



UNITED NATIONS

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European
Commission

EU Inter-Country Supply, Use and Input-Output Tables – 2022 FIGARO Edition

International Seminar - Post-COVID Value Chains

27-28 October 2022

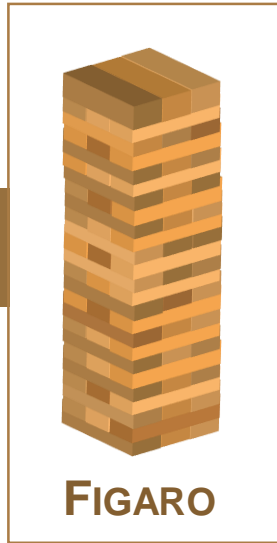
Bogotá, Colombia

Eurostat – ESTAT.C5

Joint Research Centre – JRC.B7



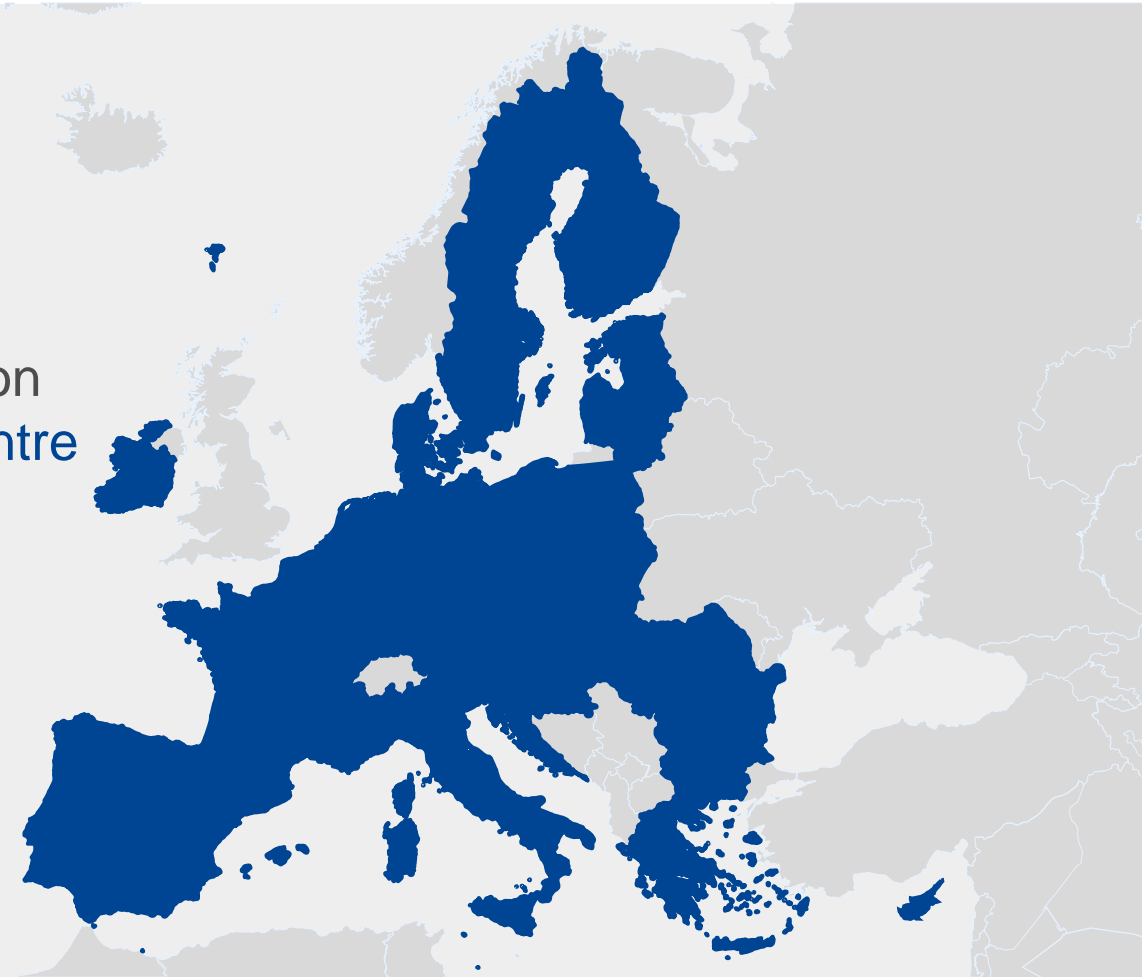
Content



- FIGARO – 2022 edition
- Methodological features
- Outlook

FIGARO – 2022 edition (1/5)

- FIGARO - ‘**F**ull **I**nternational and **G**lobal **A**ccounts for **R**esearch in input-**O**utput analysis’
- EU Inter-Country Supply, Use and Input-Output Tables
- Long-term collaboration between European Commission Directorates General: Eurostat and Joint Research Centre
- Since 2021, produced by Eurostat as official statistics: benchmarked to the latest official macroeconomic aggregates (T - 2 years)
- Years 2010-2020



