Package ‘tobit1’

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Description A set of estimators and tests for models for which the response is truncated. The package includes a lot of developments following the seminal paper of Tobin (1958) <doi:10.2307/1907382>.
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Description

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

Usage

```r
## S3 method for class 'tobit1'
tidy(x, conf.int = FALSE, conf.level = 0.95, ...)

## S3 method for class 'tobit1'
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)

Value

tidy returns a data frame containing the estimates, their standard errors, the Student statistic and the p-value. glance returns a one line data frame containing goodness of fit measures.
Description

A sample of 2384 households from the PSID

Format

A tibble containing:

- donation: the amount of charitable giving
- donparents: the amount of charitable giving of the parents
- education: the level of education of household’s head, a factor with levels less_high_school, high_school, some_college, college, post_college
- religion: a factor with levels none, catholic, protestant, jewish and other.
- married: a dummy for married couples
- south: a dummy for households living in the south

Details

Intergenerational transmission of charitable giving

Source

This data set was kindly provided by Mark Ottoni Wilhelm

References

Fees and admission

Description
Expenses on fees and admission from the US expense survey

Format
a tibble containing:
- fees: expenses on fees and admission,
- expense: total expense,
- netinc: net income

Hausman test

Description
Hausman test

Usage
haustest(x, y, omit = NULL)

Arguments
- x: the first model,
- y: the second model
- omit: a character containing the effects that are removed from the test

Value
a list with class 'htest' containing the following components:
- data.mane: a character string describing the fitted model
- statistic: the value of the test statistic
- parameter: degrees of freedom
- p.value: the p.value of the test
- method: a character indicating what type of test is performed
- alternative: a character indicating the alternative hypothesis
**ivtobit**

Author(s)

Yves Croissant

References


Examples

```r
charitable <- dplyr::mutate(charitable,
                            logdon = log(donation) - log(25))
char_form <- logdon ~ log(donparents) + log(income) +
             education + religion + married + south
ml <- tobit1(char_form, data = charitable)
scls <- update(ml, method = "trimmed")
haustest(scls, ml, omit = "(Intercept)"
```

---

**ivtobit**

*Simultaneous-equation tobit model*

Description

Estimation of simultaneous-equation models when the response is truncated

Usage

```r
ivtobit(
  formula,
  data,
  subset = NULL,
  left = 0,
  right = Inf,
  method = c("ml", "2steps"),
  robust = TRUE,
  trace = 0
)
```

Arguments

- **formula**: a symbolic description of the model,
- **data**: a data frame,
- **subset**: a subset,
- **left, right**: left and right limits of the dependent variable. The default is respectively 0 and +Inf which corresponds to the most classic (left-zero truncated) tobit model,
- **method**: one of "ml" for maximum likelihood, "2steps".
robust

a boolean, if TRUE, a consistent estimation of the covariance of the coefficients is used for the 2-steps method,

trace

a boolean (the default if FALSE) if TRUE some information about the optimization process is printed.

Value

An object of class c('tobit1', 'lm'), see tobit1::tobit1 for more details.

Author(s)

Yves Croissant

References


Examples

