Package 'SECFISH'

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Type Package

Title Disaggregate Variable Costs

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Description These functions were developed within SECFISH project (Strengthening regional cooperation in the area of fisheries data collection-Socio-economic data collection for fisheries, aquaculture and the processing industry at EU level). They are aimed at identifying correlations between costs and transversal variables by metier using individual vessel data and for disaggregating variable costs from fleet segment to metier level.

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Imports ggplot2, Hmisc, optimization

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LazyData true

NeedsCompilation no

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R topics documented:

`Capacity` *Capacity*

Description

individual vessel data. Information about vessel characteristics (e.g. KW, GT, LoA)

`Constrained_regression`

Function to carry out a constrained regression for a specific fleet segment

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Description

Function to carry out a constrained regression for a specific fleet segment and a specific type of costs, after setting the metier used by the fleet segment.

Usage

```
Constrained_regression(COSTS, Fleet_segment, metier,type,path)
```

Arguments

`COSTS`	Data frame built applying EA function on individual vessel data and automatically saved as COSTS.csv in the working directory.
`Fleet_segment`	Fleet segment to be investigated.
`metier`	Vector of the metier usedd by the specified fleet segment.
`type`	Type of variable costs on which carry out the constrained regression.
`path`	Path where the results have to be saved.

Value

COSTS	data.frame: see format in the package (type CO in the console).
Fleet_segment	String defining the fleet segment as reported in the COSTS data frame.
metier	String defining the metier as reported in the COSTS data frame.
type	String defining the type of variable costs as reported in the COSTS data frame.
path	Default path=tempdir()

Author(s)

Isabella Bitetto

Examples

```
library(optimization)
path=tempdir()
Constrained_regression(COSTS, "DTS_VL1218", c("OTB_DES_>=40_0_0",
"OTB_MDD_>=40_0_0"),"fuelcost",path)
```

Cons_check *Validation of the disaggregation applied on variable costs*

Description

Function to validate the results obtained using the Disaggr function. The original costs by fleet segment are compared with the sum of the dsaggregated costs by metier within the same fleet segment.

Usage

```
Cons_check(Costs_FS,Costs_MET,path)
```

Arguments

Costs_FS	Data frame containing the variable costs time series by fleet segment.
Costs_MET	Data frame containing the variable costs time series by metier within the same fleet segment.
path	Path where the results have to be saved.

Value

Costs_FS	See example typing Co_FS in the R console.
Costs_MET	See example typing Co_MET in the R console.
path	Default path=tempdir()

Author(s)

Isabella Bitetto

Examples

```
Cons_check(Costs_FS,Costs_MET,path=tempdir())
```

COSTS *COSTS*

Description

Data frame built applying EA function on individual vessel data and automatically saved as COSTS.csv in the working directory

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Costs_FS *Costs_FS*

Description

Data frame of variable costs time series by fleet segment

Costs_MET *Costs_MET*

Description

Data frame of variable costs time series by fleet segment disaggregated by metier

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Costs_or *Costs_or*

Description

Data frame of variable costs time series by fleet segment

`Costs_vess` *Costs_vess*

Description

individual vessel data on fuel costs, fuel consumption, maintenance costs and other variable costs

`Detect_outliers` *Detecting outliers influencing the fitting of a GLM*

Description

Function to interactively detect outliers on the fGLM fitting of a specific fleet segment.

Usage

```
Detect_outliers(COSTS,Fleet_segment,formula)
```

Arguments

`COSTS`	Data frame built applying EA function on individual vessel data and automatically saved as COSTS.csv in the working directory.
`Fleet_segment`	Fleet segment to be investigated.
`formula`	GLM formula for which the outlier is detected.

Value

`COSTS`	See format in the package (type CO in the console).
`Fleet_segment`	A string defining the fleet segment.This string should be the same reported in the COSTS data frame.
`formula`	Example: fuelcost~factor(Met_LOA)+Effort+0

Author(s)

Isabella Bitetto

Examples

```
Detect_outliers(COSTS,"DTS_VL1218",fuelcost~factor(Met_LOA)+Effort+0)
```

Disaggr *Disaggregation of the variable costs*

Description

Function to disaggregate time series of variable costs by from the fleetsegment to the metier level, using the official time series of the costs and the official time series of transversal variables, combined with the results obtained from GLM function applied on individual vessel data.

Usage

```
Disaggr(Costs_or,key_table_or,Eff,path)
```

Arguments

Costs_or	Data frame containing the variable costs time series by fleet segment.
key_table_or	Data frame containing the coefficients of the best fitting GLM, describing the relationship between variable costs structure and transversal variables by metier.
Eff	Data frame containing the transversal variables (effort and revenues) by metier.
path	Path where the results have to be saved.

Value

Costs_or	See example typing Co_or in the R console.
key_table_or	See example typing key_tab_or in the R console. Details related to each column: Type of cost: Allowed values: fuel_costs, other_costs, labour_costs, maintenance_costs. Option: 1 additive model, 2 multiplicative model, 3 metier not significant. To fill in the fields Explanatory_variable and Coefficient, the output produced by the GLM.r script has to be considered for that fleet segment for the disaggregation.
Eff	See example typing Eff_ in the R console.
path	Default path=tempdir()

Author(s)

Isabella Bitetto

Examples

```
Disaggr(Costs_or,key_table_or,Eff,path=tempdir())
```

EA *Exploratory Analysis on variable costs of individual vessel data*

Description

Function to carry out an exploratory analysis on the individual vessel data to derive the correlations between variable costs and transversal variables.

