

Package ‘economiccomplexity’

September 17, 2019

Type Package

Title Methods Used in the Economic Complexity Literature

Version 0.2.2

Description A wrapper of different indices and networks commonly used in Economic Complexity to explore bipartite relations such as countries and their exported products. These methods are also useful for different kind of relations such as countries and their spoken languages. The functions within this package correspond to code implementations of the equations described in Hausmann, et al. (2005) <doi:10.3386/w11905>, Hausmann, et al. (2014) <doi:10.7551/mitpress/9647.001.0001>, and Mariani, et al. (2015) <doi:10.1140/epjb/e2015-60298-7>.

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Encoding UTF-8

LazyData true

Imports magrittr, tibble, dplyr, tidyr, Matrix, igraph, rlang

Depends R (>= 3.5)

URL <https://pachamaltese.github.io/economiccomplexity>

BugReports <http://github.com/pachamaltese/economiccomplexity/issues>

RdMacros Rdpack

RoxygenNote 6.1.1

Suggests testthat (>= 2.1.0), knitr, Rdpack, ggraph

VignetteBuilder knitr

NeedsCompilation no

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 The World Bank [dtc],
 Open Trade Statistics [dtc]

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Repository CRAN

Date/Publication 2019-09-17 19:00:02 UTC

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ec_complexity_measures
Complexity Measures

Description

Complexity Measures

Usage

```
ec_complexity_measures(rca = NULL, c = "country", p = "product",
  v = "value", method = "fitness", iterations = 20,
  extremality = 1, atlas = FALSE, tbl = FALSE)
```

Arguments

rca	matrix or tibble/data.frame (e.g. the output of revealed_comparative_advantage()). If the input is a matrix it must be a zero/one matrix with countries in rows and ps in columns. If the input is a tibble/data.frame it must contain at least three columns with countries, ps and vs.
c	string to indicate the column that contains exporting countries in rca (set to "country" by default)
p	string to indicate the column that contains exported ps in rca (set to "product" by default)

v	string to indicate the column that contains traded vs in rca (set to "value" by default)
method	string to indicate to use one of these methods: reflections, eigenvalues or fitness (set to "fitness" by default)
iterations	number of iterations to use in the reflections method (set to 20 by default)
extremality	numeric coefficient to use in the fitness method (set to 1 by default)
atlas	logical v to remove the countries not ranked in The Atlas of Economic Complexity (set to FALSE by default)
tbl	logical v to use tibble output instead of a matrix output (set to FALSE by default)

References

For more information on complexity measures, indices and its applications see:

Hausmann R, Hidalgo C, Bustos S, Coscia M, Simoes A, Yildirim M (2014). *The atlas of economic complexity: Mapping paths to prosperity*. MIT Press. doi: [10.7551/mitpress/9647.001.0001](https://doi.org/10.7551/mitpress/9647.001.0001).

Mariani M, Vidmer A, Medo M, Zhang Y (2015). "Measuring economic complexity of countries and products: which metric to use?" *The European Physical Journal B*, **88**(11), 293. doi: [10.1140/epjb/e2015602987](https://doi.org/10.1140/epjb/e2015602987).

Examples

```
ec_complexity_measures(  
  rca = ec_output_demo$rca_tbl,  
  tbl = TRUE  
)
```

ec_countries_position *Countries position*

Description

Countries position

Usage

```
ec_countries_position(rca = NULL, c1 = "country", p1 = "product",  
  v1 = "value", pp = NULL, p21 = "from", p22 = "to",  
  v2 = "value", pci = NULL, p3 = "product", v3 = "value",  
  tbl = FALSE)
```

