# Package ‘erer’

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**Author** Changyou Sun <csun@cfr.msstate.edu>

**Maintainer** Changyou Sun <csun@cfr.msstate.edu>

**Depends** R (>= 3.0.0), systemfit, lmtest, tseries, ggplot2, urca

**Description** This package contains functions and datasets for the book of ’Empirical Research in Economics: Growing up with R’ by Dr. Changyou Sun. These functions can calculate marginal effects for a binary probit or logit model, estimate static and dynamic Almost Ideal Demand System (AIDS) models, and conduct event analysis.

**License** GPL (>= 2)

**LazyLoad** yes

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`erer-package` *Empirical Research in Economics with R*

---

## Description

This package contains functions and datasets for the book of 'Empirical Research in Economics: Growing up with R' by Dr. Changyou Sun. These functions can calculate marginal effects for a binary probit or logit model, estimate static and dynamic Almost Ideal Demand System (AIDS) models, and conduct event analysis.

## Details

| | |
|---|---|
| Package: | erer |
| Type: | Package |
| Version: | 2.0 |
| Date: | 2010-11-15 (first built); 2014-1-9 (last) |
| Depends: | R (>= 3.0.0), systemfit, lmtest, tseries, ggplot2, urca |
| License: | GPL (>= 2) |
| LazyLoad: | yes |

## Author(s)

Changyou Sun <csun@cfr.msstate.edu>

---

`aiData` *Transforming Raw Data for Static AIDS Model*

---

## Description

This function transforms import values and quantities into a data format that are needed for a static AIDS model.

### Usage

```
aiData(x, label, label.tot = "WD", prefix.value = "v",
  prefix.quant = "q", start = NULL, end = NULL, stone = TRUE,
  dummy = NULL, season = c("none", "m", "q"), ...)
```

### Arguments

| | |
|---|---|
| `x` | raw time series data such as `daBedRaw`. |
| `label` | names of supplying countries; this can be as long as needed. |
| `label.tot` | names of the world total (default label is "WD"). |
| `prefix.value` | prefix for value variables. |
| `prefix.quant` | prefix for quantity varibles. |
| `start` | start date for the transformed time series; this can be used to select a smaller window; the default is the start date of the raw data `x`. |
| `end` | end date for the transformed time series. |
| `stone` | whether the Stond Price Index is constructed (default TRUE); if FALSE, the version of log-linear analog to the Paasche index with lagged budget shares in Moschini (1995) is used. See references for detail. |
| `dummy` | adding dummy variables if date ranges are provided as a list. |
| `season` | adding seasonality variables or not; if yes, either monthly dummy or quarterly dummy; this is prepared mainly for monthly data. |
| `...` | additional arguments to be passed. |

### Details

This transforms raw import data into a format needed for a static AIDS model. This separation of data preprаration from model fitting allows greater flexibility in using `aiStaFit` in estimating a static AIDS model. In addition, when the raw data contain zero, a small number is substituted to avoid NA when the price variable (value/quantity) is calculated.

### Value

Return a list object with two components:

| | |
|---|---|
| `out` | a time series object ready for static AIDS models. |
| `share` | a time series object of the share data. |
| `price` | a time series object of the price data. |
| `quantity` | a time series object of the quantity data. |
| `value` | a time series object of the value data. |
| `m` | a vector of the total expenditure. |
| `call` | a record of the system call; this allows `update.default` to be used. |

### Methods

One method is defined as follows:

`print`**:** print the first several observations of the final data needed for the AIDS model.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### References

Moschini, G. 1995. Units of measurement and the Stone index in demand system estimation. American Journal of Agricultural Economics 77(1):63-68.

Singh, K., M.M. Dey, and G. Thapa. 2011. An error corrected almost ideal demand system for crustaceans in the United States. Journal of International Food & Agribusiness Marketing 23(3):271-284.

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

### See Also

aiStaFit; daBedRaw; daBed.

### Examples

```
data(daBedRaw)
imp8 <- aiData(x = daBedRaw,
  label = c("CN", "VN", "ID", "MY", "CA", "BR", "IT"),
  label.tot = "WD", prefix.value = "v", prefix.quant = "q",
  start = c(2001, 1), end = c(2008, 12), frequency = 12)
imp4 <- update(imp8, label = c("CN", "VN", "ID"))
imp5 <- update(imp4, label = c("CN", "VN", "ID", "MY"))
imp8; imp4; imp5
dat8 <- imp8$out

dum  <- ts(0, start = start(dat8), end = end(dat8), frequency = 12)
dum1 <- replace(dum, time(dum) == 2003+(10-1)/12, 1)
dum2 <- replace(dum, time(dum) == 2004+(7 -1)/12, 1)
dum3 <- replace(dum, time(dum) == 2005+(1 -1)/12, 1)
daTest <- ts.union(dat8, dum1, dum2, dum3)
colnames(daTest) <- c(colnames(dat8), "dum1", "dum2", "dum3")

data(daBed)
identical(daBed, daTest)
```

---

aiDiag *Diagnostic Statitics for Static or Dynamic AIDS Model*

---

### Description

Report a set of diagnostic statistics for static or dynamic AIDS models

### Usage

```
aiDiag(x, digits = 3, ...)
```

### Arguments

| | |
|---|---|
| x | an object of class aiFit from the function of aiStaFit or aiDynFit. |
| digits | number of digits used in rounding outputs. |
| ... | additional arguments to be passed. |

### Details

Compute several diagnostic statistics for each equation in a AIDS model. Tests includes are BG, BP, RESET, and JB. See the reference paper for detail.

### Value

Return a data frame object with the statistics and p values for the four tests by equation.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### References

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

### See Also

aiStaFit; aiDynFit.

### Examples

```
# see the examples for 'aiDynFit'.
```

---

## aiDynFit — *Fitting a Dynamic AIDS Model*

---

### Description

Estimate a dynamic AIDS model for a system.

### Usage

```
aiDynFit(w, dum.dif = FALSE, AR1 = FALSE,
  rho.sel = c("all", "mean"), ...)
```

### Arguments

| | |
|---|---|
| w | a object of class aiStaFit. |
| dum.dif | a logical value (default of FALSE) of whether to take a difference on the dummy variables passed from w. |
| AR1 | whether first-degree autocorrelation should be corrected. |
| rho.sel | if AR1 = TRUE, there are two ways of computing the autocorrelation coefficient. |
| ... | additional arguments to be passed. |

## Details

This estimates a dynamic AIDS model. The residuals from the statis AIDS model are included. As it is programmed now, only one lag is allowed for the share variables on the right-hand side. Autocorrelation in the residuals can be corrected following the treatment in Berndt (1975).

## Value

Return a list object of class "aiFit" and "aiDynFit" with the following components:

| | |
|---|---|
| `w` | a object of class `aiStaFit`. |
| `y` | data for fitting the static AIDS model, passed down by `w`. |
| `dum.dif` | a logical value (default of FALSE) of whether to take a difference on the dummy variables passed from `w`. |
| `daDyn` | data for fitting the dynamic AIDS model. |
| `share` | names of shares by commodity, used as depedent variables. |
| `price` | names of prices by commodity, used as independent variables. |
| `expen` | names of expenditure variable. |
| `shift` | names of the shifters. |
| `omit` | names of the omitted share variable. |
| `nOmit` | position of the omitted share variable in the name of share variable. |
| `hom` | a logical value of homogeneity test. |
| `sym` | a logical value of symmetry test. |
| `nShare` | number of share variables. |
| `nExoge` | number of exogenous variables (lagged share, residual, expenditure, and shifters). |
| `nParam` | number of parameters in one equation. |
| `nTotal` | number of parameters in the whole system estimated. |
| `formula` | formula for estimating the system. |
| `res.matrix` | restriction matrix for `hom` or `sym`, or both. |
| `res.rhs` | right-hand values for tests of `hom` or `sym`, or both. |
| `est` | the dynamic AIDS model estimated. |

## Methods

One method is defined as follows:

`print`: print the first several observations of the final data.

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## References

Berndt, E.R., and N.E. Savin. 1975. Estimation and hypothesis testing in singular equation systems with autoregressive disturbances. Econometrica 43(5/6):937-957.

