Readme RSGARCH toolbox

Thomas CHUFFART *

February 20, 2013

1 Notes

1.1 License

1.2 Bug Reports and Feedback

There are probably many bugs in this version of the toolbox, so, I welcome bug reports and feedback about it. The best type of bug report should include the command run that produced the errors and the version of MATLAB run.

2 List of functions

The toolbox comes with few functions. When I am not he owned of the function I notify it explicitly. Moreover, you need the stixbox toolbox available to run some other functions. All the explanation how to use these functions is in the preamble of the program.

2.1 Time series simulation processes

- **msGarchSim.m** - Simulation of Markov-Switching GARCH models (Haas & all (2004) and Klaassen (2002))

*Aix-Marseille University (Aix Marseille School of Economics), CNRS & EHESS

- **argarchSim.m** - Simulation of ARMA(P,Q)-GARCH(p,q), ARMA(P,Q)-STGARCH(p,q) (Smooth Transtion GARCH) with logistic or exponential transition function and ARMA(P,Q)-GJR(o)-GARCH(p,q) (Engle (1982), Bollerslev (1986), Glosten, Jagannathan et Runkle (1993), Hagerud (1997))

2.2 Estimation functions

- **swgarchEst.m** - Estimation of Markov-Switching GARCH models (Haas & all (2004) and Klaassen (2002))
- **argarchEst.m** - Estimation of ARMA(P,Q)-GARCH(p,q), ARMA(P,Q)-STGARCH(p,q) (Smooth Transtion GARCH) with logistic or exponential transition function and ARMA(P,Q)-GJR(o)-GARCH(p,q) (Engle (1982), Bollerslev (1986), Glosten, Jagannathan et Runkle (1993), Hagerud (1997))

These two functions call some other functions: **argarchLik.m**, **swgarchLik.m**, **swgarchlikcoreH.m**, **swgarchlikcoreK.m** and **constrMSGARCH.m**. These functions are used to compute de likelihood function called by fmincon a MATLAB routine for minimization under constraints.

2.3 Test functions

- **testEngel.m** - Compute the statistical test of Engel to detect ARCH effect in the variance
- **studenttest.m** - Compute the student statistical test
- **ljungboxtest.m** - Compute the Ljung-Box test statistic
- **jbtest.m** - Compute the Jarque and Bera test statistic to detect if the law of a sample is normal

2.4 Useful functions

- **robustvcv.m** - Compute a robust variance covariance matrix. This function comes from the MFE Toolbox of Kevin Shepard. I make little modifications.
- **pdf_kernel.m** - Non parametric estimation of a density
- **nwcov.m** - Compute Newey West covariance matrix. This function comes from the MFE Toolbox of Kevin Shepard
- **matrixlag.m** - Compute a matrix of lag
- **markovSim.m** - Simulation of Markov chains
- **lossfun.m** - Compute some loss functions (MSE, MAE, QLIKE)
- **InfoCrit.m** - Compute information criteria

- **hessian2s.m** - Calculate the hessian matrix with two-sided method from JP Lesage spatial econometric Toolbox, modified by Kevin Sheppard from the MFE Toolbox.
- **blokdiag** - Compute block diagonal matrix
- **autocov** - Compute empirical auto-covariance function
- **autocorr** - Compute empirical auto-correlation function
- **arroots** - Check the roots of AR process