```r
inst <- ~ sic3 + k_serv + inv + engsci + whitecol + skill + semskill + cropland + pasture + forest + coal + petro + minerals + scrconc + bcrconc + scrcomp + bcrcomp + meps + kstock + puni + geog2 + tenure + klratio + bunion
tradeprotection <- dplyr::mutate(tradeprotection,
                                   y = ntb / (1 + ntb),
                                   x1 = exports / imports / elast,
                                   x2 = cap * x1)
GH <- ivtobit(Formula::as.Formula(y ~ x1 + x2, inst), tradeprotection, method = "2steps")
Full <- ivtobit(Formula::as.Formula(y ~ x1 + x2 + labvar, inst), tradeprotection, method = "2steps")
Short <- ivtobit(Formula::as.Formula(y ~ x1 + I(x2 + labvar), inst),
                  tradeprotection, method = "2steps")
```

moffitt

*Moffitt data set*

Description

a sample of 610 women drawn from the 1972 wave of the national Longitudinal Survey (NLS) of Older Women

Format

a tibble containing:

- hours: hours worked per week,
- wage: hourly wage,
- nwinc: asset income per week,
prediction_margins

- married: dummy for married women,
- age: age of the women,
- black: dummy for black women,
- fsize: size of the family
- c16: number of children under 6 years old,
- cgt6: number of children above 6 years old,
- educ: number of years of education,
- lfs: size of the labor force (in millions),
- manuf: manufacturing fraction,
- gov: government fraction.

Details

Labor force participation and hours worked by women

Source

this data set was kindly provided by David Drukker

References


prediction_margins      prediction methods

Description

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

## S3 method for class 'tobit1'
prediction(
  model,
  data = find_data(model, parent.frame()),
  at = NULL,
  type = "response",
  vcov = stats::vcov(model),
  calculate_se = FALSE,
  ...
)

## S3 method for class 'tobit1'
predict(object, newdata = NULL, what = c("expvalue", "prob", "linpred"), ...)

Arguments

model, object
  a model fitted using tobit1
data, at, type, vcov, calculate_se
  see prediction::prediction
...
  further arguments, especially, a what argument can be provided and will be
  passed to predict
newdata
  a new data frame for which the predict method should compute the predictions
what
  for the predict method, the kind of predictions, can be the probabilities (prob),
  the linear predictor (linpred) and the expected value of the response (expvalue)

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.

Value

prediction returns a data frame which is a data frame containing the values of the covariates
used for the predictions augmented by the predicted values. margins return an object of class
c("margins", 'data.frame') which is data frame containing the marginal effects.

Examples

data("feesadm", package = "tobit1")
z <- tobit1(fees ~ expense + I(expense ^ 2) + region, feesadm)
head(predict(z))
# same with what = "expvalue", the default
head(predict(z, what = "expvalue"))
# compute the linear predictor and the probability
head(predict(z, what = "linpred"))
head(predict(z, what = "prob"))
# the prediction method returns a data frame
prediction(z, what = "prob")
# use a smaller data set
fees2 <- feesadm[5:25,]
predict(z, newdata = fees2, what = "prob")
prediction(z, data = fees2, what = "prob")
margins(z, data = fees2, what = "prob")
summary(margins(z, data = fees2, what = "prob"))

---

**smbltest**

*Smith and Blundell Test*

**Description**

Test for Exogeneity in Tobit models

**Usage**

