mfx: Marginal Effects, Odds Ratios and Incidence Rate Ratios for GLMs

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Description Estimates probit, logit, Poisson, negative binomial, and beta regression models, returning their marginal effects, odds ratios, or incidence rate ratios as an output.

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R topics documented:

betamfx ................................................................. 2
betaor ................................................................. 3
logitmfx ............................................................... 4
logitor ................................................................. 6
negbinirr ............................................................. 7
negbinmfx ............................................................ 8
poissonrir ............................................................ 9
poissonmfx .......................................................... 11
probitmfx ........................................................... 12

Index 14
**Description**

This function estimates a beta regression model and calculates the corresponding marginal effects.

**Usage**

```r
betamfx(formula, data, atmean = TRUE, robust = FALSE, clustervar1 = NULL, clustervar2 = NULL, control = betareg.control(), link.phi = NULL, type = "ml")
```

**Arguments**

- `formula`: an object of class “formula” (or one that can be coerced to that class).
- `data`: the data frame containing these data. This argument must be used.
- `atmean`: default marginal effects represent the partial effects for the average observation. If `atmean = FALSE` the function calculates average partial effects.
- `robust`: if `TRUE` the function reports White/robust standard errors.
- `clustervar1`: a character value naming the first cluster on which to adjust the standard errors.
- `clustervar2`: a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
- `control`: a list of control arguments specified via `betareg.control`.
- `link.phi`: as in the `betareg` function.
- `type`: as in the `betareg` function.

**Details**

The underlying link function in the mean model (mu) is “logit”. If both `robust=TRUE` and `!is.null(clustervar1)` the function overrides the robust command and computes clustered standard errors.

**Value**

- `mfxest`: a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
- `fit`: the fitted `betareg` object.
- `dcvar`: a character vector containing the variable names where the marginal effect refers to the impact of a discrete change on the outcome. For example, a factor variable.
- `call`: the matched call.
References

See Also
betaor, betareg

Examples
# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)

# beta outcome
y = rbeta(n, shape1 = plogis(1 + 0.5 * x), shape2 = (abs(0.2*x)))
# use Smithson and Verkuilen correction
y = (y*(n-1)+0.5)/n
data = data.frame(y,x)
betamfx(y~x|x, data=data)

betaor

Odds ratios for a beta regression.

Description
This function estimates a beta regression model and calculates the corresponding odds ratios.

Usage
betaor(formula, data, robust = FALSE, clustervar1 = NULL, clustervar2 = NULL, control = betareg.control(), link.phi = NULL, type = "ml")

Arguments

formula an object of class “formula” (or one that can be coerced to that class).
data the data frame containing these data. This argument must be used.
robust if TRUE the function reports White/robust standard errors.
clustervar1 a character value naming the first cluster on which to adjust the standard errors.
clustervar2 a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
control a list of control arguments specified via betareg.control.
link.phi as in the betareg function.
type as in the betareg function.
Details

The underlying link function in the mean model (mu) is "logit". If both robust=TRUE and !is.null(clustervar1) the function overrides the robust command and computes clustered standard errors.

Value

oddsratio a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.

fit the fitted betareg object.

call the matched call.

References


See Also

betamfx, betareg

Examples

# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)
# beta outcome
y = rbeta(n, shape1 = plogis(1 + 0.5 * x), shape2 = (abs(0.2*x)))
# use Smithson and Verkuilen correction
y = (y*(n-1)+0.5)/n
data = data.frame(y,x)
betaor(y~x|data=data)
Usage

logitmfx(formulaL dataL atmean = TRUEL robust = FALSEL clustervar1 = NULLL
          clustervar2 = NULLL start = NULLL control = list())

Arguments

formula: an object of class "formula" (or one that can be coerced to that class).
data: the data frame containing these data. This argument must be used.
atmean: default marginal effects represent the partial effects for the average observation.
         If atmean = FALSE the function calculates average partial effects.
robust: if TRUE the function reports White/robust standard errors.
clustervar1: a character value naming the first cluster on which to adjust the standard errors.
clustervar2: a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
start: starting values for the parameters in the glm model.
control: see glm.control.

Details

If both robust=TRUE and !is.null(clustervar1) the function overrides the robust command and computes clustered standard errors.

Value

mfxest: a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
fit: the fitted glm object.
dcvar: a character vector containing the variable names where the marginal effect refers to the impact of a discrete change on the outcome. For example, a factor variable.
call: the matched call.

