

Online Appendix

Technical Documentation for the International Trade and Production Database by End Use (ITPD-U)

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Abstract. This online technical appendix explains the construction of the ITPD-U. ITPD-U is a public good that was created in response to market demand. Our team is grateful for the research support and encouragement that we received from the United States International Trade Commission. The USITC is not in any way responsible for any errors in the ITPD-U.

The Database is available on USITC's Gravity Portal

<https://gravity.usitc.gov>

*United States International Trade Commission (USITC). The views expressed solely represent the opinions and professional research of the authors. The content of the working paper is not meant to represent the views of the U.S. International Trade Commission, any of its individual Commissioners, or the United States government.

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1 Overview and Key Features

The International Trade and Production Database by End Use (ITPD-U) is a new database that separates international and domestic trade flows by their end use: consumer, capital, and intermediate, which are defined as follows:

- Intermediate goods are products used as inputs in the production of other goods and services. They include raw materials, components, and semi-finished products that require further processing before reaching the final consumer. Examples include steel used in car manufacturing, semiconductor chips for smartphones, and textiles for apparel production.
- Capital goods consist of physical assets used by businesses to produce goods and services. These goods are not directly consumed but serve as tools or infrastructure in production. Examples include machinery and equipment.
- Consumer goods are finished products intended for direct consumption by individuals or households. Examples include household appliances, food, and clothing. These goods require no further processing before reaching end users.

The first release of ITPD-U is built upon the third release of the International Trade and Production Database for Estimation (ITPD-E) (Borchert et al., 2021; Larch et al., 2025). ITPD-U has the same industry classification, time coverage, and country coverage as ITPD-E, but excludes services. ITPD-U has data for 153 goods-producing industries in agriculture, mining and energy, and manufacturing. It covers the period from 1986 to 2022 for 264 countries. It includes both international and domestic trade.

Like ITPD-E, ITPD-U only includes official data reported by countries and does not include data estimated using statistical techniques, such as the gravity model. Therefore, ITPD-U is suitable for use in statistical estimation. ITPD-U has many potential applications, such as study of the global supply chains (Jones et al., 2025).

2 File Format, Access, and Variables

The data is available for download on the Gravity Portal of the United States International Trade Commission (USITC).¹ The file is in csv format and includes the same variables as the ITPD-E with the exception of the trade variable. Variable names are included on the first line of the file.

As in ITPD-E, countries are identified by their standard ISO3 codes and dynamic ISO3 codes, as explained in the manual for ITPD-E, which can be found on the gravity portal (Borchert et al., 2021; Larch et al., 2025). Specifically, the variables identifying the exporter are `exporter_iso3`, `exporter_iso3_dynamic`, and `exporter_name`. Similarly, importers are identified by `importer_iso3`, `importer_iso3_dynamic`, and `importer_name`.

Variable ‘year’ identifies the year of the data. Variables `industry_id`, `industry_name`, and `broad_sector` identify the industry and broad sector of the data. Industry id is the same as in the ITPD-E. Technical documentation for ITPD-E lists the industries and shows their correspondence to standard industrial classifications, specifically ISIC and FCL.

Unlike ITPD-E, there are three variables measuring trade in ITPD-U: `trade_int`, `trade_con`, and `trade_cap`, measuring trade in intermediate, consumption, and capital goods, respectively. Note that trade can be international or domestic. In case of domestic trade, exporter and importer are the same.

As in ITPD-E, there are two flag variables. One is `flag_mirror`, which marks international trade observations obtained from the mirror export data. Another is `flag_zero`, which marks trade observations that are zero in the data. See the ITPD-E technical documentation for more detail.

¹<https://gravity.usitc.gov>

3 Construction of the ITPD-U

3.1 End Use Concordance

To construct the ITPD-U, we first disaggregate bilateral merchandise trade data from UN Comtrade into three end-use categories using the *End Use Concordance*, described in the paragraphs below. Then we aggregate trade data by end use and map it to align with the industry classification used in the ITPD-E.

UN Comtrade classifies merchandise trade data at the Harmonized System (HS) 6-digit level. Although the HS is a standard classification system for traded goods, it does not provide information on how these goods are used—whether they serve as intermediate inputs in production processes, function as capital assets that support production without becoming part of the final output, or are intended for use by final consumer. Therefore, we rely on the *End Use Concordance* to assign each of traded goods at the HS 6-digit level (HS-6) to one of the four end-use categories: capital goods (CAP), consumer goods (CONS), intermediate goods (INT), and dual-use goods (DUAL), based on its primary economic function.

