*Guide to OECD **Trade in Value Added** (TiVA) Indicators, **2023 edition***

OECD, Directorate for Science, Technology and Innovation

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Abstract

This guide presents the Trade in Value Added (TiVA) indicators published by OECD. The latest indicators were generated using the 2023 release of OECD annual Inter-Country Input-Output (ICIO) tables which cover the period from 1995 to 2020. The indicators are provided for 76 economies (including all OECD, European Union, ASEAN and G20 countries) and a selection of region aggregates, and for 45 unique industries and related aggregates (such as total manufactures and total services) based on the ISIC Rev. 4 classification.

This guide builds on previous versions and is intended for all users, from experienced Input-Output practitioners familiar with the matrix algebra for generating indicators, to relative novices who wish to use TiVA indicators in their analyses and just need guidance on their use and interpretation.

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1 Introduction

This guide presents the Trade in Value Added (TiVA) indicators published by OECD[1]. The latest indicators were estimated using the 2023 release of OECD Inter-Country Input-Output (ICIO) tables covering the years 1995 to 2020[2]. A range of indicators are provided for 76 economies (including all OECD, European Union, ASEAN and G20 countries) and a selection of region aggregates and, for 45 unique industries and related aggregates (such as total manufactures and total services).

This guide builds on previous versions and is intended for all users, from experienced Input-Output practitioners familiar with the matrix algebra for generating indicators, to relative novices who wish to use TiVA indicators in their analyses and just need guidance on their use and interpretation.

The ICIO and TiVA databases are primarily based on statistics compiled according to 2008 System of National Accounts (2008 SNA) concepts and, an industry list based on ISIC Revision 4. Compared to the 2021 edition, the 2023 edition of TiVA indicators includes 10 new countries, Bangladesh, Belarus, Cameroon, Côte d'Ivoire, Egypt, Jordan, Nigeria, Pakistan, Senegal and Ukraine. As well as the 76 target economies, an aggregate for the "Rest of the World" economies is included in ICIO tables and TiVA for completeness.

The TiVA indicators are designed to provide better insights into global production networks and supply chains than is possible with conventional trade statistics.

2 OECD ICIO Tables: basic definitions

This section presents the basic structure of the OECD annual ICIO tables and the elements needed for the calculation of the TiVA indicators.[3]

The latest edition of TiVA is provided for all years from 1995 to 2020[4]. Indicators cover 76 target economies (plus an aggregate representing "Rest of the world") and 17 regions and country groups (see Annex Table A.1 and Table A.2); as well as 45 unique industries and 25 industry aggregates within a hierarchy (see Annex Table A.3 to Table A.5). Indicators may be expressed in USD million (current prices) or as percentages (shares or ratios).

Note that for regional aggregates, once USD million measures have been calculated for the 76 economies (and "Rest of the World"), aggregation to various regional groupings is carried out before ratios and shares are derived. Similarly, for aggregate industry sectors. Once USD million measures have been calculated for the 45 unique industries, summing to aggregate industry sectors is carried before ratios and shares are derived.

[1] See http://oe.cd/tiva

[2] See http://oe.cd/icio

[3] For readers new to input-output analysis, the book by Miller, R. and P. Blair (2022). Input-Output Analysis: Foundations and Extensions. Cambridge: Cambridge University Press, 3rd Edition is recommended.

[4] See Annex for an important note concerning TiVA estimates for the most recent years.

2.1 The OECD Inter-Country Input-Output (ICIO) system

The OECD ICIO system consists of a set of annual symmetric industry-by-industry global input-output tables. For each year, several matrices can be generated from the ICIO tables to calculate TiVA indicators. Table 2.1, Figure 2.1, Figure 2.2 and Figure 2.3 present the basic structure of the ICIO database and the main matrices need for the estimation of the TiVA indicators.

Table 2.1. Basic Matrices in OECD ICIO Tables and TiVA Indicators

Matrix	Size of the matrix	Description
W	$1 \times NK$	**Value added**, where w_i^r is the value added (**at basic prices**) by industry i (1 to K) in country r (1 to N) plus *taxes less subsidies* on intermediate products, so that total value added equals total final demand at basic prices.
X	$1 \times NK$	**Gross output (at basic prices)**, where x_i^r is the gross output from industry i in country r
V	$1 \times NK$	**Value added to output ratio**, where $v_i^r = w_i^r / x_i^r$ is the ratio of value added to gross output by industry i in country r.
Z	$NK \times NK$	**Intermediate consumption (at basic prices)**, where z_{ij}^{rs} is the flow of goods from producing industry i in country r to the purchasing industry j in country s.
Y	$NK \times N$	**Final demand,** where the element $\boldsymbol{y_i^{rs}}$ represents final demand of country s for goods and services produced by industry i in country r. Final demand is separated into Household and Government Final Consumption, Gross Fixed Capital Formation (GFCF) and changes in inventories.
A	$NK \times NK$	**Input coefficients**, calculated as $a_{ij}^{rs} = z_{ij}^{rs} / x_j^s$
B	$NK \times NK$	***Leontief inverse***, or "output multipliers", $\mathbf{B} = (\mathbf{I} - \mathbf{A})^{-1}$, where the element b_{ij}^{rs} shows the direct and indirect requirements of inputs from industry i in country r for the production of one unit of output for demand by industry j in country s.
GRTR GRTR_INT GRTR_FNL	$NK \times N$	**Bilateral gross trade** matrices by exporting industry/country and importing country of intermediate (INT) and final (FNL) goods GRTR = GRTR_INT + GRTR_FNL

Figure 2.1. OECD ICIO Basic Structure

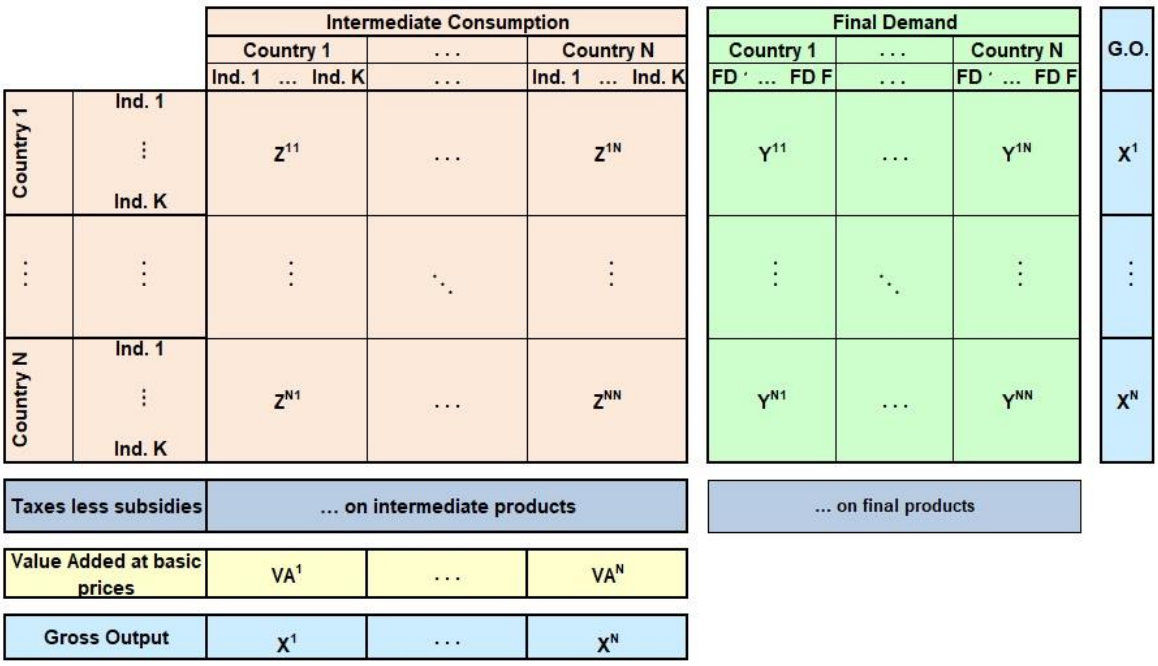


Figure 2.2. Obtaining the Leontief Inverse and the Value Added to Output Ratio

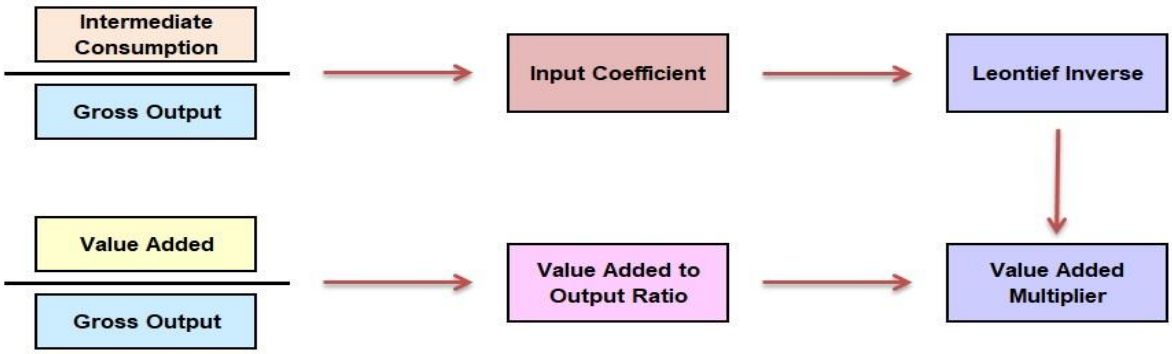
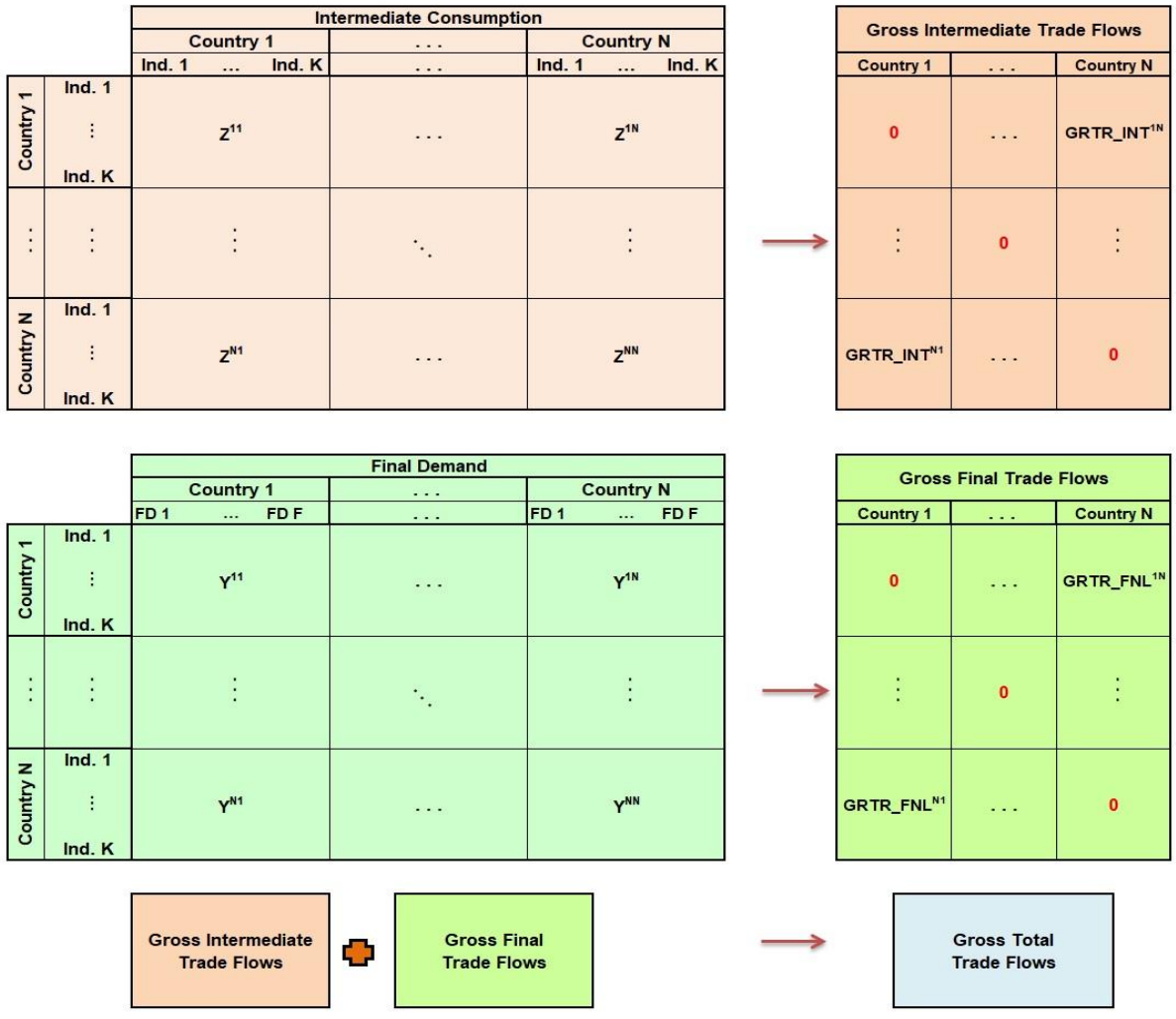


Figure 2.3. Obtaining the Bilateral Trade Flows



2.2 Definitions and notation used in this Guide

The TiVA indicators are shown in blue in the equations, while the variables derived from the ICIO system are shown in black. Visual representations of the indicators are also provided (see Box 1.)

$EXGR_{c,p}$ represents a $K\times1$ vector of gross exports from country c to partner country p for all K industries, where $c \neq p$. $EXGR_c$ is a $K\times1$ vector of total exports of country c.

$V_c = [v_{c1} \cdots v_{cK}]$ is a $1\times K$ row vector with domestic value added shares of output for each industry i in country c, while V_p generally represents value added shares of the partner country p. $\widehat{V_c}$ denotes the diagonalised matrix of vector V_c, i.e. a $K\times K$ matrix with elements $v_{c1} \cdots v_{cK}$ on the diagonal and 0 elsewhere.

$\boldsymbol{B} = (\boldsymbol{I} - \boldsymbol{A})^{-1}$, is the global Leontief inverse matrix with $NK\times NK$ dimensions, where A is the global I-O coefficient matrix. $B_{c,c}$ is a $K\times K$ diagonal block matrix of B representing total domestic gross output required for one unit increase of country c demand. $B_{p,c}$ is also a $K\times K$ block matrix, and it represents the total gross output from country p required for a one unit increase in country c demand.

Total gross exports and imports in ICIO tables, and hence in TiVA indicators, differ from official National Accounts statistics due to removal of estimates of re-exports and re-imports, conversion to a *basic price* valuation and reconciliation of bilateral asymmetries via balancing under output constraints.