References


See Also

logitor, glm
Examples

```r
# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)

# binary outcome
y = ifelse(pnorm(1 + 0.5*x + rnorm(n)) > 0.5, 1, 0)
data = data.frame(y, x)
logitmfx(formula = y~x, data = data)
```

`logitor`  
**Odds ratios for a logit regression.**

Description

This function estimates a binary logistic regression model and calculates the corresponding odds ratios.

Usage

```r
logitor(formula, data, robust = FALSE, clustervar1 = NULL, clustervar2 = NULL, start = NULL, control = list())
```

Arguments

- `formula` an object of class “formula” (or one that can be coerced to that class).
- `data` the data frame containing these data. This argument must be used.
- `robust` if TRUE the function reports White/robust standard errors.
- `clustervar1` a character value naming the first cluster on which to adjust the standard errors.
- `clustervar2` a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
- `start` starting values for the parameters in the `glm` model.
- `control` see `glm.control`.

Details

If both `robust`=TRUE and `!is.null(clustervar1)` the function overrides the robust command and computes clustered standard errors.

Value

- `oddsratio` a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
- `fit` the fitted `glm` object.
- `call` the matched call.
negbinirr

See Also

logitmfx, glm

Examples

# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)

# binary outcome
y = ifelse(pnorm(1 + 0.5*x + rnorm(n))>0.5, 1, 0)
data = data.frame(y,x)
logitor(formula=y~x, data=data)

negbinirr

Incidence rate ratios for a negative binomial regression.

Description

This function estimates a negative binomial regression model and calculates the corresponding incidence rate ratios.

Usage

negbinirr(formula, data, robust = FALSE, clustervar1 = NULL,
clustervar2 = NULL, start = NULL, control = glm.control())

Arguments

formula an object of class “formula” (or one that can be coerced to that class).
data the data frame containing these data. This argument must be used.
robust if TRUE the function reports White/robust standard errors.
clustervar1 a character value naming the first cluster on which to adjust the standard errors.
clustervar2 a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
start starting values for the parameters in the glm.nb model.
control see glm.control.

Details

If both robust=TRUE and !is.null(clustervar1) the function overrides the robust command and computes clustered standard errors.
Value

- **irr**: a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
- **fit**: the fitted \texttt{glm.nb} object.
- **call**: the matched call.

See Also

\texttt{negbinmfx}, \texttt{glm.nb}

Examples

```r
# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)
y = rnegbin(n, mu = exp(1 + 0.5 * x), theta = 0.5)
data = data.frame(y, x)
negbinirr(formula = y ~ x, data = data)
```

Description

This function estimates a negative binomial regression model and calculates the corresponding marginal effects.

Usage

```
negbinmfx(formula, data, atmean = TRUE, robust = FALSE, clustervar1 = NULL,
          clustervar2 = NULL, start = NULL, control = glm.control())
```

Arguments

- **formula**: an object of class “formula” (or one that can be coerced to that class).
- **data**: the data frame containing these data. This argument must be used.
- **atmean**: default marginal effects represent the partial effects for the average observation. If `atmean = FALSE` the function calculates average partial effects.
- **robust**: if `TRUE` the function reports White/robust standard errors.
- **clustervar1**: a character value naming the first cluster on which to adjust the standard errors.
- **clustervar2**: a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
- **start**: starting values for the parameters in the \texttt{glm.nb} model.
- **control**: see \texttt{glm.control}. 

\texttt{negbinmfx} \hspace{1cm} \textit{Marginal effects for a negative binomial regression.}
Details

If both robust=TRUE and !is.null(clustervar1) the function overrides the robust command and computes clustered standard errors.

Value

- `mfxest`: a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
- `fit`: the fitted `glm.nb` object.
- `dcvar`: a character vector containing the variable names where the marginal effect refers to the impact of a discrete change on the outcome. For example, a factor variable.
- `call`: the matched call.

See Also

`negbinirr`, `glm.nb`

Examples

```r
# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)
y = rnegbin(n, mu = exp(1 + 0.5 * x), theta = 0.5)
data = data.frame(y,x)
negbinmfx(formula=y~x, data=data)
```

Description

This function estimates a negative binomial regression model and calculates the corresponding incidence rate ratios.

Usage

```r
poissonirr(formula, data, robust = FALSE, clustervar1 = NULL, clustervar2 = NULL, start = NULL, control = list())
```
Arguments

- formula: an object of class "formula" (or one that can be coerced to that class).
- data: the data frame containing these data. This argument must be used.
- robust: if TRUE the function reports White/robust standard errors.
- clustervar1: a character value naming the first cluster on which to adjust the standard errors.
- clustervar2: a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
- start: starting values for the parameters in the glm model.
- control: see glm.control.

