Input-Output Data Converter

Documentation and User Manual

English

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Table of Contents

1 Introduction **2**
- 1.1 Purpose of the tool . . . 2
- 1.2 Recommended matrix sizes . . . 2

2 Tab 1: Import **3**
- 2.1 Data source . . . 3
- 2.2 Embedded example: Destatis input-output accounts 2022 . . . 3
- 2.3 Own Destatis or generic file . . . 3
- 2.4 Eurostat import . . . 4
- 2.5 Data sources and licences . . . 4

3 Tab 2: Analysis **5**
- 3.1 Data overview and matrix preview . . . 5
- 3.2 Additional rows (additional coefficients) . . . 5
- 3.3 Final use vectors . . . 5

4 Tab 3: Aggregation **6**
- 4.1 Procedure . . . 6
- 4.2 Aggregation formulas . . . 6
- 4.3 Suggested grouping (example) . . . 6

5 Tab 4: Export **7**
- 5.1 Export files . . . 7
- 5.2 Saving in the databox . . . 7

6 Tips and Common Errors **8**

Literature **8**

1 Introduction

1.1 Purpose of the tool

The **Input-Output Data Converter** prepares input-output tables from statistical offices (Destatis, Eurostat) or own tables for the Leontief calculators. It reads the *intermediate flow matrix* X (volumes, EUR million) and the output, calculates the technical coefficients, aggregates large tables into a manageable number of groups and passes the result either as CSV files or directly to the central databox.

The tool is divided into four tabs:

1. **Import** — data source, embedded Destatis example, file upload, data structure
2. **Analysis** — statistics, matrix preview, sector names, additional rows, final use
3. **Aggregation** — grouping of the sectors and calculation of the aggregated matrix
4. **Export** — CSV files, metadata and saving in the databox

All processing takes place in the browser. Uploaded files are *not* stored; only what is explicitly transferred to the databox is stored (locally in the browser).

1.2 Recommended matrix sizes

The Leontief calculators can handle any size in principle, but for clear results and fast calculation aggregation to about 8–15 groups is recommended (up to 30 groups is still fast, over 50 groups slow and hard to interpret).

2 Tab 1: Import

2.1 Data source

Select the data source in the dropdown:

- **Destatis (Germany)** — statistical report "Input-Output-Rechnung" (Excel)
- **Eurostat (EU)** — dataset `naio_10_cp1700` (SDMX-CSV or TSV)
- **Generic (CSV/Excel)** — own tables with intermediate flow matrix and output row

Depending on the selection, the matching upload field is shown.

2.2 Embedded example: Destatis input-output accounts 2022

The button **"Load example: Destatis input-output accounts 2022 (72 production sectors)"** loads the sheets of statistical report 2180200227005 (revision 2024, as of August 2025) that are embedded in the tool — no file upload is needed. Sheet `81511-03` (domestic production at basic prices) is selected automatically, and the structure is detected:

Parameter	Detected value
Excel sheet	81511-03
Start row (matrix)	8
Start column (matrix)	3 (column C)
Number of sectors	72
Output row	90 ("Produktionswert")

Table 1: Automatically detected structure of the Destatis example

The sheets keep the original German labels of Destatis (e. g. "Erzeugnisse der Landwirtschaft, Jagd und Dienstleistungen"). Continue with **"Read intermediate flow matrix X"**.

2.3 Own Destatis or generic file

1. Click **"Click to upload"** and select an Excel (`.xlsx`, `.xls`) or CSV file.
2. Select the sheet (for Destatis: `81511-03`). For Destatis sheets, start row, number of sectors and output row are detected automatically: the matrix starts at the first row whose column A contains the code `01`; all following rows with a CPA code count as sectors; the output row is the first row below the matrix whose label begins with "Produktionswert". Newer report years have the same structure.
3. Check or enter the data structure:

Field	Meaning
Start row (matrix)	Excel row in which the intermediate flow matrix starts
Start column (matrix)	column in which the matrix starts (e. g. C = 3); the sector names are read from the *two columns before it* (number + name, e. g. A and B)
Number of sectors	dimension n of the square matrix
Output row	Excel row containing the output X_j of each sector

Table 2: Data structure parameters

"Read intermediate flow matrix X" reads the $n \times n$ volumes X_{ij} (EUR million) and the output row and calculates the technical coefficients

$$a_{ij} = \frac{X_{ij}}{X_j},$$

where X_j is the output of sector j taken from the output row. The tool then switches to the **Analysis** tab.