Changes in inventories, acquisitions less disposals of valuables, and expenditure approach statistical discrepancy for a given country are included in countries' total final demand. In other words, there is an implicit assumption that all products consumed within a year are produced in the same year, and vice versa.

Gross trade and output measures are presented in current prices, USD millions and, with a *basic price* valuation.

Dimensions for each indicator are provided with the following abbreviations:

Country / Region:

- Prod cou = Production country
- VA src cou = Value added source country
- Exp cou = Export country
- Imp cou = Import country
- FD cou = final demand / destination country
- World = all countries which are related to the indicator

Industry:

- Prod ind = Production source industry
- VA src ind = Value added source industry
- Exp ind = Export products producing industry
- FD ind = final demand products producing industry
- Tot ind = total industry

Supply and Demand Dimensions:

- Depending on the indicator, the supply and demand dimensions could refer to intermediate, final or total goods and services.

3 An overview of OECD TIVA indicators

This section presents an overview of OECD TiVA indicators classified into four groups according to data requirements:

- Structural indicators, based on the values presented in ICIO;
- Indicators based on value added, gross exports and gross imports;
- Indicators based on value added and final demand;
- Detailed indicators, with four dimensions, revealing the origins of value added in gross exports, gross imports and final demand.

The complete set of indicators, with their respective dimensions, is presented in Table 3.1 and Table 3.2.

Table 3.1. Overview of OECD TiVA indicators and requirements for calculation

Number in doc.	Code	Label	Unit	ICIO Matrices or vectors used in the calculations
	Structural Indicators - based on the values in ICIO tables			
4.1	PROD	Production (gross output)	USD	X
4.2	VALU	Value added	USD	W
4.3	PROD_VASH	Value added as a % of production	PC	V
4.4	EXGR	Gross exports	USD	GRTR
4.4	EXGR_INT	Gross exports of intermediate products	USD	GRTR_INT
4.4	EXGR_FNL	Gross exports of final products	USD	GRTR_FNL
4.5	IMGR	Gross imports	USD	GRTR
4.5	IMGR_INT	Gross imports of intermediate products	USD	GRTR_INT
4.5	IMGR_FNL	Gross imports of final products	USD	GRTR_FNL
4.6	BALGR	Gross trade balance	USD	GRTR
4.7	EXGRpSH	Gross exports, partner shares	PC	GRTR
4.7	IMGRpSH	Gross imports, partner shares	PC	GRTR
	Indicators based on value added in gross exports and imports			
	Domestic value added content of gross exports			
5.1	EXGR_DVA	Domestic value added content of gross exports	USD	VB * GRTR
5.2	EXGR_DVASH	Domestic value added share of gross exports	PC	VB * GRTR
5.3	EXGR_TDVAIND	Industry domestic value added contribution to gross exports	PC	VB * GRTR
5.4	EXGR_DVApSH	Domestic value added in gross exports, partner shares	PC	VB * GRTR
	Decomposition of domestic value added content of gross exports			
5.5	EXGR_DDC	Direct domestic value added content of gross exports	USD	VB * GRTR
5.6	EXGR_IDC	Indirect domestic value added content of gross exports	USD	VB * GRTR
5.7	EXGR_RIM	Re-imported domestic value added content of gross exports	USD	VB * GRTR
	Foreign value added content of gross exports (backward participation in GVCs)			
5.8	EXGR_FVA	Foreign value added content of gross exports	USD	VB * GRTR
5.9	EXGR_FVASH	Foreign value added share of gross exports	PC	VB * GRTR
5.10	EXGR_TFVAIND	Industry foreign value added contribution to gross exports	PC	VB * GRTR
5.11	DEXFVApSH	Foreign value added share of gross exports, by value added origin country	PC	VB * GRTR
	Domestic value added content of foreign gross exports (forward participation in GVCs)			
5.12	EXGR_DVAFXSH	Domestic value added embodied in foreign exports as share of gross exports	PC	VB * GRTR
5.13	FEXDVApSH	Domestic value added in foreign exports as a share of gross exports, by foreign exporting country	PC	VB * GRTR
	Domestic value added content of intermediate and final gross exports			
5.14	EXGR_INTDVASH	Domestic value added in exports of intermediate products, as a share of total gross exports	PC	VB * GRTR_INT
5.15	EXGR_FNLDVASH	Domestic value added in exports of final products, as a share of total gross exports	PC	VB * GRTR_FNL
5.16	EXGR_INTDVApSH	Domestic value added in exports of intermediate products, partner shares	PC	VB * GRTR_INT
	Services value added content of gross exports			
5.17	EXGR_SERV_DVASH	Domestic services value added share of gross exports	PC	VB * GRTR
5.18	EXGR_SERV_FVASH	Foreign services value added share of gross exports	PC	VB * GRTR
	Domestic value added in imports			
5.19	IMGR_DVA	Domestic value added content of gross imports	USD	VB * GRTR
5.20	IMGR_DVASH	Domestic value added share of gross imports	PC	VB * GRTR
	Re-exported intermediate imports			
5.21	REII	Re-exported intermediate imports	USD	A, B, GRTR
5.22	IMGRINT_REII	Re-exported intermediate imports as % of intermediate imports	PC	A, B, GRTR_INT
	Indicators based on value added in final demand			
6.1	FFD_DVA	Domestic value added embodied in foreign final demand	USD	VB * FD
6.2	FFD_DVApSH	Domestic value added in foreign final demand, partner shares	PC	VB * FD
6.3	VALU_FFDDVA	Share of domestic value added embodied in foreign final demand	PC	VB * FD
6.4	DFD_FVA	Foreign value added embodied in domestic final demand	USD	VB * FD
6.5	DFD_FVApSH	Foreign value added in domestic final demand, partner shares	PC	VB * FD
6.6	BALVAFD	Value added embodied in final demand, balance	USD	VB * FD
	Sources of value added in final demand			
6.7	FD_VA	Value added content of final demand, by source country and industry	USD	VB * FD
6.7	CONS_VA	Value added content of total consumption, by source country and industry	USD	VB * CONS
6.7	GFCF_VA	Value added content of gross fixed capital formation, by source country and industry	USD	VB * GFCF
6.8	FD_VASH	Value added share of total final demand, by source country and industry	PC	VB * FD
6.8	CONS_VASH	Value added share of total consumption, by source country and industry	PC	VB * CONS
6.8	GFCF_VASH	Value added share of gross fixed capital formation, by source country and industry	PC	VB * GFCF
	Indicators with four dimensions			
	Origins of value added By Source Country and Industry (BSCI)			
7.1	EXGR_BSCI	Origin of value added in gross exports	USD	VB * GRTR
7.2	IMGR_BSCI	Origin of value added in gross imports	USD	VB * GRTR
7.3	FDVA_BSCI	Origin of value added in final demand	USD	VB * FD
	Gross exports with 3 country dimensions: exporter, value added origin and final destination			
7.4	FD_EXGRINT_VA	Gross exports of intermediate products by origin of value added and final destination	USD	V, A, B, FD
7.4	FD_EXGRFNL_VA	Gross exports of final products by origin of value added and final destination	USD	VB * GRTR_FNL
7.4	FD_EXGR_VA	Gross exports by origin of value added and final destination	USD	FD_EXGRINT_VA + FD_EXGRFNL_VA

Table 3.2. OECD TiVA Indicators and their dimensions

Trade in Value Added (TiVA) - Dataset on Principal indicators				
		Indicator dimensions in OECD.STAT		
N.	Code	number of dimensions	Country c | Industry i | 'Partner' p	Unit
1	EXGR	3	Exp cou | Exp ind | Imp cou	USD
2	EXGR_FNL	3	Exp cou | Exp ind | Imp cou	USD
3	EXGR_INT	3	Exp cou | Exp ind | Imp cou	USD
4	EXGR_DVA	3	Exp cou | Exp ind | Imp cou	USD
5	EXGR_DDC	2	Exp cou | Exp ind | *World*	USD
6	EXGR_IDC	2	Exp cou | Exp ind | *World*	USD
7	EXGR_RIM	2	Exp cou | Exp ind | *World*	USD
8	EXGR_FVA	2	Exp cou | Exp ind | *World*	USD
9	IMGR	3	Imp cou | Exp ind | Exp cou	USD
10	IMGR_FNL	3	Imp cou | Exp ind | Exp cou	USD
11	IMGR_INT	3	Imp cou | Exp ind | Exp cou	USD
12	IMGR_DVA	3	Imp cou | Exp ind | Exp cou	USD
13	BALGR	2	Exp cou | *Tot ind* | Imp cou	USD
14	REII	2	Exp cou | Prod ind | *World*	USD
15	PROD	2	Prod cou | Prod ind | *World*	USD
16	VALU	2	Prod cou | Prod ind | *World*	USD
17	FFD_DVA	3	VA src cou | VA src ind | FD cou	USD
18	DFD_FVA	3	FD cou | VA src ind | VA src cou	USD
19	BALVAFD	3	VA src cou | VA src ind | FD cou	USD
20	FD_VA	3	FD cou | VA src ind | VA src cou	USD
21	CONS_VA	3	FD cou | VA src ind | VA src cou	USD
22	GFCF_VA	3	FD cou | VA src ind | VA src cou	USD
23	EXGR_DVASH	2	Exp cou | Exp ind | *World*	PC
24	EXGR_FVASH	2	Exp cou | Exp ind | *World*	PC
25	EXGR_DVAFXSH	2	VA src cou | Exp ind | *World*	PC
26	EXGR_FNLDVASH	2	Exp cou | Exp ind | *World*	PC
27	EXGR_INTDVASH	2	Exp cou | Exp ind | *World*	PC
28	EXGR_INTDVApSH	3	Exp cou | Exp ind | Imp cou	PC
29	EXGRpSH	3	Exp cou | Exp ind | Imp cou	PC
30	EXGR_DVApSH	3	Exp cou | Exp ind | Imp cou	PC
31	EXGR_TDVAIND	2	Exp cou | Exp Ind | *World*	PC
32	EXGR_TFVAIND	2	Exp cou | Exp Ind | *World*	PC
33	EXGR_SERV_DVASH	2	Exp cou | Exp Ind | *World*	PC
34	EXGR_SERV_FVASH	2	Exp cou | Exp Ind | *World*	PC
35	IMGRINT_REII	2	Exp cou | Prod ind | *World*	PC
36	IMGR_DVASH	3	Imp cou | Exp ind | Exp cou	PC
37	IMGRpSH	3	Imp cou | Exp ind | Exp cou	PC
38	FFD_DVApSH	3	VA src cou | VA src ind | FD cou	PC
39	DFD_FVApSH	3	FD cou | VA src ind | VA src cou	PC
40	VALU_FFDDVA	2	VA src cou | VA src ind | *World*	PC
41	PROD_VASH	2	Prod cou | Prod ind | *World*	PC
42	FD_VASH	3	FD cou | VA src ind | VA src cou	PC
43	CONS_VASH	3	FD cou | VA src ind | VA src cou	PC
44	GFCF_VASH	3	FD cou | VA src ind | VA src cou	PC
45	DEXFVApSH	2	Exp cou | *Tot ind* | VA src cou	PC
46	FEXDVApSH	2	VA src cou | *Tot ind* | Exp cou	PC

Trade in Value Added (TiVA) - Datasets on Origins of value added				
N.	Code	number of dimensions	Indicator dimensions in OECD.STAT	Unit
2	EXGR_BSCI	4	VA src cou | VA src ind | Exp cou | Exp ind	USD
3	FDVA_BSCI	4	VA src cou | VA src ind | FD cou | FD ind	USD
4	FD_EXGR_VA	4	VA src cou | Exp cou | Exp ind | FD cou	USD
4	FD_EXGRFNL_VA	4	VA src cou | Exp cou | Exp ind | FD cou	USD
4	FD_EXGRINT_VA	4	VA src cou | Exp cou | Exp ind | FD cou	USD
5	IMGR_BSCI	4	Imp cou | VA src cou | Exp ind | Exp cou	USD

Notes:

Country / Region:

Prod cou = Production country
VA src cou = Value added source country
Exp cou = Export country
Imp cou = Import country
FD cou = Final demand / destination country
World = total world i.e. indicator with no partner dimension

Industry:

Prod ind = Production industry
VA src ind = Value added source industry
Exp ind = Export products producing industry
FD ind = Final demand products producing industry
Tot ind = Total industry

4 Structural Indicators - based on the values presented in ICIO

4.1 PROD: Production (gross output), USD million

Indicator dimensions: [Prod cou | Prod ind | World]

This indicator is extracted directly from ICIO and defined as the production (gross output) *at basic prices* by industry *i* in country *c*:

$$\text{PROD}_{c,i} = \text{X}_{\text{c,i}}$$

The estimates are compatible, to the greatest extent possible, with the latest available official System of National Accounts, 2008 (2008 SNA) annual statistics.

For most OECD countries, gross output by industry time series are drawn from the OECD STAN Database (http://oe.cd/stan), or the OECD Annual National Accounts, adapted to the industry classification of the ICIO system. For other countries, particularly non-OECD economies, sources include United Nations Statistics Division (UNSD) and Eurostat databases as well as National Accounts statistics published by national statistical institutes.

Where necessary, industry estimates of gross output are calculated by drawing on other sources such as national Supply and Use tables (SUTs), Input-Output tables (IOTs) and, structural business statistics (industry survey data) such as UNIDO's INDSTAT Database.

4.2 VALU: Value added, USD million

Indicator dimensions: [Prod cou | Prod ind | World]

This indicator is extracted directly from ICIO and is defined here as production (gross output) *at basic prices* minus total intermediate inputs *at basic prices*. In other words, it represents value added *at basic prices* plus any *taxes less subsidies* on purchases of intermediate products by industries. Value added in the TiVA indicator system includes *taxes less subsidies* on intermediate products to maintain the condition of equity with final expenditures *at basic prices* (Total output *at basic prices* less intermediate consumption expenditures *at basic prices*).

Value added by industry *i* in country *c*:

$$\text{VALU}_{c,i} = \text{W}_{\text{c,i}}$$

Value added *at basic prices* reflects the value that is added by industry *i* in country *c* when producing goods and services. It follows the definition of value added used in the 2008 System of National Accounts (2008 SNA) and is equivalent to the difference between the industry's Production (gross output) *at basic prices* and the sum of its intermediate inputs of goods and services *in purchasers' prices*.

Value added *at basic prices* consists of Compensation of employees, Consumption of fixed capital, and Net operating surplus and mixed income (i.e. profits and income of the self-employed and family members). It also includes 'Other taxes, less subsidies, on Production' (such as payroll taxes).

The sources for value added are the same as those used for gross output (see above).