Arguments

rca	matrix or tibble/data.frame (e.g. the output of <code>revealed_comparative_advantage()</code>). If the input is a matrix it must be a zero/one matrix with countries in rows and products in columns. If the input is a tibble/data.frame it must contain at least three columns with countries, products and values.
c1	string to indicate the column that contains exporting countries in rca (set to "country" by default)
p1	string to indicate the column that contains exported products in rca (set to "product" by default)
v1	string to indicate the column that contains traded values in rca (set to "value" by default)
pp	matrix or tibble/data.frame (e.g. the output of <code>proximity_matrices()</code>). If the input is a matrix it must be a numeric matrix with products in both rows and columns. If the input is a tibble/data.frame it must contain at least three columns with products (twice) and values.
p21	string to indicate the first column that contains exported products in pp (set to "from" by default)
p22	string to indicate the second column that contains exported products in pp (set to "to" by default)
v2	string to indicate the column that contains proximity values in pp (set to "value" by default)
pci	numeric vector or tibble/data.frame with the product complexity index (e.g. the product index from <code>ec_complexity_measures()</code>). If the input is a vector it must be numeric with optional names. If the input is a tibble/data.frame it must contain at least two columns with products and values.
p3	string to indicate the column that contains exported products in pp (e.g. "product")
v3	string to indicate the column that contains proximity values in pp (e.g. "value") from <code>ec_complexity_measures()</code>
tbl	logical value to use tibble output instead of a matrix output (set to FALSE by default)

References

For more information on proximity distance, complexity outlook, complexity outlook gain and its applications see:

Hausmann R, Hidalgo C, Bustos S, Coscia M, Simoes A, Yildirim M (2014). *The atlas of economic complexity: Mapping paths to prosperity*. MIT Press. doi: [10.7551/mitpress/9647.001.0001](https://doi.org/10.7551/mitpress/9647.001.0001).

Examples

```
ec_countries_position(
  rca = ec_output_demo$rca_tbl,
  c1 = "country",
  p1 = "product",
```

```
v1 = "value",
pp = ec_output_demo$proximity_tbl$proximity_p,
p21 = "from",
p22 = "to",
v2 = "value",
pci = ec_output_demo$complexity_measures_tbl$complexity_index_p,
p3 = "product",
v3 = "value",
tbl = TRUE
)
```

ec_gdp_pc_1962

GDP per capita in 1962

Description

Example dataset with countries and their gross domestic product divided by total population.

Usage

```
ec_gdp_pc_1962
```

Format

A data frame with 135 observations on the following 2 variables.

country a character vector

value a numeric vector

Source

The World Bank

Examples

```
ec_gdp_pc_1962
```

 ec_networks

 Networks

Description

Networks

Usage

```
ec_networks(pc, pp, cutoff_c = 0.2, cutoff_p = 0.4, tbl = FALSE,
            compute = "both")
```

Arguments

pc	matrix or tibble/data.frame, if d is a tibble/ data.frame it must contain the columns from (character/factor), to (character/factor) and value (numeric), if it is a matrix it must be a numeric matrix with countries in row names and column names
pp	matrix or tibble/data.frame, if d is a tibble/data.frame it must contain the columns from (character/factor), to (character/factor) and value (numeric), if it is a matrix it must be a numeric matrix with products in row names and column names
cutoff_c	all the values below the specified cutoff_c will be converted to 0 and excluded from the countries network (default set to 0.2)
cutoff_p	all the values below the specified cutoff_p will be converted to 0 and excluded from the products network (default set to 0.4)
tbl	when set to TRUE the output will be a tibble instead of a graph (default set to FALSE)
compute	by default set to "both", it can also be "country" or "product"

References

For more information on networks such as the product space and its applications see:

Hausmann R, Hidalgo C, Bustos S, Coscia M, Simoes A, Yildirim M (2014). *The atlas of economic complexity: Mapping paths to prosperity*. MIT Press. doi: [10.7551/mitpress/9647.001.0001](https://doi.org/10.7551/mitpress/9647.001.0001).

Examples

```
ec_networks(
  pc = ec_output_demo$proximity_tbl$proximity_c,
  pp = ec_output_demo$proximity_tbl$proximity_p,
  tbl = TRUE
)
```

 ec_output_demo

Example outputs of the functions within the package

Description

List of different economic complexity computations obtained by using the functions within the package. The output is provided as a list of tibbles.