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

## See Also

systemfitAR; aiStaFit; aiDiag; aiElas; summary.aiFit.

## Examples

```
# --- Step 1: Read data
data(daExp, daBedRaw, daBed)

# --- Step 2: Hausman Test
# 2.1 Getting started with a static AIDS model
sh  <- c("sCN", "sVN", "sID", "sMY", "sCA", "sBR", "sIT", "sRW")
pr  <- c("lnpCN", "lnpVN", "lnpID", "lnpMY",
         "lnpCA", "lnpBR", "lnpIT", "lnpRW")
du3 <- c("dum1","dum2","dum3")
rSta <- aiStaFit(y = daBed, share = sh, price = pr, shift = du3,
  expen = "rte", omit = "sRW", hom = TRUE, sym = TRUE)
summary(rSta)

# The following steps should work. It takes about 20 seconds.
## Not run:
# 2.2 The final Hausman test and new data
(dg <- daExp[, "dg"])
rHau <- aiStaHau(x = rSta, instr = dg, choice = FALSE)
names(rHau); colnames(rHau$daHau); colnames(rHau$daFit); rHau
two.exp <- rHau$daFit[, c("rte", "rte.fit")]
bsStat(two.exp, digits = 4)
plot(data.frame(two.exp)); abline(a = 0, b = 1)
daBedFit <- rHau$daFit

# --- Step 3: Static and dynamic AIDS models
# 3.1 Diagnostics and coefficients
hSta  <- update(rSta, y = daBedFit, expen = "rte.fit")
hSta2 <- update(hSta, hom = FALSE, sym = FALSE)
hSta3 <- update(hSta, hom = FALSE, sym = TRUE)
hSta4 <- update(hSta, hom = TRUE,  sym = FALSE)
lrtest(hSta2$est, hSta$est)
lrtest(hSta2$est, hSta3$est)
lrtest(hSta2$est, hSta4$est)

hDyn  <- aiDynFit(hSta)
hDyn2 <- aiDynFit(hSta2); lrtest(hDyn2$est, hDyn$est)
hDyn3 <- aiDynFit(hSta3); lrtest(hDyn2$est, hDyn3$est)
hDyn4 <- aiDynFit(hSta4); lrtest(hDyn2$est, hDyn4$est)

(table.2 <- rbind(aiDiag(hSta), aiDiag(hDyn)))
(table.3 <- summary(hSta))
(table.4 <- summary(hDyn))

# 3.2 Elasticity calculation
es <- aiElas(hSta); esm <- es$marsh
ed <- aiElas(hDyn); edm <- ed$marsh
esm2 <- data.frame(c(esm[1:2, 2], esm[3:4, 3],
  esm[5:6, 4], esm[7:8, 5], esm[9:10, 6], esm[11:12, 7],
  esm[13:14, 8], esm[15:16, 9]))
edm2 <- data.frame(c(edm[1:2, 2], edm[3:4, 3],
```

```
  edm[5:6, 4], edm[7:8, 5], edm[9:10, 6], edm[11:12, 7],
  edm[13:14, 8], edm[15:16, 9]))
eEM <- cbind(es$expen, esm2, ed$expen[2], edm2)
colnames(eEM) <- c("Country", "LR.expen", "LR.Marsh",
  "SR.expen", "SR.Marsh")
(table.5 <- eEM[-c(15:16),])
(table.6a <- es$hicks[-c(15:16), -9])
(table.6b <- ed$hicks[-c(15:16), -9])

## End(Not run)
```

---

aiElas *Computing Elasticity for Static or Dynamic AIDS Models*

---

## Description

Calculate expenditure elasticity, Marshalllian price elasticity, Hicksian price elasticity, and their variances for static or dynamic AIDS Models.

## Usage

```
aiElas(z, digits = 3, ...)
```

## Arguments

| | |
|---|---|
| `z` | an object of class `aiFit` from the function of `aiStaFit` or `aiDynFit`. |
| `digits` | number of digits used in rounding outputs. |
| `...` | additional arguments to be passed. |

## Details

Calculate expenditure elasticity, Marshalllian price elasticity, and Hicksian price elasticity for static or dynamic AIDS Models. The related variance, t-ratio, p-value, and significance are also reported.

## Value

Return a list object with the following components:

| | |
|---|---|
| `name` | name of the share variables; the omitted share name is the last one. |
| `expen` | expenditure elasticity and related statistics. |
| `marsh` | Marshalllian price elasticity and related statistics. |
| `hicks` | Hicksian price elasticity and related statistics. |

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## References

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

## See Also

aiStaFit; aiDynFit.

## Examples

```
# see the examples for 'aiDynFit'.
```

---

aiStaFit *Fitting a Static AIDS Model*

---

## Description

Estimate a static AIDS model for a system.

## Usage

```
aiStaFit(y, share, price, expen, shift = NULL, omit = NULL,
  hom = TRUE, sym = TRUE, AR1 = FALSE, rho.sel = c("all", "mean"), ...)
```

## Arguments

| | |
|---|---|
| y | a multiple time series data. |
| share | names of the share variables. |
| price | names of the price variables. |
| expen | name of the expenditure variables. |
| shift | names of the shifter variables. |
| omit | name of the share variable omitted; if not supplied, this is the last one of share. |
| hom | a logical value of homogeneity test. |
| sym | a logical value of symmetry test. |
| AR1 | whether first-degree autocorrelation should be corrected. |
| rho.sel | if AR1 = TRUE, there are two ways of computing the autocorrelation coefficient. |
| ... | additional arguments to be passed. |

## Details

This estimates a static AIDS model. The data supplied should be in the final format. Autocorrelation in the residuals can be corrected following the treatment in Berndt (1975).

## Value

Return a list object of class "aiFit" and "aiStaFit" with the following components:

| | |
|---|---|
| y | data for fitting the static AIDS model. |
| share | names of the share variables. |
| price | names of the price variables. |
| expen | name of the expenditure variables. |
| shift | names of the shifter variables. |

| | |
|---|---|
| omit | name of the share variable omitted; if not supplied, this is the last one of share. |
| nOmit | position of the omitted share variable in the name of share variable. |
| hom | a logical value of homogeneity test. |
| sym | a logical value of symmetry test. |
| nShare | number of share variables. |
| nExoge | number of exogenous variables (lagged share, residual, expenditure, and shifters). |
| nParam | number of parameters in one equation. |
| nTotal | number of parameters in the whole system estimated. |
| formula | formula for estimating the system. |
| res.matrix | restriction matrix for hom or sym, or both. |
| res.rhs | right-hand values for tests of hom or sym, or both. |
| est | the static AIDS model estimated. |
| AR1 | a logical value whether autocorrelation is corrected. |
| call | a record of the system call; this allows update.default to be used. |

## Methods

One method is defined as follows. This is the print method related to three functions: aiStaFit, aiDynFit, and aiStaHau.

**print:** print the first several observations of selectec outputs.

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## References

Berndt, E.R., and N.E. Savin. 1975. Estimation and hypothesis testing in singular equation systems with autoregressive disturbances. Econometrica 43(5/6):937-957.

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

## See Also

aiDiag; aiElas; summary.aiFit; aiDynFit; aiStaHau; systemfitAR.

## Examples

```
# see the examples for 'aiDynFit'.
```

`aiStaHau` *Conducting a Hausman Test on a Static AIDS Model*

## Description

Conduct a Hausman test on a static AIDS model and report the result of likelihood ratio test.

## Usage

```
aiStaHau(x, instr, choice = FALSE, ...)
```

## Arguments

| | |
|---|---|
| `x` | an object of class `aiStaFit` from a static AIDS model. |
| `instr` | a single time series data as instrument for the expenditure variable in AIDS model. |
| `choice` | a logical value of whether to take a difference on the right-hand `price` and `instr` variables. |
| `...` | additional arguments to be passed. |

## Details

Conduct a Hausman test on a static AIDS model and report the result of likelihood ratio test. Note that logarithm is taken on every variable in the auxiliary regression. These variables are the real total expenditure and its lagged value, instrumental variable, and the price variables.

