

Chinese upstream value added in allied manufacturing exports

Observation year: 2022 · Study completed: September 23, 2026

China-origin value added exceeds U.S.-origin value added in all nine selected export sectors.

China-origin basic-price value added accounts for 3.20–9.68% of the nine selected gross-export bundles; the corresponding U.S.-origin shares are 2.01–3.73%. These are separate economy–industry results, not an average or a coalition total.

South Korea has the highest China-origin share in each of the three matched industries. Its electrical-equipment exports have the largest share in the sample, 9.68%, compared with 3.68% from the United States. Germany's machinery exports have the smallest China-origin share, 3.20%, compared with 2.45% from the United States.

The implication for U.S. planning is bounded: shifting final sourcing to an ally does not, by itself, establish independence from Chinese upstream production. Use this historical screen to identify where current supplier tracing would be valuable—not to estimate production lost in a disruption.

A historical accounting benchmark—not a current supplier-replaceability or disruption-loss estimate.

Nine economy–industry results

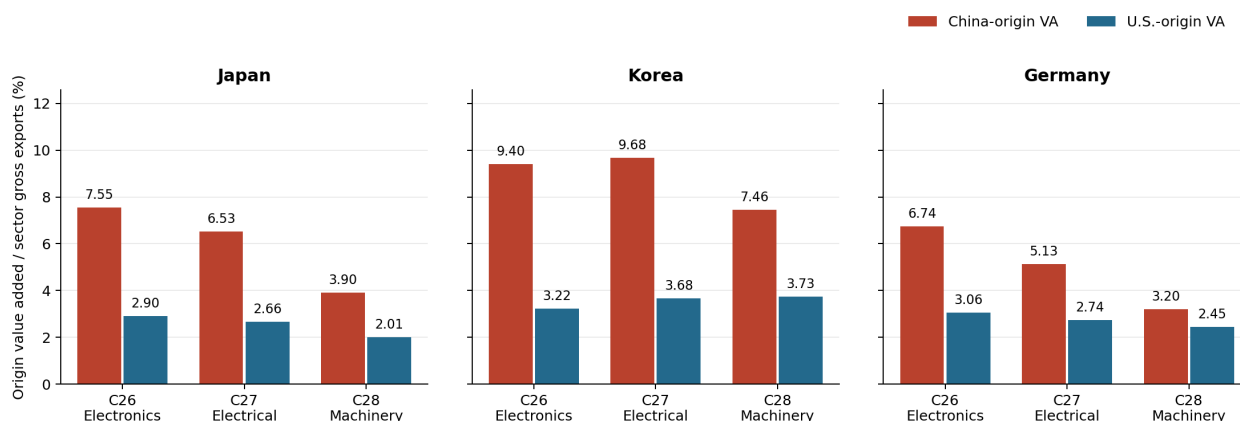
Gross exports to all foreign destinations. Basic-price value added, excluding separate net taxes. Export denominators below are USD billion (the CSV records USD million).

Exporter / industry	Exports USD bn	China VA share	U.S. VA share	China–U.S. pp
Japan · C26	74.73	7.55%	2.90%	+4.65
Japan · C27	54.49	6.53%	2.66%	+3.87
Japan · C28	112.60	3.90%	2.01%	+1.90
South Korea · C26	182.93	9.40%	3.22%	+6.18
South Korea · C27	31.12	9.68%	3.68%	+6.00
South Korea · C28	45.16	7.46%	3.73%	+3.72
Germany · C26	86.34	6.74%	3.06%	+3.68

Exporter / industry	Exports USD bn	China VA share	U.S. VA share	China–U.S. pp
Germany · C27	82.17	5.13%	2.74%	+2.39
Germany · C28	162.66	3.20%	2.45%	+0.75

C26: computers, electronics and optical products; C27: electrical equipment; C28: machinery and equipment n.e.c. No coalition total is calculated.