Before doing so, we first conduct a comprehensive review and update on the *End Use Concordance*, a dataset originally produced for the construction of the Asia-Pacific Economic Cooperation (APEC) Trade-in-value-added (TiVA) database (Jones et al., 2019). Consistent with the UN Broad Economic Categories (BEC) framework,² the *End Use Concordance* incorporates input data from various sources, including the Organisation for Economic Cooperation and Development (OECD), the United Nations Statistics Division (UNSD), the World Bank, and the World Input-Output Database (WIOD). The first version of the *End Use Concordance* was incorporated into the UN BEC rev. 5 (2019).³

For many traded goods, the end use is unique and can be clearly assigned to a specific category. For instance, 100 percent of traded goods under HS 220410—sparkling wine—

²The UN Broad Economic Categories (BEC) is a classification system designed to group goods based on their main end-use in economic activities. United Nations Statistical Division (2018)

³UNSD, “BEC 5 Correlations (2019),” <https://unstats.un.org/unsd/trade/classifications/BEC5Correlations.zip>

are classified as consumer goods, as this group of goods is primarily intended for consumer consumption. In contrast, certain goods serve multiple functions with both industrial and consumer applications. Accordingly, they are classified as mixed-use goods and split across multiple end use categories according to estimated shares. These estimated shares are derived from industry sources, such as industry reports, expert assessments, and data from trade associations.

For example, traded goods under HS 870380—vehicles with only electric motor for propulsion (EVs)—can be either used by firms as capital goods to support production operations, or driven by individuals or households as consumer goods. Accordingly, EVs are classified as mixed-use goods. Based on available industry data such as the Vehicle Inventory and Use Survey (VIUS), it is estimated that approximately 87.5 percent of EVs are used for consumer purposes, while 12.5 percent are used as capital goods in commercial fleets (Table 1).⁴

The *End Use Concordance* (revision 2024) includes over 400 such mixed-use goods, each assigned estimated shares across these three primary end-use categories. Nearly 99 percent of these mixed-use goods are assigned to two end-use categories. Only about 1 percent are assigned to three end-use categories, including those under special chapter 99 which does not describe specific products.

Table 1: Illustration of the USITC End Use Concordance

HS6	Description	End Use	CAP	CONS	INT
220410	Sparkling wine	CONS	0.00	1.00	0.00
281122	Silicon dioxide	INT	0.00	0.00	1.00
840110	Nuclear reactors	CAP	1.00	0.00	0.00
870380	Vehicles with electric motor for propulsion	MIXED	0.125	0.875	0.00

Source: USITC End Use Concordance (2024 revision).

⁴U.S. Census Bureau, “2021: ECNSVY Vehicle Inventory and Use Survey All Vehicles,” <https://data.census.gov/table/VIUSA2021.VIUS212A?d=ECNSVY+Vehicle+Inventory+and+Use+Survey+All+Vehicles>

3.2 Methods

The ITPD-U builds upon the International Trade and Production Database for Estimation (ITPD-E), a database originally developed by Borchert et al. (2021). The third release of the ITPD-E covers 264 countries over a 36-year period from 1986 to 2022,⁵. It includes 170 industries across all major sectors of the economy, including 28 industries in agriculture, 7 in mining and energy, 120 in manufacturing, and 17 in services. (Larch et al., 2025).⁶ The ITPD-U has the same coverage as ITPD-E in terms of years and countries. However, it only covers the 153 goods-producing industries in ITPD-E excluding the 17 service industries.

To construct the ITPD-U, we first disaggregate bilateral merchandise trade data from UN Comtrade into three end-use categories using the *USITC End Use Concordance*. Trade value of dual-use goods are distributed to respective end-use categories based on their estimated splits. These data are then mapped and aggregated to align with the industry classification used in the ITPD-E. To estimate domestic trade (or production) by end use, we apply the proportionality derived from total exports—under the assumption that a country’s export product composition mirrors its domestic production. The resulting dataset, ITPD-U, is a novel contribution that provides harmonized information on both international trade and domestic production by end-use category.

References

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⁵The year coverage is 1986-2022 for agriculture, 1988-2022 for manufacturing, mining, and energy, and 2000-2022 for services

⁶Both ITPD-U and ITPD-E are available on USITC’s Gravity Portal at gravity.usitc.gov.

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