## Value

Return a data frame object with the statistics and p values for the four tests by equation.

| | |
|---|---|
| `daHau` | data used in estimating the Hausman test. |
| `formuHau` | formula for estimating the Hausman test. |
| `regHau` | regression for the Hausman test. |
| `daFit` | revised data with the fitted value of expenditure included. |
| `aiBase` | the base static AIDs model estimated. |
| `aiHaus` | the reestimated static AIDS model using the fitted value of expenditure. |
| `ratio` | result of the likelihood ration test for the Hausman test. |

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## References

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

## See Also

`aiStaFit`; `print.aiFit`.

### Examples

```
# see the examples for 'aiDynFit'.
```

---

## bsFormu *Generating Formula for Models*

---

### Description

Generate a single formula for models like `lm` or a list of formula for models like `systemfit`.

### Usage

```
bsFormu(name.y, name.x, intercept = TRUE, ...)
```

### Arguments

| | |
|---|---|
| `name.y` | a character vector of variables names for dependent variables; when the length is more than one, there will a list of formula generated for each variable in the name. |
| `name.x` | a character vector of indepedent variables. |
| `intercept` | a logical value (default of TRUE) of whether to include intercept or not. |
| `...` | additional arguments to be passed. |

### Details

This function can generate a single formula for simple model like `lm` or a list of formula for systems (`systemfit`. Note that the right-hand side variables are the same for each dependent variable. If different, a `for` loop can be added by users to address that, as demonstrated by the example below.

### Value

a single formula object or a list of formula objects.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### Examples

```
# fake data
y  <- c("y")
ym <- c("y1", "y2", "y3")
x <- c("x")
xAll <- c("x", "xx", "xxx", "xxxx")

bsFormu(name.y = y, name.x = x)
bsFormu(name.y = ym, name.x = xAll)
fm.ym <- bsFormu(name.y = ym, name.x = xAll, intercept = FALSE)
fm.ym

# If independent variables differ by equation,
```

```
# add a loop to address the differentiation.
xInd <- c("x1", "x2", "x3")
fm.ym <- list()
for (i in 1:length(ym)) {
    ny <- ym[i]
    nx <- c(xInd[i], xAll)
    fm.ym[[i]] <- bsFormu(name.y = ny, name.x = nx, intercept = FALSE)
}
fm.ym

# real data
data(daIns)
(xx <- colnames(daIns)[-c(1, 14)])
fm.ins <- bsFormu(name.y = "Y", name.x = xx, intercept = TRUE)
fm.ins
(ra <- glm(formula = fm.ins,
          family = binomial(link="logit"),
          data = daIns, x = TRUE))
```

---

## bsLag *Lagged Time Series*

---

### Description

Generate a set of lagged time series for time series data.

### Usage

```
bsLag(h, lag, prefix = "", var.name, suffix = ".t_",
    include.orig = TRUE, by.lag = FALSE, ...)
```

### Arguments

| | |
|---|---|
| `h` | time series data |
| `lag` | number of lags |
| `prefix` | prefix for the name of lagged time series. |
| `var.name` | varible name of the lagged time series. |
| `suffix` | suffix of the name of lagged time series. |
| `include.orig` | logical value (default of TRUE) of whether to include the original series (i.e., lag zero) in the final output. |
| `by.lag` | logical value (default of FALSE) of whether to order the column by variable (FALSE) or by lag (TRUE). |
| `...` | additional arguments to be passed. |

### Details

The input data can be a single time series or a set of multiple time series data. The output is a set of lagged time series with the specified lag dimension. All the series are aligned with the shortest window so the loss of observations is equal to `lag`. The original series (e.g., without lag but just loss of beginning observations) can be included or excluded by setting the logical value of `include.org`.

The name of the output data is composed of four parts: `prefix`, `var.name`, `suffix`, and an index number of `lag`. Users can control the first three parts only because the lag number is added automatically. `prefix` and `suffix` can be fixed for all the output series. `var.name` provides some flexibility when `bsLag` is used within a function and the variable name is unknown *a priori*.

The column of the output can be ordered either by the variable name (e.g., diff.GA.t_0, diff.GA.t_1, diff.ND.t_0, diff.ND.t_1), or by the lag order ((e.g., diff.GA.t_0, diff.ND.t_0, diff.GA.t_1, diff.ND.t_1).

## Value

Return a multiple time series object.

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## Examples

```
# simple example
h1 <- ts(data=cbind(1:24), start=c(2001, 1), frequency=12)
h2 <- ts(data=cbind(1:24, 25:48), start=c(2001, 1), frequency=12)
h3 <- ts(data=cbind(1:4, 5:8, 9:12), start=c(2001, 1), frequency=4)
colnames(h2) <- c("aa", "bb")
colnames(h3) <- c("cc", "dd", "ee")
h1; h2; h3

bsLag(h=h1, lag=0, prefix="", suffix=".t_")
bsLag(h=h1, lag=2, prefix="price.", var.name="fl", suffix=".t_")
bsLag(h=h1, lag=2, prefix="price.", var.name="fl", suffix=".t_", by.lag=TRUE)
bsLag(h=h1, lag=23, prefix="price.", suffix=".t_", include.orig=FALSE)

bsLag(h=h2, lag=4, prefix="", suffix=".t_", include.orig = TRUE)
bsLag(h=h2, lag=4, prefix="", suffix=".t_", include.orig = FALSE)
bsLag(h=h2, lag=4, prefix="", suffix=".t_", include.orig = FALSE, by.lag=TRUE)
bsLag(h=h2, lag=0, prefix="", var.name=c("nc", "sc"), suffix=".t_")

bsLag(h=h3, lag=2, prefix="", suffix=".t_", include.orig=FALSE)
bsLag(h=h3, lag=1, prefix="", var.name=c("nd", "sd", "mi"), suffix=".lag.")
bsLag(h=h3, lag=2, prefix="NY.", suffix=".t_", by.lag=TRUE)
bsLag(h=h3, lag=3, prefix="NY.", suffix=".t_", include.orig=FALSE)

# with real data
data(daBedRaw)
small <- daBedRaw[, c("vCN", "qCN")]
(lag.small <- bsLag(h=small, lag=4))
colnames(lag.small)

resid <- residuals(lm(qCN ~ vCN, data = small))
res <- ts(resid, start=start(small), end=end(small),
    frequency=tsp(small)[3])
lag.res <- bsLag(h=res, lag=2, prefix="resid.", var.name="china")
str(lag.res)
head(lag.res)
tail(lag.res)
```

## bsStat — *Summary of Basic Statistics*

### Description

Calcluate basic statistics of data.

### Usage

```
bsStat(y, two = NULL, digits = c(2, 2), use = 'complete.obs',
  na.rm = TRUE, ...)
```

### Arguments

| | |
|---|---|
| `y` | input data for summary statistics. |
| `two` | a logical value of whether to report the correlation and summary statistics separately; if `NULL` and the number of variables is less than 11, its value will be set to `TRUE`. |
| `digits` | digits for the output data, one for correlation coefficients and the other for mean and others; if a single scalar is supplied, it will be used for both. |
| `use` | an argument for correlation coefficient; see `cor` for detail. |
| `na.rm` | an argument for `mean`, `sd`, `min`, and `max`. |
| `...` | additional arguments to be passed. |

### Details

Two set of summary statistics are generated. One is correlation coefficients and the other is mean, minimum, maximum, standard deviation, and number of observations. When `two` is unspecified and the number of variables is bigger than ten, the two sets are reported separately; otherwise, it is reported as a single data frame object.