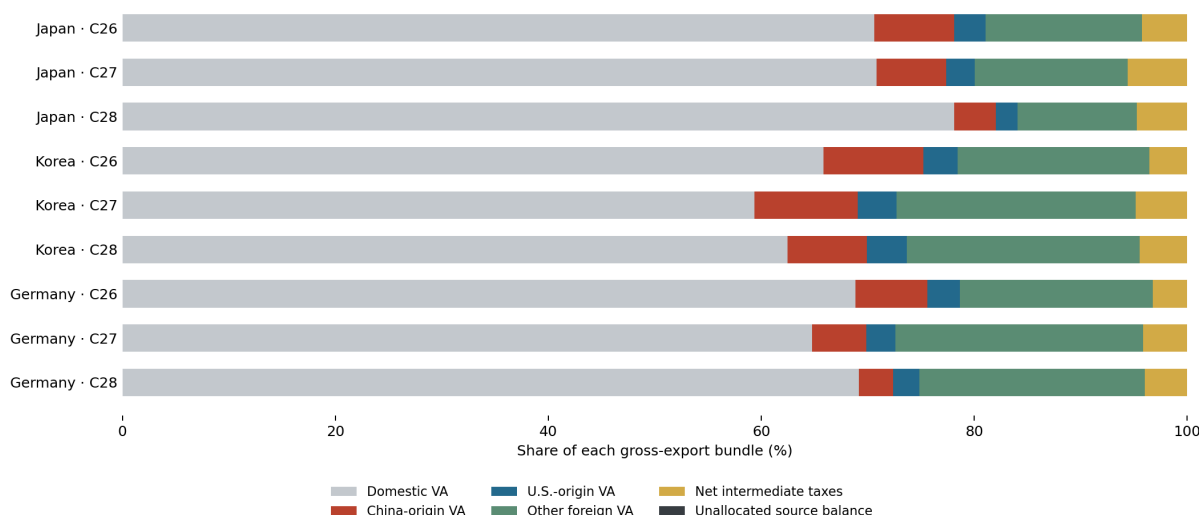
China and U.S. upstream value added in manufacturing exports — 2022



Source: Statecrafts calculations, OECD regular ICIO 2025 edition, January 2026 revision. Basic-price VA; taxes separate. Historical accounting benchmark, not a measurement of current dependence, substitutability, or wartime access.

2022 shares of each gross-export bundle. China-origin basic-price value added exceeds the U.S.-origin share in all nine cells. These are origin-accounting shares, not estimated disruption losses.

Where the value in each export bundle originated — 2022



Basic-price VA and net taxes are separate. Source-balance residuals (too small to see here) are retained, not assigned to an origin. OECD regular ICIO, 2025 edition / January 2026 revision. Each bar is separate; do not add the nine export bundles into a coalition total.

2022 all-origin accounting. Domestic and other-foreign contributions remain visible; net taxes and the tiny signed source-balance contribution are separate, not folded into an origin's value added.

What was measured—and why these nine cells?

The question is how much basic-price value added originating in China, compared with the United States, is embodied in each selected economy-industry's 2022 exports. Export destinations include the entire foreign market, not only the United States.

Japan, South Korea and Germany were selected before estimates were inspected, alongside C26 (computers, electronics and optical products), C27 (electrical equipment) and C28 (machinery and equipment n.e.c.). This is a purposive manufacturing sample: three partner economies with substantial manufacturing activity, not a representative sample of all allies. The three-industry extension is explicit; the September 19 protocol originally specified electronics.

Every origin industry is retained in the calculation: 80 economies plus the rest of the world, with 50 industries each. The Chinese contribution can therefore reach an exporter indirectly through third countries and need not appear as a direct import from China.

A bounded U.S. policy use

For a U.S. buyer or program selecting allied supply, use origin exposure as an initial tracing question. In this sample, South Korean electrical equipment and electronics are the first places to investigate if the screening criterion is China-origin value-added share. That is not a ranking of military importance, expected disruption loss or preferred suppliers.

Before crediting a particular allied source as independent redundancy, identify its relevant upstream plants and parts, map Chinese-origin inputs through intermediary suppliers, and verify qualified alternatives, inventories and switching times. Access permissions, contract capacity and delivery schedules must also match the U.S. requirement.

