Package 'estprod'

October 13, 2022

Title Estimation of Production Functions

Version 1.2

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Description Estimation of production functions by the Olley-Pakes, Levinsohn-
Petrin and Wooldridge methodologies.
The package aims to reproduce the results obtained with the Stata's user written opreg <http:
//www.stata-journal.com/article.html?article=st0145> and levpet <http:
//www.stata-journal.com/article.html?article=st0060> commands.
The first was originally proposed by Olley, G.S. and Pakes, A. (1996) <doi:10.2307/2171831>.
The second by Levinsohn, J. and Petrin, A. (2003) <doi:10.1111/1467-937X.00246>.
And the third by Wooldridge (2009) <doi:10.1016/j.econlet.2009.04.026>.

Depends R (>= 3.0)

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Imports lazyeval, boot, minpack.lm, Formula, gmm

NeedsCompilation no

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R topics documented:

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combination_with_repetition
                              Combination with repetition.

Description

From combinatorial math, this function aims calculates combinations with repetitions.

Usage

```
combination_with_repetition(n, r)
```

Arguments

n	The number of elements (variables).
r	The size of the groups (degreess of the polynomial interaction).

---

estprod_data   *10000 randomly generated variables in panel data format.*

Description

10000 randomly generated variables in panel data format.

Usage

```
estprod_data
```

Format

A data frame with 10000 rows and 10 variables:

id Identifies the 1000 randomly generated individuals.

year The year associated to each individual observation.

g1 Put individuals in 25 groups.

g2 Put individuals in 50 groups.

var1 Randomly generated variable.

var2 Randomly generated variable.

var3 Randomly generated variable.

var4 Randomly generated variable.

var5 Randomly generated variable.

exit The last year an id appears.

---

levinsohn_petrin	*Levinsohn-Petrin Estimation of Production Functions*

Description

This function aims the estimation of production functions using Levinsohn-Petrin (2000).

Usage

```
levinsohn_petrin(
  data,
  formula = y ~ free | capital | proxy | controls,
  exit = NULL,
  gross = FALSE,
  id = "id",
  time = "year",
  bootstrap = TRUE,
  reps = 2,
  degree = c(3, 3),
  verify = TRUE,
  maxiter = 100,
  ...
)
```

Arguments

data	A data.frame or tibble containing the variables of the model.
formula	An object of the class `formula`.
exit	An optional formula with the name of the variabe indicator of firm's last period. *~exit*, for example.
gross	If TRUE dependent variable is gross output.
id	A character with the name of the indicator variable.
time	A character with the name of the time variable.
bootstrap	An optional logical. If TRUE calculate bootstrap standard errors.
reps	The number of bootstrap replications.
degree	A vector with the number of polynomial interactions in each stage of the routine.
verify	Verify if inputs are sorted.
maxiter	Parameter of `nls.lm` at second stage.
...	Additional arguments.

Details

Multipart formula must be specified in the following order: `y ~ free | capital | proxy | controls`. Additional controls are optional. It is possible to use more than one variable, although the use of more than one capital may not be theoretically identified. The function returns an object of the estprod or boot classes (if `bootstrap` is TRUE).

Examples

```
data(estprod_data)
levinsohn_petrin(data = estprod_data, var1 ~ var2 | var3 | var4,
exit = ~exit, id = "id", time = "year", bootstrap = TRUE)
```

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olley_pakes   *Olley-Pakes Estimation of Production Functions*

Description

This function aims the estimation of production functions using Olley-Pakes (1996).

Usage

```
olley_pakes(
  data,
  formula = y ~ free | capital | proxy | controls,
  exit = NULL,
  id = "id",
  time = "year",
  bootstrap = TRUE,
  reps = 2,
  degree = c(3, 2),
  verify = TRUE,
  maxiter = 100,
  ...
)
```

Arguments

data	A data.frame or tibble containing the variables of the model.
formula	An object of the class formula.
exit	An optional formula with the name of the variabe indicator of firm's last period. ~exit, for example.
id	A character with the name of the indicator variable.
time	A character with the name of the time variable.
bootstrap	An optional logical. If TRUE calculate bootstrap standard errors.
reps	The number of bootstrap replications.
degree	A vector with the number of the polynomial interactions in each stage of the routine.
verify	Verify if inputs are sorted.
maxiter	Parameter of nls.lm at second stage.
...	Additional arguments.

Details

Multipart formula must be specified in the following order: y ~ free | capital | proxy | controls. Additional controls are optional. It is possible to use more than one variable, although the use of more than one capital may not be theoretically identified. The function returns an object of the estprod or boot classes (if `bootstrap` is TRUE).

Examples

```
data(estprod_data)
olley_pakes(data = estprod_data, var1 ~ var2 | var3 | var4,
exit = ~exit, id = "id", time = "year", bootstrap = TRUE)
```

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panel_lag   *Panel data lag function*

Description

This function aims create the lags of a specified variable from panel data.

Usage

```
panel_lag(x, id, time, lag = 1, verify = TRUE)
```

Arguments

x	A vector, data.frame, tibble or matrix.
id	A character with the name of the indicator variable.
time	A character with the name of the time variable.
lag	Number of lags.
verify	Check if panel is sorted by id and time variables.

Note

Based on Paul Schrimpf's lag function.

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poly_elements	*Number of* poly *elements.*

Description

This function aims calculate the number of terms of a polynomial interactions.

Usage

```
poly_elements(n, d)
```

Arguments

n	The number of variables.
d	Degreess of polynomial interaction.

---

wooldridge	*Wooldridge Estimation of Production Functions (Cobb-Douglas)*

Description

This function aims the estimation of Cobb-Douglas production functions using Wooldridge (2009) method.

Usage

```
wooldridge(
  data,
  formula = y ~ free | capital | proxy | controls,
  gross = FALSE,
  id = "id",
  time = "year",
  bootstrap = FALSE,
  reps = 2,
  degree = c(3, 2),
  verify = TRUE,
  ...
)
```

Arguments

data	A data.frame or tibble containing the variables of the model.
formula	An object of the class [formula](#).
gross	If TRUE dependent variable is gross output.
id	A character with the name of the indicator variable.
time	A character with the name of the time variable.
bootstrap	An optional logical. If TRUE calculate bootstrap standard errors.
reps	The number of bootstrap replications.
degree	A vector with the number of the polynomial interactions in each stage of the routine.
verify	Verify if inputs are sorted.
...	Additional arguments.

Details

Multipart formula must be specified in the following order: y ~ free | capital | proxy | controls. Additional controls are optional. It is possible to use more than one variable, although the use of more than one capital may not be theoretically identified. The function returns an object of the estprod or boot classes (if bootstrap is TRUE).

Examples

```
data(estprod_data)
wooldridge(data = estprod_data, var1 ~ var2 | var3 | var4,
id = "id", time = "year", bootstrap = TRUE)
```

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