### Value

A dataframe or list of the summary statistics.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### Examples

```
data(daIns)
(sum.daIns <- bsStat(y=daIns, digits=c(3,2)))
```

bsTab *Generating Pretty Statistical Tables*

## Description

Format statistics from regressions into pretty outputs

## Usage

```
bsTab(w,
  need = c("1T", "1E", "2T", "2E", "3T", "3E", "4T", "4E", "5"),
  wrap.TE = c("(", "", "["),
  add.sig = c("coef", "TE"),
  percent = c(0.01, 0.05, 0.10),
  symbol = c("***", "**", "*", ""),
  digits = c(3, 3, 3, 2), ... )
```

## Arguments

| | |
|---|---|
| `w` | statistical results from regression models; an object of class `glm`, `lm`, and `systemfit` can be supplied directly, or a data frame with at least four columns with the sequence of estimates, errors, t-values, and p-values. |
| `need` | a choice of output formats; default of `1T` is one column with t ratio and significance symbols; 1 to 5 is the number of columns; T is t ratios; E is standard errors. This argument must be a character string. |
| `wrap.TE` | parentheses, none, or brackets can be used to enclose t ratios or standard errors; default value is parenthses for one-column format and none for other formats. |
| `add.sig` | a chacter string to indicate where to add the significance symbol, either to the coefficents (`"coef"`) or the t-value and error (`"TE"`). |
| `percent` | percentage values used to categorize p values. |
| `symbol` | symbols used to represent p-value categories; the default values can be changed to symbols like a, b, c, or different combinations of *. |
| `digits` | digits for outputs; the default values are 3, 3, 3, and 2 for estimate, error, t value, and p value, correspondingly. A single value like 4 can be supplied and it will be recycled for all of them. |
| `...` | additional arguments to be passed. |

## Details

Format statistics from regressions into tables that are often reported in economic journals. The column of 'Variable' in the outuput is the row names of the input data so the raw data should contain meaningful rownames. Besides the variable name column, the maximum number of output is five columns: estimate, error, t ratio, p value, and significance. `wrap.TE` and `add.sig` are only valid for column widths of 1 and 2.

## Value

A dataframe of statistical results.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### Examples

```
# a simulated data
tes <- data.frame(est = c(4, 56, 12), err = c(0.3, 0.56, 0.789),
  t.rat = c(2.56, 7.9, 1.2), p.val = c(0.002, 0.23, 0.061))
tes
bsTab(tes)
bsTab(w = tes, need = "2E")

# real data
data(daIns)
ra <- glm(formula = Y ~ Injury + HuntYrs + Nonres +
                    Lspman + Lnong + Gender + Age +
                    Race + Marital + Edu + Inc + TownPop,
          family = binomial(link="logit"),
          data = daIns, x = TRUE)
(ca <- data.frame(summary(ra)$coefficients))

# an object of class 'glm' as input
bsTab(w = ra, add.sig = "TE")
bsTab(w = ra, wrap.TE = "[")
bsTab(w = ra, need = "5")
bsTab(w = ra, need = "4T", wrap.TE = "[")
final <- bsTab(w = ra, need = "3T",
  percent = c(0.01, 0.05, 0.10),
  symbol = c("a", "b", "c", ""), digits = 4)
final
print(final, right = FALSE)

# any matrix with at least four columns can be supplied
cbind(bsTab(ca), bsTab(ra))
```

---

daBed *Transformed Wooden Beds Import Data for Static AIDS Models*

---

### Description

This data set contains transformed values related to wooden beds imports by the United States from January 2001 to December 2008. There are 96 observations and 20 variables.

| | |
|---|---|
| sCN | monthly import share of wooden beds from China |
| sVN | monthly import share of wooden beds from Vietnam |
| sID | monthly import share of wooden beds from Indonesia |
| sMY | monthly import share of wooden beds from Malaysia |
| sCA | monthly import share of wooden beds from Canada |
| sBR | monthly import share of wooden beds from Brazil |
| sIT | monthly import share of wooden beds from Italy |
| sRW | monthly import share of wooden beds from the rest of world |
| rte | real total expenditure in logarithm |

| | |
|---|---|
| lnpCN | monthly import price of wooden beds from China in logarithm |
| inpVN | monthly import price of wooden beds from Vietnam in logarithm |
| lnpID | monthly import price of wooden beds from Indonesia in logarithm |
| lnpMY | monthly import price of wooden beds from Malaysia in logarithm |
| lnpCA | monthly import price of wooden beds from Canada in logarithm |
| inpBR | monthly import price of wooden beds from Brazil in logarithm |
| lnpIT | monthly import price of wooden beds from Italy in logarithm |
| lnpRW | monthly import price of wooden beds from the rest of world in logarithm |
| dum1 | a pulse dummy variable (1 for October 2003, 0 otherwise) |
| dum2 | a pulse dummy variable (1 for July 2004, 0 otherwise) |
| dum3 | a pulse dummy variable (1 for January 2005, 0 otherwise) |

## Usage

```
data(daBed)
```

## Format

Monthly time series from Janurary 2001 to December 2008 with 96 observations for each of the 20 variables.

## Details

This is the transformated data set for static AIDS model. The transformation detail is described in Wan et al. (2010).

## Source

U.S. ITC, 2010. Interactive tariff and trade data web. http://dataweb.usitc.gov (Assecced on March 1, 2010).

## References

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

## See Also

aiStaFit; daBedRaw.

## Examples

```
data(daBed)
class(daBed); dim(daBed); colnames(daBed)
daBed
```

daBedRaw *Wooden Beds Import Data*

## Description

This data set contains a mulitiple time series related to wooden beds imports by the United States. The time covered is January 1996 to December 2008 with 156 observations. There are 34 variables in total: 17 import values (dollars) and 17 import quantities (dollars / piece). In total, 16 countries are covered and the world total is also reported.

| | |
|---|---|
| vBR | cost-insurance-freight import values in dollar from Brazil |
| vCA | cost-insurance-freight import values in dollar from Canada |
| vCN | cost-insurance-freight import values in dollar from China |
| vDK | cost-insurance-freight import values in dollar from Denmark |
| vFR | cost-insurance-freight import values in dollar from France |
| vHK | cost-insurance-freight import values in dollar from Hong Kong |
| vIA | cost-insurance-freight import values in dollar from India |
| vID | cost-insurance-freight import values in dollar from Indonesia |
| vIT | cost-insurance-freight import values in dollar from Italy |
| vMY | cost-insurance-freight import values in dollar from Malaysia |
| vMX | cost-insurance-freight import values in dollar from Mexico |
| vPH | cost-insurance-freight import values in dollar from Philippines |
| vTW | cost-insurance-freight import values in dollar from Taiwan |
| vTH | cost-insurance-freight import values in dollar from Thailand |
| vUK | cost-insurance-freight import values in dollar from United Kingdom |
| vVN | cost-insurance-freight import values in dollar from Vietnam |
| vWD | cost-insurance-freight import values in dollar from World in total |
| qBR | quantity in piece from Brazil |
| qCA | quantity in piece from Canada |
| qCN | quantity in piece from China |
| qDK | quantity in piece from Denmark |
| qFR | quantity in piece from France |
| qHK | quantity in piece from Hong Kong |
| qIA | quantity in piece from India |
| qID | quantity in piece from Indonesia |
| qIT | quantity in piece from Italy |
| qMY | quantity in piece from Malaysia |
| qMX | quantity in piece from Mexico |
| qPH | quantity in piece from Philippines |
| qTW | quantity in piece from Taiwan |
| qTH | quantity in piece from Thailand |
| qUK | quantity in piece from United Kingdom |
| qVN | quantity in piece from Vietnam |
| qWD | quantity in piece from World in total |

## Usage

```
data(daBedRaw)
```

### Format

Monthly time series from Janurary 1996 to December 2008 with 156 observations for each of the 34 variables.

### Details

Under the Harmonized Tariff Schedule (HTS) system, the commodity of wooden beds is classified as HTS 9403.50.9040. The monthly cost-insurance-freight values in dollar and quantities in piece are reported by country from U.S. ITC (2010).

### Source

U.S. ITC, 2010. Interactive tariff and trade data web. http://dataweb.usitc.gov (Assecced on March 1, 2010).

### References

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

### See Also

aiStaFit; daBed.

