

Package Name: OGARCH

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Add-in Type: Group and Global

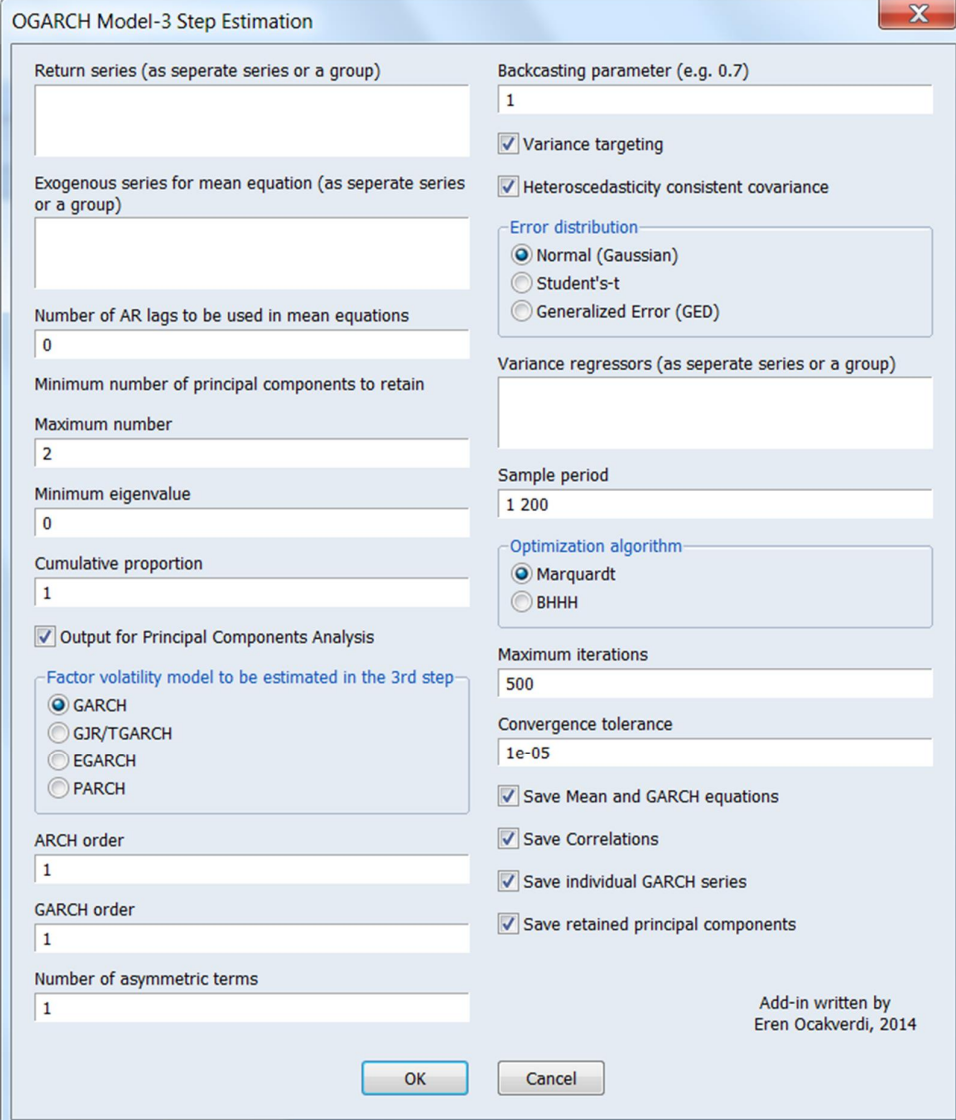
Default Proc Name: ogarch

Default Menu Text: Orthogonal GARCH-3 step

Interface: Dialog and Command Line

Description: This add-in estimates an Orthogonal GARCH model with 3-step procedure. It is written solely for educational purposes. Detailed information on this type of modeling can be found in Alexander (2001) and Tsay (2010).

