Package 'GARCHIto'

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Type Package

Title Class of GARCH-Ito Models

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Author Xinyu Song

Maintainer Xinyu Song <song.xinyu@mail.shufe.edu.cn>

Description

Provides functions to estimate model parameters and forecast future volatilities using the Unified GARCH-Ito [Kim and Wang (2016) <doi:10.1016/j.jeconom.2016.05.003>] and Realized GARCH-Ito [Song et. al. (2020) <doi:10.1016/j.jeconom.2020.07.007>] models. Optimization is done using augmented Lagrange multiplier method.

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Imports Rsolnp, stats

Depends R (>= 2.10)

Suggests knitr, rmarkdown

VignetteBuilder knitr

NeedsCompilation no

Repository CRAN

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Contents

RealizedEst *Realized GARCH-Ito Model*

Description

Estimate model parameters for the Realized GARCH-Ito Model

Usage

```
RealizedEst(RV = RV, JV = NULL)
```

Arguments

RV	Time series of daily realized volatilities.
JV	Time series of daily jump variations,

Value

Estimated parameter values and daily conditional volatilities:

coefficients parameter estimates of the realized GARCH-Ito model

sigma daily conditional volatility estimates of the realized GARCH-Ito model

pred one-step-ahead predicted volatility value

References

Song, X., Kim, D., Yuan, H., Cui, X., Lu, Z., Zhou, Y., & Wang, Y. (2020). Volatility Analysis with Realized GARCH-Ito Models. Journal of Econometrics, in press.

Examples

```
sample_data
RealizedEst(sample_data$RV)
RealizedEst(sample_data$BPV, sample_data$JV)
```

RealizedEst_Option *Realized GARCH-Ito Model with Options*

Description

Estimate model parameters for the Realized GARCH-Ito Model with Options

Usage

```
RealizedEst_Option(RV = RV, JV = NULL, NV = NULL, homogeneous = TRUE)
```

Arguments

RV	Time series of daily realized volatilities.
JV	Time series of daily jump variations,
NV	Time series of daily volatilities estimated using option data
homogeneous	Whether to assume homogeneous error in the linear regression model between conditional volatility of the realized GARCH-Ito model and volatility estimated from the option data, default is TRUE.

Value

Estimated parameter values and daily conditional volatilities:

coefficients parameter estimates of the realized GARCH-Ito model

sigma daily conditional volatility estimates of the realized GARCH-Ito model

pred one-step-ahead predicted volatility value

References

Song, X., Kim, D., Yuan, H., Cui, X., Lu, Z., Zhou, Y., & Wang, Y. (2020). Volatility Analysis with Realized GARCH-Ito Models. Journal of Econometrics, in press.

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sample_data *CSI 300 Index Realized Measures*

Description

This sample data set contains realized measures, such as realized volatility (RV), bi-power realized volatility (BPV) and jump variation (JV) estimated from CSI 300 Index high-frequency data, it also includes daily low-frequency log returns (return).

Usage

```
sample_data
```

Format

An object with the following elements:

RV times series of daily realized volatility estimates

BPV times series of daily bi-power realized volatility estimates

JV time series of daily jump variation estimates

return time series of daily low-frequency returns

`UnifiedEst` *Unified GARCH-Ito Models*

Description

Estimate model parameters for the Unified GARCH-Ito Model.

Usage

```
UnifiedEst(RV = RV, return = return)
```

Arguments

`RV`	Time series of daily realized volatilities.
`return`	Time series of daily log returns.

Value

Estimated parameter values and daily conditional volatilities:

coefficients parameter estimates of the realized GARCH-Ito model

sigma daily conditional volatility estimates of the realized GARCH-Ito model

pred one-step-ahead predicted volatility value

References

Kim, D. & Wang, Y. (2016). Unified discrete-time and continuous-time models and statistical inferences for merged low-frequency and high-frequency financial data. Journal of Econometrics. 194:220-230.

Examples

```
sample_data
UnifiedEst(sample_data$RV, sample_data$return)
```

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