FIGARO – 2022 edition (2/5)

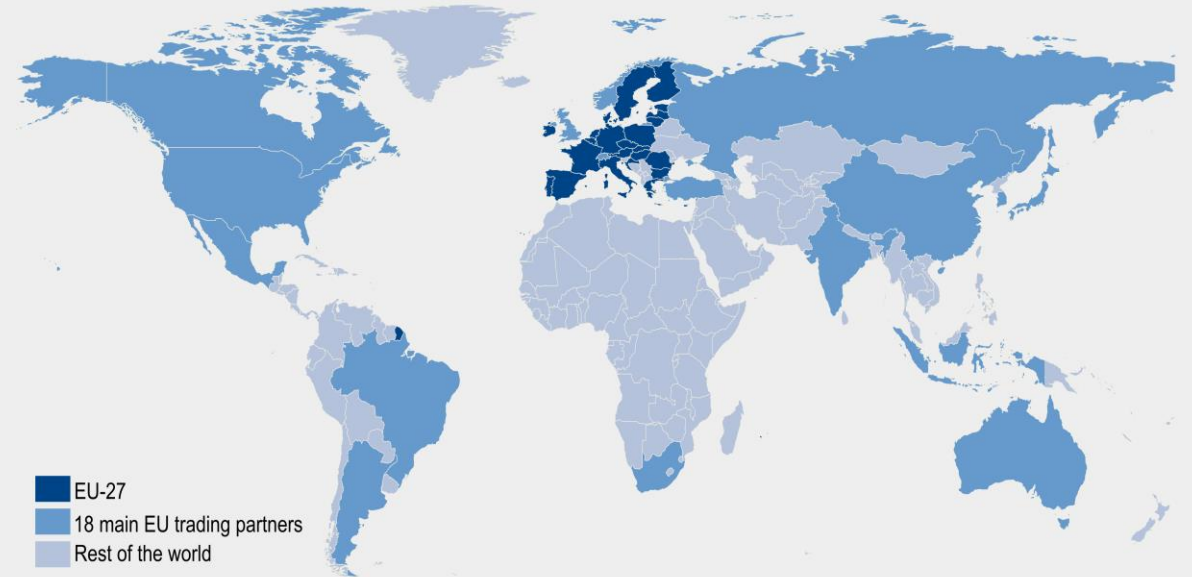


27 EU Member States
+ NO, CH

NACE Rev. 2 A*21 → A*64



FIGARO COVERAGE (45 COUNTRIES + ROW)



Argentina, Brazil, Mexico covered explicitly

FIGARO – 2022 edition (3/5)

