Package ‘mhurdle’

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broom

broom's methods

Description

Methods to compute extract in a tidy way the elements of a fitted model

Usage

```r
## S3 method for class 'mhurdle'
tidy(x, conf.int = FALSE, conf.level = 0.95, ...)

## S3 method for class 'mhurdle'
glance(x, ...)
```

Arguments

- `x` a model fitted with mhurdle
- `conf.int, conf.level` current see generics::tidy (currently unused)
- `...` further arguments, currently unused

Details

mhurdle exports the generics::tidy and generics::glance functions. The specific method provided for mhurdle objects enables the use of some package that relies on these functions (modelsummary for example)
Description

a cross section from 2014

Format

A dataframe containing:

- **month**: the month of the interview.
- **size**: the number of person in the household.
- **cu**: the number of consumption units in the household.
- **income**: the income of the household for the 12 month before the interview.
- **linc**: the logarithm of the net income per consumption unit divided by its mean.
- **linc2**: the square of link.
- **smsa**: does the household live in a SMSA (yes or no).
- **sex**: the sex of the reference person of the household (male and female).
- **race**: the race of the head of the household, one of white, black, indian, asian, pacific and multirace.
- **hispanic**: is the reference person of the household is hispanic (no or yes).
- **educ**: the number of year of education of the reference person of the household.
- **age**: the age of the reference person of the household - 50.
- **age2**: the square of age.
- **car**: cars in the household.
- **food**: food.
- **alcool**: alcool.
- **housing**: housing.
- **apparel**: apparel.
- **transport**: transport.
- **health**: health.
- **entertainment**: entertainment.
- **perscare**: perscare.
- **reading**: reading.
- **education**: education.
- **tobacco**: tobacco.
- **miscexp**: miscexp.
- **cashcont**: cashcont.
- **insurance**: insurance.
- **shows**: shows.
- **foodaway**: foodaway.
- **vacations**: vacations.
mhurdle

Details

number of observations: 1000
observation: households
country: United-States

Source


mhurdle

Estimation of limited dependent variable models

Description

mhurdle fits a large set of models relevant when the dependent variable is 0 for a part of the sample.

Usage

mhurdle(
  formula,
  data,
  subset,
  weights,
  na.action,
  start = NULL,
  dist = c("ln", "n", "bc", "ihs"),
  h2 = FALSE,
  scaled = TRUE,
  corr = FALSE,
  robust = TRUE,
  check.gradient = FALSE,
  ...
)

Arguments

formula a symbolic description of the model to be fitted,
data a data.frame,
subset see stats::lm(),
weights see stats::lm(),
na.action see stats::lm(),
start starting values,
**mhurdle**

The distribution of the error of the consumption equation: one of "n" (normal), "ln" (log-normal) "bc" (box-cox normal) and "ihs" (inverse hyperbolic sinus transformation).

h2

if TRUE the second hurdle is effective, it is not otherwise,

scaled

if TRUE, the dependent variable is divided by its geometric mean,

corr

a boolean indicating whether the errors of the different equations are correlated or not,

robust

transformation of the structural parameters in order to avoid numerical problems,

check_gradient

if TRUE, a matrix containing the analytical and the numerical gradient for the starting values are returned,

... further arguments.

**Details**

**mhurdle** fits models for which the dependent variable is zero for a part of the sample. Null values of the dependent variable may occurs because of one or several mechanisms: good rejection, lack of ressources and purchase infrequency. The model is described using a three-parts formula: the first part describes the selection process if any, the second part the regression equation and the third part the purchase infrequency process. \( y \sim \emptyset | x_1 + x_2 | z_1 + z_2 \) means that there is no selection process. \( y \sim w_1 + w_2 | x_1 + x_2 | \emptyset \) and \( y \sim w_1 + w_2 | x_1 + x_2 \) describe the same model with no purchase infrequency process. The second part is mandatory, it explains the positive values of the dependant variable. The dist argument indicates the distribution of the error term. If dist = "n", the error term is normal and (at least part of) the zero observations are also explained by the second part as the result of a corner solution. Several models described in the litterature are obtained as special cases:

A model with a formula like \( y \sim \emptyset | x_1 + x_2 \) and dist="n" is the Tobit model proposed by (Tobin 1958).

\( y \sim w_1 + w_2 | x_1 + x_2 \) and dist="l" or dist="t" is the single hurdle model proposed by (Cragg 1971). With dist="n", the double hurdle model also proposed by (Cragg 1971) is obtained. With corr="h1" we get the correlated version of this model described by (Blundell and Meghir 1987).

