

Time Series Software: Stata 12 versus RATS 8

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Stata's latest release, version 12, is a big leap forward in the programs time series capabilities. Always a popular program, Stata has had several areas where it lagged significantly behind the competition with "long-T" time series analysis being a prime example. This has been the case despite the fact that Stata's duration modeling and pooled-cross-sectional time series (PCSTS) capabilities have been excellent for several versions now. Practitioners and teachers of time series in political science have often resorted to more specialized software packages such as RATS (Regression Analysis for Time Series) and EViews if they wanted to get into advanced areas. The new Stata 12 finally has the ability to get deeper into recent (say, post-1995) advances in applied time series, making the program a viable substitute for dedicated time series programs. For teaching and many advanced models, Stata 12 can certainly do the job.

Two of Stata's advancements stand out to us as being the most pertinent to political scientists: improved multivariate GARCH estimation and ARFIMA modeling. Stata 12 can now estimate several members of the multivariate GARCH family including dynamic conditional correlations (DCC). Although the ability to estimate state-space models was first included in Stata 11, the conditional means and variances for each time period are predicted using a Kalman filter. As Lebo and Box-Steffensmeier (2008) show, DCC are better than Kalman filter estimates for determining the time-varying relationship between factors in the mean or variance equations. The native implementation of DCC along with the ability to estimate near-VARs with GARCH components (something that has not been implemented in other packages) is a great improvement for Stata 12.

Beyond including a host of multivariate GARCH, Stata now includes estimation of ARFIMA models as part of the base package. Previous releases of Stata had allowed the use of add-ons that could estimate fractional values of d in a Box-Jenkins style (p, d, q) model. This is now a built-in feature as is the ability to fractionally difference by the estimated value of d , obtained using the GPH procedure, making a series stationary. RATS 8.0 now allows fractional differencing as a command, but still relies on reading in a "source" file (similar to an ado file in Stata) for the estimation of d . In the details, however, is one spot where Stata clearly outperforms RATS. In ARFIMA models, one should be able to simultaneously estimate p , d , and q and Stata does this with little problem for multiple parameters. Try

going beyond estimating a $(1, d, 0)$ model in RATS, though, and you will quickly hit trouble.

Other techniques covered in a standard 14-week time series course continue to be easily implemented in Stata. From Box-Jenkins to vector autoregression, all can be estimated using the commands included with Stata as shipped. Stata also has an impressive series of impulse response function and structural VAR commands to trace shocks throughout a system of equations and make inferences about causality. Although not included as "canned" commands, error correction mechanisms, granger causality, and exogeneity tests can all be implemented with a few lines of code.¹ Add in impressive PCSTS and event history capabilities and Stata 12 becomes a package that is ready to handle most anything in a typical political science time series course.

There are other advancements in Stata 12 that are of less interest to political scientists but may be useful, particularly with messy economic data. These include a set of four filters to de-trend data according to business or seasonal cycles. Stata also now includes a base unobserved-components model command to parse a series into trend, cyclical, and seasonal components as well as a new date function that allows you define your own business calendar. Again, most of these commands will be of little interest to the average political scientist but may be useful for those studying international financial markets.

For all the progress Stata has made, it is still not perfect. As in RATS, adding too many parameters to an advanced (e.g. GARCH) model can pose problems, from non-convergence to parameter instability. Since these problems become more prevalent as series get shorter, they are certainly big issues for political scientists. Some researchers may balk at data that do not like the model, but as the Stata documentation notes, these models are extremely complex and rarely have well-behaved likelihood functions. However, when your model will not converge in Stata its impossible to miss. RATS, on the other hand, will often return estimates with a note in the header that convergence was not achieved. This is another point in Stata's favor you certainly want to know when your model does not run. If you miss the warning, RATS can fool you with unreliable results. Both Stata and RATS offer options to tweak, including setting starting values and changing the maximization method, but users should be aware that there may be complex multivariate models that neither package can estimate.