Usage

```
ec_output_demo
```

Format

The format is: List of 3 \$ rca_tbl :Classes 'tbl_df', 'tbl' and 'data.frame': 44435 obs. of 3 variables: ..\$ country: chr [1:44435] "afg" "afg" "afg" "afg"\$ product: chr [1:44435] "0106" "0405" "0407" "0501"\$ value : num [1:44435] 0 0 0 1 1 0 0 1 1 1 ... \$ complexity_measures_tbl:List of 4 ..\$ complexity_index_c:Classes 'tbl_df', 'tbl' and 'data.frame': 99 obs. of 2 variables: ..\$ country: chr [1:99] "deu" "fra" "usa" "gbr"\$ value : num [1:99] 19.47 11.99 11.55 8.43 6.92\$ complexity_index_p:Classes 'tbl_df', 'tbl' and 'data.frame': 991 obs. of 2 variables: ..\$ product: chr [1:991] "2702" "7111" "2850" "8804"\$ value : num [1:991] 48.1 48.1 29.7 18.4 17.9\$ diversity :Classes 'tbl_df', 'tbl' and 'data.frame': 99 obs. of 2 variables: ..\$ country: chr [1:99] "ago" "alb" "are" "arg"\$ value : num [1:99] 52 32 1 83 81 290 320 127 27 70\$ ubiquity :Classes 'tbl_df', 'tbl' and 'data.frame': 991 obs. of 2 variables: ..\$ product: chr [1:991] "0101" "0102" "0103" "0104"\$ value : num [1:991] 13 19 13 12 9 27 17 12 4 10 ... \$ proximity_tbl :List of 2 ..\$ proximity_c:Classes 'tbl_df', 'tbl' and 'data.frame': 4484 obs. of 3 variables: ..\$ from : chr [1:4484] "alb" "are" "arg" "aus"\$ to : chr [1:4484] "ago" "ago" "ago" "ago"\$ value: num [1:4484] 0.0769 0.0192 0.1325 0.0741 0.0241\$ proximity_p:Classes 'tbl_df', 'tbl' and 'data.frame': 408869 obs. of 3 variables: ..\$ from : chr [1:408869] "0102" "0103" "0104" "0106"\$ to : chr [1:408869] "0101" "0101" "0101" "0101"\$ value: num [1:408869] 0.316 0.308 0.385 0.148 0.353 ...

Examples

```
ec_output_demo$rca_tbl
ec_output_demo$complexity_measures_tbl$complexity_index_c
```

 ec_productivity_levels

Productivity Levels

Description

Productivity Levels

Usage

```
ec_productivity_levels(data = NULL, c1 = "country", p1 = "product",
  v1 = "value", gdp = NULL, c2 = "country", v2 = "value",
  tbl = FALSE)
```

Arguments

data	matrix or tibble/data.frame (e.g. world_trade_2017). If the input is a matrix it must be a zero/one matrix with countries in rows and products in columns. If the input is a tibble/data.frame it must contain at least three columns with countries, products and values.
c1	string to indicate the column that contains exporting countries in revealed_comparative_advantage (set to "country" by default)
p1	string to indicate the column that contains exported products in revealed_comparative_advantage (set to "product" by default)
v1	string to indicate the column that contains traded values in revealed_comparative_advantage (set to "value" by default)
gdp	vector or tibble/data.frame (e.g. world_gdp_and_population_2017). If the input is a vector it must be a numeric vector with optional names. If the input is a tibble/data.frame it must contain at least two columns with countries and values.
c2	string to indicate the column that contains exporting countries in revealed_comparative_advantage (set to "country" by default)
v2	string to indicate the column that contains traded values in revealed_comparative_advantage (set to "value" by default)
tbl	when set to TRUE the output will be a tibble instead of a matrix (default set to FALSE)

References

For more information on prody and its applications see:

Hausmann R, Hidalgo C, Bustos S, Coscia M, Simoes A, Yildirim M (2014). *The atlas of economic complexity: Mapping paths to prosperity*. MIT Press. doi: [10.7551/mitpress/9647.001.0001](https://doi.org/10.7551/mitpress/9647.001.0001).

Hausmann R, Hwang J, Rodrik D (2005). "What You Export Matters." Working Paper 11905, National Bureau of Economic Research. doi: [10.3386/w11905](https://doi.org/10.3386/w11905).