Dialog: Upon running the add-in from the menus or command line, a dialog will appear:



The dialog box is titled "OGARCH Model-3 Step Estimation" and contains the following fields and options:

- Return series (as separate series or a group):** [Empty text box]
- Exogenous series for mean equation (as separate series or a group):** [Empty text box]
- Number of AR lags to be used in mean equations:** [0]
- Minimum number of principal components to retain:** [Empty text box]
- Maximum number:** [2]
- Minimum eigenvalue:** [0]
- Cumulative proportion:** [1]
- ☒ **Output for Principal Components Analysis**
- Factor volatility model to be estimated in the 3rd step:**
 - ☒ GARCH
 - ☐ GJR/TGARCH
 - ☐ EGARCH
 - ☐ PARC
- ARCH order:** [1]
- GARCH order:** [1]
- Number of asymmetric terms:** [1]
- Backcasting parameter (e.g. 0.7):** [1]
- ☒ **Variance targeting**
- ☒ **Heteroscedasticity consistent covariance**
- Error distribution:**
 - ☒ Normal (Gaussian)
 - ☐ Student's-t
 - ☐ Generalized Error (GED)
- Variance regressors (as separate series or a group):** [Empty text box]
- Sample period:** [1 200]
- Optimization algorithm:**
 - ☒ Marquardt
 - ☐ BHHH
- Maximum iterations:** [500]
- Convergence tolerance:** [1e-05]
- ☒ **Save Mean and GARCH equations**
- ☒ **Save Correlations**
- ☒ **Save individual GARCH series**
- ☒ **Save retained principal components**

OK Cancel

Add-in written by
Eren Ocakverdi, 2014

In the first box, you should either enter the name of your group or specify the returns as separate series (transforming expressions like `dlog()` are also allowed). First step of the estimation procedure begins with obtaining stationary series (i.e. residuals from mean equations). If you wish to use exogenous variable(s) in the mean equation, then specify the name(s) in the second box. Autoregressive lags (p) are also allowed in the mean equation, which can be specified in the third box.

Minimum number of principal components to retain is determined in the second step. Add-in provides you with three settings for controlling the number of components to be displayed; the number displayed will be the minimum number satisfying any of the criteria. Default values are assigned so as to make sure that two principal components are retained. Values of decision criteria may depend on the research problem, so you can adjust them to suit your needs. This part uses pcomp procedure of EViews, so details can be found in the user's manual.

Factor volatility model is estimated in the third stage. Again, this part makes use of ARCH model procedures of EViews, so it offers nearly the same options as EViews' ARCH specification dialog. Individual garch series and correlations are also computed at this stage and can be retrieved by checking the related box.

Please note that, all the estimated dynamic correlation series will be equal to 1, if only single principal component is extracted in the second step. One final thing to mention is that "variance targeting" is available only for GARCH specification and may not always produce output due to convergence problems. In that case, simply uncheck the option and re-estimate your model.

Command Line:

Syntax-1: ogarch

Syntax-2: mygroup.ogarch(options)

Options:

Argument	Type	Explanation
xvar	<i>string</i>	Exogenous variable(s) for the mean equation
arlag	<i>numeric</i>	Autoregressive lag order for the mean equation
maxcomp	<i>numeric</i>	Maximum number of principal components to retain
mineval	<i>numeric</i>	Minimum eigenvalue of principal components to retain
cumprop	<i>numeric</i>	Cumulative proportion of principal components to retain
unifit	<i>numeric</i>	Uni. GARCH fit ("GARCH", "TGARCH", "EGARCH" or "PGARCH")
arch	<i>numeric</i>	Number of ARCH terms (p)
garch	<i>numeric</i>	Number of GARCH terms (q)
asymm	<i>numeric</i>	Threshold order for asymmetric models
backcast	<i>numeric</i>	Backcasting parameter (between 0 and 1 in increments of 0.1)
errors	<i>string</i>	Error distribution ("Tdist" or "GED", if not normal)
vxvar	<i>string</i>	Variance regressor(s)

optim	<i>string</i>	Optimization algorithm ("b", if not Marquardt)
iters	<i>numeric</i>	Maximum number of iterations
tol	<i>numeric</i>	Tolerance level for convergence
smpl	<i>string</i>	Sample period
hetero		Heteroscedasticity consistent covariance
vtarget		Variance targeting
outpcmp		Output for principal components analysis
eqs		Save Mean and GARCH equation outputs
rhos		Save time varying correlations
garchser		Save individual GARCH series based on factor volatility model
pcomps		Save retained principal components
prompt		Open the GUI

Examples:

- 1) mygroup.ogarch(smpl="3/2/2005 12/30/2013",pcomps)
- 2) mygroup.ogarch(unifit="TARCH",errors="Student",optim="b",asymm=1,eqs,rhos)

References:

Alexander, C. (2001). A Primer on the Orthogonal GARCH Model.

http://carolalexander.org/publish/download/DiscussionPapers/OrthogonalGARCH_Primer.pdf

Tsay, R. S. (2010). *Analysis of Financial Time Series (3rd ed.)*. New Jersey: John Wiley & Sons. pp. 543-546.