Package 'poisFErobust'

October 14, 2022

Type Package

Title Poisson Fixed Effects Robust

Version 2.0.0

Date 2020-02-17

Description Computation of robust standard errors of Poisson fixed effects models, following Wooldridge (1999).

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Depends R (>= 3.1.0)

Imports data.table (>= 1.9.6), glmmML (>= 1.0)

URL https://bitbucket.org/ew-btb/poisson-fe-robust

NeedsCompilation no

RoxygenNote 6.0.1

Suggests testthat

LazyData true

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poisFErobust-package *Poisson Fixed Effects Robust*

Description

Computation of robust standard errors of Poisson fixed effects models, following Wooldridge (1999).

Details

The DESCRIPTION file:

Package:	poisFErobust
Type:	Package
Title:	Poisson Fixed Effects Robust
Version:	2.0.0
Date:	2020-02-17
Authors@R:	person("Evan", "Wright", email = "enwright@umich.edu", role = c("aut", "cre"))
Description:	Computation of robust standard errors of Poisson fixed effects models, following Wooldridge (1999).
License:	MIT + file LICENSE
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Suggests:	testthat
LazyData:	true
Author:	Evan Wright [aut, cre]
Maintainer:	Evan Wright <enwright@umich.edu>

Index of help topics:

Author(s)

NA

Maintainer: NA

References

Wooldridge, Jeffrey M. (1999): "Distribution-free estimation of some nonlinear panel data models," Journal of Econometrics, 90, 77-97.

Examples

```
# ex.dt.good satisfies the conditional mean assumption
data("ex.dt.good")
pois.fe.robust(outcome = "y", xvars = c("x1", "x2"), group.name = "id",
               index.name = "day", data = ex.dt.good)

# ex.dt.bad violates the conditional mean assumption
data("ex.dt.bad")
pois.fe.robust(outcome = "y", xvars = c("x1", "x2"), group.name = "id",
               index.name = "day", data = ex.dt.bad)
```

---

ex.dt.bad *Poisson data violating conditional mean assumption*

Description

A data.table containing `id` by `day` observations of Poisson random variables which violate the conditional mean assumption of Wooldridge (1999).

Usage

```
data("ex.dt.bad")
```

Format

A data.table with 450 observations on the following 7 variables.

`id` a factor with levels `1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50`

`day` a numeric vector

`fe` a numeric vector

`x1` a numeric vector

`x2` a numeric vector

`y` a numeric vector

`x1.lead` a numeric vector

Details

The data were simulated like `y <- rpois(1, exp(fe + x1 + x2 + 2.5*x1.lead))` where `fe`, `x1`, and `x2` are standard normal random variables. `fe` varies only across `id`. `x1.lead` is a one period lead of `x1` which causes the violation of the conditional mean assumption.

References

Wooldridge, Jeffrey M. (1999): "Distribution-free estimation of some nonlinear panel data models," Journal of Econometrics, 90, 77-97.

Examples

```
data("ex.dt.bad")
str(ex.dt.bad)
```

`ex.dt.good` *Poisson data satisfying conditional mean assumption*

Description

A data.table containing `id` by `day` observations of Poisson random variables which satisfy the conditional mean assumption of Wooldridge (1999).

Usage

```
data("ex.dt.good")
```

Format

A data frame with 500 observations on the following 6 variables.

`id` a factor with levels `1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50`

`day` a numeric vector

`fe` a numeric vector

`x1` a numeric vector

`x2` a numeric vector

`y` a numeric vector

Details

The data were simulated like `y <- rpois(1, exp(fe + x1 + x2))` where `fe`, `x1`, and `x2` are standard normal random variables. `fe` varies only across `id`.

References

Wooldridge, Jeffrey M. (1999): "Distribution-free estimation of some nonlinear panel data models," Journal of Econometrics, 90, 77-97.

Examples

```
data("ex.dt.good")
str(ex.dt.good)
```

pois.fe.robust *Robust standard errors of Poisson fixed effects regression*

Description

Compute standard errors following Wooldridge (1999) for Poisson regression with fixed effects, and a hypothesis test of the conditional mean assumption (3.1).

Usage

```
pois.fe.robust(outcome, xvars, group.name, data,
               qcmle.coefs = NULL, allow.set.key = FALSE,
               index.name = NULL)
```

Arguments

outcome	character string of the name of the dependent variable.
xvars	vector of character strings of the names of the independent variables.
group.name	character string of the name of the grouping variable.
data	data.table which contains the variables named in other arguments. See details for variable type requirements.
qcmle.coefs	an optional numeric vector of coefficients in the same order as xvars. If NULL, coefficients are estimated using glmmML::glmmboot.
allow.set.key	logical. When TRUE (recommended), data will have its key set to group.name, so it may be reordered. This should reduce memory usage.
index.name	DEPRECATED (leave as NULL).

Details

data must be a data.table containing the following:

- a column named by outcome, non-negative integer
- columns named according to each string in xvars, numeric type
- a column named by group.name, factor type
- a column named by index.name, integer sequence increasing by one each observation with no gaps within groups

No observation in data may contain a missing value.

Setting allow.set.key to TRUE is recommended to reduce memory usage; however, it will allow data to be modified (sorted in-place).

pois.fe.robust also returns the p-value of the hypothesis test of the conditional mean assumption (3.1) as described in Wooldridge (1999) section 3.3.

Value

A list containing

- `coefficients`, a numeric vector of coefficients.
- `se.robust`, a numeric vector of standard errors.
- `p.value`, the p-value of a hypothesis test of the conditional mean assumption (3.1).

Author(s)

Evan Wright

References

Wooldridge, Jeffrey M. (1999): "Distribution-free estimation of some nonlinear panel data models," Journal of Econometrics, 90, 77-97.

See Also

`glmmboot`

Examples

```
# ex.dt.good satisfies the conditional mean assumption
data("ex.dt.good")
pois.fe.robust(outcome = "y", xvars = c("x1", "x2"), group.name = "id",
               index.name = "day", data = ex.dt.good)

# ex.dt.bad violates the conditional mean assumption
data("ex.dt.bad")
pois.fe.robust(outcome = "y", xvars = c("x1", "x2"), group.name = "id",
               index.name = "day", data = ex.dt.bad)
```

Index