4.3 PROD_VASH: Value added as a share of Gross Output, by industry, percentage

Indicator dimensions: [Prod cou | Prod ind | World]

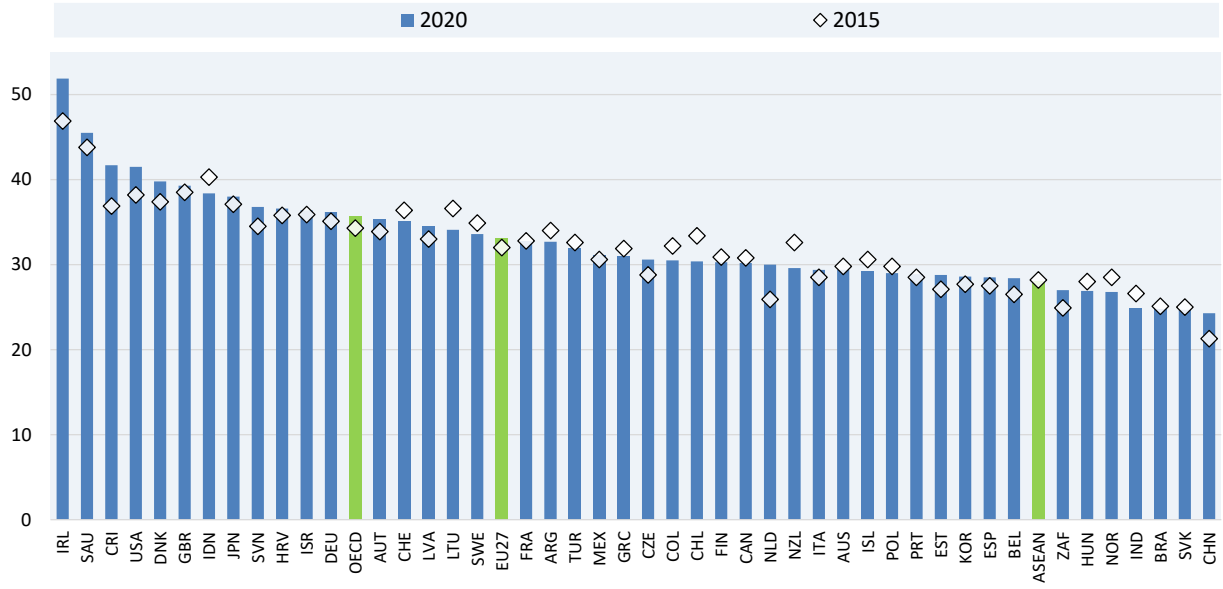
The value added share is given for each industry in each country, and represents value added generated by industry *i* in country *c*, $VALU_{c,i}$, as a percentage of gross output, $PROD_{c,i}$.

$$\text{PROD\_VASH}_{c,i} = \frac{\text{VALU}_{c,i}}{\text{PROD}_{c,i}} = \text{V}_{c,i}$$

Industry value added / gross output ratios are a major determinant of a country's shares of value added embodied in trade and final demand.

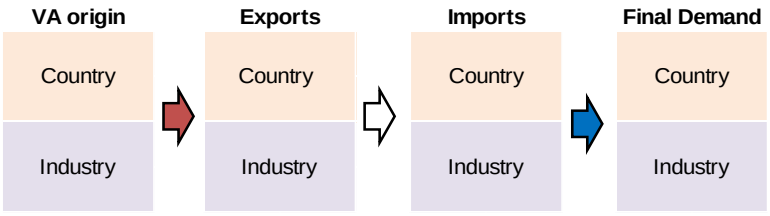
For the OECD as a whole, in 2020, about 36% of gross output in the manufacturing sector consisted of value added generated in production. Large OECD economies such as Japan, Germany, the United Kingdom and the United States had shares between 36% and 42%. These shares were higher than those for China and the aggregate of Southeast Asian (ASEAN) countries with 24% and 28% respectively. In many OECD countries, value added shares of gross output have fallen over the past five years (Figure 4.1).

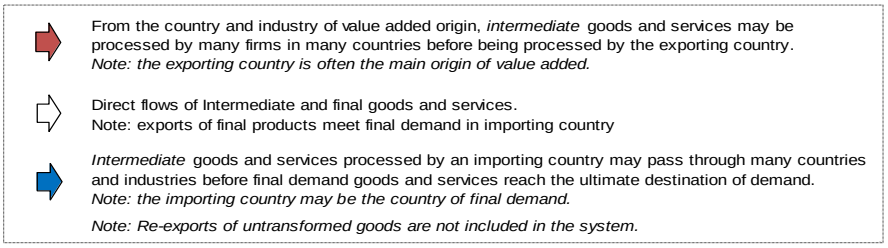
Figure 4.1. Value added as a share of Gross Output, Total Manufacturing



Box 1. The choice of TiVA indicators and their dimensions

Indicators of global flows of goods and services can be considered from four perspectives: the origin of value added, exporters, importers and final consumers. Each with a country and industry (or product group) dimension.



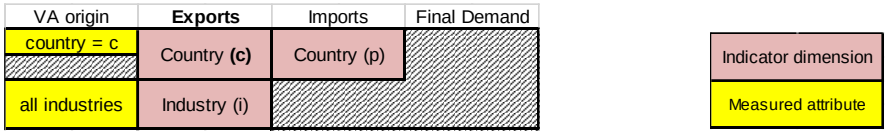


Thus, Indicators could be produced that reveal, for example: a) value added from the Chinese basic metals industry; b) embodied in Japanese exports of ICT components; c) imported by the Mexican machinery industry; and d) ultimately meeting US final demand for motor vehicles.

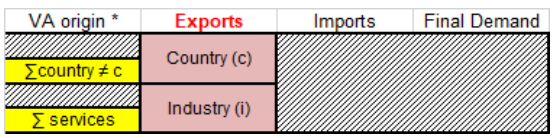
However, with 77 countries and 45 industries/product groups, there are potentially about $(77 \times 45)^4 \approx$ 144,000,000,000,000 combinations.

Although many of the combinations have no meaning, this estimate does not consider regional groups, industry aggregates, splitting final demand into Gross fixed capital formation (GFCF) and Household consumption, splitting exports into intermediates and final goods and services and, the variety of ratios and shares that can be calculated. A very small fraction of the possibilities will meet the majority of analytical needs, and the challenge is to identify a set of easy-to-use TiVA indicators for policy analysts and researchers i.e. indicators with 2, 3 or 4 dimensions.

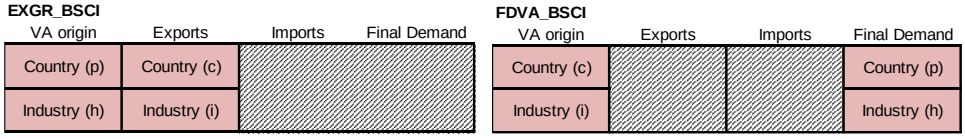
As an aid to understanding the dimensions of the indicators provided, simple illustrative diagrams are provided alongside the definitions. For example, in the principal indicators (with 2 or 3 dimensions), *Domestic value added content of gross exports* (EXGR_DVA) can be represented as:



While the Foreign services value added share of gross exports is illustrated thus:

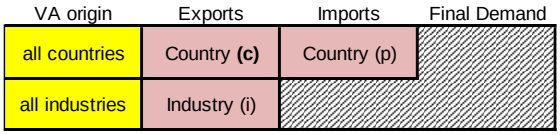


Similarly, for the indicators with 4 dimensions such as *Value added origin of gross exports* (*EXGR_BSCI*) and *Value added origin of final demand* (*FDVA_BSCI*) we have the following:



4.4 EXGR | EXGR_INT | EXGR_FNL: Gross exports, by industry and by partner country, USD million (f.o.b.)

Indicator dimensions:
[Exp cou | Exp ind | Imp cou]



Country *c*'s total gross exports for a given industry *i* can be directly calculated from the ICIO system by summing exports in intermediate goods and services and exports of final demand goods and services.

$$\text{EXGR}_{c,i} = \sum_{\text{p}} \text{EXGR}_{c,i,p} = \sum_{\text{p}} (\text{EXGR\_INT}_{c,i,p} + \text{EXGR\_FNL}_{c,i,p})$$

where $\text{EXGR\_INT}_{c,i,p}$ represents gross exports of intermediate goods and services from domestic industry *i* in country *c* to partner country *p*, and $\text{EXGR\_FNL}_{c,i,p}$ is gross exports of final demand goods and services, where *c* and $p \in [1,..,N]$ and $c \neq p$. They are calculated from the gross trade matrices as:

$$\text{EXGR\_INT}_{c,i,p} = \text{GRTR\_INT}_{(\text{c}-1)*\text{N}+\text{i,p}}$$

$$\text{EXGR\_FNL}_{c,i,p} = \text{GRTR\_FNL}_{(\text{c}-1)*\text{N}+\text{i,p}}$$

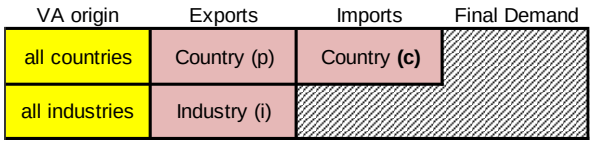
Note that the gross exports are consistent with official National Accounts estimates of total exports and imports of goods and services, adjusted for re-exports, as well as estimates for GDP. However, while National Accounts exports are valued *at purchaser's prices*, Gross exports for TiVA indicators are valued *at basic prices* in line with the valuation used throughout the ICIO tables. When transforming exports from *purchasers' prices* to *basic prices*, one of the main adjustments is the reallocation of the domestic distribution margins, (inherent in exports of goods *at purchasers' prices*) to exports of services (wholesale, retail and transportation). A consequence is that, for many countries, total exports of services in the TiVA database may be significantly higher than total exports of services reported in National Accounts (and Balance of Payments) statistics.

EXGR includes both cross-border flows and direct expenditure by non-residents on the domestic territory. Estimates of bilateral exports by industry are based on the balanced trade system drawn from the ICIO database. "Unspecified export destination" (i.e. any discrepancy between exports and imports) is allocated to the partner "Rest of the World".

For regions, EXGR excludes intra-regional trade (e.g. for EU27, exports to non-EU27 partners only)

4.5 IMGR | IMGR_INT | IMGR_FNL: Gross imports, by industry and by partner country, USD million (f.o.b.)

Indicator dimensions:
[Imp cou | Exp ind | Exp cou]



Total imports of country c are measured as:

$$\text{IMGR}_{c,i} = \sum_{p} \text{IMGR}_{c,i,p} = \sum_{\text{p}} (\text{IMGR\_INT}_{c,i,p} + \text{IMGR\_FNL}_{c,i,p})$$

where $\text{IMGR\_INT}_{\text{c,i,p}}$ is gross imports of intermediates by country *c* from industry *i* in country *p*; and $\text{IMGR\_FNL}_{\text{c,i,p}}$ is gross imports of final demand goods and services.

They can be calculated from the gross trade matrices as:

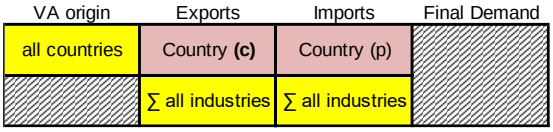
$$\text{IMGR\_INT}_{c,i,p} = \text{GRTR\_INT}_{(p-1)*\text{N}+i,c}$$

$$\text{IMGR\_FNL}_{c,i,p} = \text{GRTR\_FNL}_{(p-1)*\text{N}+i,c}$$

See also the notes for the EXGR indicators, which also apply to the IMGR indicators.

4.6 BALGR: Gross trade balance, by partner country, USD million (f.o.b.)

Indicator dimensions:
[Exp cou | Tot ind | Imp cou]



The gross trade balance is the difference between Gross exports, $EXGR_{c,p}$, and Gross imports, $IMGR_{c,p}$ and is provided for country *c* and partner *p* for total industry.

$$\text{BALGR}_{c,p} = \text{EXGR}_{c,p} - \text{IMGR}_{c,p}$$

Total goods and services trade balances provided in the TiVA database are generally aligned with those reported by national statistical offices.

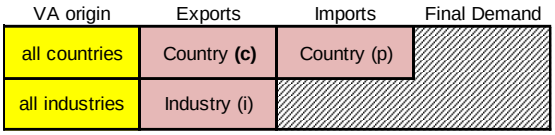
However, differences between TiVA estimates and official national statistics may be apparent, particularly for bilateral trade balances. There are well documented reasons for such differences. For example, there are numerous asymmetries in official national trade statistics (country A's reported exports from Country B can differ, sometimes significantly, from Country B's reported imports from Country A, even when allowing for differences in valuation). Reasons include: *i)* the treatment of re-exports and transit trade through major regional trading hubs such as Belgium, Netherlands, Hong Kong (China), Singapore and United States: exporters may report their exports by country of consignment while the importers report the imports by country of origin; and *ii)* coverage and quality issues (missing data etc.) that affect official bilateral data particularly for trade in services.

By necessity, to generate a balanced view of bilateral trade by industry (product group) in the ICIO system, missing data are estimated and exports and imports adjusted to eliminate asymmetries. The resulting exports matrix is thus a transpose of the imports matrix.

See also notes for EXGR and IMGR.

4.7 EXGRpSH: Gross exports, partner shares, percentage

Indicator dimensions:
[Exp cou | Exp ind | Imp cou]

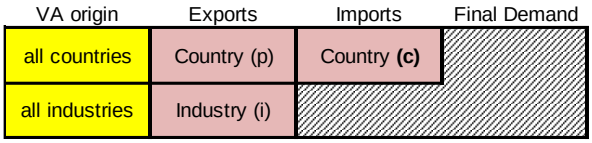


The partner shares are calculated for each country, industry and partner country by dividing by total exports of the industry and country. The industry is the exporting industry.

$$\text{EXGRpSH}_{c,i,p} = \frac{\text{EXGR}_{c,i,p}}{\sum_p \text{EXGR}_{c,i,p}} \times 100$$

4.8 IMGRpSH: Gross imports, partner shares, percentage

Indicator dimensions:
[Imp cou | Exp ind | Exp cou]



The partner shares are calculated for each country, industry and partner country by dividing by total imports of the industry and country. The industry refers to the exporting industry (i.e. from country c's perspective, the industry of origin of the imports).