Examples

```
ec_productivity_levels(
  data = ec_trade_1962,
  c1 = "country",
  p1 = "product",
  v1 = "value",
  gdp = ec_gdp_pc_1962,
  c2 = "country",
  v2 = "value",
  tbl = TRUE)
```


)

ec_proximity

*Proximity***Description**

Proximity

Usage

```
ec_proximity(rca = NULL, c = "country", p = "product", v = "value",
             d = NULL, d_c = "country", d_v = "value", u = NULL,
             u_p = "product", u_v = "value", tbl = FALSE, compute = "both")
```

Arguments

rca	matrix or tibble/data.frame in long format (e.g. the output of <code>revealed_comparative_advantage()</code>). If it is a matrix it must be a zero/one matrix with countries in the row names and ps in the column names. If rca is a tibble/data.frame it must contain the columns c (character/ factor), p (character/factor) and discrete RCA (integer)
c	string to indicate the column that contains exporting countries (default set to "country" that is the output of <code>revealed_comparative_advantage()</code> , applies only if rca is a data.frame)
p	string to indicate the column that contains exported ps (default set to "product" that is the output of <code>revealed_comparative_advantage()</code> , applies only if rca is a data.frame)
v	string to indicate the column that contains RCA vs (default set to "value" that is the output of <code>revealed_comparative_advantage()</code> , applies only if rca is a data.frame)
d	numeric vector or tibble/data.frame containing diversity measures (e.g. d from <code>complexity_measures()</code>)
d_c	string to indicate the column that contains countries in "diversity" (default set to "country" that is the output of <code>economic_complexity_measures()</code>)
d_v	string to indicate the column that contains values in "diversity" (default set to "value" that is the output of <code>economic_complexity_measures()</code>)
u	numeric vector or tibble/data.frame containing ubiquity measures (e.g. u from <code>complexity_measures()</code>)
u_p	string to indicate the column that contains products in "ubiquity" (default set to "product" that is the output of <code>economic_complexity_measures()</code>)
u_v	string to indicate the column that contains values in "ubiquity" (default set to "value" that is the output of <code>economic_complexity_measures()</code>)
tbl	when set to TRUE the output will be a tibble instead of a matrix (default set to FALSE)
compute	by default set to "both", it can also be "country" or "product"

References

For more information on proximity and its applications see:

Hausmann R, Hidalgo C, Bustos S, Coscia M, Simoes A, Yildirim M (2014). *The atlas of economic complexity: Mapping paths to prosperity*. MIT Press. doi: [10.7551/mitpress/9647.001.0001](https://doi.org/10.7551/mitpress/9647.001.0001).

Examples

```
ec_proximity(
  rca = ec_output_demo$rca_tbl,
  d = ec_output_demo$complexity_measures_tbl$diversity,
  u = ec_output_demo$complexity_measures_tbl$subiquity,
  tbl = TRUE
)
```

ec_rca

Revealed Comparative Advantage (RCA)

Description

Revealed Comparative Advantage (RCA)

Usage

```
ec_rca(data = NULL, c = "country", p = "product", v = "value",
  cutoff = 1, discrete = TRUE, tbl = FALSE)
```

Arguments

data	tibble/data.frame in long format, it must contain the columns c (character/factor), p (character/factor) and export v (numeric)
c	string to indicate the column that contains exporting countries (e.g. "reporter_iso")
p	string to indicate the column that contains exported ps (e.g. "p_code")
v	string to indicate the column that contains traded vs (e.g. "trade_v_usd")
cutoff	when set to TRUE all the vs lower than the specified cutoff will be converted to zero and to one in other case, numeric (default set to 1)
discrete	when set to TRUE it will convert all the Revealed Comparative Advantage vs to zero or one based on the cutoff v (default set to TRUE)
tbl	when set to TRUE the output will be a tibble instead of a matrix (default set to FALSE)

References

For more information on revealed comparative advantage and its uses see:

Hausmann R, Hidalgo C, Bustos S, Coscia M, Simoes A, Yildirim M (2014). *The atlas of economic complexity: Mapping paths to prosperity*. MIT Press. doi: [10.7551/mitpress/9647.001.0001](https://doi.org/10.7551/mitpress/9647.001.0001).

Examples

```
ec_rca(  
  data = ec_trade_1962,  
  tbl = TRUE  
)
```

ec_trade_1962	<i>Exported products in 1962</i>
---------------	----------------------------------

Description

Example dataset with countries and the products they export. The exports are grouped to four digits HS 2007 codes.

Usage

```
ec_trade_1962
```

Format

A data frame with 44435 observations on the following 3 variables.

country a character vector
product a character vector
value a numeric vector

Source

Open Trade Statistics

Examples

```
ec_trade_1962
```

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