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Article

Positioning in Global Value Chains: World Map and Indicators, a New Dataset Available for GVC Analyses

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Abstract

This work reviews and computes the commonly used Global Value Chains (GVC) positioning indicators found in the empirical literature, providing scholars with a novel and comprehensive global dataset of upstreamness and downstreamness measures. This dataset covers a wide range of countries, including many developing nations, and industries, and spans an extensive timeframe. Specifically, it offers GVC positioning indicators for all economies and industries included in prominent Inter-Country Input-Output tables, such as ADB, EORA, OECD TiVA, WIOD, and Long-run WIOD. This work also delves into the degree of comparability across the different datasets, offering informative comparisons of the GVC positioning measures encompassing overlapping countries and periods, sectors, geographical regions, and income levels. Notably, these indicators are "ready-to-use" and open access, presenting an exceptional opportunity for qualitative and quantitative analyses of various economic dimensions on GVCs and for informing policymaking.

JEL classification: D57, F14, O50

Keywords: Global Value Chains, positioning indicators, upstreamness, downstreamness, international trade, country-sector analysis, data

1. Introduction

Over the last decades, the world economy has experienced a radical transformation through a significant fragmentation in the production of goods and services, and a deeper international division of labor. This

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transformation, which has been called the "Age of Global Value Chains" (World Bank 2020; Antràs and Chor 2022), has had remarkable effects worldwide via changes in income, productivity, and poverty (World Bank 2020).

Scholars have developed various indicators to map and measure the degree of participation of countries and sectors in GVCs (see, among others, Hummels, Ishii, and Yi 2001; Johnson and Noguera 2012; Koopman, Wang, and Wei 2014; Borin and Mancini 2023). A parallel body of work looks instead at the country and/or sectoral positioning *within GVC*, that is whether a given country (or industry) is specialized in relatively upstream activities or activities that are more proximate to final demand (see Antràs et al. 2012; Fally 2012; Antràs and Chor 2013; Miller and Temurshoev 2017; Wang et al. 2017; Fally and Hillberry 2018; Alfaro et al. 2019).[1] Such notions of production staging are important as they can contribute to model productivity differences or geography/firm organizational decisions, demonstrating that these choices are not merely a function of marginal costs (see Antràs and Chor 2022 for details). Together with the GVCs' participation indicators, these positioning measures enrich and complete empirical analyses on GVCs and inform policymaking.

This paper aims to review and compute the most common GVC positioning indicators used in the empirical literature and provides scholars with a new global dataset of upstreamness and downstreamness measures for the largest number of countries—including most developing countries—and sectors and for the longest time span. Specifically, it provides GVC positioning indicators for all the economies and industries available in the most used Inter-Country Input Output (ICIO) tables, namely ADB MRIO (ADB kidb.adb.org/mrio); EORA (Lenzen et al. 2013); OECD TiVA (oe.cd/tiva); WIOD (Timmer et al. 2015); Long-run WIOD (Woltjer, Gouma, and Timmer 2021). This vast and comprehensive dataset—which will be regularly updated—is available at the following link https://www.tradeconomics.com/position/.[2] It complements the already available database on GVC participation measures by the World Bank WITS (Borin, Mancini, and Taglioni 2021). Using these new measures, scholars can investigate the evolution of GVC positioning over time, at both the country and industry levels, and provide an international comparison. The key added value of this work is that scholars working on the topic of GVC and belonging to different research disciplines—economics, sociology, international economics, economic geography, international political economy, supply chain management, and international business—will benefit from these ready-to-use indicators, without necessarily getting into technicalities and performing matrix calculations.

Specifically, two measures are computed: (1) a measure of distance or *upstreamness* of a production sector from final demand, which was developed by Antràs et al. (2012), Fally (2012), and Antràs and Chor (2013, 2019); this measure captures the average number of production stages by pegging the endpoint of the sequence at final consumption, which makes it possible to measure the distance to the final demand of a product (or a country) along the production chains; and (2) a measure of distance or *downstreamness* of a given sector (or a country) from the economy's primary factors of production (or sources of value-added), originally proposed by Fally (2012). This measure is based on a country-industry pair's use of intermediate inputs and primary factors of production. To the best of the authors' knowledge, this is the first work that computes GVC positioning indicators for such a large set of countries and sectors, and makes them freely available to scholars.

