eventstudies R package
@useR 2017

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The **eventstudies** package allows you to conduct event study in R and do methodological research on event studies. It has functionality to conduct basic to advanced event study analysis. Familiarity with **zoo** and base R is all what is required. And of course:

- List of events
- Returns/price data
Event time

1. Handles event time.
2. Converts continuous time series into event time frame for each event.
3. Detects missing event data and incorrect data span.
4. Frequency agnostic: can handle intra-day as well as monthly data.
Estimation models

1. Market model
3. Excess return (market returns)
4. Constant mean return
Computing Cumulative Abnormal Return (CAR)

1. Cumulative sum with remapping.
2. Cumulative product with remapping.
Inference procedures

1. Bootstrap
2. T-test
3. Wilcoxon test
Steps done by eventstudy()

1. Define event period.
2. Convert physical time to event time.
3. Define estimation period.
4. Perform model estimation to compute abnormal returns.
5. Compute CAR.
6. Perform inference tests.
7. Plot.
Demonstration of event study analysis using stock splits data.

- **Step 1: load the data**

```r
library(eventstudies, verbose = FALSE)

data("SplitDates")
data("StockPriceReturns")
data("OtherReturns")
```

- **Step 2: run eventstudy():**

```r
es <- eventstudy(firm.returns = StockPriceReturns,
                 event.list = SplitDates,
                 event.window = 7,
                 type = "None")
```
Step 3: structure of object:

```r
str(es, 1, 1)
## List of 2
## $ result : num [1:14, 1:3] 0 ...
## ..- attr(*, "dimnames")=List of 2
## $ outcomes: chr [1:22] "wdatamissing" ...
## - attr(*, "CAR")= zoo series from -6 to 7
## Data: num [1:14, 1:5] 0 ...
## ..- attr(*, "dimnames")=List of 2
## Index: int [1:14] -6 -5 ...
## - attr(*, "event.window")= num 7
## - attr(*, "inference")= logi TRUE
## - attr(*, "inference.strategy")= chr "bootstrap"
## - attr(*, "remap")= chr "cumsum"
## - attr(*, "class")= chr "es"
```
print(es)

## Event study Mean response with TRUE inference for CI:
## 2.5%  Mean   97.5%
## [1,]  0.000000  0.0000000  0.0000000
## [2,] -1.449722 -0.3575148  0.4106271
## [3,] -1.287458  0.1880957  1.1852786
## [4,] -1.361171  0.2771475  1.6144334
## [5,] -2.513148 -0.2462372  2.3286154
## [6,] -1.229292 -0.0314114  1.1063878
## [7,] -3.366436 -1.6603020 -0.0759738
## [8,] -5.748373 -1.4942549  2.8972769
## [9,] -5.077755 -1.1685093  2.6754226
## [10,] -3.073885  0.1217461  2.5082721
## [11,] -2.583986  0.6846773  4.1106833
## [12,] -2.909594 -0.1171899  3.3195156
## [13,] -3.046579  0.6461453  5.0837180
## [14,] -3.302320  0.6122838  4.9997566
##
## Event outcome has 5 successful outcomes out of 22 events:
## [1] "wdatamissing"  "wrongspan"  "wrongspan"  "wrongspan"
## [5] "wrongspan"     "success"    "wrongspan"  "wrongspan"
## [9] "success"       "wrongspan"  "wrongspan"  "wrongspan"
## [13] "wrongspan"    "wrongspan"  "wrongspan"    "success"
## [17] "wrongspan"    "wrongspan"  "wrongspan"  "wdatamissing"
## [21] "success"      "success"
Step 4: plot()

```
par(las=1, mar=c(4,4,.1,.1))
plot(es)
```
Demonstration of same data with market model.

```r
es <- eventstudy(firm.returns = StockPriceReturns,
                 event.list = SplitDates,
                 event.window = 7,
                 type = "marketModel",
                 to.remap = TRUE,
                 remap = "cumsum",
                 inference = TRUE,
                 inference.strategy = "bootstrap",
                 model.args = list(
                                   market.returns = OtherReturns[, "NiftyIndex"]
                                 )
                 )
```
Stock splits with market model

\begin{verbatim}
par(las=1, mar=c(4,4,.1,.1))
plot(es)
\end{verbatim}
Package

- **Latest version**: 1.2
- **Installation**

  ```r
  install.packages("eventstudies")
  ## OR
  devtools::install_github("nipfpmf/eventstudies")
  ```

- **CRAN**
  https://CRAN.R-project.org/package=eventstudies

- **GitHub**
  https://github.com/nipfpmf/eventstudies
Help

- **Man pages** include details of inner workings.
- **Vignettes:**
  1. `eventstudies`: Basic introduction to the package.
  2. `replications`: Replicates two journal papers.
- **BugReports**
  https://github.com/nipfpmf/eventstudies/issues/new
- **Maintainer’s email**: anand.chirag@gmail.com