As a specialty program, RATS had enjoyed some distinct advantages. Advanced programming, for example, was greatly aided by the community of users who archive and share their code generously. Also, although less customizable, the graphics produced by RATS are nicer than Stata's time series graphs and graphs from both programs can be exported in either PDF or EPS format for easy incorpora-

¹Stata does include pre-programmed ECM and granger causality commands for use in estimating VARs, but these do not work with single equation models.

tion into Word and L^AT_EX documents. As of RATS 8, both programs are able to export estimation results in L^AT_EX as well.

On the other hand, RATS has always been a difficult program to use and to teach. It doesn't have a learning curve ... just a long slow incline that remains slow as one gets into more advanced programming. Programming Box-Jenkins transfer functions, for example, involves using archaic holdovers from its mainframe FORTRAN origins. One gets blank stares when explaining to a graduate class that a line of code reading "# indvar 1 1 1" is asking RATS to estimate the effects of an independent variable on the dependent variable at lags of one and two periods (not at zero) and is also asking for an adjustment parameter to be estimated on the effect of the first lag. Moreover, students using MacRATS will have their own complaints of compatibility issues and crashes.

The Stata community is certainly large and active, but finding other researchers with long-T programming experi-

ence is not as easy there. That being said, the Stata time series community is growing and may do so at an exponential rate with the advancements in Stata 12. Stata's improvements in ARFIMA estimation and the expansion of the multivariate GARCH commands are especially welcome. Add to this a more intuitive programming language, easier data manipulation, and the ability to handle a variety of other data structures, including duration models and PC-STTS, and Stata 12 becomes an even more attractive option for most instructors and users. Those with limited research budgets or who would prefer an all-in-one software package capable of running many advanced time series models will be very pleased with the improvements made in Stata 12. In sum, both programs are quite capable. That so much now comes down to taste is major progress for Stata. Stata 12 is now a very good alternative to RATS and one your students will ease into far more simply than they would add RATS to their catalogue of statistical packages.

A Note from Our Section President

Report from the President: Recap of the 2012 Business Meeting (that Never Happened)

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As all know, our annual business meeting fell prey to the weather cancellation of APSA 2012, so let me use these remarks as another chance (following on my PolMeth listserv emailed virtual meeting then) to communicate a summary of what would have transpired at the meeting.

At the business meeting, I would have reported on the states of the Society and the Section—which states, to summarize, were and are both grand—including a report on our finances from Treasurer, Luke Keele—he'd have told you our balances are positive and stable in both cases. To elaborate:

I would have thanked again Tom Carsey and Mike Ward and the teams at UNC and Duke for the successful summer meetings, and I would have announced that a host and venue for the 2015 PolMeth meetings has been secured, although an official letter of intent is pending, so I wouldn't

have said whom and where. I would have mentioned that discussions with a possible 2016 host are ongoing, and emphasized that we're always interested in hearing from any and all interested parties in this regard.

I would have reminded the attendees about the call for proposals for small, thematic conferences, the winner of which was just announced (after anonymous review by a senior member of the Society and Section, for whose efforts I am extending this public, albeit parenthetical & still anonymous, thanks) as the "Causality in Political Networks Conference" proposed by Betsy Sinclair (Chicago), Guanglei Hong (Chicago), and Jake Bowers (Illinois).

I would have announced an upcoming contest to solicit a logo and letterhead for The Society for Political Methodology, the announcement of which contest is now very soon pending.

I would have recognized the *Political Methodologist* newsletter editors, Jake Bowers, Brian Gaines, and Wendy Tam Cho (all of Illinois), any of whom in attendance would have stood and said, to quote Jake: "please send submissions' and 'feel free to talk to me in person if you have ideas' and such."

I would have recognized Michelle Dion (McMaster), who'd have announced the going-live of OPOSSEM [http:](http://)