### Examples

```
data(daBedRaw)
class(daBedRaw); dim(daBedRaw); colnames(daBedRaw)
```

---

## daEsa *Daily returns of 14 public firms from 1990 to 2004*

---

### Description

This data set contains daily returns of 14 public firms, three-month treasury bill, and SP 500 Index from 1990 to 2004.

| | |
|---|---|
| `date` | Eight-digit numbers for date of 1990-2004; the format is YYMMDD, e.g., 19900102 for Jan 2, 1990 |
| `tb3m` | Daily returns for three-month treasury bills |
| `sp500` | Daily returns for SP 500 Index |
| `bcc` | Daily returns for Boise Cascade |
| `bow` | Daily returns for Bowater |
| `csk` | Daily returns for Chesapeake Corp VA |
| `gp` | Daily returns for Georgia-Pacific |
| `ip` | Daily returns for International Paper |
| `kmb` | Daily returns for Kimberly Clark |
| `lpx` | Daily returns for Louisiana Pacific |
| `mwv` | Daily returns for MeadWestvaco |
| `pch` | Daily returns for Potlatch |
| `pcl` | Daily returns for Plum Creek |
| `pop` | Daily returns for Pope and Talbot |
| `tin` | Daily returns for Temple Inland |

| | |
|---|---|
| wpp | Daily returns for Wausau Mosinee Paper |
| wy | Daily returns for Weyerhaeuser |

### Usage

```
data(daEsa)
```

### Format

A data frame object with daily returns for firms or indexes from 1994 to 2004. There are 17 columns and 3747 rows. The date is not regular because there is no trading on weekends and holidays. Therefore, the date is represented by a number, not a date.

### Details

This is the transformated data set used in the study of Sun and Liao (2011).

### Source

The daily returns for SP 500 and individual firms are from the database of the Center for Research in Security Prices (CRSP). The risk-free rate of return is the secondary market rate for the 3-month US Treasury bills from the Federal Reserve Bank.

### References

Sun, C., and X. Liao. 2011. Effects of litigation under the Endangered Species Act on forest firm values. Journal of Forest Economics 17(4):388-398.

### See Also

evReturn; evRisk.

### Examples

```
data(daEsa)
dim(daEsa); colnames(daEsa)
head(daEsa); tail(daEsa)
str(daEsa)

# if dates are stored as a date object in R, then it can be converted into
# numbers as the following example shows.

raw <- as.Date(c('1990-01-02', '1991-11-12')); raw; str(raw)
raw2 <- as.numeric(strftime(raw, format = "%Y%m%d")); raw2; str(raw2)
```

---

## daExp — *Expenditure Data for a Hausman Test in AIDS Model*

---

### Description

This data set contains seven monthly times series for expenditure from 2001 to 2008.

| | |
|---|---|
| pinc | Billions of dollars, personal income |
| dpi | Billions of dollars, disposable personal income |
| pce | Billions of dollars, personal consumption expenditures |
| dg | Billions of dollars, Personal consumption expenditures for durable goods |
| rdpi | Billions of dollars, real disposable personal income |
| rpce | Billions of dollars, real personal consumption expenditures |
| rdg | Billions of dollars, real personal consumption expenditures for durable goods |

### Usage

```
data(daExp)
```

### Format

Monthly time series from Janurary 2001 to December 2008 with 96 observations for each of the seven variables.

### Details

This is the data set for conducting a Hausman test in a static AIDS model, as detailed in Wan et al. (2010). The test focuses on whether the expenditure variable in a AIDS model is exogenous or not. Each of the seven expenditure data can be used as an instrumental variable in an auxiliary regression.

### Source

Federal Reserve Bank of St. Louis. Economic Data - Fred. Internet site: http://stlouisfed.org (Accessed February 25, 2010).

### References

Wan, Y., C. Sun, and D.L. Grebner. 2010. Analysis of import demand for wooden beds in the United States. Journal of Agricultural and Applied Economics 42(4):643-658.

### Examples

```
data(daExp)
class(daExp); dim(daExp); colnames(daExp)
daExp
```

---

## daIns — *Liability Insurance Coverage for Hunters and Anglers in Mississippi*

---

### Description

This data set contains a survey result about liability insurance purchase decision by hunters and anglers in Mississippi. There are 1653 observations for 14 variables.

| | |
|---|---|
| Y | Binary dependent variable = 1 if had liability insurance; 0 otherwise |
| Injury | Times of bodily injuries or property damages in the past three years |
| HuntYrs | Years of hunting |

| | |
|---|---|
| Nonres | Dummy = 1 if nonresidents; 0 if Mississippi residents |
| Lspman | Dummy = 1 if purchased the license of resident sportsman; 0 otherwise |
| Lnong | Dummy = 1 if purchased the license of nonresident all game; 0 otherwise |
| Gender | Dummy = 1 if male; 0 otherwise |
| Age | Age of the hunter or angler |
| Race | Dummy = 1 if Caucasian; 0 otherwise |
| Marital | Dummy = 1 if married; 0 otherwise |
| Edu | Years of education |
| Inc | Household income in 2004 (1,000 dollars) |
| TownPop | Population size of the residence town (1,000) |
| FishYrs | Years of fishing |

## Usage

```
data(daIns)
```

## Format

A cross sectional data with 1653 observations and 14 variables.

## Details

The data set is from a telephone survey conducted in 2005 in Mississippi.

## Source

Sun, C., S. Pokharel, W.D. Jones, S.C. Grado, and D.L. Grebner. 2007. Extent of recreational incidents and determinants of liability insurance coverage for hunters and anglers in Mississippi. Southern Journal of Applied Forestry 31(3):151-158.

## Examples

```
data(daIns)
class(daIns); dim(daIns)
head(daIns); tail(daIns)

ra <- glm(formula = Y ~ Injury + HuntYrs + Nonres +
                    Lspman + Lnong + Gender + Age +
                    Race + Marital + Edu + Inc + TownPop,
          family = binomial(link="logit"),
          data = daIns, x = TRUE, y= TRUE)
names(ra); summary(ra)

(ins.me <- maBina(w = ra))
(ins.mt <- maTrend(q=ins.me, nam.c="Age", nam.d="Nonres"))
plot(ins.mt)
```

`daLaw` *Data for statutory reforms and retention of prescribed fire liability laws on forest land by state*

## Description

This data set contains a cross-sectional data set for current adoption of statutory laws with regard to prescribed fire liability on forest landowners. It has 50 observations and 16 variables.

| | |
|---|---|
| `SHORT` | Two-letter abbreviations of 50 state names |
| `STATE` | Full state names |
| `Y` | Categorical dependent variable (Y = 0, 1, 2, or 3) |
| `FYNFS` | National Forests area in a state (million acres) |
| `FYIND` | Industrial forest land area in a state (million acres) |
| `FYNIP` | Nonindustrial private forest land area in a state (million acres) |
| `AGEN` | Permanent forestry program personnel in a state |
| `POPRUR` | Rural population in a state (million) |
| `EDU` | Population 25 years and older with advanced degrees in a state (million) |
| `INC` | Per capita income in a state (thousand dollars) |
| `DAY` | The maximum length of legislative sessions in calendar days in a state |
| `BIANN` | A dummy variable equal to one for states with annual legislative sessions, zero with biannual (or less) |
| `SEAT` | Total number of legislative seats (Senate plus House) in the legislative body in a state |
| `BICAM` | Level of bicameralism in a state, defined as the size of the Senate divided by the size of the House |
| `COMIT` | Total number of standing committees in a state |
| `RATIO` | Total number of standing committees in a state divided by the number of legislators |

## Usage

```
data(daLaw)
```

## Format

A data frame object with 50 rows and 16 variables.

## Details

This is the final data set used in the study of Sun (2006).

## Source

See Table 2 in Sun (2006) for detail of data sources.

## References

Sun, C. 2006. State statutory reforms and retention of prescribed fire liability laws on US forest land. Forest Policy and Economics 9(4):392-402.

## Examples

```
data(daLaw)
str(daLaw); head(daLaw); names(daLaw)
```

---

daPe *Program Effectiveness of a New Method of Teaching Economics*

---

### Description

This data set contains the evaluation results of a new program of teaching in economics. There are 32 observations for 4 variables.

| | |
|---|---|
| `grade` | a binary variable indicating grade increase (1) and decrease (0) after participation. |
| `gpa` | a continous variable measuring studens' grade point average. |
| `tuce` | a continous variable measuring students' scores on an economics test. |
| `psi` | a binary variable indicating whether a student participates the program or not. |

### Usage

```
data(daPe)
```

### Format

A data frame of cross sectional data with 32 observations and 4 variables.

### Details

Evaluation results on 32 students of the impact of a new teaching methods.

### Source

Spector, L.C., and M. Mazzeo. 1980. Probit analysis and economic education. Journal of Economic Education 11(2):37-44.