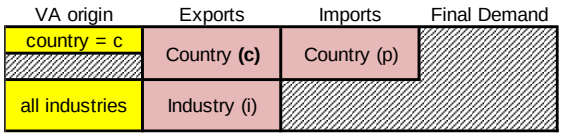
$$\text{IMGRpSH}_{c,i,p} = \frac{\text{IMGR}_{c,i,p}}{\sum_p \text{IMGR}_{c,i,p}} \times 100$$

5 Indicators based on the Origins of Value Added in Gross Exports and Imports

5.a Domestic value added content of gross exports

5.1 EXGR_DVA: Domestic value added content of gross exports, USD million

Indicator dimensions:
[Exp cou | Exp ind | Imp cou]



EXGR_DVA$_{c,i,p}$, Domestic Value Added content of exports, by industry *i* in country/region *c* to partner country/region *p*, represents the exported value added that has been generated anywhere in the domestic economy (i.e. not just by the exporting industry).

$$\text{EXGR\_DVA}_{c,i,p} = \text{V}_c\text{B}_{c,c}\text{EXGR}_{c,i,p}$$

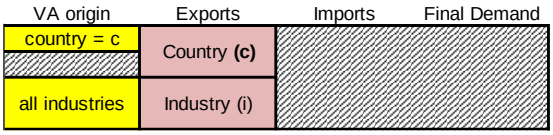
Where $\text{EXGR}_{c,i,p}$ is a *K×1* vector with all entries equal to zero except those corresponding to industry *i*.

For regions *c*, EXGR_DVA excludes intra-regional trade (e.g. for EU27, exports to non-EU27 partners only) and intra-regional value added flows (e.g. German value added in French exports) are treated as domestic value added. In other words, a region is treated as a single economy. Alternatively, region averages can be calculated (see Box 2).

The domestic value added content of gross exports can be split further into three components, direct domestic industry value added (EXGR_DDC, see 5.5), indirect domestic value added (EXGR_IDC, see 5.6) and re-imported domestic value added (EXGR_RIM, see 5.7).

5.2 EXGR_DVASH: Domestic value added share of gross exports, percentage

Indicator dimensions:
[Exp cou | Exp ind | World]



The share of domestic value added in gross exports is available by industry for partner world is defined as domestic value added in gross exports, $\text{EXGR\_DVA}_{c,i}$, as a percentage of total gross exports, $\text{EXGR}_{c,i}$:

$$\text{EXGR\_DVASH}_{c,i} = \frac{\sum_p \text{EXGR\_DVA}_{c,i,p}}{\sum_p \text{EXGR}_{c,i,p}} \times 100$$

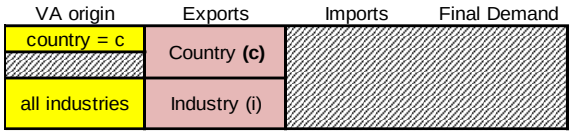
It is a 'DVA intensity measure' and reflects how much value added, generated anywhere in the domestic economy, is embodied per unit of total gross exports by industry, *i*.

For regions c, EXGR and EXGR_DVA exclude intra-regional trade (e.g. for EU27, exports to non-EU27 only) and for EXGR_DVA, intra-region value added flows are treated as domestic value added. Hence, for EXGR_DVASH, a region is treated as a single economy.

See also the notes for EXGR_DVA and EXGR_TDVAIND.

5.3 EXGR_TDVAIND: Industry domestic value added contribution to gross exports, as a percentage of total gross exports

Indicator dimensions:
[Exp cou | Exp ind | World]



This indicator reflects the share, in total gross exports, of domestic value added in an industry's exports. The sum over all industries is the total domestic value added share of gross exports (EXGR_DVASH)

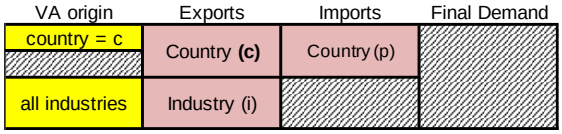
$$\text{EXGR\_TDVAIND}_{c,i} = \frac{\sum_p \text{EXGR\_DVA}_{c,i,p}}{\sum_{p,i} \text{EXGR}_{c,i,p}} \times 100$$

While $\text{EXGR\_DVASH}_{c,i}$ measures the intensity of Domestic value added in an industry's exports, $\text{EXGR\_TDVAIND}_{c,i}$ captures the magnitude compared to other industries. Note that the sum of EXGR_TDVAIND across industries equals EXGR_DVASH for total industry.

See also the notes for EXGR and EXGR_DVA

5.4 EXGR_DVApSH: Domestic value added in gross exports, partner shares, percentage

Indicator dimensions:
[Exp cou | Exp ind | Imp cou]



For each country and industry, this indicator shows the importing partner distribution of domestic value added in gross exports.

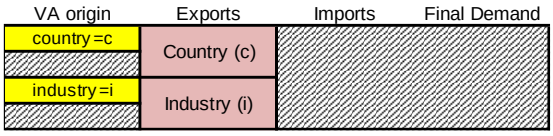
$$\text{EXGR\_DVApSH}_{c,i,p} = \frac{\text{EXGR\_DVA}_{c,i,p}}{\sum_p \text{EXGR\_DVA}_{c,i,p}} \times 100$$

See also the notes for EXGR_DVA.

5.b Decomposition of domestic value added content of gross exports

5.5 EXGR_DDC: Direct domestic industry value added content of gross exports, USD million

Indicator dimensions:
[Exp cou | Exp ind | World]



Direct domestic value added content of exports, *EXGR_DDC$_{c,i}$*, measures the direct value added contribution made by industry *i* in country *c* to the production of goods and services exported by industry *i* to the world

$$\mathrm{EXGR\_DDC_c} = \hat{\mathrm{V}}_\mathrm{c}\mathrm{diagB}_c\mathrm{EXGR_c}$$

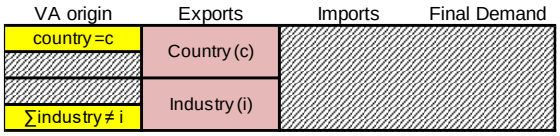
where $\mathrm{EXGR\_DDC_c}$ is a *K×1* vector representing the industry dimension and $\mathrm{A_c}$ is a local I-O coefficient matrix from country *c* single Input-Output table and $\mathrm{B}_c = (\mathrm{I} - \mathrm{A_c})^{-1}$ is the local Leontief inverse. Matrix diagB_c consists of the diagonal elements of the local Leontief inverse, i.e. those entries of the matrix displaying the direct requirements.

$\mathrm{EXGR\_DDC_{c,i}}$ is the *i-th* element of the *K×1* vector $\mathrm{EXGR\_DDC_c}$, and gives direct domestic value added content of gross export of a given industry *i*.

It does not include domestic value added that has returned, via imports, after previously being exported (embodied in intermediates) i.e. only the value added directly generated by domestic industries in producing goods and services prior to export is covered.

5.6 EXGR_IDC: Indirect domestic value added content of gross exports (originating from domestic intermediates), USD million

Indicator dimensions:
[Exp cou | Exp ind | World]



Indirect domestic value added content of exports, $\mathrm{EXGR\_IDC_{c,i}}$, corresponds to the value added originating from other, upstream, domestic industries (different from industry *i*) in country *c* that are incorporated in the exports of industry *i*.

$$\mathrm{EXGR\_IDC_c} = \hat{\mathrm{V}}_\mathrm{c}\mathrm{offdiagB}_c\mathrm{EXGR_c}$$

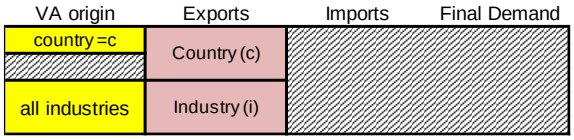
where $\mathrm{EXGR\_IDC_c}$, is a *K×1* vector representing the industry dimension and $\mathrm{A_c}$ is a local I-O coefficient matrix from country *c* single Input-Output table and $\mathrm{B}_c = (\mathrm{I} - \mathrm{A_c})^{-1}$ is the local Leontief inverse. Matrix $\mathrm{offdiagB}_c$ is the local Leontief inverse with all diagonal elements set to zero, thus representing the indirect requirements.

$\mathrm{EXGR\_IDC_{c,i}}$ is the *i-th* element of the *K×1* vector $\mathrm{EXGR\_IDC_c}$, and gives indirect domestic value added content of gross export of a given industry *i*.

It does not include domestic value added that has returned, via imports, after previously being exported (embodied in intermediates) i.e. only the value added directly generated by domestic industries in producing goods and services prior to export is covered.

5.7 EXGR_RIM: Re-imported domestic value added content of gross exports, USD million

Indicator dimensions:
[Exp cou | Exp ind | World]



Re-imported domestic value added content of exports, $EXGR\_RIM_{c.i}$, measures the domestic value added content, from any industry in country c, which has been exported for the production of intermediate goods or services abroad and subsequently embodied in imports used in the production of exports by industry i in country c.

$$EXGR\_RIM_c = EXGR\_DVA_c - EXGR\_DDC_c - EXGR\_IDC_c$$

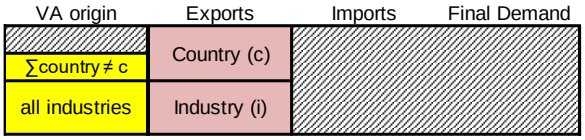
where $EXGR\_RIM_c$ is a *K×1* vector representing the industry dimension, and the other variables are as defined before.

$EXGR\_RIM_{c,i}$ is the *i-th* element of the *K×1* vector $EXGR\_RIM_c$, and gives the re-imported domestic value added content of gross exports of a given industry *i*.

5.c Foreign value added content of gross exports *(backward participation in GVCs)*

5.8 EXGR_FVA: Foreign value added content of gross exports, USD million

Indicator dimensions:
[Exp cou | Exp ind | World]



Foreign value added content of gross exports captures the value of imported intermediate goods and services that are embodied in a domestic industry's exports. The value added can come from any foreign industry upstream in the production chain.

$$\text{EXGR\_FVA}_{c,i} = \hat{\text{V}}\ \ \text{B}_{\text{ci}}\text{EXGR}_{c,i}$$

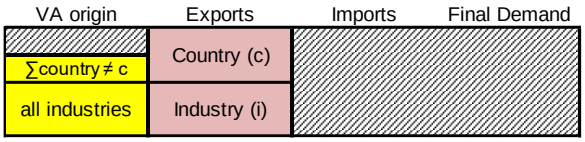
B_{ci} is the column of B corresponding to *inputs used by industry i* in country *c*, where the rows corresponding to inputs from origin industries in country c are set to zero.

Note that EXGR_FVA includes re-imported foreign value added that was previously exported by country *c* (c.f. EXGR_RIM)

For regions c, EXGR_FVA excludes intra-regional trade (e.g. for EU27, exports to non-EU27 only). Intra-region value added flows (e.g. German value added in French exports) are treated as domestic value added. In other words, a region is treated as a single economy. Alternatively, region averages can be calculated (see Box 2).

5.9 EXGR_FVASH: Foreign value added share of gross exports, percentage

Indicator dimensions:
[Exp cou | Exp ind | World]



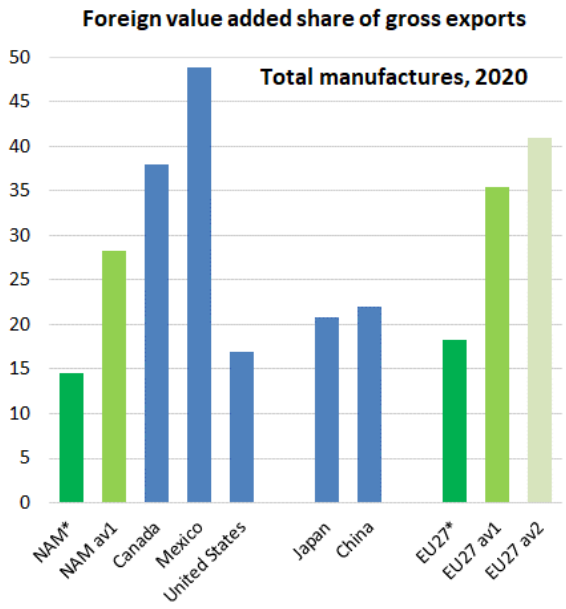
The share of foreign value added in gross exports is available by industry for partner world, and is defined as foreign value added embodied in gross exports $\text{EXGR\_FVA}_{\text{c,w,i}}$, as a percentage of total gross exports, $\text{EXGR}_{\text{c,w,i}}$.

$$\text{EXGR\_FVASH}_{c,i} = \frac{\sum_p \text{EXGR\_FVA}_{c,i,p}}{\sum_p \text{EXGR}_{c,i,p}} \times 100$$

It is a 'FVA intensity measure' often referred to as 'import content of exports' and considered as a measure of 'backward linkages' in analyses of GVCs.

See also notes for EXGR_FVA and EXGR_TFVAIND.

Box 2. Indicators for region aggregates



When considering regions (e.g. the European Union, EU27 and North America, NAM) there are alternative approaches to calculating certain indicators: weighted or unweighted averages of the countries within the region or, *treating the region as if it was a single economy*. For example, for the measure Foreign Value Added share of gross exports:

1. As a single economy (EU27*): gross exports to non-EU27 only and intra-region flows of value added are considered as domestic flows: i.e. value added generated in non-EU27 countries embodied in EU27 exports to non-EU27 economies (*this is the approach used for TiVA indicators*);

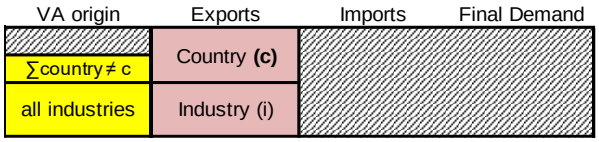
2. Weighted average of region's countries' Foreign value added content of gross exports: ∑(EXGR_FVA)/∑(EXGR). Intra-regional VA flows are considered foreign. Intra-regional exports included (see EU27av1, NAMav1);

3. Unweighted average of region's countries' Foreign value added share of gross exports i.e. average (EXGR_FVA/EXGR) Intra-regional value added flows are considered foreign. Intra-regional exports included (see EU27av2).

Note: Treating the European Union as a single economy yields foreign value added shares of gross exports closer to those of China, Japan and the United States.

