Package 'GEGravity'

March 18, 2020

Type Package

Title General Equilibrium Effect Estimator

Version 0.1.0

Description This package solves for general equilibrium effects of changes in trade policies using a one sector Armington-CES trade model. It uses a simple fixed point algorithm that allows for fast computation and is ideal for bootstrapping confidence intervals for general equilibrium simulations based on prior gravity estimates of FTAs or other similar variables. Note that this package is directly associated with the ge_gravity Stata package and has been commissioned with the appreciated support of the UK Department for Digital, Culture, Media & Sport.

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Depends R (>= 2.10), utils

Suggests alpaca

Encoding UTF-8

LazyData true

RoxygenNote 7.1.0

NeedsCompilation no

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R topics documented:

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ge_gravity   *Solves a general equilibrium one sector Armington-CES trade model.*

Description

ge_gravity solves for general equilibrium effects of changes in trade policies using a one sector Armington-CES trade model. It uses a simple fixed point algorithm that allows for fast computation that makes this program ideal for bootstrapping confidence intervals for general equilibrium simulations based on prior gravity estimates of FTAs or other similar variables.

Examples of references that conduct general equilibrium analysis based on FTA estimates in this way include Egger, Larch, Staub, & Winkelmann (2011), Anderson & Yotov (2016), and Baier, Yotov, & Zylkin (2019). Yotov, Piermartini, Monteiro, & Larch (2016) provide a detailed survey and introduction to the topic.

Usage

```
ge_gravity(exp_id, imp_id, flows, beta, theta = 1, mult = FALSE, data = list())
```

Arguments

exp_id	String representation of the exporter/origin country associated with each observation. This is arbitrary and for organization purposes only, i.e. AUS, Australia
imp_id	String representation of the importer/destination country associated with each observation. This is arbitrary and for organization purposes only, i.e. AUS, Australia
flows	Observed trade flows in the data for the year being used as the baseline for the counterfactual.
beta	An input reflecting the "partial" change in trade, typically obtained as a coefficient from a prior gravity estimation.
theta	Overall trade elasticity
mult	If true, assume that national expenditure is a fixed multiple of national output, as in Anderson & Yotov (2016). Otherwise (and by default), handle unbalances in the data by treating the trade balance as an additive component of national expenditure (see below).
data	A list to which we should add the new values. By default, this is an empty list. Note that this will be converted to a named dataframe on output.

Details

Please see 'ge_gracity_rmd("all")' for additional details.

Value

A dataframe element containing resulting estimations of impacts. Specifically, it returns results for general equilibrium changes in trade flows, welfare, and real wages as a result of the change in trade frictions. If 'data' is specified, the results will be added as columns.

This data will include the following:

- X_eu: The new level of trade for each pair of countries.

- welfare: The exporter's change in welfare (new/old level of welfare)

- real_wage: The exporter's change in real wage (new/old real wage).
  Note: this is generally different from the change in welfare unless either trade is balanced or the "multiplicative" option is chosen.

- nom_wage: The exporter's change in nominal wage (new/old nom wage).

- price_index: The exporter's change in price index (new/old price index)

References

Please see 'ge_gracity_rmd("all")' for information on references and sources.

See Also

'ge_gracity_rmd' allows you to access very explanatory RMD files to augment documentation.

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ge_gravity_rmd *ge_gravity_rmd Opens Explanatory Rmd Files for GEGravity*

Description

This is a streamlined way of opening the descriptive logic and testing files that were made to accompany this function. Specifically, this will copy the appropriate file and open it with your default rmd application (probably RStudio). This can be done manually via system.file, i.e. system.file("rmds", "how.Rmd", package = "GEGravity") to get the directory address of how.Rmd. The system.file approach on its own should be used if you do not want to exhibit the default behavior.

Usage

```
ge_gravity_rmd(file = "all")
```

Arguments

file   The name of the Rmd file to open. The following are valid parameters:

- "all" : Opens "about.Rmd"
  A compact file with all of the Rmd components combined.
- "theory" : Opens "theory.Rmd"
  The background, theory, and further readings for how this works.
- "example" : Opens "example.Rmd"
  A standard use case of ge_gravity using TradeData0014.
- "logic" : Opens "logic.Rmd"
  A step-by-step of exactly how ge_gravity operates.
- "compare" : Opens "compare.Rmd"
  A comparison of the results of ge_gravity against its Stata counterpart.

TradeData0014   *Trade Data 2000 - 2014*

Description

The data set represents the aggregate trade between 44 countries observed over 2000-2014, using years 2000, 2005, 2010, and 2014.

Trade and domestic sales data has been aggregated from the WIOD database (see sources). For its use, consider "An Illustrated User Guide to the World Input-Output Database.

Information on Free Trade Agreements (FTAs) is taken from the NSF-Kellogg database maintained by Scott Baier and Jeff Bergstrand (see sources).

Usage

```
TradeData0014
```

Format

A list with 7744 rows and 9 variables:

exporter Country code of exporter country

importer Country code of importer country

expcode Label encoding of exporter country

impcode Label encoding of importer country

year Year of row data

trade Aggregate trade flow between importer and exporter for that year

eu_enlargement 0-1 Booleanic; whether this pair in the EU

other_fta 0-1 Booleanic; other FTA pairwise satisfaction

FTA 0-1 Booleanic; eu_enlargement or other_fta

Source

http://www.wiod.org/database/wiots16

https://sites.nd.edu/jeffrey-bergstrand/database-on-economic-integration-agreements/

http://www.tomzylkin.com/uploads/4/1/0/4/41048809/help_file.pdf

TradeData0014_Results *Trade Data 2000 - 2014 Results When Running Stata ge_gravity*

Description

Given the approach described in the example file of ge_gravity, running the function in conjunction with the ppmlhdfe function yields the following results when converted to a list. This is provided to test the R implementation against this, as this is package is commissioned to mimic the performance of the Stata counterpart.

Usage

```
TradeData0014_Results
```

Format

A list with 7744 rows and 15 variables:

exporter - FTA described by TradeData0014

new_eu_pair 0-1 Booleanic: Did they shift from non-EU pair to EU pair in time period

eu_effect Effect of EU entrance on country based on partial, if entry happened

w_eu Estimated exporter welfare at equilibrium, with default (additive) assumption on national expendature. Omitted for entries where year != 2000

w_mult Estimated exporter welfare at equilibrium, with multiplicative assumption on national expendature. Omitted for entries where year != 2000

X_eu Estimated level of trade at equilibrium, with default (additive) assumption on national expendature. Omitted for entries where year != 2000

X_mult Estimated level of trade at equilibrium, with multiplicative assumption on national expendature. Omitted for entries where year != 2000

Source

http://www.tomzylkin.com/uploads/4/1/0/4/41048809/help_file.pdf

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