This paper illustrates the indicators included in this new open-access dataset, the methodologies applied to compute them, as well as the diverse methodologies and assumptions employed in constructing the various ICIO sources, offering valuable insights into their suitability based on users' research interests. It also delves into the actual degree of comparability across the different datasets, offering informative

1 This definition is sufficiently broad to encompass various possible structures and distinctive characteristics of different GVCs (Antràs and Chor 2022).

2 Codes to replicate the dataset, as well as to compute positioning measures on other ICIO tables, are available here https://www.tradeconomics.com/position/docs/position_codes.zip

comparisons of the GVC positioning metrics derived from these datasets. These comparisons encompass overlapping countries and periods, sectors, geographical regions, and income levels. Overall, while acknowledging nuanced differences, a commendable level of consistency among the various GVC positioning measures across the ICIO datasets has been identified.

The paper is structured as follows: Section 2 outlines the methodology employed for constructing the GVC indicators. Section 3 provides an overview of the ICIO data sources used in the computation of the GVC positioning measures. Section 4 offers descriptive statistics and explores the comparability of the indicators across different ICIO datasets. Section 5 concludes.

2. Measuring GVCs Positioning: The Upstreamness and Downstreamness Indicators

To compute the upstreamness or downstreamness of specific industries and countries, a common approach is to consider the extent to which a country-industry pair sells its output for final use to consumers worldwide or instead sells intermediate inputs to other producing sectors in the world. A sector that sells disproportionately to final consumers would appear to be downstream in value chains. In contrast, a sector that sells little to final consumers is more likely to be upstream in value chains.

Following this approach, two measures of GVC positioning, that are the most popular in the literature, have been computed in this work. The first indicator is a measure of distance or upstreamness of a production sector from final demand, which was developed by Antràs et al. (2012), Fally (2012), and Antràs and Chor (2013).[3] Fally's model, as well as the variation proposed by Antràs et al. (2012), captures the average number of production stages by pegging the endpoint of the sequence at final consumption, which makes it possible to measure the *distance to the final demand* of a sector along the production chains. More specifically, this measure (labeled *U* in Antràs and Chor 2019 and given the same name in the present dataset) aggregates information on the extent to which "an industry in a given country produces goods that are sold directly to final consumers or that are sold to other sectors that themselves sell disproportionately to final consumers. A relatively upstream sector is thus one that sells a small share of its output to final consumers and instead sells disproportionately to other sectors that themselves sell relatively little to final consumers" (Antràs and Chor 2019, p. 127). Expanding upon these concepts, final goods are positioned one step away from immediate demand, inputs directly used in the production of final goods stand two steps away from demand, and inputs used in the production of other inputs reside three steps removed from immediate demand, and so forth. Furthermore, this count is weighted by the share of the value of output at each production stage in total output. The *U* indicator can assume values equal to or greater than 1: larger values are associated with relatively higher levels of upstreamness of the output originating from one sector.

The second measure, originally proposed by Fally (2012), is based on a country-industry pair's use of intermediate inputs and primary factors of production. It captures the distance or downstreamness of a given sector from the economy's primary factors of production (or sources of value-added). According to this measure (labeled *D*), an industry in each country is downstream if its production process embodies a larger value of intermediate inputs relative to its use of primary factors of production. Conversely, if an industry relies disproportionately on value-added from primary factors of production, then this industry is relatively less downstream. The *D* indicator can assume values equal to or greater than 1: larger values are associated with relatively higher levels of downstreamness of an industry.

These positioning indicators are computed by using the intermediate use matrix (Z), the final demand matrix (FD), and the value-added matrix (VA). Following Antràs et al. (2012) and Antràs and Chor (2019), a "net inventory" correction has been performed. This correction consists of imputing N_i^r changes

3 Though the arguments used to develop the index differ in Fally (2012) and Antràs et al. (2012), Antràs and Chor (2013) emphasize that the resulting indexes are equivalent.

in inventories in country i, sector r, to each Z_{ij}^{rs} intermediates sold by country i sector r to country j sector s, and FD_{ij}^{r} final goods in sector r sold by i to j, by applying a multiplicative factor equal to $Y_i^r/(Y_i^r - N_i^r)$ where Y_i^r is the gross output in sector r in country i and is computed as follows:[4]

$$Y_i^r = \sum_{s=1}^{S}\sum_{j=1}^{J} Z_{ij}^{rs} + \sum_{j=1}^{J} FD_{ij}^{r} \tag{1}$$