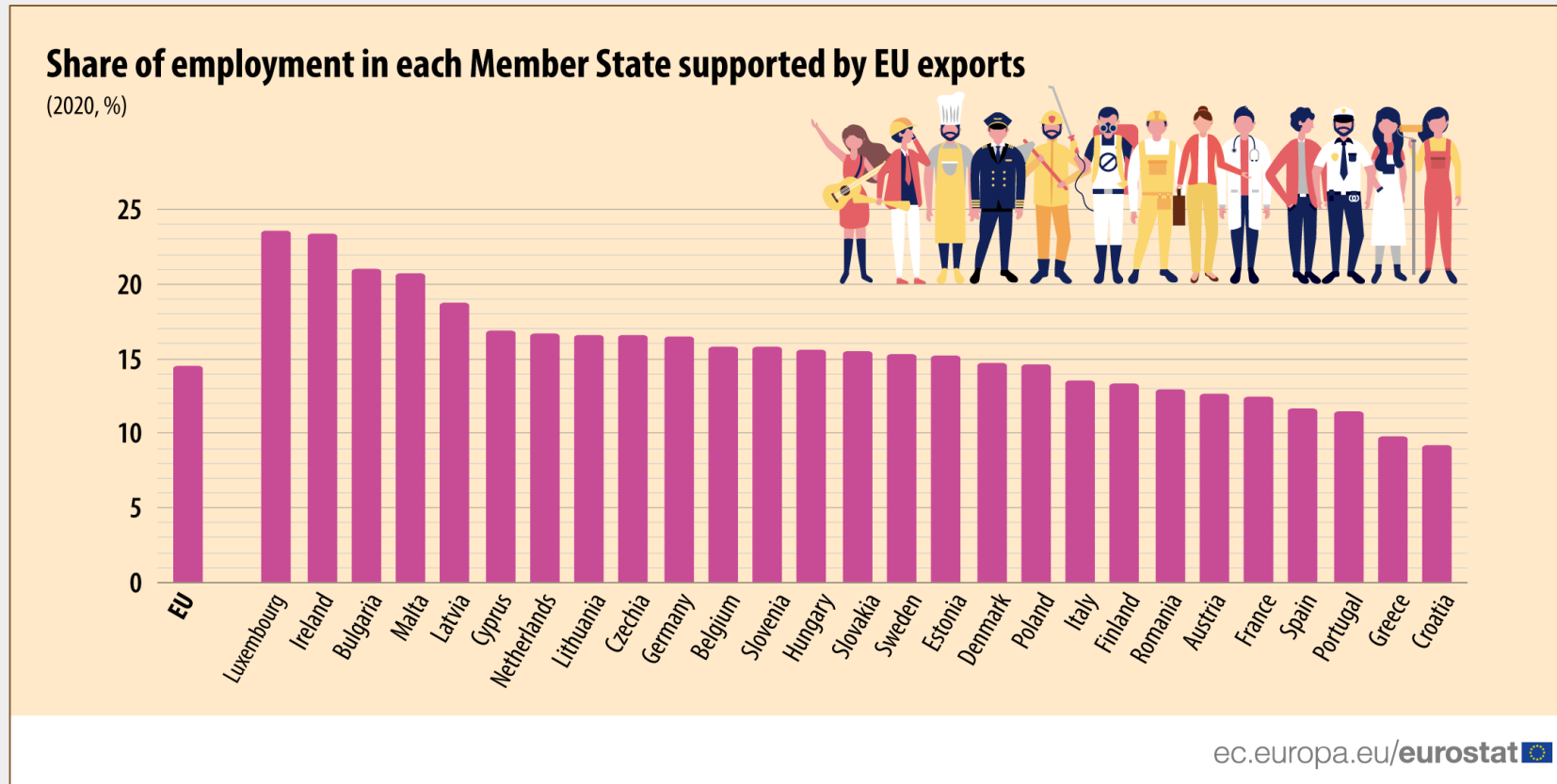
FIGARO applications

- Employment and value added supported by EU exports
 - Years 2010-2020
 - NACE Rev.2: A*21 → A*64
 - Trade in services among non-EU countries
- Update of CO₂ footprints from final consumption expenditure in Q4 2022

FIGARO – 2022 edition (4/5)