5.10 EXGR_TFVAIND Industry foreign value added contribution to gross exports, as a percentage of total gross exports

Indicator dimensions:
[Exp cou | Exp ind | World]

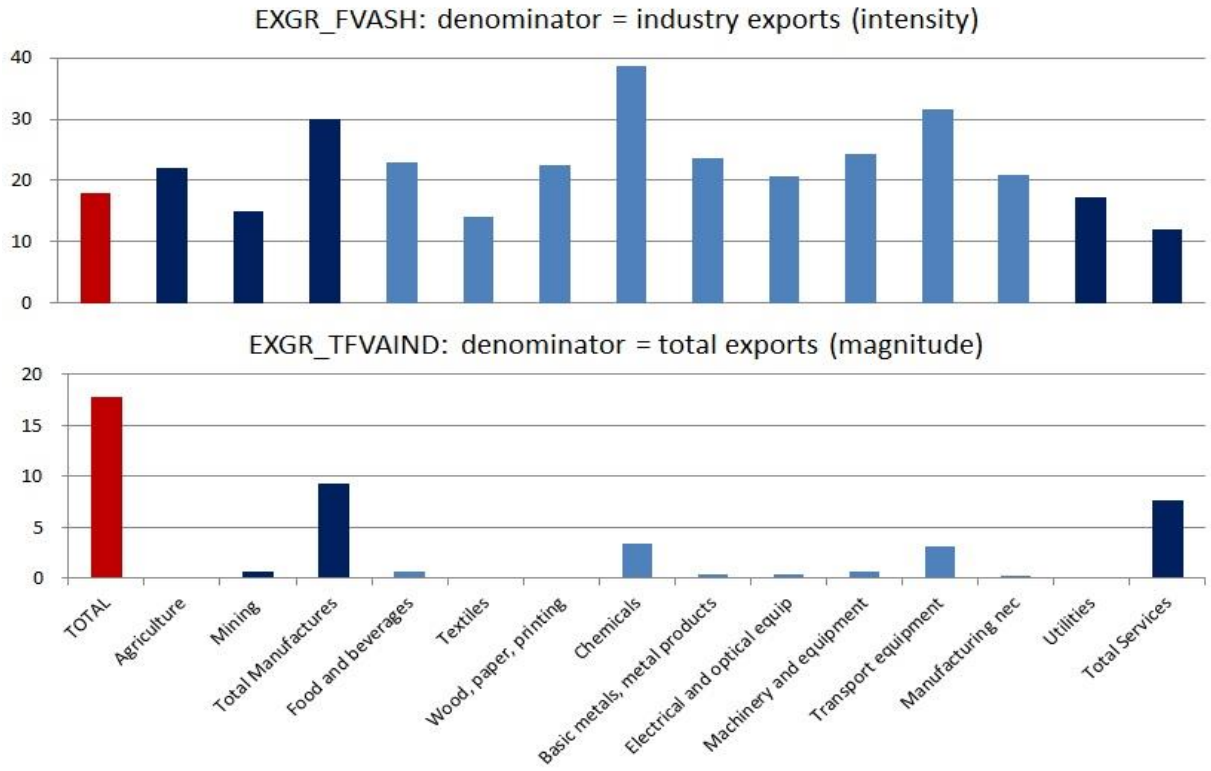


This indicator reflects the share, in total gross exports, of foreign value added in an industry's exports. The sum over all industries is the total foreign value added share of gross exports (EXGR_FVASH)

$$\text{EXGR\_TFVAIND}_{c,i} = \frac{\sum_{p} \text{EXGR\_FVA}_{c,i,p}}{\sum_{p,i} \text{EXGR}_{c,i,p}} \times 100$$

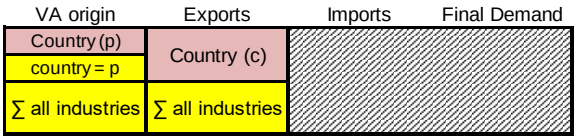
While $\text{EXGR\_FVASH}_{c,i}$ measures the *intensity* of FVA in an industry's exports, $\text{EXGR\_TFVAIND}_{c,i}$ captures the *magnitude* compared to other industries. Sum of EXGR_TFVAIND across industries equals EXGR_FVASH for total industry.

Figure 5. Example of EXGR_FVASH versus EXGR_TFVAIND



5.11 DEXFVApSH: Backward participation in GVCs, percentage

Indicator dimensions:
[Exp cou | Tot ind | VA src cou]



Foreign VA embodied in exports, as % of total gross exports of the exporting country.

This indicator is calculated for the total value of source and exporting industries; it is estimated as the ratio between the VA contents of imports from the source country *p* and the gross exports of the exporting country *c*.

This indicator is estimated as:

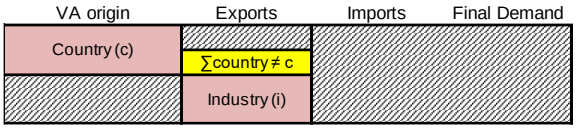
$$\text{DEXFVApSH}_{c,p} = \frac{\text{EXGR\_BSCI}_{c,p}}{\text{EXGR}_c} \times 100$$

Where $\text{EXGR\_BSCI}_{c,p}$, see 7.1, is the total VA from country p embodied in the total exports of exporting country *c*, and EXGR_c is the total gross exports of exporting country *c*.

5.d Domestic value added content of foreign gross exports (*forward participation in GVCs*)

5.12 EXGR_DVAFXSH: Domestic value added embodied in foreign exports as a share of gross exports, percentage

Indicator dimensions:
[VA src cou | Exp ind | World]



This indicator presents the country c domestic value added content embodied in the gross exports of industry *i* in foreign countries as a percentage of total gross exports of country *c*.

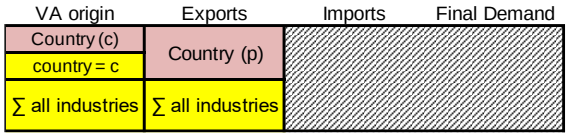
$$\mathrm{EXGR\_DVAFXSH}_{c,i} = \frac{\sum_p \mathrm{EXGR\_BSCI}_{c,i,p}}{\mathrm{EXGR}_c} \times 100$$

Where $\mathrm{EXGR\_BSCI}_{c,p,i}$, see 7.1, is the total VA from country *c* embodied in the total gross exports of industry *i* in foreign country *p*, and EXGR_c is the total gross exports of value added source country *c*.

It is often considered as a measure of 'forward linkages' in analyses of GVCs.

5.13 FEXDVApSH: Forward participation in GVCs, percentage

Indicator dimensions:
[VA src cou | Tot ind | Exp cou]



Domestic VA embodied in foreign exports, as a share (%) of total gross exports of the value added source country.

This indicator is calculated for the total value of source and exporting industries; it is estimated as being the VA contents of exports originated in the source country, and embodied in the exports of the exporting country, divided by the gross exports of the source country.

This indicator is estimated as:

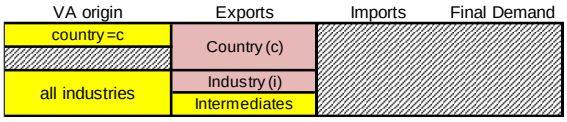
$$\mathrm{FEXDVApSH}_{c,p} = \frac{\mathrm{EXGR\_BSCI}_{c,p}}{\mathrm{EXGR}_c} \times 100$$

Where $\mathrm{EXGR\_BSCI}_{c,p}$, see 7.1, is the total VA from country *c* embodied in the exports of country *p*, and EXGR_c is the total gross exports of the value added source country *c*.

5.e Domestic value added content of intermediate and final gross exports

5.14 EXGR_INTDVASH: Domestic value added in exports of intermediate products, as a share of total gross exports, percentage

Indicator dimensions:
[Exp cou | Exp ind | World]



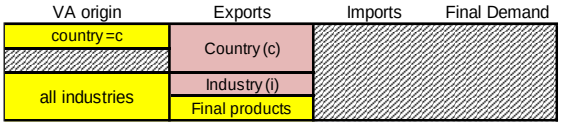
This indicator shows the share of domestic value added in exports of intermediate goods and services as a share of total gross exports. The indicator is available by country and industry.

$$\text{EXGR\_INTDVASH}_{c,i} = \frac{\sum_p \text{EXGR\_INTDVA}_{c,i,p}}{\sum_p \text{EXGR}_{c,i,p}} \times 100$$

$\text{EXGR\_INTDVASH}_{c,i}$ is defined as domestic value added in gross exports of intermediate products, by industry i in country c, as a percentage of total industry exports, $\text{EXGR}_{c,i}$. It reveals the share of industry exports that consists of domestic value added destined for further production within direct partners' economies - either to meet partners' final demand or to be embodied in exports by direct partners. It can be considered as a measure of forward linkages in global value chains (GVCs).

5.15 EXGR_FNLDVASH: Domestic value added in exports of final products, as a share of total gross exports, percentage

Indicator dimensions:
[Exp cou | Exp ind | World]



This indicator shows the share of domestic value added in exports of final goods and services as a share of total gross exports. The indicator is available by country and industry.

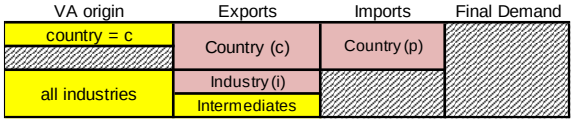
$$\text{EXGR\_FNLDVASH}_{c,i} = \frac{\sum_p \text{EXGR\_FNLDVA}_{c,i,p}}{\sum_p \text{EXGR}_{c,i,p}} \times 100$$

$\text{EXGR\_FNLDVASH}_{c,i}$ is defined as domestic value added in gross exports of final demand products, by industry *i* in country *c*, as a percentage of total industry exports, $\text{EXGR}_{c,i}$.

Note: EXGR_INTDVASH + EXGR_FNLDVASH = EXGR_DVASH.

5.16 EXGR_INTDVApSH: Domestic value added in exports of intermediate products, partner shares, percentage

Indicator dimensions:
[Exp cou | Exp ind | Imp cou]



This indicator presents, for a given industry i in country c, the domestic value added content of gross exports of intermediate goods and services (including the direct and upstream domestic value-added content) to immediate partner country, *p*, as a percent of total domestic value added content of gross exports of intermediates *i*.

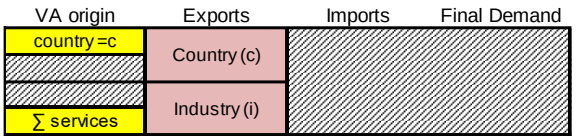
$$\text{EXGR\_INTDVApSH}_{c,i,p} = \frac{\text{EXGR\_INTDVA}_{c,i,p}}{\sum_p \text{EXGR\_INTDVA}_{c,i,p}} \times 100$$

5.f Services value added content of gross exports

The indicators dealing with service value added content consider only the service industries as a source of value added in the exports by all industries. Service industries include *Construction*, *Wholesale and retail*, *Accommodation and food services*, *Transportation services*, *Information and communications*, *Financial and insurance*, *Real estate*, *Professional, scientific and technical services*, *Administrative and support services*, *Public Administration*, *Health*, *Education* and *Personal services* i.e. defined a ISIC Rev.4 Divisions 41 to 98

5.17 EXGR_SERV_DVASH: Domestic services value added share in gross exports, percentage

Indicator dimensions:
[Exp cou | Exp ind | World]



$\text{EXGR\_SERV\_DVASH}_{c,i}$ is the share of value added originating from all domestic service industries in total gross exports by industry *i* in country *c* and defined as :

$$\text{EXGR\_SERV\_DVASH}_{c,i} = \frac{\text{EXGR\_SERV\_DVA}_{c,i}}{\text{EXGR}_{c,i}} \times 100$$

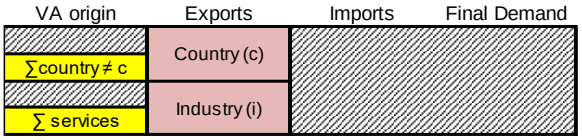
where:

$$\text{EXGR\_SERV\_DVA}_{c,i} = \sum_{j \in S} \widehat{V_{c,J}} \left(B_{c,c}\right)_{ji} \text{EXGR}_{c,i}$$

$\widehat{V_{c,J}}$ is the diagonal matrix $\widehat{V_c}$, with all entries corresponding to industry $i \neq j$ equal to zero and the element corresponding to $j \in S$ to the value added share of service industry j in country c. S is the set of service industry indices. $\left(B_{c,c}\right)_{ji}$ is *ji-th* element of $B_{c,c}$.

5.18 EXGR_SERV_FVASH: Foreign services value added share in gross exports, percentage

Indicator dimensions:
[Exp cou | Exp ind | World]



$EXGR\_SERV\_FVASH_{c,i}$ is the share of value added originating from all foreign service industries in total gross exports by industry *i* in country *c* and defined as:

$$EXGR\_SERV\_FVASH_{c,i} = \frac{EXGR\_SERV\_FVA_{c,i}}{EXGR_{c,i}} \times 100$$

where:

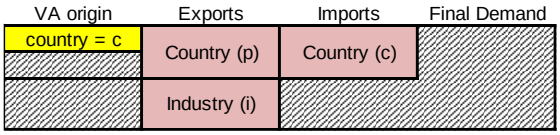
$$EXGR\_SERV\_FVA_{c,i} = \sum_{p} \sum_{j \in S} \widehat{V_{p,j}} \left(B_{p,c}\right)_{ji} EXGR_{c,p,i}$$

$\widehat{V_{c,j}}$ is the diagonal matrix $\widehat{V_c}$, with all entries corresponding to industry $i \neq j$ equal to zero and the element corresponding to $j \in S$ to the value added share of service industry j in country c. S is the set of service industry indices. $\left(B_{p,c}\right)_{ji}$ is the *ji-th* element of $B_{p,c}$.

5.g Domestic value added in imports

5.19 IMGR_DVA: Domestic value added embodied in gross imports, USD million

Indicator dimensions:
[Imp cou | Exp ind | Exp cou]



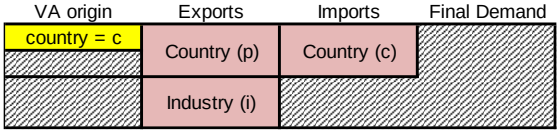
Domestic value added content of gross imports reveals the value added generated in country *c* that returns to country *c* embodied in gross imports from industry *i* in partner country *p*.

$$\text{IMGR\_DVA}_{\text{c,i,p}} = \widehat{V}_c \text{B}_{c,\text{i,p}} \text{IMGR}_{c,\text{i,p}}$$

Where $\text{IMGR}_{\text{c,i,p}}$ is a K×K diagonal matrix with the imports of country *c* from the exporting industries of partner country *p*.

5.20 IMGR_DVASH: Domestic value added share of gross imports, percentage

Indicator dimensions:
[Imp cou | Exp ind | Exp cou]



Domestic value added share of gross imports (IMGR_DVASH) is defined as the domestic value added embodied in gross imports (IMGR_DVA) by exporting industry *i* of exporting country *p* divided by total gross imports of exporting industry *i* of exporting country *p*, in %. It is a 'DVA intensity measure' and reflects how much domestic value-added is embodied per unit of total gross imports from exporting industry *i* of exporting country *p*:

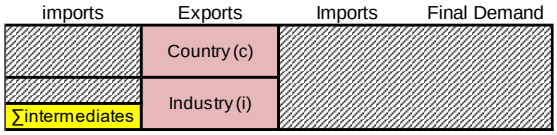
$$\text{IMGR\_DVASH}_{c,i,p} = \frac{IMGR\_DVA_{c,i,p}}{\sum_{\text{p}} \text{IMGR}_{c,i,p}} \times 100$$

It can reveal the extent to which previously exported domestic value added returns to the domestic economy, via imports of both final and intermediate goods and services, after passing through regional or global production chains.