In order to measure sectoral upstreamness, the U_i^r index by Antràs and Chor (2013) has been adopted. Since $Y_i^r = \sum_{s=1}^{S}\sum_{j=1}^{J} a_{ij}^{rs} Y_j^s + FD_i^r$ (where $a_{ij}^{rs} = Z_{ij}^{rs}/Y_j^s$ is the dollar amount of sectors r's output from country i needed to produce one dollar worth of industry s's output in country j), by iterating such identity, industry r's output in country i can be expressed as an infinite sequence of terms as follows:

$$Y_i^r = FD_i^r + \sum_{s=1}^{S}\sum_{j=1}^{J} a_{ij}^{rs} FD_j^s + \sum_{s=1}^{S}\sum_{j=1}^{J}\sum_{t=1}^{S}\sum_{k=1}^{J} a_{ij}^{rs} a_{jk}^{st} FD_k^t + \ldots \tag{2}$$

As in Antràs and Chor (2019), the weighted average position of each country/sector pair has been computed by multiplying each term by its respective production-staging distance from final use plus 1 and dividing everything by Y_i^r. This means that the first term in equation (2), representing the production stage destined to final consumption, is multiplied by 1, the second term in equation (2), representing the production stage one step before the completion of final good, is multiplied by 2, and so on. Building on such identity, the upstreamness index can be expressed as follow:

$$U_i^r = 1 * \frac{FD_i^r}{Y_i^r} + 2 * \frac{\sum_{s=1}^{S}\sum_{j=1}^{J} a_{ij}^{rs} FD_j^s}{Y_i^r} + 3 * \frac{\sum_{s=1}^{S}\sum_{j=1}^{J}\sum_{t=1}^{S}\sum_{k=1}^{J} a_{ij}^{rs} a_{jk}^{st} FD_k^t}{Y_i^r} + \ldots \tag{3}$$

It can be shown that in matrix notation this corresponds to:

$$U = [I - A]^{-2} FD_i^r \oslash [I - A]^{-1} FD_i^r \tag{4}$$

Where A is J*S-by-J*S matrix of the a_{ij}^{rs}s whereas $\oslash$ refers to an elementwise division.

As for downstreamness, following Antràs and Chor (2013), the D_j^s measure has been adopted. Since $Y_j^s = \sum_{r=1}^{S}\sum_{i=1}^{J} Z_{ij}^{rs} + VA_j^s = \sum_{r=1}^{S}\sum_{i=1}^{J} b_{ij}^{rs} Y_i^r + VA_j^s$ (where $b_{ij}^{rs} = Z_{ij}^{rs}/Y_i^r$ is the share of sectors r's output in country i that is used in industry s in country j), and $Y_j^s = VA_j^s + \sum_{r=1}^{S}\sum_{i=1}^{J} b_{ij}^{rs} VA_i^r + \sum_{r=1}^{S}\sum_{i=1}^{J}\sum_{t=1}^{S}\sum_{k=1}^{J} b_{ki}^{tr} b_{ij}^{rs} VA_k^t + \ldots$, analogously to the upstreamness case, downstreamness is computed as follows:

$$D_j^s = 1 * \frac{VA_j^s}{Y_j^s} + 2 * \frac{\sum_{r=1}^{S}\sum_{i=1}^{J} b_{ij}^{rs} VA_i^r}{Y_j^s} + 3 * \frac{\sum_{r=1}^{S}\sum_{i=1}^{J}\sum_{t=1}^{S}\sum_{k=1}^{J} b_{ki}^{tr} b_{ij}^{rs} VA_k^t}{Y_j^s} + \ldots \tag{5}$$

In equation (4) each element is multiplied by the production stage distance from primary factors plus 1 and divided by country s gross output in sector j. In matrix notation:

$$D = [I - B]^{-2} VA_j^s \oslash [I - B]^{-1} VA_j^s \tag{6}$$

Where B is J*S-by-J*S matrix of the b_{ij}^{rs} whereas $\oslash$ refers to an elementwise division.