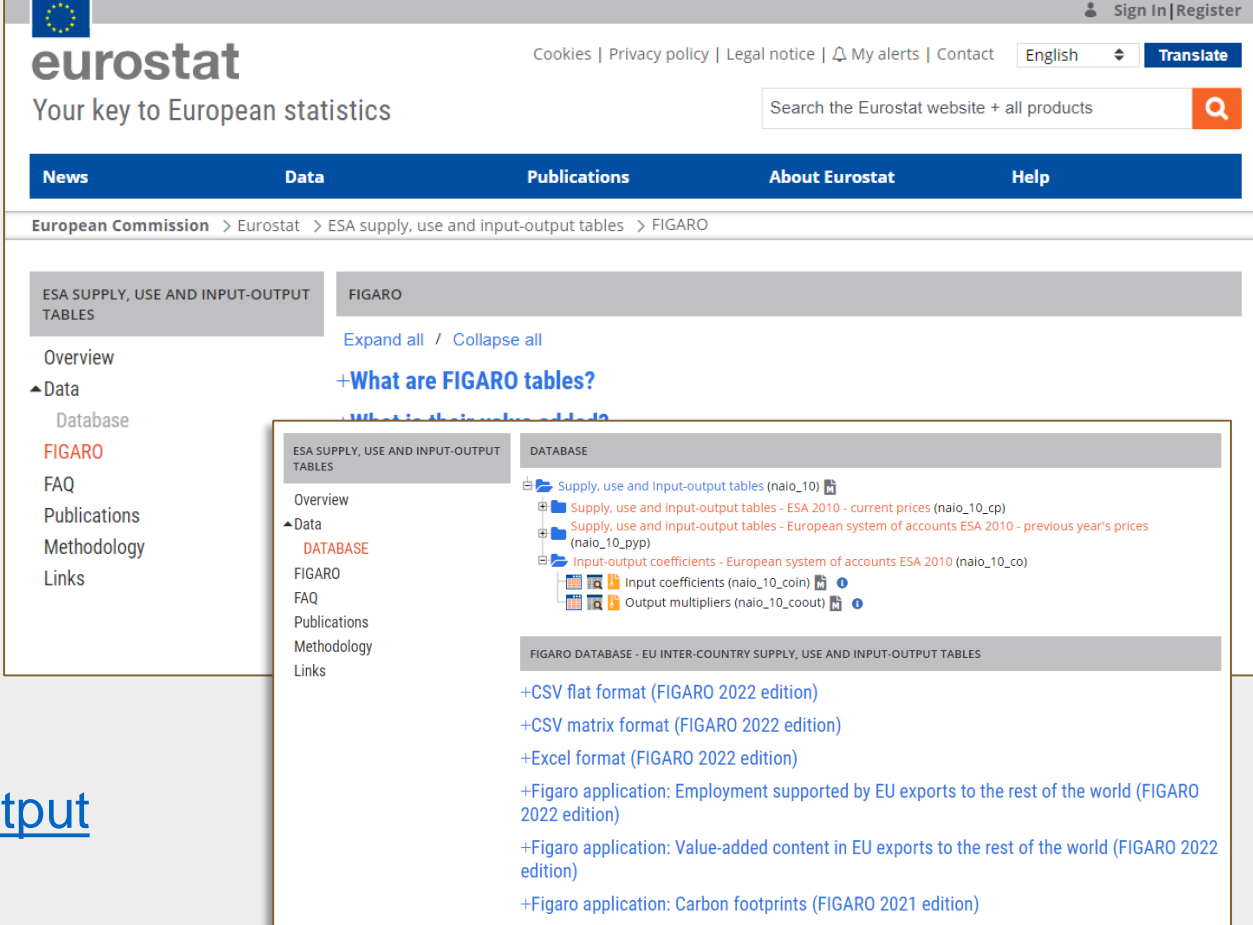
FIGARO applications

- 30 million jobs (14% of all jobs in the EU) were supported by EU exports in 2020
- 16% of value added was supported by EU exports
- Direct and indirect domestic effects + spillover effects across EU Member States



FIGARO – 2022 edition (5/5)

- [FIGARO database](#) (csv, excel)
- [FIGARO methodology](#)
- [FIGARO applications](#)
 - Employment and value added supported by EU exports
 - CO₂ footprints (*update in Q4 2022*)
- Statistics Explained
 - [Employment content in EU exports](#)
 - [Value added content in EU exports](#)
- [Eurostat website – ESA supply, use and input-output tables](#)

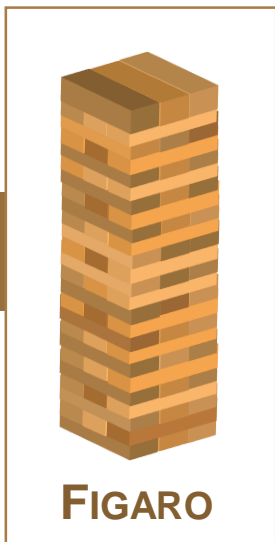


The screenshot displays the Eurostat website interface. At the top, the Eurostat logo and navigation links (Cookies, Privacy policy, Legal notice, My alerts, Contact) are visible. A search bar is present on the right. Below the navigation bar, the main content area is titled "European Commission > Eurostat > ESA supply, use and input-output tables > FIGARO". The left sidebar contains a menu with options: Overview, Data, Database, FIGARO, FAQ, Publications, Methodology, and Links. The main content area shows the "FIGARO" section with a "Expand all / Collapse all" link and a heading "+What are FIGARO tables?". Below this, a list of data products is shown, including "Supply, use and input-output tables (naio_10)", "Supply, use and input-output tables - ESA 2010 - current prices (naio_10_cp)", "Supply, use and input-output tables - European system of accounts ESA 2010 - previous year's prices (naio_10_pyp)", "Input-output coefficients - European system of accounts ESA 2010 (naio_10_co)", "Input coefficients (naio_10_co_in)", and "Output multipliers (naio_10_co_out)". A section titled "FIGARO DATABASE - EU INTER-COUNTRY SUPPLY, USE AND INPUT-OUTPUT TABLES" lists various formats and applications: "+CSV flat format (FIGARO 2022 edition)", "+CSV matrix format (FIGARO 2022 edition)", "+Excel format (FIGARO 2022 edition)", "+Figaro application: Employment supported by EU exports to the rest of the world (FIGARO 2022 edition)", "+Figaro application: Value-added content in EU exports to the rest of the world (FIGARO 2022 edition)", and "+Figaro application: Carbon footprints (FIGARO 2021 edition)".

Methodological features (1/8)

Main features

- Regular **statistical production** at Eurostat, with JRC support
- Data release on ESTAT website – **csv, excel, new excel pivot tables**
- **New estimates for Year T-2**, updates for Years T-3 and T-4 (2019-2021 for the 2023 FIGARO edition)
- NACE Rev. 2: **A*21 → A*64**
- Globally balanced view of **National Accounts Main Aggregates**, adjusted to latest national GDP main aggregates (99.1% population and 99.8% GDP)
- Build upon available data from National Accounts (national SUTs) and balanced international trade statistics
- 2019 FIGARO handbook



Methodological features (2/8)

Supply and use tables
EU countries + NO, CH
(purchaser's prices, FOB)

Supply and use tables
16 Non-EU countries
(purchaser's prices, FOB)

