0, this book provides a comprehensive look at both the theory and practice of cointegration analysis. It is highly recommended for anyone using CATS.