### Examples

```
data(daPe)
dim(daPe)
summary(daPe)
daPe
```

---

daRoll *Voting records for the Healthy Forests Restoration Act in 2003 and the associated characteristics of congressmen*

---

### Description

This data set contains the voting records for the Healthy Forests Restoration Act in 2003, as used in Sun (2006). The characteristics of individual congressmen are also included. There are 537 observations and 22 variables.

| | |
|---|---|
| `state` | state name for a congressman |
| `district` | district for a congressman; 0 for senators |

| | |
|---|---|
| `name` | Family name of a congressman |
| `voteMay` | voting record in May 2003 in the House; 1 if yes, 0 if no, and NA if not voted |
| `voteNov` | voting record in Nov 2003 in both the House and Senate |
| `RepParty` | Dummy equals one if Republican |
| `East` | Regional dummy for 11 northeastern states |
| `West` | Regional dummy for 11 western states |
| `South` | Regional dummy for 13 southern states |
| `PopDen` | Population density - 1000 persons per km2 |
| `PopRural` | Population density per km2 |
| `Edu` | Percentage of population over 25 with a Bachelor's degree |
| `Income` | Median family income ($1,000) |
| `FYland` | Percentage of federal lands in total forestlands 2002 |
| `Size` | Value of shipments of forest industry 1997 (million dollars) |
| `ContrFY` | Contribution from forest firms (1,000 dollars) |
| `ContrEN` | Contribution from environmental groups (1,000 dollars) |
| `Sex` | Dummy equals one if male |
| `Lawyer` | Dummy equals one if lawyer |
| `Member` | Dummy equals one if a committee member for the HFRA |
| `Year` | Number of years in the position |
| `Chamber` | Dummy equals one if House and zero if Senate |

## Usage

```
data(daRoll)
```

## Format

A data frame object with 537 rows and 22 variables. This is a cross-sectional dataset that are generating from merging several raw datasets.

## Details

This is the combinded final data set used in the study of Sun (2006).

## Source

See Table 1 in Sun (2006) for detail.

## References

Sun, C. 2006. A roll call analysis of the Healthy Forests Restoration Act and constituent interests in fire policy. Forest Policy and Economics 9(2):126-138.

## See Also

`glm`; `maBina`.

## Examples

```
# generate four datasets used in Sun (2006)
data(daRoll)
xn <- c('RepParty', 'East', 'West', 'South', 'PopDen',
```

```
  'PopRural', 'Edu', 'Income', 'FYland', 'Size',
  'ContrFY', 'ContrEN', 'Sex', 'Lawyer', 'Member', 'Year', 'Chamber')

f1 <- daRoll[!is.na(daRoll$voteMay), c('voteMay', xn)]
f2 <- daRoll[!is.na(daRoll$voteNov) & daRoll$Chamber == 1, c('voteNov', xn)]
f3 <- daRoll[!is.na(daRoll$voteNov), c('voteNov', xn)]
f4 <- daRoll[!is.na(daRoll$voteNov) & daRoll$RepParty == 0, c('voteNov', xn)]
rownames(f1) <- 1:nrow(f1); rownames(f2) <- 1:nrow(f2)
rownames(f3) <- 1:nrow(f3); rownames(f4) <- 1:nrow(f4)
colnames(f1)[1] <- colnames(f2)[1] <- 'Vote'
colnames(f3)[1] <- colnames(f4)[1] <- 'Vote'
dim(f1); dim(f2); dim(f3); dim(f4)
tail(f3)
```

---

`download.lib` *Downloading source and PDF version of R packages*

---

## Description

This function can download three documents for each package: zip version, source version (tar.gz), and PDF manual.

## Usage

```
download.lib(pkgs, destdir = getwd(), mode = "wb",
  pdf.url = "http://cran.r-project.org/web/packages/",
  f.zip = TRUE, f.pdf = TRUE)
```

## Arguments

| | |
|---|---|
| `pkgs` | A character vector for the names of one or multiple packages |
| `destdir` | The directory where documents are saved (e.g., C:/myFile; the default directory is the current working directory. |
| `mode` | The argument for `download.file`; the default is 'wb' for PDF version. |
| `pdf.url` | The url for PDF documents online. |
| `f.zip` | A logical value indicating whether a zip version is downloaded; by default, a zip version is downloaded by `download.packages` |
| `f.pdf` | A logical value indicating whether a PDF mannual for a package should be downloaded from the internet. |

## Details

This function is mainly used to download the source version of one or multiple packages. A zip version and a PDF manual can also be downloaded at the same time.

## Value

Return the packge names.

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### See Also

download.packages; download.file.

### Examples

```
## Not run:
  download.lib(pkgs = 'erer', destdir = 'c:/aErer/Rcode',
    f.zip = FALSE, f.pdf = TRUE)

## End(Not run)
```

---

## evReturn *Estimating Abnormal Return from Event Analysis*

---

### Description

Conduct an event analysis and estimate abnormal returns over time and across firms.

### Usage

```
evReturn(y, firm, event.date, y.date = "date",
  index = "sp500", event.win = 3, est.win = 250, digits = 4, ...)
```

### Arguments

| | |
|---|---|
| y | a data frame object with one column for date, return series by firms, a return series for a stock market index, and a return series for a risk free asset. |
| firm | a character vector of firm names; this is the name of the return series in y. |
| event.date | event dates for each firm as specified in firm; this should be a numerical vector and can match the values in y$y.date; if event dates are the same for all the firms, this can be specificed as a single number. |
| y.date | a character value for the column name of date in y. |
| index | a character value for the column name of index in y. |
| event.win | the one-side width of event window in days; the default value of 3 corresponds to a 7-day window (i.e., 3 + 1 + 3). |
| est.win | the width of estimation window in days. |
| digits | number of digits used to format outputs. |
| ... | additional arguments to be passed. |

### Details

This is the core function for event analysis. It estimates a market model by firm and then calculate abnormal returns by firm and over time. The time series of stock returns have irregular time frequency because of varying trading days. Thus, the time dimension is explicitly specified as a y.date column in the data of y.

## Value

Return a list object of class "evReturn" with the following components:

| | |
|---|---|
| y | a data frame of raw return data. |
| y.date | a character value for the column name of date in y.. |
| firm | a character vector of firm names. |
| N | the number of firms. |
| index | a character value for the column name of index in y. |
| event.date | event dates for each firm as specified in firm. |
| event.win | the one-side width of event window in days. |
| event.width | total number of days in an event window. |
| est.win | the width of estimation window in days.. |
| daEst | data used to estimate the market model for the last firm as specified in codefirm. |
| daEve | data over the event window for the last firm. |
| ra | fitted market model for the last firm. |
| digits | number of digits used to format outputs. |
| reg | regression coefficients by firm. |
| abr | abnormal returns by day over the event window and by firm. |
| abc | average abnormal returns across firms. |
| call | a record of the system call; this allows update.default to be used. |

## Methods

Two methods are defined as follows:

**print:** print three selected outputs.

**plot:** plot average cumulative abnormal returns from event analysis versus days in event window.

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## References

Mei, B., and C. Sun. 2008. Event analysis of the impact of mergers and acquisitions on the financial performance of the U.S. forest products industry. Forest Policy and Economics 10(5):286-294.

Sun, C., and X. Liao. 2011. Effects of litigation under the Endangered Species Act on forest firm values. Journal of Forest Economics 17(4):388-398.

## See Also

evRisk

### Examples

```
data(daEsa)

# event analysis for one firm and one event window
hh <- evReturn(y = daEsa, firm = "wpp",
   y.date = "date", index = "sp500", est.win = 250, digits = 3,
   event.date = 19990505, event.win = 5)
hh; plot(hh)

# event analysis for many firms and one event window
hh2 <- update(hh, firm = c("tin", "wy", "pcl", "pch")); hh2

# event analysis for many firms and many event windows: need a for loop
```

---

## evRisk *Risk Evaluation for Event Analysis*

---

### Description

Conduct a risk analysis by firm and evaluate the change of risk before and after an event. The model used is the Captial Asset Pricing Model.

