

NDK_GARCHM_FORE

Last Modified on 07/15/2016 9:51 am CDT

- C/C++
- .Net

```
int __stdcall NDK_GARCHM_FORE(double *    pData,
                               size_t     nSize,
                               double *   sigmas,
                               size_t     nSigmaSize,
                               double     mu,
                               double     flambda,
                               const double * Alphas,
                               size_t     p,
                               const double * Betas,
                               size_t     q,
                               WORD       nInnovationType,
                               double     nu,
                               size_t     nStep,
                               WORD       retType,
                               double     alpha,
                               double *   retVal
                               )
```

Calculates the out-of-sample forecast statistics.

Returns

status code of the operation

Return values

NDK_SUCCESS Operation successful

NDK_FAILED Operation unsuccessful. See [Macros](#) for full list.

Parameters

- | | |
|------------------------|---|
| [in] pData | is the univariate time series data (a one dimensional array). |
| [in] nSize | is the number of observations in pData. |
| [in] sigmas | is the univariate time series data (a one dimensional array of cells (e.g. rows or columns)) of the last q realized volatilities. |
| [in] nSigmaSize | is the number of elements in sigmas. Only the latest q observations are used. |
| [in] mu | is the GARCH model conditional mean (i.e. mu). |
| [in] flambda | is the volatility coefficient for the mean. In finance, lambda is referenced as the risk premium. |
| [in] Alphas | are the parameters of the ARCH(p) component model (starting with the lowest lag). |

[in] p	is the number of elements in Alphas array
[in] Betas	are the parameters of the GARCH(q) component model (starting with the lowest lag).
[in] q	is the number of elements in Betas array
[in] nInnovationType	is the probability distribution function of the innovations/residuals (see INNOVATION_TYPE) <ul style="list-style-type: none"> • INNOVATION_GAUSSIAN Gaussian or Normal Distribution • INNOVATION_TDIST Student's T-Distribution, • INNOVATION_GED Generalized Error Distribution (GED)
[in] nu	is the shape factor (or degrees of freedom) of the innovations/residuals probability distribution function.
[in] nStep	is the forecast time/horizon (expressed in terms of steps beyond end of the time series).
[in] retType	is a switch to select the type of value returned <ol style="list-style-type: none"> 1. Mean forecast 2. Forecast Error 3. Volatility term structure 4. Confidence interval lower limit 5. Confidence interval upper limit (see FORECAST_RETVAL_FUNC)
[in] alpha	is the statistical significance level. If missing, a default of 5% is assumed.
[out] retVal	is the calculated forecast value

Remarks

1. The data sample may include missing values (NaN).
2. The test hypothesis for the population standard deviation: $[H_0]: \sigma = \sigma_o$ $[H_1]: \sigma \neq \sigma_o$ Where:
 - The underlying model is described [here](#).
 - The time series is homogeneous or equally spaced.
 - The time series may include missing values (e.g. #N/A) at either end.
 - The number of parameters in the input argument - alpha - determines the order of the ARCH component model.
 - The number of parameters in the input argument - beta - determines the order of the GARCH component model.

Requirements

Header	SFSDK.H
Library	SFSDK.LIB
DLL	SFSDK.DLL

```

int NDK_GARCHM_FORE(double[] pData,
                    UIntPtr nSize,
                    double[] pVols,
                    UIntPtr npVolSize,
                    double mu,
                    double flambda,
                    double[] Alphas,
                    UIntPtr p,
                    double[] Betas,
                    UIntPtr q,
                    short nInnovationType,
                    double nu,
                    UIntPtr nStep,
                    short retType,
                    ref double retVal
)

```

Namespace: NumXLAPI Class: SFSDK Scope: Public Lifetime: Static
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Calculates the out-of-sample forecast statistics.

Return Value

a value from [NDK_RETCODE](#) enumeration for the status of the call.

NDK_SUCCESS operation successful
 Error Error Code

Parameters

- [in] **pData** is the univariate time series data (a one dimensional array).
- [in] **nSize** is the number of observations in pData.
- [in] **mu** is the GARCH model conditional mean (i.e. mu).
- [in] **flambda** is the volatility coefficient for the mean. In finance, lambda is referenced as the risk premium.
- [in] **Alphas** are the parameters of the ARCH(p) component model (starting with the lowest lag).
- [in] **p** is the number of elements in Alphas array
- [in] **Betas** are the parameters of the GARCH(q) component model (starting with the lowest lag).
- [in] **q** is the number of elements in Betas array
- [in] **nInnovationType** is the probability distribution function of the innovations/residuals (see [INNOVATION_TYPE](#))
 - INNOVATION_GAUSSIAN Gaussian or Normal Distribution
 - INNOVATION_TDIST Student's T-Distribution,
 - INNOVATION_GED Generalized Error Distribution (GED)
- [in] **nu** is the shape factor (or degrees of freedom) of the

innovations/residuals probability distribution function.

[in] **nStep** is the forecast time/horizon (expressed in terms of steps beyond end of the time series).

[in] **retType** is a switch to select the type of value returned

1. Mean forecast
2. Forecast Error
3. Volatility term structure
4. Confidence interval lower limit
5. Confidence interval upper limit (see [FORECAST_RETVAL_FUNC](#))

[out] **retVal** is the calculated forecast value

Remarks

1. The data sample may include missing values (NaN).
2. The test hypothesis for the population standard deviation: $[H_0: \sigma = \sigma_o]$ $[H_1: \sigma \neq \sigma_o]$ Where:
 - The underlying model is described [here](#).
 - The time series is homogeneous or equally spaced.
 - The time series may include missing values (e.g. #N/A) at either end.
 - The number of parameters in the input argument - alpha - determines the order of the ARCH component model.
 - The number of parameters in the input argument - beta - determines the order of the GARCH component model.

Exceptions

Exception Type	Condition
None	N/A

Requirements

Namespace	NumXLAPI
Class	SFSDK
Scope	Public
Lifetime	Static
Package	NumXLAPI.DLL

Examples

References

Hamilton, J .D.; [Time Series Analysis](#) , Princeton University Press (1994), ISBN 0-691-04289-6

Tsay, Ruey S.; [Analysis of Financial Time Series](#) John Wiley & SONS. (2005), ISBN 0-471-690740

See Also

[template("related")]