\( y \sim \emptyset | x_1 + x_2 | z_1 + z_2 \) is the P-Tobit model of (Deaton and Irish 1984), which can be a single hurdle model if dist="t" or dist="l" or a double hurdle model if dist="n".

**Value**

# an object of class c("mhurdle", "maxLik").

A mhurdle object has the following elements:

- coefficients: the vector of coefficients,
- vcov: the covariance matrix of the coefficients,
- fitted.values: a matrix of fitted.values, the first column being the probability of 0 and the second one the mean values for the positive observations,
- logLik: the log-likelihood,
- gradient: the gradient at convergence,
• model: a data.frame containing the variables used for the estimation,
• coef.names: a list containing the names of the coefficients in the selection equation, the regression equation, the infrequency of purchase equation and the other coefficients (the standard deviation of the error term and the coefficient of correlation if corr = TRUE),
• formula: the model formula, an object of class Formula
• call: the call,
• rho: the lagrange multiplier test of no correlation.

References


Examples

data("Interview", package = "mhurdle")

# independent double hurdle model
idhm <- mhurdle(vacations ~ car + size | linc + linc2 | 0, Interview,  
                 dist = "ln", h2 = TRUE, method = "bfgs")

# dependent double hurdle model
ddhm <- mhurdle(vacations ~ car + size | linc + linc2 | 0, Interview,  
                 dist = "ln", h2 = TRUE, method = "bfgs", corr = TRUE)

# a double hurdle p-tobit model
ptm <- mhurdle(vacations ~ 0 | linc + linc2 | car + size, Interview,  
                dist = "ln", h2 = TRUE, method = "bfgs", corr = TRUE)

mhurdle.methods

Methods for mhurdle fitted objects

Description

specific predict, fitted, coef, vcov, summary, ... for mhurdle objects. In particular, these methods enables to extract the several parts of the model
mhurdle.methods

Usage

## S3 method for class 'mhurdle'
coef(
  object,
  which = c("all", "h1", "h2", "h3", "h4", "sd", "corr", "tr", "pos"),
  ...
)

## S3 method for class 'mhurdle'
vcov(
  object,
  which = c("all", "h1", "h2", "h3", "h4", "sd", "corr", "tr", "pos"),
  ...
)

## S3 method for class 'mhurdle'
logLik(object, naive = FALSE, ...)

## S3 method for class 'mhurdle'
print(
  x,
  digits = max(3, getOption("digits") - 2),
  width = getOption("width"),
  ...
)

## S3 method for class 'mhurdle'
summary(object, ...)

## S3 method for class 'summary.mhurdle'
coef(
  object,
  which = c("all", "h1", "h2", "h3", "sd", "corr", "tr", "pos"),
  ...
)

## S3 method for class 'summary.mhurdle'
print(
  x,
  digits = max(3, getOption("digits") - 2),
  width = getOption("width"),
  ...
)

## S3 method for class 'mhurdle'
fitted(object, which = c("all", "zero", "positive"), mean = FALSE, ...)

## S3 method for class 'mhurdle'

predict(object, newdata = NULL, what = c("E", "Ep", "p"), ...)

## S3 method for class 'mhurdle'
update(object, new, ...)

## S3 method for class 'mhurdle'
nobs(object, which = c("all", "null", "positive"), ...)

## S3 method for class 'mhurdle'
effects(
  object,
  covariate = NULL,
  data = NULL,
  what = c("E", "Ep", "p"),
  reflevel = NULL,
  mean = FALSE,
  ...)

Arguments

object, x an object of class "mhurdle",
which which coefficients or covariances should be extracted? Those of the selection ("h1"), consumption ("h2") or purchase ("h3") equation, the other coefficients "other" (the standard error and the coefficient of corr), the standard error ("sigma") or the coefficient of correlation ("rho"),
... further arguments.
naive a boolean, it TRUE, the likelihood of the naive model is returned,
digits see print,
width see print.
mean if TRUE, the mean of the effects is returned,
newdata, data a data.frame for which the predictions or the effectssshould be computed,
what for the predict and the effects method, the kind of prediction, one of E Ep and p (respectively for expected values in the censored sample, expected values in the truncated sample and probability of positive values),
new an updated formula for the update method,
covariate the covariate for which the effect has to be computed,
reflevel for the computation of effects for a factor, the reference level,
ndvuongtest

Vuong test for non-nested models

Description

The Vuong test is suitable to discriminate between two non-nested models.