The user has to define the percentage of fishing activity (in hours) to associate a prevalent metier to each vessel (namely by setting the "thr" value) and the minimum number of observations to be required for each metier, within a fleet segment, for carrying out the simple linear correlations analysis. For the metier for which less than "n_obs" observations are available, the simple linear regression is not fitted and the results are not produced.

Moreover, the user can decide to estimate the relationships with 2 options for the activity (Effort): Option 1: hours at sea; Option 2: Days_at_sea x KW. The days at sea are estimated as the sum of the fishing hours divided by 24.

Usage

```
EA(Effort,Landings,Trip,OperID,Operations,Costs_vess, Capacity,thr,n_obs,Eff_option,path)
```

Arguments

`Effort`	association trip-total hours at sea
`Landings`	association trip-landing and related revenue
`Trip`	association trip-vessel
`OperID`	association operation-trip
`Operations`	association fishing operation-number of fishing hours-metier
`Costs_vess`	data on fuel costs, fuel consumption, maintenance costs and other variable costs
`Capacity`	information vessel characteristics (KW, GT, LoA, etc…)
`thr`	percentage to fishing activity (hours) associated to the prevalent metier. If 50 is set, only the vessels with a percentage of fishing hours in a specific metier greater or equal to 50 will be retained (this metier will be defined as prevalent metier).
`n_obs`	minimum number of observations for each metier used by the fleet segment for carrying out the simple linear correlations.
`Eff_option`	1: Hours at sea 2: Days at sea X KW
`path`	Path where the results have to be saved.

Value

Effort	data.frame: see format in the package (type Eff in the console).
Landings	data.frame: see format in the package (type Land in the console)
Trip	data.frame: see format in the package (type Tr in the console)
OperID	data.frame: see format in the package (type OpID in the console)
Operations	data.frame: see format in the package (type Oper in the console)
Costs_vess	data.frame: see format in the package (type Cos in the console)
Capacity	data.frame: see format in the package (type Cap in the console)
thr	a value (even decimal) from 1 to 100 representing a percentage for the definition of the prevalent metier for each vessel.
n_obs	number of minimum observations to obtain reliable correlations. A number from 2 to the maximum number of observations by metier in the dataset.
Eff_option	1 or 2.
path	Default path=tempdir()

Author(s)

Isabella Bitetto

Examples

```
EA(Effort,Landings,Trip,OperID,Operation,Costs_vess, Capacity,30,30,1,path=tempdir())
```

Eff *Eff*

Description

Data frame containing the transversal variables (effort and revenues) by metier

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Effort *Effort*

Description

individual vessel data: association trip-total hours at sea

GLM *Generalized Linear Modelling on variable costs of individual vessel data*

Description

Function to explore GLMs on the individual vessel data to test the significance of metier and transversal variables on the variable costs structure.

The function should be run on COSTS.csv file produced by EA function run previously on individual vessel data. This file should be correctly stored in the working directory. Only the fleet segments with a minimum number of observations are considered. This value can be set by the user as input in the GLM function, defining thr_obs value. It is also possible to define the most significant metier to be used in the GLM through the percentage of cumulative estimated on the number of vessels observed by metier. A buffer of 5 percent on the cumulative percentage is applied by default.

Usage

```
GLM(COSTS,thr_obs,thr_cum,FORMULA_LAB1,FORMULA_LAB2,path)
```

Arguments

COSTS	Data frame built applying EA function on individual vessel data and automatically saved as COSTS.csv in the working directory.
thr_obs	threshold to be used for carry out the modelling to a fleet segment.
thr_cum	threshold to be used for selecting the metier to be used in the modelling according to a cumulative metier-number of vessels observed.
FORMULA_LAB1	Option for labour costs modelling (additive model).
FORMULA_LAB2	Option for labour costs modelling (multiplicative model).
path	Path where the results have to be saved.

Value

COSTS	data.frame: see format in the package (type CO in the console).
thr_obs	minimum number of observations needed to run fit the GLM; e.g. 30 means that only the fleet segments with at least 30 vessels observed will be modelled.
thr_cum	a decimal number representing a proportion for the selection of the more significant metier: 0.8 means that only the metier representing the 80 percent of the vessels observed in the fleet segment will be considered, to avoid spurious relathionships.
FORMULA_LAB1	Options: crewcost~factor(Met_LOA)+Rev_minus_Tot_var_costs+0 crewcost~factor(Met_LOA)+Sum_r crewcost~factor(Met_LOA)+Effort+0 crewcost~factor(Met_LOA)+Rev_minus_fuel+0
FORMULA_LAB2	Options: crewcost~factor(Met_LOA)*Rev_minus_Tot_var_costs+0 crewcost~factor(Met_LOA)*Sum_re crewcost~factor(Met_LOA)*Effort+0 crewcost~factor(Met_LOA)*Rev_minus_fuel+0
path	Default path=tempdir()

Author(s)

Isabella Bitetto

Examples

```
formula1=crewcost~factor(Met_LOA)+Rev_minus_Tot_var_costs+0
formula2=crewcost~factor(Met_LOA)*Rev_minus_Tot_var_costs+0
GLM(COSTS,30,0.95,formula1,formula2,path=tempdir())
```

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key_table_or *key_table_or*

Description

Data frame containing the coefficients of the best fitting GLM, describing the relationship between variable costs structure and transversal variables by metier.

Landings *Landings*

Description

individual vessel data: association trip-landing and related revenue

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Operation *Operation*

Description

association fishing operation-number of fishing hours-metier

OperID *OperID*

Description

individual vessel data: association operation-trip

Trip *Trip*

Description

association trip-vessel

Index