Support a substitution or capacity intervention only after those product-level checks establish the binding constraint. This study estimates neither the cost of replacing an input nor the return to a subsidy, tariff or stockpile; it does not justify blanket exclusion of any partner or industry.

China's larger share than the United States is an accounting comparison, not a national-power score. Other partner-origin inputs and the exporter's own value added remain substantial. The source-based comparison must not be interpreted as a choice between only Chinese and American suppliers.

The strongest alternative interpretation

A value-added share records the economic value attributable to an origin, not an input's indispensability. A cheap component can halt an expensive production line, while a larger commodity input can have readily qualified alternatives. Thus the country-industry with the smaller Chinese share is not necessarily more resilient.

Different industry mixes, prices and input intensities can explain cross-country differences within these broad categories. The regular tables also average across firms rather than identifying the supplier network of any particular plant. They cannot isolate semiconductors,

batteries, machine tools or defense-qualified products from their larger industries.

This is one observation year, not evidence that dependence has risen, fallen or persisted unchanged through 2026. A present-day decision requires updated supplier evidence; a historical trend requires comparable calculations for additional years.

Data provenance and the tax convention

The numerical source is OECD's 2022 regular ICIO table from its 2025 edition, January 2026 revision, as identified in World Bank replication catalogue 511. The matrix was retrieved from that institutional archive when the direct OECD bulk-download route was unavailable. Its SHA-256 matches the archive's March 20, 2026 data-hash report. Byte identity with the currently hosted OECD ZIP was not established.

The primary numerator follows the original study protocol: the table's VA row at basic prices. Net taxes less subsidies on intermediate products are carried separately as TLS. OECD's published TiVA decomposition includes these taxes within its value-added convention, and uses the extended rather than regular matrix. Our primary shares are therefore not interchangeable with published TiVA indicators.

The downloadable results include a separately labelled VA-plus-TLS sensitivity. Source-account imbalances are retained as an explicit unallocated balance contribution, not silently normalized away or reassigned to China or the United States.

Methods

For each of the nine cells, trace one gross-export bundle through the full global intermediate-input system. All monetary amounts are current 2022 U.S. dollars expressed in millions; percentages use that cell's gross-export value as the denominator.

1. Read the industry transaction matrix Z , output vector x , basic-price value-added vector VA and net-tax vector TLS from the hash-identified 2022 table. Match string labels, not the ReadMe's duplicated numerical row identifiers.
2. Sum the selected exporter-industry row over all foreign intermediate and final-demand columns, including the supplied direct-purchase-abroad categories. Exclude domestic uses and the provided output total. Call this gross-export amount E , and create a vector e with E in the selected industry's position and zero elsewhere.
3. Form A by dividing each column of Z by its industry's gross output. Explicitly retain and validate the source's zero-output industries. Solve $(I - A)q = e$ without truncating foreign production links.
4. Compute (VA / x) multiplied elementwise by q . Sum the 50 origin-industry contributions separately for China and the United States, and divide each by E . Preserve domestic and every other origin's value added in the reconciliation.
5. Calculate TLS and source input-balance contributions separately through the same system. Check export denominators, labels, signs, output identities, solver residuals and all-origin accounting. The separate verifier reconstructs the CSV and uses transposed origin-specific systems instead of the production script's forward systems.

Numerical checks and source-accounting qualification

The 4,050-industry source matrix has 123 output-row and 26 input-column discrepancies larger than conservative four-decimal rounding allowances. The largest absolute discrepancies are USD 238.6058 million in the U.S. real-estate output row and USD 82.0320 million in the Chinese real-estate input column. These source inconsistencies are disclosed, not repaired or described as rounding.

For the nine selected export bundles, the propagated signed input-balance contributions are USD 0.00787–0.04458 million. The maximum relative contribution is 0.00003372% of a bundle; propagating absolute rather than signed input gaps reaches 0.00004788%. These are accounting diagnostics, not bounds on model or measurement uncertainty. No gap is assigned to an origin's value added.