Usage

```
ndvuongtest(
  x,
  y,
  size = 0.05,
  pval = TRUE,
  type = c("non-nested", "nested", "overlapping"),
  ndraws = 10000,
  diffnorm = 0.1,
  seed = 1,
  print.level = 0
)
```

Arguments

- `x`: a first fitted model of class "mhurdle".
- `y`: a second fitted model of class "mhurdle".
- `size`: the size of the test.
- `pval`: should the p-value be computed?
- `type`: the kind of test to be computed.
- `ndraws`: the number of draws for the simulations.
- `diffnorm`: a creuser.
- `seed`: the seed.
- `print.level`: the level of details to be printed.

Value

an object of class "htest"

References


See Also

vuong in package pscl.
Examples

data("Interview", package = "mhurdle")
# dependent double hurdle model
dhm <- mhurdle(vacations ~ car + size | linc + linc2 | 0, Interview,
               dist = "ln", h2 = TRUE, method = "bhhh", corr = TRUE)

# a double hurdle p-tobit model
ptm <- mhurdle(vacations ~ 0 | linc + linc2 | car + size, Interview,
               dist = "ln", h2 = TRUE, method = "bhhh", corr = TRUE)

vuongtest(dhm, ptm)

Description

Methods to compute the predictions and the marginal effects for tobit1 objects

Usage

## S3 method for class 'mhurdle'
prediction(
  model,                   
data = find_data(model, parent.frame()),
at = NULL,                
what = c("E", "Ep", "p"), 
vcov = stats::vcov(model),
calculate_se = FALSE,      
...
)

Arguments

model           a model fitted using mhurdle
data, at, vcov, calculate_se
               see prediction::prediction
what            see mhurdle:::predict.mhurdle
...             further arguments, especially, a what argument can be provided and will be
                passed to predict

Details

tobit1 exports the prediction::prediction and margins::margins functions. prediction use
the predict method to compute the predictions in a "tidy way", it returns the data frame provided
for the predictions augmented by the predictions. margins compute the average marginal effect of
every covariate. It uses the numerical derivatives of the predictions using the prediction function.
**rsq**

*R squared and pseudo R squared*

---

**Description**

This function computes the R squared for multiple hurdle models. The measure is a pseudo coefficient of determination or may be based on the likelihood.

**Usage**

```r
rsq(
  object,
  type = c("coefdet", "lratio"),
  adj = FALSE,
  r2pos = c("rss", "ess", "cor")
)
```

**Arguments**

- **object**: an object of class "mhurdle",
- **type**: one of "coefdet" or "lratio" to select a pseudo coefficient of correlation or a McFadden like measure based on the likelihood function,
- **adj**: if TRUE a correction for the degrees of freedom is performed,
- **r2pos**: only for pseudo coefficient of determination, should the positive part of the R squared be computed using the residual sum of squares ("rss"), the explained sum of squares ("ess") or the coefficient of correlation between the fitted values and the response (cor).

**Value**

a numerical value

**References**


**Examples**

```r
data("Interview", package = "mhurdle")
# independent double hurdle model
idhm <- mhurdle(vacations ~ car + size | linc + linc2 | 0, Interview, 
  dist = "ln", h2 = TRUE, method = "bfgs")
rsq(idhm, type = "lratio")
rsq(idhm, type = "coefdet", r2pos = "rss")
```
vuongtest  Vuong test for non-nested models

Description

The Vuong test is suitable to discriminate between two non-nested models.

Usage

vuongtest(
  x,
  y,
  type = c("non-nested", "nested", "overlapping"),
  hyp = FALSE,
  variance = c("centered", "uncentered"),
  matrix = c("large", "reduced")
)

Arguments

- **x**: a first fitted model of class "mhurdle".
- **y**: a second fitted model of class "mhurdle".
- **type**: the kind of test to be computed.
- **hyp**: a boolean, TRUE if one of the models is assumed to be the true model.
- **variance**: the variance is estimated using the centered or uncentered expression.
- **matrix**: the W matrix can be computed using the general expression large or the reduced matrix reduced (only relevant for the nested case).

Value

an object of class "htest"

References


See Also

vuong in package pscl.
Examples

data("Interview", package = "mhurdle")
# dependent double hurdle model
dhm <- mhurdle(vacations ~ car + size | linc + linc2 | 0, Interview,
                dist = "ln", h2 = TRUE, method = "bhhh", corr = TRUE)

# a double hurdle p-tobit model
ptm <- mhurdle(vacations ~ 0 | linc + linc2 | car + size, Interview,
               dist = "ln", h2 = TRUE, method = "bhhh", corr = TRUE)

vuongtest(dhm, ptm)
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