4 Value-added is obtained as $VA_j^s = Y_j^s - \sum_{r=1}^{S}\sum_{i=1}^{J} Z_{ij}^{rs}$. In doing so, the analysis disregards taxes less subsidies on products, CIF/FOB adjustments on exports, direct purchases abroad by residents, purchases on the domestic territory by nonresidents, and international transport margins. Therefore, the different methods used by data producers to compute these elements do not affect the results. This is a standard procedure in the literature, see Antràs and Chor (2019) and Caliendo and Parro (2015).

These measures were originally used to know where single industries are located along global value chains. Nevertheless, they can be aggregated at the country, global industry and global aggregate level. As a matter of fact, at the global aggregate level, upstreamness and downstreamness coincide and are a proxy for global production complexity (Antràs and Chor 2019).

3. Data Sources

ICIO tables offer an extensive overview of global transactions involving goods and services. Within a single integrated accounting framework, these tables combine the national input-output tables (which illustrate financial interactions between economic sectors within a country) of different economies at specific points in time, along with trade flow tables (depicting export and import values by country and economic sector). By encapsulating supply-use relationships between industries and spanning countries, these tables make it possible to delineate the vertical configuration of international production sharing. Moreover, they enable the quantification of cross-border value flows for a particular country or region (Inomata 2017).

Construction and Characteristics of the ICIO Datasets

Since the early 2000s, various research initiatives have undertaken the development of different ICIO databases. The construction of ICIO tables is a complex task that typically requires the application of specific compilation methods and assumptions to reconcile data from different sources and cope with data availability or reliability issues.[5] As a result, divergent methodological choices can result in noteworthy differences among various databases (see Jones et al. 2014).[6] For instance, the ways goods and services are categorized by end-use in the ICIO tables, as well as the inclusion of re-exports or processing trade, that notably affect economies engaged in such activities (e.g., the Netherlands and Belgium, as well as China and Mexico). Furthermore, deviations can arise from other factors, such as the origin of the raw data. The data used in creating ICIO tables are drawn from diverse statistical sources. These encompass national Input-Output tables, Supply-Use tables, national accounts, merchandise trade statistics categorized under the Broad Economic Categories classification or the Harmonized System, and trade in services statistics based on the balance of payments data, among others. Even if the ICIO tables were constructed using identical macroeconomic constraints, there remains considerable room for variation across the independent models at the sector level. The choice of aggregation or disaggregation level also represents an important factor contributing to variation. The target databases present different aggregation levels. This means that the national IO tables have to be reclassified, aggregated, or disaggregated, in order to adjust the source national tables to match the chosen sector classification. Additionally, discrepancies can stem from the update frequency and availability of data during the table's construction. ICIO tables are compiled at various points in time and might not undergo uniform revision or updates. These aspects also significantly influence the extent of country coverage and the temporal span covered in the ICIO tables.

Despite their increasing widespread use in economic research, ICIO tables share a number of shortcomings. First, because they rely on aggregated input-output data, the resulting sectoral disaggregation is rough. Therefore, data sources miss a notable amount of GVC-related trade activities taking place among sectors. Second, in constructing the tables, researchers are forced to impose strong assumptions to back

5 All ICIO databases incorporate a certain level of modeling. Within these databases, certain segments are characterized by being overdetermined, featuring multiple and occasionally conflicting reports. Conversely, other segments are underdetermined, necessitating the incorporation of assumptions or modeling techniques to complete sections of the dataset that lack coverage from official sources (Casella et al. 2019).

6 The topic of ICIO construction and reliability has been extensively discussed in the literature (see among others Wiedman et al. 2011; Dietzenbacher et al. 2013; Tukker and Dietzenbacher 2013; Owen et al. 2014; Tukker et al. 2020).

out some bilateral intermediate input trade flows that cannot be directly read from either customs data or national IO tables, leading to relevant aggregation biases (de Gortari 2019; Antràs 2020). For instance, the "proportionality assumption" which—due to the lack of data on the destination industries of international trade flows—implies identical trade shares for all input-purchasing industries (i.e., imported commodities are proportionally distributed over the target sectors) and the "production assumption," which says that because of the aggregation level, each industry grouping produces all its different outputs using a single production function.[7] The absence of information regarding heterogeneity in production processes within firm-level data is a notable gap in the prevailing databases. Specifically, the analysis of value chains could be enhanced by segmenting industries into various types of firms based on characteristics such as size, ownership, exporter status, or import share.[8]

Despite these limitations, ICIO tables have emerged as an essential resource for economists investigating GVCs. These tables serve as a means to quantify the involvement of countries and sectors in GVCs, as well as various aspects of GVC linkages (Antràs 2020; Antràs and Chor 2022).