**Import, export of goods
and services** for 205
countries (HS 6-digit level)

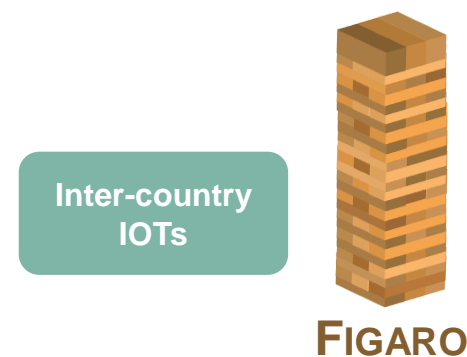
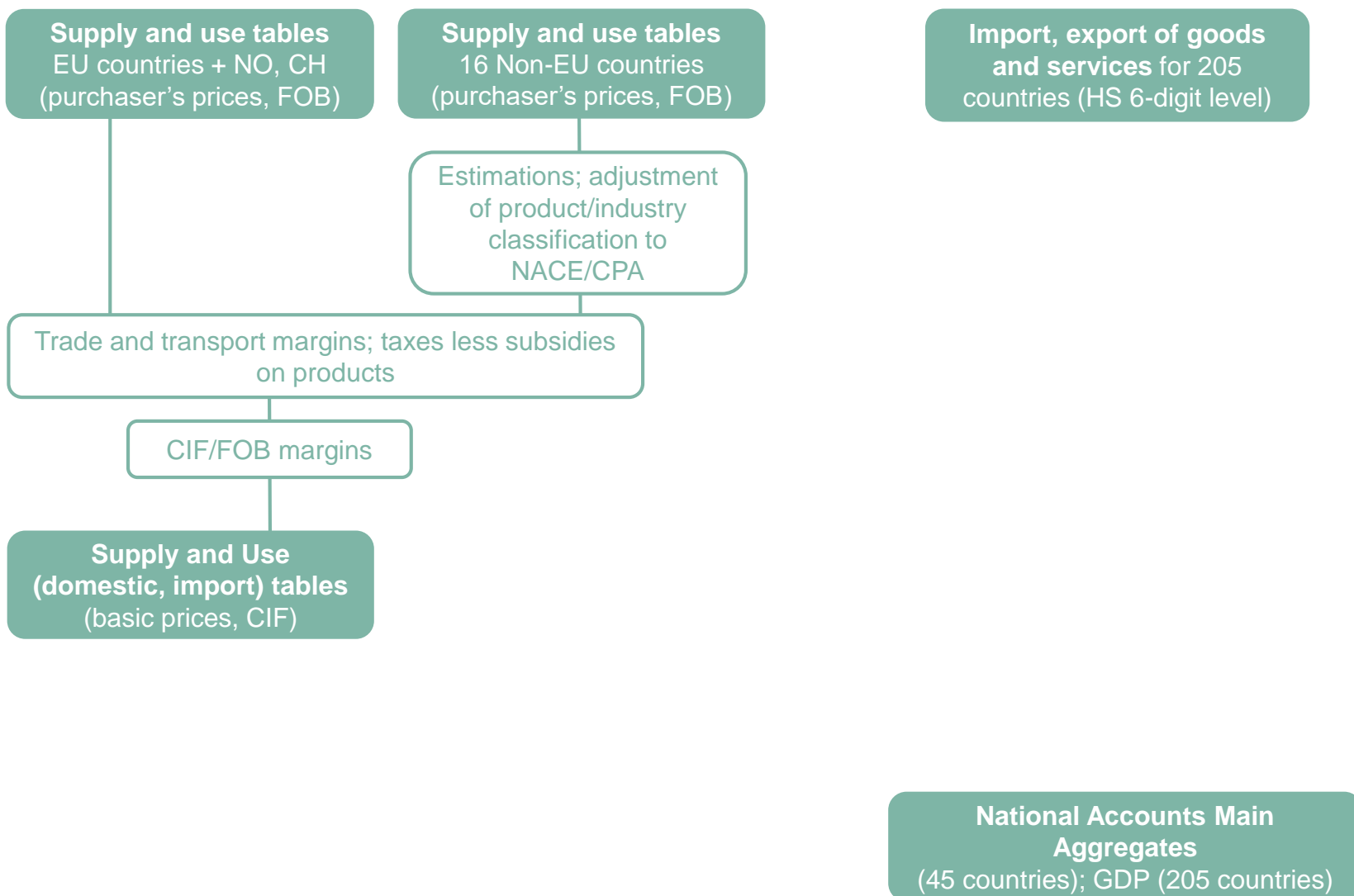
**Inter-country
IOTs**