5.h Re-exported intermediate imports

5.21 REII: Re-exported intermediate imports, USD million

Indicator dimensions:
[Exp cou | Prod ind | World]



Imported products which are used as inputs into production processes and then exported again are referred to as re-exported intermediate products. This indicator is available by country and exporting industry.

$$\mathrm{REII}_{c,i} = \sum_{p} A_{p,c}\, \mathrm{B}_{c,c}\mathrm{EXGR}_{c,i}$$

$\mathrm{A}_{p,c}$ is a $K \times K$ off-diagonal block matrix of A giving country c imported intermediate products sourced from country p required to produce one unit of output.

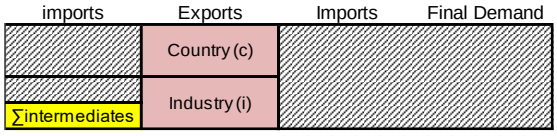
$\mathrm{EXGR}_{c,i}$ is a $K \times 1$ vector, representing total exports of each industry i of country c to all other countries.

$\mathrm{A}_{p,c}\mathrm{B}_{c,c}\mathrm{EXGR}_{c}$, is also a $K \times 1$ vector and refers to intermediate goods and services absorbed in country c that originated from country p for total exports by country c.

$\mathrm{REII}_{c,i}$ gives total intermediate goods and services absorbed by country c that originated from all foreign countries in industry i. It reveals the importance of intermediate imports in the production of goods and services for export and their role as a source for international competitiveness.

5.22 IMGRINT_REII: Re-exported intermediate imports, as a share of total intermediate imports, percentage

Indicator dimensions:
[Exp cou | Prod ind | World]



Re-exported intermediate imports by exporting industry as a share of intermediate imports shows how much of the imports are exported.

$$\mathrm{IMGRINT\_REII}_{c,i} = \frac{\mathrm{REII}_{c,i}}{\sum_{p} \mathrm{IMGR\_INT}_{c,i,p}}$$

Where $\sum_{p} \mathrm{IMGR\_INT}_{c,i,p}$ is total intermediate imports by country c from industry i in partner p.

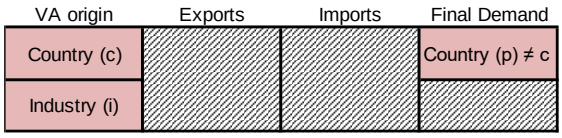
This indicator reflects the share of intermediate imports from all partners' industry i that are used domestically by country c (both indirectly and directly) in producing goods and services for export, as a percentage of total intermediate imports (from industry i).

The indicator provides a measure of the importance of intermediate imports to produce goods and services for export and their role as a source of international competitiveness.

6 Indicators based on the origins of Value Added in Final Demand

6.1 FFD_DVA: Domestic value added embodied in foreign final demand, USD million

Indicator dimensions:
[VA src cou | VA src ind | FD cou]



Domestic value added embodied in foreign final demand captures the value added that industries export both directly, through exports of final goods or services and, indirectly via exports of intermediates that reach foreign final consumers (households, government, business investment) through other countries. The measure reflects how domestic industries (upstream in a value-chain) are connected to consumers in other countries, even when no direct trade relationship exists. The indicator illustrates therefore the full impact of final demand in foreign markets on domestic output. It can be interpreted as 'exports of value added', and is defined as:

$$\text{FFD\_DVA}_{\text{c,p}} = \left(\hat{\mathbf{V}}\,\mathbf{B}\,\mathbf{FD}\right)_{c,p}$$

Where $\text{FFD\_DVA}_{\text{c,p}}$ is a $K \times 1$ vector. Matrix $\hat{\mathbf{V}}\,\mathbf{B}\,\mathbf{FD}$ is of size $(KN \times K)$ and calculated from multiplying the three global matrices, $\hat{\mathbf{V}}$, the diagonalized value added share of production PROD_VASH, **B** the global Leontief inverse and **FD** the global final demand matrix showing the demand of country p (in columns) for goods and services from industry i in country c (rows), and $\left(\hat{\mathbf{V}}\,\mathbf{B}\,\mathbf{FD}\right)_{c,p}$ is the part of the matrix with K rows (one for each industry) corresponding to country c and column corresponding to country p. This is only available for $p \neq c$. FFD_DVA is available by value added country, value added industry, and partner country.

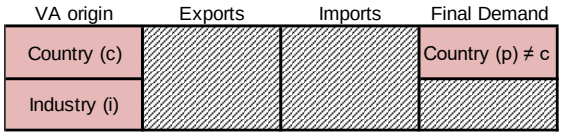
$\text{FFD\_DVA}_{\text{c,p,i}}$ is the *i-th* element of the $K \times 1$ vector $\text{FFD\_DVA}_{\text{c,p}}$

$\text{FFD\_DVA}_{\text{c,p,i}}$ shows the value added originating from industry i in country/region c embodied in the final demand of country/region p.

For regions c, FFD_DVA excludes within-region final demand (e.g. for EU27, final demand in non-EU27 economies only).

6.2 FFD_DVApSH: Domestic value added embodied in foreign final demand, partner shares, percentage

Indicator dimensions:
[VA src cou | VA src ind | FD cou]



This indicator shows domestic value added generated by industry *i* in country *c* embodied in final demand of country *p* as a percentage of total domestic value added from industry *i* in foreign final demand:

$$\text{FFD\_DVApSH}_{c,i,p} = \frac{\text{FFD\_DVA}_{c,i,p}}{\sum_p \text{FFD\_DVA}_{c,i,p}} \times 100$$

FFD_DVApSH is available by country and industry origin of value added and final demand partner country.

It provides a value added perspective of domestic industries' relative connectedness with other countries and regions - independent of whether or not domestic (upstream) industries are direct exporters. Compare with EXGRpSH and EXGR_DVApSH

6.3 VALU_FFDDVA: Domestic value added embodied in foreign final demand as a share of total value added, percentage

Indicator dimensions:
[VA src cou | VA src ind | World]

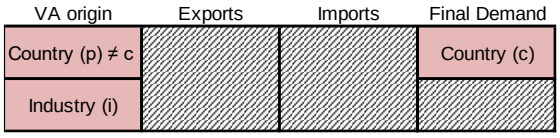
$\text{VALU\_FFDDVA}_{c,i}$ for industry *i* in country *c* is defined as domestic value added, from industry *i*, meeting foreign final demand, $\text{FFD\_DVA}_{c,i}$, as a percentage of industry *i* value added:

$$\text{VALU\_FFDDVA}_{c,i} = \frac{\sum_p \text{FFD\_DVA}_{c,i,p}}{\text{VALU}_{c,i}} \times 100$$

This is available by country and industry origin of value added. It can be considered as a measure of an industry's reliance on foreign final demand.

6.4 DFD_FVA: Foreign value added embodied in domestic final demand, USD million

Indicator dimensions:
[FD cou | VA src ind | VA src cou]



Foreign value added embodied in domestic final demand reveals the amount of foreign value added present in final goods or services purchased by households, government, non-profit institutions serving households or, as investments. It is the 'import' equivalent of FFD_DVA and can show how industries abroad (upstream in a value-chain) are connected to consumers at home, even where no direct trade relationship exists. It can be interpreted as 'imports of value-added', in such a way:

$$\text{DFD\_FVA}_{\text{p,c}} = \left(\hat{V}\ B\ FD\right)_{p,c}$$

$\text{DFD\_FVA}_{p,\text{c}}$ is the part of matrix $\hat{V}\ B\ FD$ with rows corresponding to country p industries and column c of domestic consumption. This is only available for $p \neq c$.

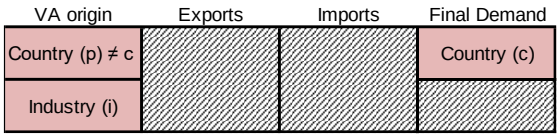
$\text{DFD\_FVA}_{\text{p,c,i}}$ is the i-th element of the $K{\times}1$ vector $\text{DFD\_FVA}_{\text{p,c}}$

$\text{DFD\_FVA}_{\text{p,c,i}}$ shows the value added originating from industry i in country/region p embodied in the final demand of country/region c.

For regions c, DFD_FVA excludes within-region origin of value added (e.g. for EU27, foreign value added is non-EU27 origin only).

6.5 DFD_FVApSH: Foreign value added embodied in domestic final demand, partner shares, percentage

Indicator dimensions:
[FD cou | VA src ind | VA src cou]



This indicator shows foreign value added generated by industry i in country p embodied in domestic final demand of country c as a percentage of total foreign value added from industry i in domestic final demand.

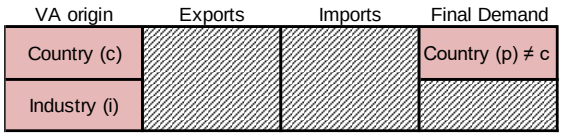
$$\text{DFD\_FVApSH}_{c,i,p} = \frac{\text{DFD\_FVA}_{c,i,p}}{\sum_{\text{p}} \text{DFD\_FVA}_{c,i,p}} \times 100$$

DFD_FVApSH is available by country and, partner country and industry origin of value added.

It provides a value added perspective of a domestic economy's relative connectedness to production in other countries and regions - independent of whether or not there are direct imports from foreign (upstream) industries. Compare with IMGRpSH.

6.6 BALVAFD: Value added embodied in final demand, balance, USD million

Indicator dimensions:
[VA src cou | VA src ind | FD cou]



The balance is calculated as the difference between domestic value added embodied in foreign final demand and foreign value added in domestic final demand by value added origin industry.

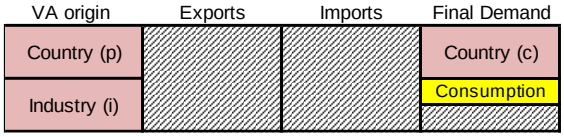
$$\text{BALVAFD}_{\text{c,i,p}} = \text{FFD\_DVA}_{\text{c,i,p}} - \text{DFD\_FVA}_{\text{c,i,p}}$$

For each country *c* the total value added trade balance, summed over all industries and for partner World is equal to the equivalent total gross trade balance (BALGR). However, at the partner and industry level, BALVAFD can reveal trading relationships not evident when looking at the trade balances in gross terms.

$\text{BALVAFD}_{c,i,p}$ shows country *c* value added trade balance with country *p* for industry (or product group) *i*.

6.7 FD_VA | CONS_VA | GFCF_VA: Value added embodied in final demand, consumption and GFCF, USD million

Indicators dimensions:
[FD cou | VA src ind | VA src cou]



Value added (from industry i in country p) in final demand (FD), consumption (CONS) and gross fixed capital formation (GFCF) of country *c* are defined as the *K×1* vectors (representing the *K* industries).

$$\text{FD\_VA}_{\text{p,c}} = \left(\hat{V}\ B\ FD\right)_{p,c}$$

$$\text{CONS\_VA}_{\text{p,c}} = \left(\hat{V}\ B\ CONS\right)_{p,c}$$

$$\text{GFCF\_VA}_{\text{p,c}} = \left(\hat{V}\ B\ GFCF\right)_{p,c}$$

Here, the indicator includes domestic value added embodied in domestic demand, i.e. $c = p$ is possible.

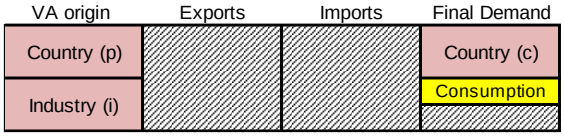
Total consumption, CONS, covers household consumption, government expenditure and NPISHs. It excludes direct purchases abroad by residents and non–residents direct purchases on domestic territory (*non-res*). It is a subset of FD_VA.

Gross fixed capital formation (GFCF), covers the demand for investment goods and services, by businesses and government in country *c*. It does not include change in inventories (*invnt*). It is also a subset of FD_VA.

In such a way: *FD_VA = (CONS_VA + GFCF_VA) + (non-res + invnt)*

6.8 FD_VASH | CONS_VASH | GFCF_VASH: Value added shares in final demand, consumption and GFCF, percentage

Indicators dimensions:
[FD cou | VA src ind | VA src cou]



These indicators look on the demand side of the countries, i.e., for the total domestic demand (final demand, consumption or GFCF) of a country *c* they show what is the share of the value added from source country *p* industry *i* in country *c* total value added consumed and which has its origin in industry *i*. They are defined as follows:

$$\text{FD\_VASH}_{\text{p,c,i}} = \frac{\text{FD\_VA}_{p,\text{c,i}}}{\sum_p \text{FD\_VA}_{\text{p,c,i}}} \times 100$$

$$\text{CONS\_VASH}_{\text{p,c,i}} = \frac{\text{CONS\_VA}_{\text{p,c,i}}}{\sum_p \text{CONS\_VA}_{\text{p,c,i}}} \times 100$$

$$\text{GFCF\_VASH}_{\text{p,c,i}} = \frac{\text{GFCF\_VA}_{\text{p,c,i}}}{\sum_p \text{GFCF\_VA}_{\text{p,c,i}}} \times 100$$

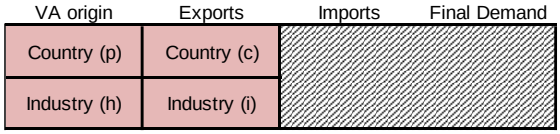
Total consumption, CONS, covers household consumption, government expenditure and NPISHs. It excludes direct purchases abroad by residents. It is a subset of FD_VA.

Gross fixed capital formation (GFCF), covers the demand for investment goods and services, by businesses and government in country *c*. It is also a subset of FD_VA.

7 Detailed Indicators for Gross Exports, Gross Imports and Final Demand

7.1 EXGR_BSCI: Origin of value added in gross exports, USD million

Indicators dimensions:
[VA src cou | VA src ind | Exp cou | Exp ind]



Origin of value added in gross exports provides estimates of total gross exports by exporting industry *i* in country *c* broken down by the value added generated by source industry h in country *p*:

$$\text{EXGR\_BSCI}_{p,\text{h},\text{c},\text{i}} = \left(\hat{\nabla}\text{B}\ \text{EXGR}_{c,\text{i}}\right)_{p,\text{h}}$$

Where $\text{EXGR}_{c,\text{i}}$ is a vector of size *KN×1*, with all entries being zero except the entry corresponding to exports by country c industry *i*. $\hat{\nabla}\text{B}\ \text{EXGR}_{c,\text{i}}$ is a vector of size *KN×1* as well and $\left(\hat{\nabla}\text{B}\ \text{EXGR}_{c,\text{i}}\right)_{p,\text{h}}$ is the vector element corresponding to value adding in country *p* industry *h*.

This indicator reveals how the value of a country's gross exports of intermediate and final products is an accumulation of value generated by many industries in many countries.