### Usage

```
evRisk(x, m = 50, r.free = "tbill", ...)
```

### Arguments

| | |
|---|---|
| `x` | a object from `evReturn`. |
| `m` | the number of days before and after the event date for estimating CAPM. |
| `r.free` | the column name of risk free asset in `y`. |
| `...` | additional arguments to be passed. |

### Details

This fits CAPM for each firm and reports the statistics for alpha, beta, and gamma. The statistics of gamma reveal the change of risk before and after the event.

### Value

Return a list object of class "evReturn" with the following components:

| | |
|---|---|
| `x` | a object from `evReturn`. |
| `daEst` | data used to estimate CAPM for the last firm as specified in codefirm. |
| `rb` | fitted CAPM for the last firm. |
| `reg` | regression coefficients by firm. |

### Methods

One method is defined as follows:

`print`: print selected outputs.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### References

Mei, B., and C. Sun. 2008. Event analysis of the impact of mergers and acquisitions on the financial performance of the U.S. forest products industry. Forest Policy and Economics 10(5):286-294.

### See Also

evReturn

### Examples

```
data(daEsa)

hh <- evReturn(y = daEsa, firm = "wpp",
   y.date = "date", index = "sp500", est.win = 250, digits = 3,
   event.date = 19990505, event.win = 5)
hh2 <- update(hh, firm = c("tin", "wy", "pcl", "pch"))

kk <- evRisk(x = hh2, m = 100, r.free="tb3m")
kk
```

---

## head — *Return the first or last part of time series data*

---

### Description

Return the first of last parts of an object of time series data.

### Usage

```
  ## S3 method for class 'ts'
head(x, n = 5, ...)
  ## S3 method for class 'ts'
tail(x, n = 5, ...)
```

### Arguments

| | |
|---|---|
| x | input time seires data. |
| n | a single integer for the length or row of returned data |
| ... | additional arguments to be passed. |

### Details

The data can be an univariate or multivariate time series data.

### Value

An object like x but generally smaller.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### Examples

```
h1 <- ts(data=cbind(1:24), start=c(2001, 1), frequency=12)
h2 <- ts(data=cbind(1:24, 25:48), start=c(2001, 1), frequency=12)
h3 <- ts(data=cbind(1:4, 5:8, 9:12), start=c(2001, 1), frequency=4)
colnames(h2) <- c("aa", "bb")
colnames(h3) <- c("cc", "dd", "ee")
h1; h2; h3

h1; head(h1); tail(h1, 28)
h2; head(h2); tail(h2, 50)
h3; head(h3, 2); tail(h3); tail(h3, 8)

data(daBed); head(daBed); tail(daBed)
```

---

## listn *Generate a list object with names*

---

### Description

Generate a list object with names.

### Usage

```
listn(...)
```

### Arguments

| | |
|---|---|
| ... | individual objects to be included in a list. |

### Details

This generates a list object by addressing the naming problem. For `list`, if no names are given, the list generated will have no names. In some situations, the number of individual objects is large and the names of these individual objects can be used as the names. This function addresses this need. If names are given, they will be used. If not, the names of individual objects will be used.

### Value

Return a list object with names.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### Examples

```
y1 <- 1:10
y2 <- c("a", "b")
listn(y1, y2)
listn(y1 = y1, y2)
listn(y1 = y1, y2.rev = y2, y2, 5:8, c("d", "f"))

identical(listn(y1, y2), listn(y1 = y1, y2))       # TRUE
identical(listn(y1, y2), list(y1 = y1, y2))       # FALSE
identical(listn(y1, y2), list(y1 = y1, y2=y2))    # TRUE
```

---

## lss — *List Objects with Their Sizes*

---

### Description

Show the name and memory size of objects in an R session.

### Usage

```
lss(n = 5, pos = 1, decreasing = TRUE, order.by=c("Size", "Type"))
```

### Arguments

| | |
|---|---|
| `n` | number of objects to show. |
| `pos` | specifying the environment; see `ls`. |
| `decreasing` | sorting order. |
| `order.by` | sorting variable. |

### Details

This function shows the names and sizes of objects in an R session. This is useful for managing avaiable memory in an R Session.

### Value

Return a dataframe object with the following columns: name, type, size, prettysize, rows, and columns.

### See Also

`ls`.

### Examples

```
lss()
ls()
```

`maBina` *Marginal Effect for Binary Probit and Logit Model*

## Description

This function calculates marginal effects for a binary probit or logit model and their standard errors.

## Usage

```
maBina(w, x.mean = TRUE, rev.dum = TRUE, digits = 3, ...)
```

## Arguments

| | |
|---|---|
| `w` | a binary probit or logit model object estimated from `glm()`. |
| `x.mean` | a logical value (default of TRUE) of whether to calculate marginal effects at the means of independent variables. If FALSE, marginal effects are calculated for each observation and then averaged. |
| `rev.dum` | a logical value (default of TRUE) of whether to revise the estimates and standard erros for binary independant variables. If FALSE, derivatives are taken on binary independant variables as continuous variables. |
| `digits` | number of digits for output. |
| `...` | additional arguments to be passed. |

## Details

Marginal effects from a binary probit or logit model is calculated. The two choices are the method of averaging effects and revising estimates for dummy variables. Marginal effects can be calculated at the mean of the independent variables (i.e., `x.mean = TRUE`), or as the average of individual marginal effects at each observation (i.e., `x.mean = FALSE`). `rev.dum = TRUE` allows marginal effects for dummy variables are calculated differently, instead of treating them as continuous variables.

## Value

Return a list object of class "maBina" with the following components:

| | |
|---|---|
| `link` | link function used in the binary model; |
| `f.xb` | scale factor of marginal effects, calculated as the density function evaluated at the means of the variables when `x.mean = TRUE` is specified or the average density value for all individual observations when `x.mean = FALSE` is specified; |
| `w` | a binary probit or logit model object estimated from `glm()`; |
| `out` | a data frame object of marginal effects, t-value, and p-value. |

## Methods

One method is defined as follows:

**`print`:** print the key output of marginal effects.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### References

Greene, W.H. 2003. Econometric Analysis (5th ed.). Prentice Hall, New York. 1026 P.

### See Also

maTrend; plot.maTrend.

### Examples

```
data(daPe)
ma <- glm(grade ~ gpa + tuce + psi, x = TRUE,
    data = daPe, family = binomial(link = "probit"))
ea <- maBina(w = ma, x.mean = TRUE, rev.dum = TRUE)
ea
```

---

## maTrend — *Trend of Marginal Effects*

---

### Description

This function computes the change of probability for a continuous variable, and furthermore, stratifies the probability through a binary independant variable.

### Usage

```
maTrend(q, n = 300, nam.c, nam.d, ...)
```

### Arguments

| | |
|---|---|
| q | a object of class of "maBina" estimated from maBina(). |
| n | number of points for calculating probability; the large the number, the smoother the curve. |
| nam.c | a name of a continuous indepedent variable; this must be given for the function to work. |
| nam.d | an optional name of a binary independent variable; this is used to stratify the probability. |
| ... | additional arguments to be passed. |

### Details

Marginal effects are calcuated at each value of a continous variable. If specficied, the trend can be stratified by a binary independent variable.

## Value

Return a list object of class "maTrend" with the following components:

- `q` a list object of class "maBina";
- `nam.c` the name of a continous variable;
- `mm` matrix of independant variables for all
- `trend` a data frame of the continous variable and probability values; if `nam.d` is specificied, the data frame also contains the probability values stratified by the dummy variable;
- `nam.d` if `nam.d` is specified, the name of a binary variable .
- `m1` if `nam.d` is specified, the matrix of `mm` with the column value for `nam.d` replaced by 1
- `m0` if `nam.d` is specified, the matrix of `mm` with the column value for `nam.d` replaced by 0

## Methods

Two methods are defined as follows:

**`print`:** print the probability output.

**`plot`:** Plot the probability values for a continuous variable. If a strata is specified through `nam.d` in `maTrend()`, then the stratified values also are shown.

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## References

Greene, W.H. 2003. Econometric Analysis (5th ed.). Prentice Hall, New York. 1026 P.

## See Also

`maBina`; `print.maTrend`; `plot.maTrend`.