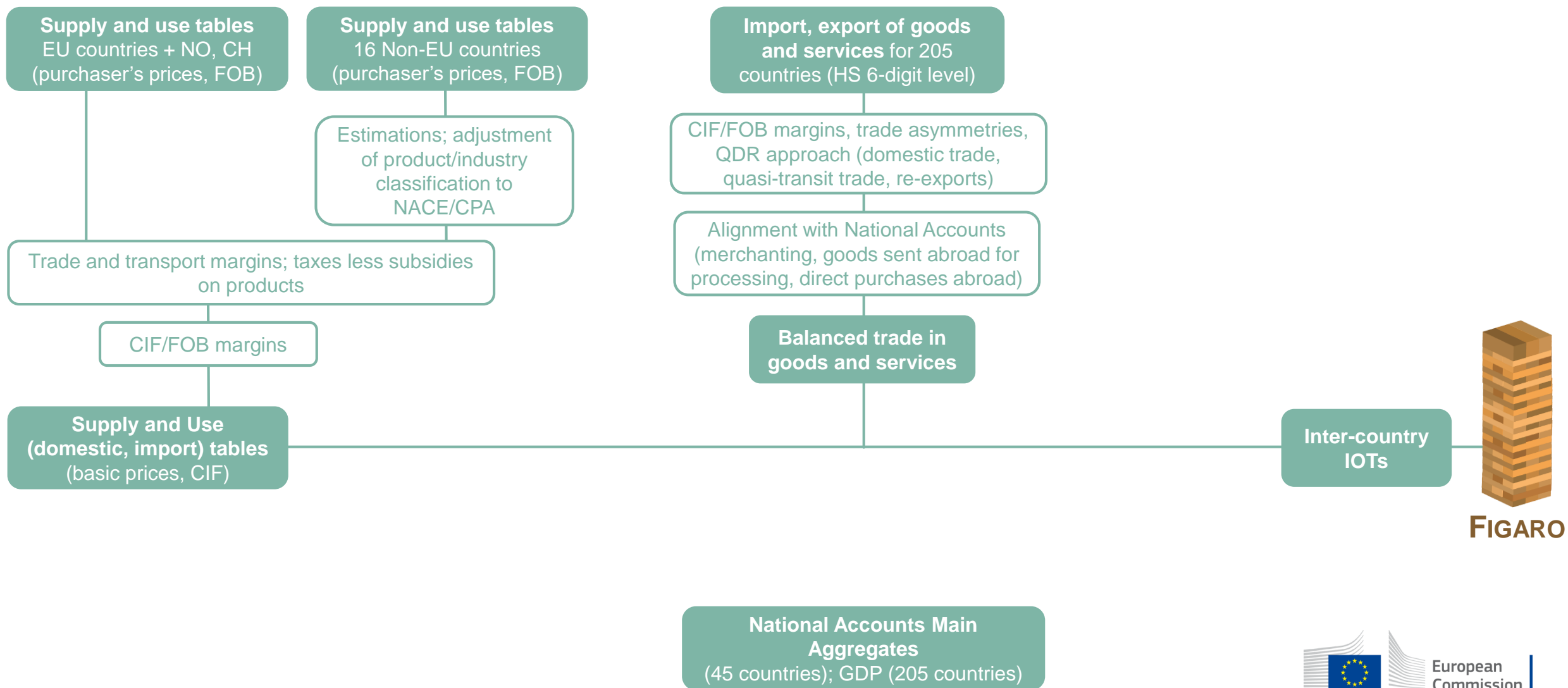
FIGARO

**National Accounts Main
Aggregates**
(45 countries); GDP (205 countries)

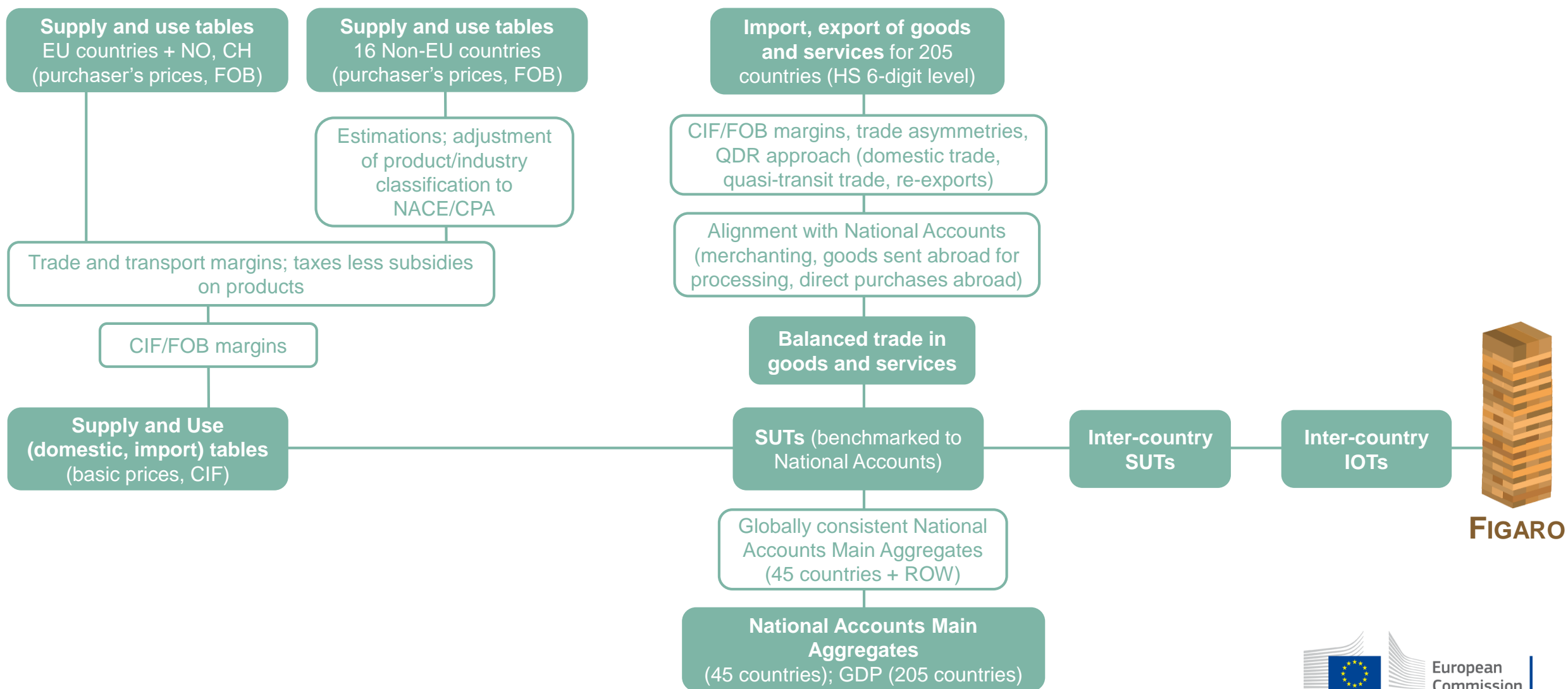
Methodological features (2/8)