Domestic value added origin is shown where source country *p=c* and, for convenience, also represented by *source country = "DXD: Domestic"*.

From this indicator a range of gross exports-based measures can be derived including those in the main TiVA indicators database such as:

Total gross exports by industry, $\text{EXGR}_{c,\text{i}}$: set VA source country, *p = World*, source industry, *h = DTOTAL*;

Total domestic and foreign value added content of gross exports by industry, $\text{EXGR\_DVA}_{\text{c,i}}$ and $\text{EXGR\_FVA}_{\text{c,i}}$. For EXGR_DVA, set source country *p = DXD "Domestic"*, VA source industry, *h = DTOTAL*;

Shares of EXGR_DVA and EXGR_FVA in relation to EXGR such as $\text{EXGR\_DVASH}_{\text{c,i}}$, $\text{EXGR\_TDVAIND}_{\text{c,i}}$, and the "GVC backward linkage" indicators $\text{EXGR\_FVASH}_{\text{c,i}}$ and $\text{EXGR\_TFVAIND}_{\text{c,i}}$;

"GVC forward linkage" indicators such as EXGR_DVAFXSH;

Service value added contents of gross exports $\text{EXGR\_SERV\_DVASH}_{\text{c,i}}$ and $\text{EXGR\_SERV\_FVASH}_{\text{c,i}}$. Set source industry, *h = D41T98* (Total Services including Construction activities);

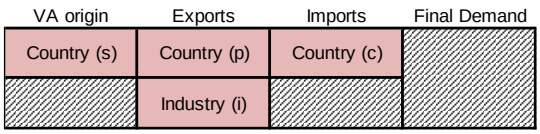
For regions, exports exclude intra-regional trade and, intra-regional value added flows are considered as domestic value added. For example, for exporting region EU27, exports are to non-EU27 economies and, source country "*DXD: domestic*" includes value added originating from Member States.

Note that the same value added originating from industry j in country p can be present in the gross exports of more than one country c (as embodied value added, from upstream production, may cross national borders many times). In general, therefore, these estimates should be viewed from the perspective of the exporting country *c* and exporting industry *i*.

However, for indicators of "GVC forward linkages" a source country p, source industry j perspective is required.

7.2 IMGR_BSCI: Origin of value added in gross imports, USD million

Indicators dimensions:
[Imp cou | VA src cou | Exp ind | Exp cou]



Origin of value added in gross imports provides estimates of the value added in gross imports by country *c* of goods and services from industry *i* originating from partner country/region *p* broken down by value added originating from country/region *s*.

$$\text{IMGR\_BSCI}_{\text{p,c,i,s}} = \hat{V}B\ IMGR_{p,c}$$

Where $\text{IMGR}_{\text{p,c}}$ is a diagonal matrix of size *KN*×*KN*, with the gross imports of country *c* from the exporting industries of the partners' countries *p*.

In other words, the four dimensions link the imports of country *c* to the value added from source country *s* embodied in the exports of industry *i* in the exporting country *p* - thus revealing how the value of a country's gross imports of intermediate and final products from a particular partner is an accumulation of value generated by many countries.

From this indicator a range of gross imports-based measures can be derived including the following found in the main TiVA indicators database:

Total gross imports by industry, $\text{IMGR}_{\text{c,i}}$: set exporting country, *p* = *World* and source country, *s* = *World*.

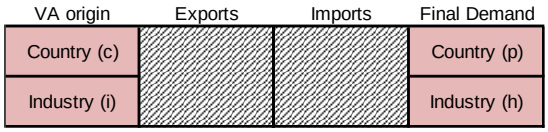
Domestic value added content of gross imports by partner and industry, $\text{IMGR\_DVA}_{\text{c,p,i}}$: set source country *s* = importing country *c*.

Share of IMGR_DVA in relation to IMGR: $\text{IMGR\_DVASH}_{\text{c,p,i}}$

Note that the same value added originating from source country *s* can be present in the gross imports of more than one importing country *c* (as embodied value added, from upstream production, may cross national borders many times). In general, therefore, these estimates should be viewed from the perspective of an importing country *c*.

7.3 FDVA_BSCI: Origin of value added in final demand, USD million

Indicators dimensions:
[VA src cou | VA src ind | FD cou | FD ind]



Origin of value added in final demand provides estimates of value added for final demand in country *p* for industry *h* final goods and services broken down by the value added generated by source industry *i* in VA source country *c*.

$$\text{FDVA\_BSCI}_{c,i,p,\text{h}} = \left(\hat{\text{V}}\text{B FD}_{\text{p,h}}\right)_{c,\text{i}}$$

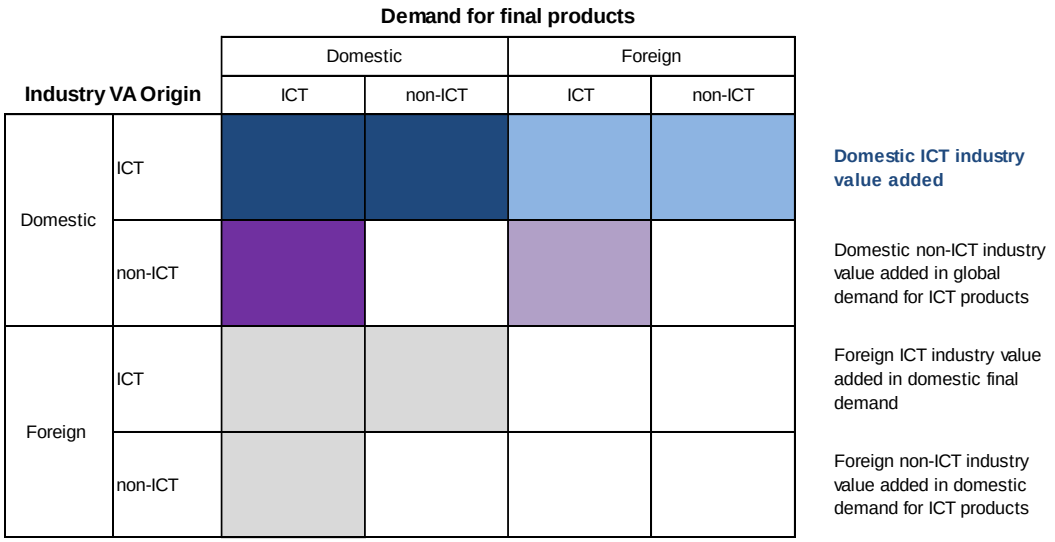
Where $\text{FD}_{\text{p,h}}$ is a vector of size *KN*×*1*, with all entries being zero except the entry corresponding to final demand for goods and services of industry h in country p. $\hat{\text{V}}\text{B FD}_{\text{p,h}}$ is a vector of size *KN x 1* as well and $\left(\hat{\text{V}}\text{B FD}_{\text{p,h}}\right)_{c,i}$ is the vector element corresponding to value added generate by industry i in country *c*.

In other words, it reveals how the value of final demand goods and services consumed within a country is an accumulation of value generated by many industries in many countries.

Domestic value added origin is shown where source country $p = c$ and, for convenience, also represented by source country = "*DXD: Domestic*".

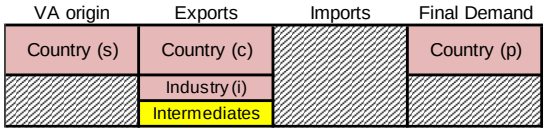
From this indicator a range of final demand-based measures can be derived including those in the main TiVA indicators database such as Domestic value added embodied in foreign final demand, FFD_DVA and related partner shares FFD_DVApSH; and, Foreign value added embodied in domestic final demand, DFD_FVA and related partner shares DFD_FVApSH.

The diagram below, with two industries - ICT (ISIC Rev.4 Division 26) and "non-ICT" - illustrates how the data can provide new perspectives on the output of certain industries and related demand. The value added generated by a country's domestic ICT industry is present in final demand for both ICT and "non-ICT" products, both at home and abroad. Similarly, domestic final demand for ICT products includes value added generated by domestic and foreign ICT and "non-ICT" industries.



7.4 FD_EXGRINT_VA: Gross exports of intermediate products by origin of value added and final destination, USD million

Indicators dimensions:
[VA src cou | Exp cou | Exp ind | FD cou]



This indicator (FD_EXGRINT_VA) presents gross exports of intermediate products by industry i in country c, broken down by both the source country/region s origin of value added, and according to final demand destination country/region p.

$$\text{FD\_EXGRINT\_VA}_{s,c,i,p} = V_{s,j} * B_{s,j,c,i} * \text{F}_{c,i,p}$$

Where:

$F = diag\{[\gamma \circ A * diag(B * FD)] * i\}$

γ is a matrix with ones in the off main block diagonals and zeros in the main block diagonals, i.e., zeros for the block diagonal of the same country of origin and destination,

$\circ$ is the symbol for the Hadamard product, i.e., the element-wise multiplication

i is a vector of ones

This indicator is from the exporting countries point of view, i.e., it shows the value added from source country s embodied in the exports of intermediates by exporting country c which ends up in the final destination country p.

7.5 FD_EXGRFNL_VA: Gross exports of final products by origin of value added and final destination, USD million

Indicators dimensions:
[VA src cou | Exp cou | Exp ind | FD cou]

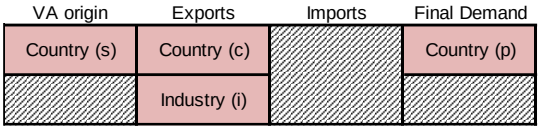
This indicator (FD_EXGRFNL_VA) presents gross exports of final products by industry i in country c, broken down by both the source country/region s origin of value added and, according to final demand destination country/region p.

$$\text{FD\_EXGRFNL\_VA}_{s,c,i,p} = V_{s,j} * B_{s,j,c,i} * \text{EXGR\_FNL}_{c,i,p}$$

This indicator is from the exporting countries point of view, i.e., it shows the value added from source country s embodied in the exports of final goods by exporting country c which ends up in the final destination p.

7.6 FD_EXGR_VA: Gross exports by origin of value added and final destination, USD million

Indicators dimensions:
[VA src cou | Exp cou | Exp ind | FD cou]



This indicator (FD_EXGR_VA) presents gross exports of final and intermediate products by industry *i* in country *c*, broken down by both the source country/region s origin of value added and, according to final demand destination country/region *p*.

$$\text{FD\_EXGR\_VA}_{s,c,i,p} = \text{FD\_EXGRINT\_VA}_{s,c,i,p} + \text{FD\_EXGRFNL\_VA}_{s,c,i,p}$$

This indicator is from the exporting countries point of view, i.e., it shows the value added from source country *s* embodied in the exports of exporting country *c* which ends up in the final destination *p*.

Annex A. Dimensions of OECD TiVA database 2023 edition

The TiVA indicators are estimated for years from 1995 to 2020; 76 economies and "*Rest of the World*" (Table A.1); 17 regions and country groups and total World (Table A.2); 45 unique industries (Table A.3) and 25 industry aggregates (Table A.4) within a hierarchy (Table A.5).

Important note concerning TiVA estimates for most recent years

The TiVA estimates for the most recent years should be interpreted with caution.

Harmonised national Supply and Use Tables (SUTs) and Input-Output Tables (IOTs) are key inputs in the construction of Inter-Country Input-Output (ICIO) tables from which TiVA indicators are calculated. Availability of official SUTs and IOTs is therefore a major determinant of inclusion in the published TiVA database. While some large economies (such as China, Japan and the United States) have already published SUTs for 2020, many countries publish SUTs with a time-lag of 3 to 5 years. Therefore, to produce ICIO tables for more recent years, the latest available harmonised SUTs are extrapolated under constraints coming from National Accounts (SNA) time series up to 2020, and further adjusted using Balance of Payments statistics and bilateral trade in goods and services, also up to 2020. An important implicit assumption is that countries' industry input and output structures in extrapolated SUTs are similar to the structures of the latest available SUTs. This is a reasonable assumption in the absence of global or regional economic shocks. However, in 2020, the COVID pandemic and related restrictions hit certain activities disproportionally (such as transport services; accommodation and food services; arts, entertainment and sporting events) and the timing and the pace of recovery varied across countries and sectors. The magnitude of these changes and the extent to which they affect core TIVA indicators needs to be investigated further. As countries update and revise their annual SNA statistics from 2020 onwards and publish more recent SUTs and benchmark IOTs, a clearer understanding of the economic impact of COVID will emerge and future updates of OECD ICIO tables and TiVA indicators should reflect this.

Table A.1. Country coverage

N.	Code	Country	N.	Code	Country
1	AUS	Australia	39	ARG	Argentina
2	AUT	Austria	40	BGD	Bangladesh
3	BEL	Belgium	41	BLR	Belarus
4	CAN	Canada	42	BRA	Brazil
5	CHL	Chile	43	BRN	Brunei Darussalam
6	COL	Colombia	44	BGR	Bulgaria
7	CRI	Costa Rica	45	KHM	Cambodia
8	CZE	Czechia	46	CMR	Cameroon
9	DNK	Denmark	47	CHN	China (People's Republic of)
10	EST	Estonia	48	CIV	Côte d'Ivoire
11	FIN	Finland	49	HRV	Croatia
12	FRA	France	50	CYP	Cyprus[2]
13	DEU	Germany	51	EGY	Egypt
14	GRC	Greece	52	HKG	Hong Kong, China
15	HUN	Hungary	53	IND	India
16	ISL	Iceland	54	IDN	Indonesia
17	IRL	Ireland	55	JOR	Jordan
18	ISR	Israel[1]	56	KAZ	Kazakhstan
19	ITA	Italy	57	LAO	Lao (People's Democratic Rep.)
20	JPN	Japan	58	MYS	Malaysia
21	KOR	Korea	59	MLT	Malta
22	LVA	Latvia	60	MAR	Morocco
23	LTU	Lithuania	61	MMR	Myanmar
24	LUX	Luxembourg	62	NGA	Nigeria
25	MEX	Mexico	63	PAK	Pakistan
26	NLD	Netherlands	64	PER	Peru
27	NZL	New Zealand	65	PHL	Philippines
28	NOR	Norway	66	ROU	Romania
29	POL	Poland	67	RUS	Russian Federation
30	PRT	Portugal	68	SAU	Saudi Arabia
31	SVK	Slovakia	69	SEN	Senegal
32	SVN	Slovenia	70	SGP	Singapore
33	ESP	Spain	71	ZAF	South Africa
34	SWE	Sweden	72	TWN	Chinese Taipei
35	CHE	Switzerland	73	THA	Thailand
36	TUR	Türkiye	74	TUN	Tunisia
37	GBR	United Kingdom	75	UKR	Ukraine
38	USA	United States	76	VNM	Viet Nam
			77	WXD	Rest of the World

OECD countries (as of 25 May 2021) | Countries added in 2022

Notes:

1. The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities or third party. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in theWest Bank under the terms of international law.

