

Package ‘cmtest’

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Title Conditional Moments Test

Depends R (>= 4.0.0)

Imports Rdpack

Suggests censReg, AER, knitr, rmarkdown, maxLik, bookdown, tobit1

Description Conditional moments test, as proposed by Newey (1985) <doi:10.2307/1911011 > and Tauchen (1985) <doi:10.1016/0304-4076(85)90149-6>, useful to detect specification violations for models estimated by maximum likelihood. Methods for probit and tobit models are provided.

Encoding UTF-8

License GPL (>= 2)

URL <https://www.r-project.org>

VignetteBuilder knitr

RoxygenNote 7.1.2

RdMacros Rdpack

NeedsCompilation no

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`cmtest`*Conditional moments test*

Description

Conditional moments tests for maximum likelihood estimators consist on adding to the matrix of individual contributions to the score moments conditions and then test the hypothesis that the expected value of the vector of augmented scores is zero. It is particularly convenient for the probit and the tobit model to test for functional form, omitted variables, heteroscedasticity and normality.

Usage

```
cmtest(  
  x,  
  test = c("normality", "reset", "heterosc", "skewness", "kurtosis"),  
  powers = 2:3,  
  heter_cov = NULL,  
  OPG = FALSE  
)  
  
## S3 method for class 'tobit'  
cmtest(  
  x,  
  test = c("normality", "reset", "heterosc", "skewness", "kurtosis"),  
  powers = 2:3,  
  heter_cov = NULL,  
  OPG = FALSE  
)  
  
## S3 method for class 'tobit1'  
cmtest(  
  x,  
  test = c("normality", "reset", "heterosc", "skewness", "kurtosis"),  
  powers = 2:3,  
  heter_cov = NULL,  
  OPG = FALSE  
)  
  
## S3 method for class 'censReg'  
cmtest(  
  x,  
  test = c("normality", "reset", "heterosc", "skewness", "kurtosis"),  
  powers = 2:3,  
  heter_cov = NULL,  
  OPG = FALSE  
)
```

```
## S3 method for class 'glm'
cmtest(
  x,
  test = c("normality", "reset", "heterosc", "skewness", "kurtosis"),
  powers = 2:3,
  heter_cov = NULL,
  OPG = FALSE
)
```

Arguments

x	a fitted model, currently a tobit model either fitted by <code>AER::tobit</code> or <code>censReg::censReg</code> or a probit model fitted by <code>glm</code> with <code>family = binomial(link = 'probit')</code> ,
test	the kind of test to be performed, either a normality test (or separately a test that the skewness or kurtosis coefficients are 0 and 3), a heteroscedasticity test or a reset test,
powers	the powers of the fitted values that should be used in the reset test,
heter_cov	a one side formula that indicates the covariates that should be used for the heteroscedasticity test (by default all the covariates used in the regression are used),
OPG	a boolean, if FALSE (the default), the analytic derivatives are used, otherwise the outer product of the gradient formula is used

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

Author(s)

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References

- Newey WK (1985). "Maximum Likelihood Specification Testing and Conditional Moment Tests." *Econometrica*, **53**(5), 1047–1070. ISSN 00129682, 14680262, <https://www.jstor.org/stable/1911011>.
- Pagan A, Vella F (1989). "Diagnostic Tests for Models Based on Individual Data: A Survey." *Journal of Applied Econometrics*, **4**, S29–S59. ISSN 08837252, 10991255, <https://www.jstor.org/stable/2096593>.
- Tauchen G (1985). "Diagnostic testing and evaluation of maximum likelihood models." *Journal of Econometrics*, **30**(1), 415–443. ISSN 0304-4076, doi: [10.1016/03044076\(85\)901496](https://doi.org/10.1016/03044076(85)901496), <https://www.sciencedirect.com/science/article/pii/0304407685901496>.

Wells C (2003). "Retesting Fair's (1978) Model on Infidelity." *Journal of Applied Econometrics*, **18**(2), 237–239. ISSN 08837252, 10991255, <https://www.jstor.org/stable/30035205>.

Examples

```
# replication of Wells (2003) and Pagan and Vella (1989) using Fair's data
library("AER")
data("Affairs", package = "AER")
z <- tobit'affairs ~ gender + age + yearsmarried + children + religiousness +
      education + occupation + rating, data = Affairs)
cmtest(z, test = "normality")
cmtest(z, test = "skewness", OPG = TRUE)
cmtest(z, test = "kurtosis", OPG = TRUE)
cmtest(z, test = "reset", powers = 2, OPG = TRUE)
cmtest(z, test = "reset", powers = 3, OPG = TRUE)
cmtest(z, test = "heterosc", OPG = TRUE, heter_cov = ~ gender)
```

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