Methodological features (2/8)



Methodological features (2/8)



Methodological features (3/8)

- **Balancing bilateral trade**
 - Exports and imports – trade statistics rarely align with national SUTs
- **Challenges**
 - Reporting principles in trade statistics and National Accounts (physical cross-border movement of goods vs. change of ownership)
 - Conversion to CPA product categories
 - Misclassification of products
- **QDR** methodology: balanced view of trade broken down by **Q**uasi-transit, **D**omestic and **R**e-exports

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DOI: 10.1111/pirs.12625

FULL ARTICLE



The multidimensional nD-GRAS method:
Applications for the projection of multiregional
input-output frameworks and valuation matrices

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DEALING WITH MISCLASSIFICATION OF PRODUCTS IN THE COMPILATION OF INTER-COUNTRY USE TABLES

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Abstract

Balanced bilateral trade data can certainly help in the construction of inter-country use tables but it is important to note that these balances rarely align with the corresponding total exports and imports (by product) of national supply and use tables. Among others, these differences are due to the balancing process of trade asymmetries; alignment of trade statistics principles to National Accounts principles; and the conversion from trade statistics categories to CPA categories of goods and services, and misclassification of products. This paper develops a novel method to resolve those discrepancies due to possible misclassification of products, which *per se* is essential to balance inter-country use tables and inter-country input-output (ICIO) tables. Beyond automatic balancing processes, this approach is conceived to be transparent for users seeking to understand how national data is adjusted to fit into ICIO tables, and to allow for higher consistency across various international initiatives.

Keywords: Balanced trade statistics; inter-country input-output tables; supply and use tables; misclassification of products

Abstract

We present a multidimensional generalization of the GRAS method (nD-GRAS) for the estimation of multiple matrices in an integrated framework. The potential applications of this method in regional and multi-regional input-output analyses based on national/regional accounts frameworks are many. We provide two real applications, a 3D-GRAS that estimates a use table at basic prices jointly with valuation matrices for Denmark; and a 4D-GRAS for estimating intercountry input-output tables with OECD data. We show that higher dimensional GRAS methods provide more consistent and accurate estimates than those with lower number of dimensions. We provide the analytical closed-form solution and the RAS-like algorithm for an easy operationalization.

KEYWORDS

GRAS, multidimensional balancing and projections, multiregional Input-Output analysis, valuation matrices, iterative proportional fitting procedure

JEL CLASSIFICATION

C61; D57; C62; C80; R15; C55

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European
Commission

Methodological features (4/8)

QDR workflow



Consolidate - trade balancing (1/2)

- Relative asymmetry ($i \rightarrow j$)

$$A_{ij} = \frac{|X_{ij} - M_{ij}|}{|X_{ij}| + |M_{ij}|}$$

X_{ij} : exports reported by country i

M_{ij} : imports reported by country j

➡ For each **HS-6-digit** level product

- Relative asymmetry of exports

$$\theta_i = \frac{\sum_k A_{ik} X_{ik}}{\sum_k X_{ik}}$$

- Relative asymmetry of imports

$$\phi_j = \frac{\sum_k A_{kj} M_{kj}}{\sum_k M_{kj}}$$

Methodological features (5/8)

Consolidate - trade balancing (2/2)

- Consolidated trade flow as weighted average over three years between exports and corresponding imports

$$T_{ij} = \frac{(1 - \bar{\theta}_i) \cdot X_{ij} + (1 - \bar{\phi}_j) \cdot M_{ij}}{(1 - \bar{\theta}_i) + (1 - \bar{\phi}_j)}$$

Methodological features (6/8)

- National Accounts trade for FIGARO: balanced international trade for 205 countries
 - Exports of A to B = Imports of B from A
 - Compliant with aggregated estimates P61, P62, P71, P72

- Breakdown:

P6	Export of goods and services
P61	Export of goods
P610	Domestic exports
P61A	Re-exports
P61C	Merchanting
P61D_E	Goods sent abroad for processing
P62	Export of services



Methodological features (7/8)