ICIO Datasets Used for Calculating GVC Positioning Indicators

This study employs widely used and openly accessible databases to calculate the GVC positioning measures. Specifically, it makes use of the following ICIO datasets: EORA, OECD TiVA, WIOD, Long-run WIOD, and ADB (see table s1.1 in the supplementary online appendix, for a summary of the fundamental information).

The EORA Global Supply Chain Database (Lenzen et al. 2012; Lenzen et al. 2013) provides a set of both national and global input-output tables covering 189 countries from 1990 to 2022.[9] More specifically, reference is made to EORA26, a simplified model where all countries have been aggregated to a common 26-sector harmonized classification (International Standard Industrial Classification of Economic Activities—ISIC—Rev. 3), and the supply-use tables from the full EORA Multi-Regional Input-Output (MRIO) have been converted to symmetric product-by-product IO tables. This dataset thus contains only symmetric product-by-product and industry-by-industry IO tables.[10] The EORA data involve the integration of various data sources, including input-output tables and main aggregate data obtained from national statistical offices, as well as the UN National Accounts main aggregates database and international trade data. The database incorporates MRIO tables from national statistics offices of all generating countries. While EORA encompasses global coverage, it heavily relies on imputation techniques to address data gaps in countries with less developed statistical systems. For nations lacking official IO tables, estimates are formulated using a proxy input-output table. This proxy amalgamates macroeconomic data with a standardized input-output framework, based on an average derived from Australia, Japan, and the

7 More recent ICIO tables have sought to improve on this standard methodology, with a key step being to construct different proportionality weights for flows of imported intermediates and final goods respectively. The WIOD, the OECD-ICIO, as well as the most recent GTAP editions, have each implemented this approach.

8 In recent times, there have emerged some initiatives aimed at enhancing input-output tables and supply and use tables to include firm heterogeneity. Notably, the OECD-ICIO tables have been expanded to encompass firm heterogeneity by disaggregating countries, as demonstrated in the recently extended version available at http://oe.cd/icio. The Asian International Input-Output Tables by IDE-JETRO use confidential firm-level surveys from several Asian countries. In particular, these surveys provide insights into the breakdown of firm imports (Meng, Zhang, and Inomata 2013). The majority of these initiatives are conducted on a single-country basis, primarily driven by the requirement for substantial volumes of data (for details on these attempts, see Ahmad et al. 2023).

9 The present study has included data in its database for the years spanning 1990 to 2015, which are readily accessible through open-access sources. Regrettably, updates for more recent years are contingent upon licensing agreements and cannot be included in this dataset.

10 Please note that both the step of aggregating sectors from the higher sectoral detail of EORA to the lower detail of EORA26 and the step of converting Supply/Use tables to IO tables, involve a net information loss and the introduction of some new assumptions (see https://worldmrio.com/).

United States. Consequently, EORA compilers stress that values should be interpreted as mean values with associated confidence intervals. In addition, these tables are underpinned by the standard ICIO assumptions (the "proportionality assumption" and the "production assumption"). Furthermore, the EORA tables prioritize the fulfillment of balancing conditions, primarily for larger economies. Consequently, these conditions are notably well satisfied (within a 1 percent imbalance) for major economies such as the United States, Japan, China, and Germany. The satisfaction of these conditions is less consistent for smaller countries or countries affected by periods of conflict, government transition, or hyperinflation. For more comprehensive information about the construction of the EORA database see https://www.worldmrio.com.

The 2022 edition of the OECD Inter-Country Input-Output (ICIO) Trade in Value Added (TiVA) database covers 76 economies (including all OECD, EU, G20, and ASEAN economies) and a selection of regional aggregates. Indicators are available for 45 industries within a hierarchy based on ISIC Rev. 4. The OECD's ICIO system consists of a set of annual symmetric industry-by-industry global input-output tables. These are constructed using statistics compiled from national, regional, and international sources according to the 2008 System of National Accounts (2008 SNA). Specifically, harmonized national Supply-Use Tables (SUTs) and Input-Output tables are key inputs in the construction of the ICIO tables. The OECD TiVA uses the Broad Economic Categories (BEC) classification and end-use categories to distinguish imports, softening the "proportionality assumption" (i.e., in TiVA import shares by country might differ across use categories although they are equal within these categories). Over time, the OECD has engaged in various endeavors aimed at enhancing the scope and quality of the ICIO tables, in addition to producing annual tables.[11] For further details on OECD TiVA, see https://www.oecd.org/sti/ind/measuring-trade-in-value-added.htm.