Details

If both robust=TRUE and !is.null(clustervar1) the function overrides the robust command and computes clustered standard errors.

Value

- irr: a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
- fit: the fitted glm object.
- call: the matched call.

See Also

- poissonmfx, glm

Examples

# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)
y = rnegbin(n, mu = exp(1 + 0.5 * x), theta = 0.5)
data = data.frame(y,x)
poissonirr(formula=y~x,data=data)
Marginal effects for a Poisson regression.

Description
This function estimates a Poisson regression model and calculates the corresponding marginal effects.

Usage

```
poissonmfx(formula, data, atmean = TRUE, robust = FALSE, clustervar1 = NULL, clustervar2 = NULL, start = NULL, control = list())
```

Arguments

- `formula`: an object of class “formula” (or one that can be coerced to that class).
- `data`: the data frame containing these data. This argument must be used.
- `atmean`: default marginal effects represent the partial effects for the average observation. If `atmean = FALSE` the function calculates average partial effects.
- `robust`: if `TRUE` the function reports White/robust standard errors.
- `clustervar1`: a character value naming the first cluster on which to adjust the standard errors.
- `clustervar2`: a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
- `start`: starting values for the parameters in the `glm` model.
- `control`: see `glm.control`.

Details
If both `robust=TRUE` and `!is.null(clustervar1)` the function overrides the `robust` command and computes clustered standard errors.

Value

- `mfxest`: a coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
- `fit`: the fitted `glm` object.
- `dcvar`: a character vector containing the variable names where the marginal effect refers to the impact of a discrete change on the outcome. For example, a factor variable.
- `call`: the matched call.

See Also

- `poissonirr`, `glm`
Examples

```r
# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)
y = rnegbin(n, mu = exp(1 + 0.5 * x), theta = 0.5)
data = data.frame(y, x)

poissonmfx(formula = y ~ x, data = data)
```

probitmfx

Marginal effects for a probit regression.

Description

This function estimates a probit regression model and calculates the corresponding marginal effects.

Usage

```r
probitmfx(formula, data, atmean = TRUE, robust = FALSE, clustervar1 = NULL,
          clustervar2 = NULL, start = NULL, control = list())
```

Arguments

- `formula` an object of class “formula” (or one that can be coerced to that class).
- `data` the data frame containing these data. This argument must be used.
- `atmean` default marginal effects represent the partial effects for the average observation. If atmean = FALSE the function calculates average partial effects.
- `robust` if TRUE the function reports White/robust standard errors.
- `clustervar1` a character value naming the first cluster on which to adjust the standard errors.
- `clustervar2` a character value naming the second cluster on which to adjust the standard errors for two-way clustering.
- `start` starting values for the parameters in the glm model.
- `control` see glm.control.

Details

If both robust=TRUE and !is.null(clustervar1) the function overrides the robust command and computes clustered standard errors.
Value

- `mfxest`: A coefficient matrix with columns containing the estimates, associated standard errors, test statistics and p-values.
- `fit`: The fitted `glm` object.
- `dcvar`: A character vector containing the variable names where the marginal effect refers to the impact of a discrete change on the outcome. For example, a factor variable.
- `call`: The matched call.

References


See Also

- `glm`

Examples

```r
# simulate some data
set.seed(12345)
n = 1000
x = rnorm(n)

# binary outcome
y = ifelse(pnorm(1 + 0.5*x + rnorm(n))>0.5, 1, 0)
data = data.frame(y,x)
probitmfx(formula=y~x, data=data)
```
Index

betamfx, 2, 4
betaor, 3, 3
betareg, 2–4
betareg.control, 2, 3

glm, 5–7, 10–13
glm.control, 5–8, 10–12
glm.nb, 7–9

logitmfx, 4, 7
logitor, 5, 6

negbinirr, 7, 9
negbinmfx, 8, 8

poissonirr, 9, 11
poissonmfx, 10, 11
print.betamfx(betamfx), 2
print.betaor(betaor), 3
print.logitmfx(logitmfx), 4
print.logitor(logitor), 6
print.negbinirr(negbinirr), 7
print.negbinmfx(negbinmfx), 8
print.poissonirr(poissonirr), 9
print.poissonmfx(poissonmfx), 11
print.probitmfx(probitmfx), 12
probitmfx, 12