2. **Footnote by Türkiye**: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Türkiye recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Türkiye shall preserve its position concerning the "Cyprus issue". **Footnote by all the European Union Member States of the OECD and the European Union**: The Republic of Cyprus is recognised by all members of the United Nations with the exception of Türkiye. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Table A.2. Regions and country groups

N.	Code[1]	Old code (TiVA 2021)	Region	Countries covered									
1	OECD	OECD	OECD member countries	Countries 1 to 38									
2	WXOECD	WXOECD	Non-OECD economies	Countries 39 to 77									
3	APEC	APEC	Asia-Pacific Economic Cooperation[2]	**AUS**	**CAN**	**CHL**	**JPN**	**KOR**	**MEX**	**NZL**	**USA**	BRN	CHN
				HKG	IDN	MYS	PER	PHL	RUS	SGP	THA	TWN	VNM
4	ASEAN	ASEAN	Association of South East Asian Nations	BRN	IDN	KHM	LAO	MYS	MMR	PHL	SGP	THA	VNM
5	S2	EASIA	Eastern Asia	**JPN**	**KOR**	CHN	HKG	TWN					
6	EU27_2020	EU27_2020	European Union (27 countries)[3]	**AUT**	**BEL**	**CZE**	**DNK**	**EST**	**FIN**	**FRA**	**DEU**	**GRC**	**HUN**
				IRL	**ITA**	**LVA**	**LTU**	**LUX**	**NLD**	**POL**	**PRT**	**SVK**	**SVN**
				ESP	**SWE**	BGR	CYP	HRV	MLT	ROU			
7	EU28	EU28	European Union (28 countries)[3]	**AUT**	**BEL**	**CZE**	**DNK**	**EST**	**FIN**	**FRA**	**DEU**	**GRC**	**HUN**
				IRL	**ITA**	**LVA**	**LTU**	**LUX**	**NLD**	**POL**	**PRT**	**SVK**	**SVN**
				ESP	**SWE**	**GBR**	BGR	CYP	HRV	MLT	ROU		
8	EU15	EU15	European Union (15 countries)[3]	**AUT**	**BEL**	**DNK**	**FIN**	**FRA**	**DEU**	**GRC**	**IRL**	**ITA**	**LUX**
				NLD	**PRT**	**ESP**	**SWE**	**GBR**					
9	EU28XEU15	EU13	EU28 excluding EU15[3]	**CZE**	**EST**	**HUN**	**LVA**	**LTU**	**POL**	**SVK**	**SVN**	BGR	CYP
				HRV	MLT	ROU							
10	EA19	EA19	Euro area (19 countries)	**AUT**	**BEL**	**EST**	**FIN**	**FRA**	**DEU**	**GRC**	**IRL**	**ITA**	**LVA**
				LTU	**LUX**	**NLD**	**PRT**	**SVK**	**SVN**	**ESP**	CYP	MLT	
11	G20	G20	G20	**AUS**	**CAN**	**FRA**	**DEU**	**ITA**	**JPN**	**KOR**	**MEX**	**TUR**	**GBR**
				USA	ARG	BRA	CHN	IND	IDN	RUS	SAU	ZAF	EU27[4]
			World divided into regions										
12	E	ZEUR	Europe	**AUT**	**BEL**	**CZE**	**DNK**	**EST**	**FIN**	**FRA**	**DEU**	**GRC**	**HUN**
				ISL	**IRL**	**ITA**	**LVA**	**LTU**	**LUX**	**NLD**	**NOR**	**POL**	**PRT**
				SVK	**SVN**	**ESP**	**SWE**	**CHE**	**GBR**	BLR	BGR	CYP	HRV
				MLT	ROU	RUS	UKR						
13	S2_S8	ZASI	East and Southeastern Asia	**JPN**	**KOR**	BRN	CHN	HKG	IDN	KHM	LAO	MYS	MMR
				PHL	SGP	THA	TWN	VNM					
14	NAFTA	ZNAM	North American Free Trade Agreement	**CAN**	**MEX**	**USA**							
15	A5_A7	ZSCA	Central and South America	**CHL**	ARG	BRA	**COL**	**CRI**	PER				
16	F	ZAFR	Africa	CMR	CIV	EGY	MAR	NGA	SEN	ZAF	TUN		
17	W_O	ZOTH	Other regions	**AUS**	**ISR**	**NZL**	**TUR**	BGD	IND	JOR	KAZ	PAK	SAU
				WXD									
18	W	WLD	World										
19	D	DXD	Domestic	Dummy partner used in the diagonal for some indicators.									

OECD countries (as of 25 May 2021) | **Countries or regions added in 2022**

Notes:

1. New codes introduced in 2023 to conform to OECD common standards for region codes for the new OECD Explorer online dissemination tool.
2. APEC excludes Papua New Guinea, a country not included in the 2023 edition of TiVA database.
3. From 1 February 2020, after the departure of the United Kingdom, the European Union consists of 27 countries. The aggregates EU28 and EU15 include the United Kingdom and are retained for any analyses that may require this perspective.
EU member states: https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:EU_enlargements
4. Excludes FRA, DEU and ITA which are shown separately.

Table A.3. Industry coverage

N.	Code[1]	Old Code (TiVA 2021)	Economic activity	ISIC Rev.4 Divisions	ISIC Rev.4 Sections
1	A01_02	D01T02	Agriculture, hunting, forestry	01, 02	A
2	A03	D03	Fishing and aquaculture	03	
3	B05_06	D05T06	Mining and quarrying, energy producing products	05, 06	B
4	B07_08	D07T08	Mining and quarrying, non-energy producing products	07, 08	
5	B09	D09	Mining support service activities	09	
6	C10T12	D10T12	Food products, beverages and tobacco	10, 11, 12	C
7	C13T15	D13T15	Textiles, textile products, leather and footwear	13, 14, 15	
8	C16	D16	Wood and products of wood and cork	16	
9	C17_18	D17T18	Paper products and printing	17, 18	
10	C19	D19	Coke and refined petroleum products	19	
11	C20	D20	Chemical and chemical products	20	
12	C21	D21	Pharmaceuticals, medicinal chemical and botanical products	21	
13	C22	D22	Rubber and plastics products	22	
14	C23	D23	Other non-metallic mineral products	23	
15	C24	D24	Basic metals	24	
16	C25	D25	Fabricated metal products	25	
17	C26	D26	Computer, electronic and optical equipment	26	
18	C27	D27	Electrical equipment	27	
19	C28	D28	Machinery and equipment, nec	28	
20	C29	D29	Motor vehicles, trailers and semi-trailers	29	
21	C30	D30	Other transport equipment	30	
22	C31T33	D31T33	Manufacturing nec; repair and installation of machinery and equipment	31, 32, 33	
23	D	D35	Electricity, gas, steam and air conditioning supply	35	D
24	E	D36T39	Water supply; sewerage, waste management and remediation activities	36, 37, 38, 39	E
25	F	D41T43	Construction	41, 42, 43	F
26	G	D45T47	Wholesale and retail trade; repair of motor vehicles	45, 46, 47	G
27	H49	D49	Land transport and transport via pipelines	49	H
28	H50	D50	Water transport	50	
29	H51	D51	Air transport	51	
30	H52	D52	Warehousing and support activities for transportation	52	
31	H53	D53	Postal and courier activities	53	
32	I	D55T56	Accommodation and food service activities	55, 56	I
33	J58T60	D58T60	Publishing, audiovisual and broadcasting activities	58, 59, 60	J
34	J61	D61	Telecommunications	61	
35	J62_63	D62T63	IT and other information services	62, 63	
36	K	D64T66	Financial and insurance activities	64, 65, 66	K
37	L	D68	Real estate activities	68	L
38	M	D69T75	Professional, scientific and technical activities	69 to 75	M
39	N	D77T82	Administrative and support services	77 to 82	N
40	O	D84	Public administration and defence; compulsory social security	84	O
41	P	D85	Education	85	P
42	Q	D86T88	Human health and social work activities	86, 87, 88	Q
43	R	D90T93	Arts, entertainment and recreation	90, 91, 92, 93	R
44	S	D94T96	Other service activities	94,95, 96	S
45	T	D97T98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	97, 98	T

Note:

1. New codes introduced in 2023 to conform to OECD common standards for economic activity codes for the new OECD Explorer online dissemination tool.

Table A.4. Industry aggregates

N.	Code[1]	Old Code (TiVA 2021)	Economic activity aggregate	ISIC Rev. 4 Divisions
1	A	D01T03	Agriculture, hunting, forestry and fishing	01, 02, 03
2	B	D05T09	Mining and quarrying	05 to 09
3	C	D10T33	Total Manufacturing	10 to 33
4	C16T18	D16T18	Wood and paper products and printing	16 to 18
5	C19T23	D19T23	Chemicals and non-metallic mineral products	19 to 23
6	C20_21	D20T21	Chemicals and pharmaceutical products	20, 21
7	C24_25	D24T25	Basic metals and fabricated metal products	24, 25
8	C26_27	D26T27	Computer, electronic and electrical equipment	26, 27
9	C29_30	D29T30	Transport equipment	29, 30
10	D_E	D35T39	Electricity, gas, water supply, sewerage, waste and remediation services	35 to 39
11	GTN	D45T82	Total Business Sector Services	45 to 82
12	GTI	D45T56	Distributive trade, transport, accommodation and food services	45 to 56
13	H	D49T53	Transportation and storage	49 to 53
14	J	D58T63	Information and communication	58 to 63
15	M_N	D69T82	Other business sector services	69 to 82
16	OTT	D84T98	Public admin, education, health and other personal services	84 to 98
17	OTQ	D84T88	Public admin, defence; education and health	84 to 88
18	RTT	D90T98	Other social and personal services	90 to 98
19	R_S	D90T96	Other community, social and personal services	90 to 96
20	BTE	D05T39	Industry (Mining, Manufactures and Utilities)	05 to 39
21	GTT	D45T98	Total Services (excl. construction)	45 to 98
22	JTN	D58T82	Information, Finance, Real Estate and other business services	58 to 82
23	FTT	D41T98	Total Services (incl. construction)	41 to 98
24	INFO	DINFO	Information industries	26, 58 to 63
25	_T	DTOTAL	TOTAL	All Divisions

Note:

1. New codes introduced in 2023 to conform to OECD common standards for economic activity codes for the new OECD Explorer online dissemination tool.

Table A.5. Industry hierarchy

Hierarchy Level	Parent	Code	Industry description	3-character code[1]
0		_T	TOTAL	TOT
1	_T	**A**	**Agriculture, hunting, forestry and fishing**	**AGR**
2	A	A01_02	Agriculture, hunting, forestry	AHF
2	A	A03	Fishing and aquaculture	FSH
1	_T	**B**	**Mining and quarrying**	**MIN**
2	B	B05_06	Mining and quarrying, energy producing products	MNE
2	B	B07_08	Mining and quarrying, non-energy producing products	MNN
2	B	B09	Mining support service activities	MNS
1	_T	**C**	**Total Manufacturing**	**MAN**
2	C	C10T12	Food products, beverages and tobacco	FOD
2	C	C13T15	Textiles, textile products, leather and footwear	TEX
2	C	C16T18	Wood and paper products and printing	WPP
3	C16T18	C16	Wood and products of wood and cork	WOD
3	C16T18	C17_18	Paper products and printing	PAP
2	C	C19T23	Chemicals and non-metallic mineral products	CNM
3	C19T23	C19	Coke and refined petroleum products	PET
3	C19T23	C20_21	Chemicals and pharmaceutical products	CPP
4	C20_21	C20	Chemical and chemical products	CHM
4	C20_21	C21	Pharmaceuticals, medicinal chemical and botanical products	PHM
3	C19T23	C22	Rubber and plastics products	RBP
3	C19T23	C23	Other non-metallic mineral products	NMM
2	C	C24_25	Basic metals and fabricated metal products	BMF
3	C24_25	C24	Basic metals	MET
3	C24_25	C25	Fabricated metal products	FBM
2	C	C26_27	Computer, electronic and electrical equipment	EEQ
3	C26_27	C26	Computer, electronic and optical equipment	CEQ
3	C26_27	C27	Electrical equipment	ELQ
2	C	C28	Machinery and equipment, nec	MEQ
2	C	C29_30	Transport equipment	TEQ
3	C29_30	C29	Motor vehicles, trailers and semi-trailers	MTR
3	C29_30	C30	Other transport equipment	TRQ
2	C	C31T33	Manufacturing nec; repair and installation of machinery and equipment	OTM
1	_T	**D_E**	**Electricity, gas, water supply, sewerage, waste and remediation services**	**EGW**
2	D_E	D	Electricity, gas, steam and air conditioning supply	ELG
2	D_E	E	Water supply; sewerage, waste management and remediation activities	WSW
1	_T	**F**	**Construction**	**CON**
1	_T	**GTN**	**Total Business Sector Services**	**BSR**
2	GTN	GTI	Distributive trade, transport, accommodation and food services	WTH
3	GTI	G	Wholesale and retail trade; repair of motor vehicles	WRT
3	GTI	H	Transportation and storage	TSP
4	H	H49	Land transport and transport via pipelines	LTR
4	H	H50	Water transport	WTR
4	H	H51	Air transport	ATR
4	H	H52	Warehousing and support activities for transportation	WSA
4	H	H53	Postal and courier activities	PST
3	GTI	I	Accommodation and food service activities	HTR
2	GTN	J	Information and communication	INF
3	J	J58T60	Publishing, audiovisual and broadcasting activities	PVB
3	J	J61	Telecommunications	TEL
3	J	J62_63	IT and other information services	ITS
2	GTN	K	Financial and insurance activities	FIN
2	GTN	L	Real estate activities	REA
2	GTN	M_N	Other business sector services	OBZ
3	M_N	M	Professional, scientific and technical activities	PRF
3	M_N	N	Administrative and support services	ADM
1	_T	**OTT**	**Public admin, education, health and other personal services**	**PUB**
2	OTT	OTQ	Public admin, defence; education and health	PEH
3	OTQ	O	Public administration and defence; compulsory social security	GOV
3	OTQ	P	Education	EDU
3	OTQ	Q	Human health and social work activities	HTH
2	OTT	RTT	Other social and personal services	OSP
3	RTT	R_S	Other community, social and personal services	OTS
4	RTT	R	Arts, entertainment and recreation	AER
4	RTT	S	Other service activities	OSA
3	RTT	T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	PVH
memo	_T	BTE	Industry (mining, manufactures and utilities)	MMU
memo	_T	FTT	Total services (incl. construction)	TSC
memo	_T	GTT	Total services	SER
memo	_T	JTN	Information, finance, real estate and other business services	IFB
memo	_T	DINFO	Information industries	IFI

Notes:

1. Suggested 3-character codes for use in tables and charts.