The World Input-Output Database (WIOD) (Timmer et al. 2015), in its 2016 release, covers 43 countries for the period 2000–2014. This database classifies data for 56 sectors according to the ISIC Rev. 4. The tables adhere to the 2008 version of the SNA and are assembled utilizing a combination of published statistics from national statistical institutes across the globe, along with diverse international statistical sources. More specifically, WIOD uses SUTs from individual countries' national accounts as the starting point to integrate with bilateral trade statistics and derive the final symmetric world I-O table (WIOT). This approach underpins a commendable level of data quality, albeit with the acknowledged constraint of limiting the number of countries covered. This trade-off between data quality and coverage is a central consideration. It is worth noting that, in contrast to the majority of datasets, it openly shares the methodologies employed in its creation. Distinguishing itself from other common datasets, the construction of WIOD employs an estimation approach for the import of goods that deviates from the conventional import "proportionality assumption" (Dietzenbacher et al. 2013).[12] For further details on WIOD, see https://www.rug.nl/ggdc/valuechain/wiod.

The Long-run WIOD (Woltjer, Gouma, and Timmer 2021) provides an extensive annual time-series of WIOTs spanning the years 1965 to 2000 (https://www.rug.nl/ggdc/valuechain/long-run-wiod). It includes 25 countries and 23 sectors (according to the ISIC Rev. 3.1.). This level of granularity in sector and country coverage reflects the common denominator across nations based on the available data. Just like WIOD, it is also an open-access database that offers complete details about construction methods, enabling others to

11 Given that only specific major economies (such as China, Japan, and the United States) consistently update and release SUTs, creating ICIO tables for more recent years involves extrapolating the latest harmonized SUTs. These extrapolations are guided by constraints derived from National Accounts time series data up to 2020. Subsequent enhancements are achieved through adjustments using balance-of-payments statistics and bilateral trade data for goods and services.

12 WIOD starts with imports as they are presented in the supply tables and subsequently employs bilateral trade statistics to compute import shares for three specific end-use categories: intermediate use, final consumption, and investment. This determination is guided by a refined interpretation of the well-known BEC codes that delineate end-use distinctions. It is essential to highlight that, even though within each of the three end-use categories the allocation continues to rely on a proportionality assumption, this occurs at a lower level of aggregation.

make use of the data. The foundation of the long-run WIOTs rests upon published national input-output tables, which have been collected from national statistical institutes. These tables were harmonized in terms of concepts and classifications to ensure consistency across countries. The interlinking of national input-output tables across countries is achieved through detailed bilateral international trade statistics. An underlying conceptual framework derived from the System of National Accounts 1993 (SNA 1993) forms the basis for constructing these tables. This approach stems from the broader availability of national accounts data conforming to SNA 1993 within the time range from 1965 to 2000, compared to SNA 2008, which typically lacks historical data coverage. Just like WIOD, bilateral trade statistics have been used to derive import shares for three end-use categories (intermediate use, final consumption use, or investment use). For more comprehensive insights into the Long-run WIOD, refer to Woltjer, Gouma, and Timmer (2021).

The ADB multiregion I-O database (ADB MRIO) has been developed by the Asian Development Bank. It is basically an extension of the WIOD to facilitate analysis work related to Asia and the Pacific Region. Nineteen Asian countries have been added into WIOD for the years 2000 and 2007 to 2022 (https://kidb.adb.org/mrio). The current ADB MRIO database encompasses 62 economies, with a focus on 25 Asian economies. Each of these economies is further categorized into 35 sectors based on ISIC Rev. 3.1. Notably, the data provided by this database stem from estimations produced by researchers, rather than being based solely on official statistics. These estimations are updated annually, incorporating the latest published statistics. Consequently, the ADB MRIO database stands out as one of the most up-to-date ICIO resources, boasting the broadest coverage of developing Asia.