Supply and Use Tables

- Estimating 2020 SUTs: 2020 national accounts data + previous year SUTs structure
- SUT-RAS bi-proportional adjustment of SUTs
- Ireland – Split Q86 vs Q87_88
- Brazil – mapping industry activities to NACE Rev 2 A*64
- NO, UK, RU – adjustments and mapping of industry activities

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<https://doi.org/10.1080/09535314.2018.1545221>

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 OPEN ACCESS 

Projecting supply and use tables: new variants and fair comparisons

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ABSTRACT
We have introduced in this paper new variants of two methods for projecting Supply and Use Tables that are based on a distance minimisation approach (SUT-RAS) and the Leontief model (SUT-EURO). We have also compared them under similar and comparable exogenous information, i.e.: with and without exogenous industry output, and with explicit consideration of taxes less subsidies on products. We have conducted an empirical assessment of all of these methods against a set of annual tables between 2000 and 2005 for Austria, Belgium, Spain and Italy. From the empirical assessment, we obtained three main conclusions: (a) the use of extra information (i.e. industry output) generally improves projected estimates in both methods; (b) whenever industry output is available, the SUT-RAS method should be used and otherwise the SUT-EURO should be used instead; and (c) the total industry output is best estimated by the SUT-EURO method when this is not available.

ARTICLE HISTORY
Received 9 December 2016
In final form 3 November 2018

KEYWORDS
SUT-EURO; SUT-RAS; updating; projection; supply and use tables

1. Introduction
Several reasons may explain the large amount of non-survey methods developed over the past 50 years for the construction of input-output tables (IOTs) and one of the most rele-

Methodological features (8/8)

- For 46 economies: FIGARO tables are consistent with global National Accounts Main Aggregates: Supply, Use (domestic and imported), Taxes Less Subsidies (TLS) and Trade and Transport Margins (TTM)
- Global NAMA in an integrated IO framework: 46 inter-country use tables of domestic inputs (IC) + bilateral trade + direct purchases abroad + gross value added components
- Balancing: only trade is changed/adjusted, GDP remains fixed
- Significant balancing improvements: 10'

Outlook (1/5)

- 2023 FIGARO edition: [years 2019, 2020, 2021](#)
- ESTAT-JRC Administrative Arrangement FIGARO-Act II (2021-2023)
 - [Steering group meeting in Q1 2023](#)
 - [Completion Q2 2023](#)
- [New Administrative Arrangement FIGARO-Act III \(2023-2026\)](#) to be signed in Q4 2022
 - 4 Work packages



Outlook (2/5)

- WP1: Maintenance and further development of FIGARO tables
 - Support annual production - FIGARO tables at current and previous year's prices
 - Support integration of FIGARO tables in other global inter-country input-output table initiatives (e.g. OECD, UN-ECLAC)
 - Data sources and common methodologies
 - Sector scope and classifications
 - Reference years
 - Joint activities (FIGARO coverage of ECLAC countries)
 - Better representation of global production arrangements (processing services, merchanting, direct purchases abroad, international transport and insurance services, CIF-FOB adjustments)

Outlook (3/5)

FIGARO developments

- Direct purchases abroad, domestic purchases by non-residents - by country and product
- CO₂ footprint:
 - domestic → national scope
 - towards an EU-27 SUIOT

Country of purchase	Product	Origin of purchaser			\sum Domestic purchases by non-residents
		Country A	Country B	Country n	
Country A	1	0			A
	2	0			
	...	0			
Country B	1		0		B
	2		0		
		0		
Country n	1			0	n
	1			0	
	...			0	
\sum Direct purchases abroad		A	B	n	

Outlook (4/5)

- WP2: Implementation of a regular publication of Eurostat's global value chain (GVC) indicators
 - Annual production of GVC indicators based on **FIGARO** and the **TRADE-SCAN model**
- WP3: Implementation of the **FIGARO NAM/SAMs** as experimental statistics
 - A first time series of EU Inter-Country National Accounting Matrices (NAMs) and Social Accounting Matrices (SAMs)
- WP4: Extended FIGARO tables - Compilation of satellite accounts, including a **European Space Economy Satellite Account**
 - Experimental satellite account based on FIGARO (output, gross value added, employment, labor compensation in the European space economy)

Outlook (5/5)

FIGARO applications



Experimental statistics (2022-2023)

- Meeting with National Statistical Institutes in December 2022
- Identification of space-related products and activities, by country



FIGARO links

- [FIGARO database](#) (csv, excel format)
- [FIGARO methodology](#)
- [FIGARO applications](#)
 - Employment and value added supported by EU exports
 - CO₂ footprints (*update in Q4 2022*)
- Statistics Explained
 - [Employment content in EU exports](#)
 - [Value added content in EU exports](#)
- [Eurostat website – ESA supply, use and input-output tables](#)

Thank you.

FIGARO data base: <https://ec.europa.eu/eurostat/web/esa-supply-use-input-tables/data/database>

Contact: ESTAT-IGA@ec.europa.eu



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