2.4 Eurostat import

1. In the Eurostat Data Browser, open dataset `naio_10_cp1700` (symmetric input-output table at basic prices, product × product), filter country (`geo`), year, unit `MIO_EUR` and origin (`stk_flow`: `DOM` = domestic production, `TOTAL` = including imports) and download *SDMX-CSV* (or TSV), filtered data only.
2. Select "Data source: Eurostat" and upload the file.
3. The tool shows selection lists for all remaining dimensions (preselected: `MIO_EUR`, `DOM`) and the year. **"Read Eurostat table"** builds the table.

Rules applied:

- Sectors are all product groups `CPA_...` that occur as both row and column; the English labels are added (e. g. `CPA_C29 - Motor vehicles`).
- Output: row `P1`; if missing, the row sum of total use (`TOTAL`).
- Final use: C = `P3_S13`+`P3_S14`+`P3_S15` (or `P3`), I = `P51G`, V = `P52`+`P53`, E = `P6`, Y = `TFU` (or C+I+V+E).
- Additional rows: all non-CPA rows except `P1`, e. g. `B1G` (gross value added), `D1` (compensation of employees), `B2A3G` (operating surplus), `D29X39`, `D21X31` (taxes less subsidies), `P51C` (depreciation), `P7` (imports).
- If a column sum of A is ≥ 1, a warning appears (check unit and `stk_flow`).

2.5 Data sources and licences

The panel **"Data sources, current tables & licences"** lists the sources:

- **Destatis:** statistical report "Input-Output-Rechnung" (EVAS 81511) at https://www.destatis.de; GENESIS-Online tables 81511-0005 and 81511-0011. Licence: Data licence Germany – attribution – version 2.0 (dl-de/by-2-0); source note "Statistisches Bundesamt (Destatis)", modified data to be marked as own calculation.
- **Eurostat:** dataset `naio_10_cp1700`. Reuse permitted with source attribution (dataset code, link, retrieval date); modified data to be marked. Data on countries outside EU/EFTA/candidate countries for non-commercial use only.

The tool records the source (including filters and retrieval date) and stores it with the dataset in the databox.

3 Tab 2: Analysis

3.1 Data overview and matrix preview

The tab shows the number of sectors, the matrix type and the average column sum of A, a preview of the first 10×10 coefficients and the list of all sector names (number and name).

- Coefficients must satisfy $0 \leq a_{ij} < 1$.
- Column sums of A are normally well below 1 (the remainder is value added and imports).
- Unexpected zeros or very large values usually indicate a wrong start row or start column.

3.2 Additional rows (additional coefficients)

Under **"Select additional coefficients"** the rows directly below the matrix (up to 15 rows) are offered with their row number and label. For the Destatis sheet 81511-03 these are e. g.:

Row	Content (original German label, translated)
81	intermediate inputs from imports
82	taxes on products less subsidies on products
84	compensation of employees
85	of which: gross wages and salaries
86	other taxes on production less other subsidies
87	depreciation
88	net operating surplus
89	gross value added

Table 3: Typical additional rows in sheet 81511-03

Tick the desired rows and click **"Read selected rows"**. The volumes (EUR million) are read per sector; they are converted into coefficients only during aggregation.

3.3 Final use vectors

Click **"Select sheet for final use"**, choose the sheet (for Destatis `81511-03`; final use is in the same sheet), confirm header row (7) and first data row (8). The categories are read from fixed Excel columns:

Vector	Columns	Meaning
C	BX + BY + BZ	consumption (households, non-profit institutions, government)
I	CA + CB	investment (fixed assets)
V	CC	changes in inventories
E	CD	exports
Y	CI	total final use

Table 4: Final use categories (Destatis column layout)

Select the categories and click **"Read final use"**; a preview is shown. For Eurostat files, final use is read automatically during import.

4 Tab 3: Aggregation

4.1 Procedure

1. Enter the **number of target groups** and click **"Create groups"**.
2. Assign the original sectors to the groups by **drag & drop** or via the dropdown next to each sector; remove an assignment with ×. Group names can be edited.
3. Alternatively **"Auto-aggregation (even)"**: the sectors are distributed in their original order evenly over the groups (e. g. 72 sectors into 10 groups: two groups with 8, eight with 7 sectors).
4. **"Calculate aggregation"** — all sectors must be assigned.