As highlighted, discrepancies in the original construction of an ICIO database, necessitating modeling assumptions and computational steps, along with the consideration of specific data issues, can contribute to variations in the estimation of value-added trade data and GVC indicators. Given the unobservable nature of trade in value-added, assessing the precision of measures derived from various ICIO datasets presents a challenge. Consequently, it is important to note that ascribing inherent superiority to one database over another is unjustified. The choice between datasets hinges on specific research objectives. For instance, researchers seeking the broadest country coverage, particularly in the context of developing economies, may find the EORA database most suitable. On the other hand, those placing emphasis on data holding official status and a more refined sectoral breakdown could opt for WIOD. For those who value both data reliability and regular annual updates, the OECD TiVA database would be a suitable choice. Should their focus lie within a specific geographic region, such as Asia, the ADB MRIO database would be pertinent. If they need a historical perspective, they should certainly consider opting for the Long-run WIOD.

4. Descriptive Statistics, Evolution, and Comparability of GVC Positioning Measures Across ICIO Datasets

Although the construction of GVC positioning indicators across multiple ICIO sources naturally prompts questions concerning the comparability of these metrics and the relative positioning of countries over time, the inherent disparities in the characteristics and computation methods of the various ICIO datasets do not allow *naïve* comparisons of the computed GVC position indicators. Additionally, as already highlighted, the ICIO datasets not only differ in their computation methodologies but also in terms of their temporal, country, and sectoral coverage. Specifically, only 24 countries have data available in all the datasets, and the year 2000 is the sole year with comprehensive data across all datasets. In the other years, data availability varies: for instance, data for the 1995–99, 2001–2006, and 2015 are only available for three datasets, while in the most recent years (2016–2020), data is freely available only for two of them (OECD TiVA and ADB). ICIO datasets vary also in terms of sectoral coverage and classification ranging from the 26 (ISIC rev. 3) sectors of EORA to the 56 (ISIC rev. 4) sectors of WIOD.

Table 1. Comparisons between Inter-Country Input-Output Datasets and IMF World Economic Outlook

Variable	*p10*	*p50*	*p90*	*Mean*	*Variance*	*N*
Trade % differences compared to IMF WEO						
IMF vs. ADB (exp)	18.37	41.79	90.39	51.18	2334.20	387
IMF vs. EORA (exp)	– 22.80	12.14	94.02	31.41	6302.54	387
IMF vs. TiVA (exp)	6.41	17.74	37.96	19.79	202.24	387
IMF vs. WIOD (exp)	21.49	49.74	100.95	60.55	3031.32	387
IMF vs. ADB (imp)	15.48	30.91	62.14	35.57	537.85	387
IMF vs. EORA (imp)	– 15.73	2.06	45.07	11.00	1366.55	387
IMF vs. TiVA (imp)	1.42	13.08	31.65	15.24	222.83	387
IMF vs. WIOD (imp)	17.55	35.14	83.12	44.28	965.69	387
Annual growth rates differences compared to IMF WEO						
IMF vs. ADB (exp)	– 3.61	0.72	5.87	1.24	34.74	301
IMF vs. EORA (exp)	– 6.61	– 0.08	7.18	0.34	56.34	387
IMF vs. TiVA (exp)	– 2.97	0.44	3.53	0.73	26.10	387
IMF vs. WIOD (exp)	– 4.16	0.80	6.60	1.11	42.14	344
IMF vs. ADB (imp)	– 2.99	0.46	4.80	1.05	26.98	301
IMF vs. EORA (imp)	– 6.17	– 0.21	6.22	0.32	56.37	387
IMF vs. TiVA (imp)	– 2.76	0.32	3.81	0.62	29.34	387
IMF vs. WIOD (imp)	– 3.14	0.52	4.57	1.06	26.22	344

Source: Authors' computation.