The forward numerical solves have a maximum residual of 1.17×10^{-15} relative to their export input. Once the explicit VA, TLS and unallocated source-balance accounts are included, the remaining reconciliation error is at most 5.08×10^{-16} of exports. The primary validation status is 'passed with source-balance warnings', not a claim of perfectly balanced source data.

An independent implementation reconstructs the raw CSV and uses transposed origin-specific systems, checking all nine cells and every one of the 729 cell-origin contributions. It is an independent computational check by a second AI agent, not external human peer review.

Limits

- Observation year 2022, despite a 2026 study date: no current-dependence or trend estimate.
- Broad industry and country averages, not product-level bottlenecks, supplier ownership, qualified alternatives, inventories, delivery times or military suitability.
- Fixed-coefficient accounting, not a disruption simulation or a causal estimate of substitutability, lost output, policy effects or costs.
- Regular ICIO omits the China/Mexico firm-heterogeneity splits in extended ICIO; the primary basic-price VA measure excludes separately reported TLS.
- Nine purposively selected cells do not represent all allies. Gross export bundles can count upstream value at multiple border crossings; no unique coalition total is calculated.
- Numerical agreement and small accounting residuals do not quantify sampling, model, revision or aggregation uncertainty. No confidence interval is inferred from a single accounting table.
- Independent computational verification by a second AI agent is not external human peer review.

Reproduce and inspect

Data, code, charts, methods and independent checks:

<https://statecrafts.com/studies/china-upstream-exposure-2022>

Raw CSV SHA-256:

fbab8fd2727bda9fd8c6cfee8227816db82d33bef6aa4b90194ca5dc5ad14b

Sources

SC26-ICIO · Inter-Country Input-Output tables, 2025 edition

OECD; 2026-01. 2025 regular ICIO; 2016–2022 bundle; mid-January 2026 revision notice

Dataset coverage, regular-versus-extended distinction and January 2026 revision.

Limit: Lagged industry accounting does not establish present supplier availability or substitutability.

<https://www.oecd.org/en/data/datasets/inter-country-input-output-tables.html>

SC26-README · ReadMe for regular ICIO CSV tables

OECD; 2025. ReadMe!C11; Structure!B17, B19, B21, D27–D29 and D37; RowItems/CollItems

Units, matrix layout, VA and TLS rows, and final-demand categories.

Limit: Several numerical row identifiers are duplicated; actual string labels identify the accounts.

Documentation is not a computed exposure result.

https://webfs-sti.oecd.org/files/STI-PIE/ICIO/2025/ReadMe_ICIO_small.xlsx

SC26-ANNEX · 2025 edition ICIO annex: countries and activities

OECD; 2025. Tables 1–2

Economy identifiers and definitions of C26, C27 and C28.

Limit: Broad industries do not isolate specific strategic or military products.

<https://webfs-sti.oecd.org/files/STI-PIE/ICIO/2025/ICIO2025annex.pdf>

SC26-TIVA-GUIDE · Guide to OECD Trade in Value Added indicators, 2025 edition

OECD; 2025. Table 2.1, p. 6; sections 4.2, p. 12; 4.4, p. 16; 7.1, p. 38

Full-network gross-export decomposition, export conventions and distinction between basic-price VA and TiVA's tax-inclusive numerator.

Limit: Published TiVA uses extended ICIO and a tax-inclusive convention; it is not an exact numeric comparator for this primary regular-table VA-only study.

<https://stats.oecd.org/wbos/fileview2.aspx?IDFile=2143f34e-6feb-41a9-abaf-cb52132608c4>

SC26-WB-ARCHIVE · Replication archive: International Trade Policy and Quantitative Models: A Practitioner's Guide

World Bank Reproducible Research Repository; 2026-04-01. Catalogue 511, Data section;
RR_WLD_2026_593/reproducibility_package/data_raw/2022_SML.csv; data_hash_report.csv

Institutional delivery of the OECD January 2026 regular table, with a matching March 20, 2026 file-hash record.

Limit: The catalogue establishes the archived vintage; direct byte equivalence with the presently hosted OECD ZIP was not checked. The World Bank's reproduction of its own paper does not verify this study.

<https://reproducibility.worldbank.org/catalog/511/study-description>