4.2 Aggregation formulas

Aggregation is carried out on the *volumes*, not on the coefficients. For groups G, H:

$$X^{\text{agg}}_{GH} = \sum_{i \in G} \sum_{j \in H} X_{ij}, \qquad X^{\text{agg}}_{H} = \sum_{j \in H} X_j, \qquad a^{\text{agg}}_{GH} = \frac{X^{\text{agg}}_{GH}}{X^{\text{agg}}_{H}}. \tag{1}$$

Additional rows z (volumes) become coefficients related to the aggregated output:

$$c^{\text{agg}}_{H} = \frac{\sum_{j \in H} z_j}{X^{\text{agg}}_{H}}. \tag{2}$$

Final use vectors are summed: $Y^{\text{agg}}_{G} = \sum_{i \in G} Y_i$ (likewise for C, I, V, E).

This procedure is consistent: with the aggregated data, $X^{\text{agg}} = (I - A^{\text{agg}})^{-1} Y^{\text{agg}}$ reproduces the aggregated output (provided the output row equals the row sums plus final use).

Note

Averaging coefficients instead of summing volumes would weight small and large sectors equally and generally does not reproduce the output. The converter therefore always aggregates volumes.

4.3 Suggested grouping (example)

Group	CPA divisions
Primary sector	01–03, 05–09
Food	10–12
Consumer goods	13–18, 31–32
Chemicals	19–23
Metal & machinery	24–28, 33
Vehicles	29–30
Energy & water	35–39
Construction	41–43
Services	45–98

Table 5: Example of an economically meaningful grouping

For environmental analyses, for instance, the energy sector should remain a separate group.

5 Tab 4: Export

5.1 Export files

Button / file	Content
Export A matrix (`matrix_A.csv`)	aggregated coefficient matrix, comma-separated, 6 decimal places; format "Technical coefficients"
Additional coefficients (with header) (`additional_coefficients.csv`)	overview: one row per additional coefficient with group names as header
Selected additional coefficients (for import)	one file per coefficient, numbers only (directly importable)
Final use overview (with header) (`final_use.csv`)	vector, name, origin columns, values per group and sum
Individual final use vectors (`c.csv`, `i.csv`, `v.csv`, `e.csv`, `y.csv`)	numbers only, directly importable
Export metadata (`metadata.txt`)	date, matrix size, group names, aggregation mapping, additional coefficients and final use vectors with origin

Table 6: Export files

Files with a header are intended for viewing; files with numbers only can be imported directly into the calculators.

5.2 Saving in the databox

"Save in databox" stores the aggregated matrix A and the vector Y directly in the central databox — no CSV export needed. Y is taken from the final use vector Y; if it is missing, it is calculated as the sum of the available components. In addition, the dataset contains

- the aggregated additional coefficients (field `additionalVectors`),
- the final use components C, I, V, E (field `finalDemandComponents`),
- the group names and the recorded data source.

After entering a name, the dataset is immediately available in the static and dynamic models and in the databox management (**"Open databox system"**). **"Show/hide saved datasets"** lists all datasets with their components, with preview and delete function.

Note

The English tools use their own databox, separate from the German version. Datasets saved from the English converter appear only in the English tools.

6 Tips and Common Errors

Problem	Cause	Solution
Column sums of $A \geq 1$	wrong output row or start row; Eurostat: wrong unit/`stk_flow`	check rows; use `MIO_EUR`, `DOM`
Sector names shifted	wrong start column	names are read from the two columns before the matrix
"Not all sectors are assigned"	sectors without group	assign all sectors or use auto-aggregation
Export not possible	aggregation not calculated	click "Calculate aggregation"
Vector Y missing when saving	final use not read	read final use in tab 2

Table 7: Common errors and solutions

- Choose 8–15 groups; keep the sectors that are central to the analysis separate.
- Mark data derived from Destatis or Eurostat as own calculation when passing them on.
- Coefficients derived from domestic production (`81511-03`, `DOM`) exclude imported intermediate inputs; these can be added as an additional coefficient (row 81).

Literature

P. Fleissner, W. Böhme, H.-U. Brautzsch, J. Höhne, J. Siassi, K. Stark: *Input-Output-Analyse. Eine Einführung in Theorie und Anwendungen* [Input-output analysis. An introduction to theory and applications]. Springer-Verlag, Wien, New York 1993.