## Examples

```
data(daPe)
ma <- glm(grade ~ gpa + tuce + psi, x = TRUE,
    data = daPe, family = binomial(link = "probit"))
summary(ma)

(ea <- maBina(w = ma, x.mean = TRUE, rev.dum = TRUE))
(ta <- maTrend(q = ea, nam.c = "gpa", nam.d= "psi"))
plot(ta)
```

---

`summary.aiFit` *Summary of Results from Static or Dynamic Models*

---

## Description

This summarizes the main results from AIDS models.

## Usage

```
## S3 method for class 'aiFit'
summary(object, digits=3, ...)
```

## Arguments

| | |
|---|---|
| `object` | an object of class `aiFit` from the function of `aiStaFit` or `aiDynFit`. |
| `digits` | number of digits for rounding outputs |
| `...` | additional arguments to be passed. |

## Details

This wraps up the coefficents and statistics from aiFit by equation.

## Value

A data frame object with coefficients and related statistics by equation.

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## See Also

`aiStaFit` and `aiDynFit`.

## Examples

```
# see the examples for 'aiDynFit'.
```

---

`systemfitAR` *Linear Equation System Estimation with Correction on Autocorrelation*

---

## Description

Fits a set of linear structural equations using Ordinary Least Squares (OLS), Weighted Least Squares (WLS), Seemingly Unrelated Regression (SUR), with the option of autocorrelation correlation.

## Usage

```
systemfitAR(formula, method = "OLS", inst = NULL, data = list(),
  restrict.matrix = NULL, restrict.rhs = NULL, restrict.regMat = NULL,
  pooled = FALSE, control = systemfit.control( ... ),
  AR1 = FALSE, rho.sel = c("all", "mean"), model = c("static", "dynamic"), ...)
```

## Arguments

- `formula` — an object of class `formula` (for single-equation models) or (typically) a list of objects of class `formula` (for multiple-equation models).
- `method` — the estimation method, one of "OLS", "WLS", "SUR"; iterated estimation methods can be specified by setting control parameter `maxiter` larger than 1 (e.g. 500).
- `inst` — one-sided model formula specifying instrumental variables or a list of one-sided model formulas if different instruments should be used for the different equations (only needed for 2SLS, W2SLS, and 3SLS estimations).
- `data` — an optional data framecontaining the variables in the model.
- `restrict.matrix` — an optional j x k matrix to impose linear restrictions on the coefficients by `restrict.matrix` * $b$ = `restrict.rhs` (j = number of restrictions, k = number of all coefficients, $b$ = vector of all coefficients)
- `restrict.rhs` — an optional vector with j elements to impose linear restrictions (see `restrict.matrix`); default is a vector that contains j zeros.
- `restrict.regMat` — an optional matrix to impose restrictions on the coefficients by post-multiplying the regressor matrix with this matrix (see details).
- `control` — list of control parameters. The default is constructed by the function `systemfit.control`. See the documentation of `systemfit.control` for details.
- `pooled` — logical, restrict coefficients to be equal in all equations (only for panel-like data).
- `AR1` — whether first-order autocorrelation is corrected
- `rho.sel` — how rho is computed; `rho.sel = "all"` means that the system is estimated as a single equation and the residuals are used to compute rho. If "mean", each equation in the system is estimated separately and the average of rhos from all the equations are used.
- `model` — Static model has interceipt, while dynamic model has no intercept; see translog cost function and the package for detail.
- `...` — arguments passed to `systemfit.control`.

## Details

This is a wrapper of `systemfit` with an addition of autocorrelation correction. It is mainly used for SUR model with autocorrelation. The main reference sources are Greene (2003), LIMDEP 9.0 manual, Judge et al. (1985), and Berndt and Savin (1975).

## Value

`systemfit` returns a list of the class `systemfit`. This list contains one special object: "eq". It is a list and contains one object for each estimated equation. These objects are of the class systemfit.equation and contain the results that belong only to the regarding equation. In addition, there are four new items in the output:

The objects of the class systemfit and systemfit.equation have the following components (the elements of the latter are marked with an asterisk (∗)):

| | |
|---|---|
| rho | autocorrelation coefficient |
| rho_ste | standard error of rho; if rho.sel = "mean", then it is a vector of the standar errors for individual equations. |
| data | data used for systemfit; this is data adjusted for autocorrelation if AR1 = TRUE; otherwise, it is just the raw data. |
| formula | forumula used for systemfit. This can be adjusted for autocorrelation; costant is adjusted as (1 - rho). |

## Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

## References

Greene, W. H. (2003) *Econometric Analysis, Fifth Edition*, Prentice Hall.

Judge, George G.; W. E. Griffiths; R. Carter Hill; Helmut Luetkepohl and Tsoung-Chao Lee (1985) *The Theory and Practice of Econometrics, Second Edition*, Wiley.

LIMDEP 9.0 software manual.

Berndt, E.R., and N.E. Savin. 1975. Estimation and hypothesis testing in singular equation systems with autoregressive disturbances. Econometrica 43(5/6):937-957.

## See Also

lm; aiStaFit; systemfit

## Examples

```
# Check Berndt and Savin (1975) dataset

# Check Kemenda data
```

---

ur.df2 *Augmented-Dickey-Fuller Unit Root Test revised*

---

## Description

Augmented-Dickey-Fuller Unit Root Test revised

## Usage

```
ur.df2(y, type = c("none", "drift", "trend"), lags = 1,
  selectlags = c("Fixed", "AIC", "BIC"))
```

### Arguments

| | |
|---|---|
| `y` | Vector to be tested for a unit root. |
| `type` | Test type, either "none", "drift" or "trend".. |
| `lags` | Number of lags for endogenous variable to be included. |
| `selectlags` | Lag selection can be achieved according to the Akaike "AIC" or the Bayes "BIC" information criteria. The maximum number of lags considered is set by lags. The default is to use a "fixed" lag length set by lags. |

### Details

This is a modification of `ur.df` in the library of `urca`. The function was written in S4, and it is changed into S3. The lag selected by AIC or BIC is reported explicitly through `lag.used` in the output list. In addition, the values of AIC and BIC statistics are reported

### Value

Return an object of class `ur.df2`: the new outputs are `lag.used`, `aic`, and `bic`.

| | |
|---|---|
| `y` | input of y |
| `model` | input of model |
| `cval` | critical values |
| `lags` | input of lags |
| `lag.used` | acutal lags used |
| `teststat` | test statistics |
| `res` | resiuals of the test regression |
| `aic` | aic values |
| `bic` | bic values |
| `test.name` | test name |

### Methods

One method is defined as follows:

`print`: print test statistics and critical values.

### Author(s)

Changyou Sun (<csun@cfr.msstate.edu>)

### See Also

`ur.df` in `urca` library.

### Examples

```
# see the code for TD.Link: Japan and China wood product imports
```

## write.list — *Output and Write a List Object*

### Description

Print or write its required argument z to a file

### Usage

```
write.list(z, file, t.name = NULL, row.names = FALSE, ...)
```

### Arguments

| | |
|---|---|
| `z` | A list object to be written. Each item in the list is perferably a data frame. If not, it is converted into a data frame. All the contents are coerced into characters to avoid loss of information (e.g., a loss of zero in 5.130. |
| `file` | a character string naming a file. |
| `t.name` | table names. This can be given explicitly, or given by the list name, or by default, named as "table 1" for the first item in z. |
| `row.names` | whether the row names in each table should be written (default is FALSE). If TRUE, a new column of the row names is added to each table. |
| `...` | Other arguments that can be passed to `write.table` |

### Details

This function is a wrap-up of `write.table`. It is convenient to write a set of tables to C drive.

### See Also

`write.table`.

### Examples

```
h1 <- ts(data=cbind(1:24), start=c(2001, 1), frequency=12)
h2 <- ts(data=cbind(1:24, 25:48), start=c(2001, 1), frequency=12)
h3 <- ts(data=cbind(1:4, 5:8, 9:12), start=c(2001, 1), frequency=4)
colnames(h2) <- c("aa", "bb")
colnames(h3) <- c("cc", "dd", "ee")
h1; h2; h3

test <- list(t1 = h1, t2 = h2, t3 = h3)

## Not run:
  # test.csv can be saved at a specific working directory
  getwd(); setwd("c:/aERER"); getwd()
  write.list(z = test, file = "test.csv")

## End(Not run)
```

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