```
smbltest(formula, data)
```

**Arguments**

- `formula` a two part formula, with the instruments in the second part
- `data` a data.frame

**Value**

a list with class 'htest' containing the following components:

- `data.name`: a character string describing the fitted model
- `statistic`: the value of the test statistic
- `parameter`: degrees of freedom
- `p.value`: the p.value of the test
- `method`: a character indicating what type of test is performed
- `alternative`: a character indicating the alternative hypothesis

**Author(s)**

Yves Croissant

**References**

Examples

library("Formula")
inst <- ~ sic3 + k_serv + inv + engsci + whitecol + skill + semskill + cropland +
        pasture + forest + coal + petro + minerals + scrcconc + bcrcconc +
        scrcomp + bcrccomp + meps +
        kstock + puni + geog2 + tenure + klratio + bunion
tradeprotection <- dplyr::mutate(tradeprotection,
        y = ntb / (1 + ntb),
        x1 = exports / imports / elast,
        x2 = cap * x1)
smbltest(Formula::as.Formula(y ~ x1 + x2 + labvar, inst), tradeprotection)

---

tobit1  

Truncated response model

Description

Estimation of models for which the response is truncated, either on censored or truncated samples
using linear models, maximum likelihood or two-steps estimators

Usage

tobit1(
    formula,
    data,
    subset = NULL,
    weights = NULL,
    start = NULL,
    left = 0,
    right = Inf,
    scedas = c("exp", "pnorm"),
    sample = c("censored", "truncated"),
    method = c("ml", "lm", "2steps", "trimmed", "nls"),
    trace = FALSE
)

## S3 method for class 'tobit1'
nobs(object, ...)

## S3 method for class 'tobit1'
vcov(object, ...)

## S3 method for class 'tobit1'
logLik(object, ...)

## S3 method for class 'tobit1'
summary(object, ...)
### S3 method for class 'tobit1'
print(x, digits = max(3L, getOption("digits") - 3L), ...)

### S3 method for class 'summary.tobit1'
print(
  x,
  digits = max(3, getOption("digits") - 2),
  width = getOption("width"),
  ...
)

**Arguments**

- **formula**: a symbolic description of the model; if two right hand sides are provided, the second one is used to parametrize the conditional variance,
- **data**: a data frame,
- **subset**: a subset,
- **weights**: an optional vector of weights (currently only supported by ml method,
- **start**: an optional vector of starting values
- **left, right**: left and right limits of the dependent variable. The default is respectively 0 and +Inf which corresponds to the most classic (left-zero truncated) tobit model,
- **scedas**: the functional form used to specify the conditional variance, which is of the form: \( s_n = s_o f(Z g) \), where \( Z \) are the covariates indicated in the second part of the formula and \( z_o \) and \( g \) a set of parameters to estimate. Currently, \( f \) can either be set to "exp" or "pnorm",
- **sample**: either "censored" (the default) to estimate the censored (tobit) regression model or "truncated" to estimated the truncated regression model,
- **method**: one of "ml" for maximum likelihood, "lm" for (biased) least squares estimators and "2steps" for two-steps consistent estimators, "trimmed" for symetrically censored estimator,
- **trace**: a boolean (the default if FALSE) if TRUE some information about the optimization process is printed,
- **x, object**: an object of class tobit1 or summary.tobit1,
- **digits, width**: see base::print,

**Value**

An object of class c('tobit1', 'lm'), which is a list containg the following components:

- **coefficients**: a named vector of coefficients,
- **linear.predictor**: the linear fit,
- **fitted.values**: the fitted values,
- **residuals**: the residuals,
• df.residual: the residual degrees of freedom,
• hessian: the hessian of the log-likelihood function at the optimum,
• vcov: an estimator of the covariance matrix of the coefficients,
• gradObs: a N x K matrix containing the individual contributions to the gradient,
• logLik: the value of the log-likelihood at the optimum,
• model: the model frame,
• terms: the terms object used,
• call: the matched call
• xlevels: a record of the levels of the factors used in fitting
• na.action: information returned by model.frame on the special handling of NA's.

Author(s)
Yves Croissant

Examples

# tobit model estimated by maximum likelihood
tobit1(fees ~ expense, feesadm)
# same using two-steps estimator
tobit1(fees ~ expense, feesadm, method = "2steps")
# same model fitted on the truncated sample
tobit1(fees ~ expense, feesadm, sample = "truncated")

tradeprotection Lobying and Trade Protection

Description
194 industrial sectors in the US

Format
a tibble containing:
• ntb NTB coverage ratio, proportion
• exports exportations
• imports importations
• elast demand elasticity
• cap lobying
• labvar labor market covariate
• sic3 3-digit SIC industry classification
• inv Inventories, factor share
• engsci Engineers and scientists, factor share
• whitecol White collar, factor share
• skill Skilled, factor share
• semskill Semi-skilled, factor share
• cropland Cropland, factor share
• pasture Pasture, factor share
• forest Forest, factor share
• coal Coal, factor share
• petro Petroleum, factor share
• minerals Minerals, factor share
• scrconc Seller concentration
• bcrconc Buyer concentration
• scrcomp Seller number of firms
• bcrcomp Buyer number of firms
• meps Scale
• kstock Capital stock
• puni bla
• geog2 Geographic concentration
• tenure Average worker tenure, years
• klratio Capital-labor ratio
• bunion bla

Details
Lobbying from Capitalists and Unions and Trade Protection

Source
American Economic Association Data Archive: https://www.aeaweb.org/aer/

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