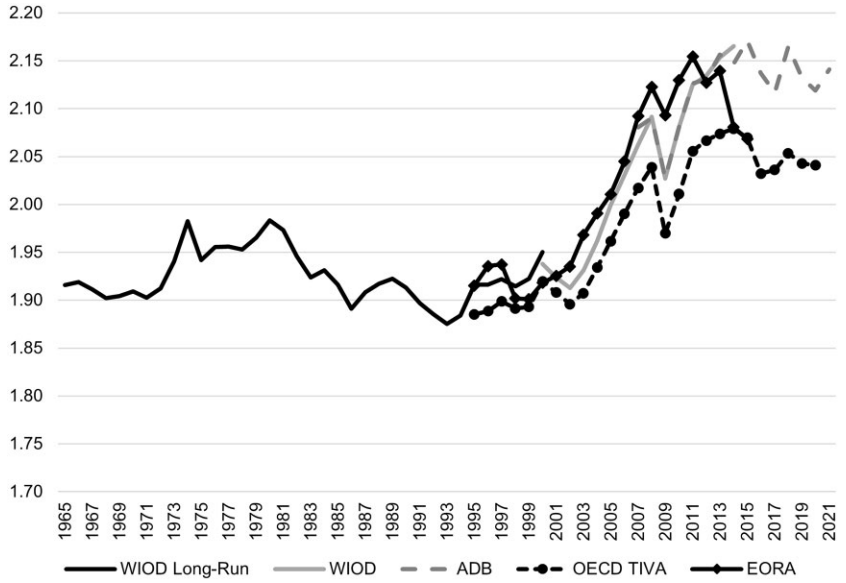
Before exploring the evolution of the various GVC positioning indicators, it is thus important to first investigate the issue of comparability of the different ICIO sources. Indeed, a substantial body of research has traditionally delved into this issue, employing various methodologies, such as direct comparison, sensitivity analysis, and decomposition analysis, with the goal of uncovering the underlying causes of disparities (Geschke et al. 2014; Inomata and Owen 2014; Moran and Wood 2014; Owen et al. 2014; Owen et al. 2016; Casella et al. 2019). These comprehensive investigations collectively demonstrate that disparities within ICIO datasets generally fall within a range of 10 percent for most values pertaining to the largest and structurally central economies and to around 30 percent for smaller economies or those with less comprehensive or reliable data (Casella et al. 2019).

For this paper's specific inquiry, attention is directed towards the matter of trade data comparability. In principle, ICIO data should conform to the trade data routinely used by economists and policymakers in the investigation of international trade in goods and services. This alignment is expected as both sources rely on common data origins. To ascertain this alignment and, in a roundabout manner, offer insights into the trustworthiness of the trade statistics provided in ICIO datasets, a comparative analysis is presented in table 1. This analysis specifically centers on overlapping countries and years, and directly compares the trade data in goods and services derived from our ICIO tables with equivalent data from the IMF World Economic Outlook (WEO), updated to October 2022.[13] These comparisons are quantified as calculated discrepancies, considering relative percentage differences and annual growth rate differences of both export and import flows.

Some discrepancies with IMF trade data have been detected (see table 1), which might be attributed to the nature of ICIO's trade block representations at the sector-to-sector level, which are typically inferred or estimated (Casella et al. 2019). However, while disparities exist, they seem not to be substantial, both in terms of percentage difference in trade flows (top panel), in particular for import data, and growth

13 The analysis excluded the Long Run WIOD due to the limited temporal overlap with the other datasets. During this overlapping period, the data within the Long Run WIOD closely resemble those contained in the WIOD.

Figure 1. GVC Positioning over Time (World Average)



Source: Authors' elaboration using data from all datasets.

rates percent differences (bottom panel). Nevertheless, ICIO trade data consistently exhibit lower values compared to the IMF, as the reported differences are, on average, all positive in favor of IMF data. Specifically, across all ICIO data, there is evidence of fat tails in the distribution of discrepancies, with a notable tendency for higher underestimation of trade data at the uppermost echelons of the distribution. EORA trade data stands out as the only ICIO table where higher values are observed compared to IMF statistics.[14] Finally, TiVA data exhibit the lowest variance across almost all the metrics.

Acknowledging these inherent discrepancies across the ICIO datasets, a first overview of the GVC positioning indicators at the global level from the various available ICIO sources is provided in fig. 1. At the global aggregate level, upstreamness and downstreamness coincide and, as already pointed out, are a proxy for global production complexity (Antràs and Chor 2019). Overall, that GVC complexity has increased during the hyper-globalization phase (1995–2008), and that the same trend is common to all the datasets considered. This empirical evidence confirms that GVCs got longer as a result of a rise in cross-border intermediate sales and purchases (Miller and Temurshoev 2017; Wang et al. 2017; Antràs and Chor 2019). Before this phase, it seems that among the 25 countries covered by Long-Run WIOD–the vast majority being advanced economies—GVC complexity expanded in the 1970s while declining in the 1980s. Thanks to the use of ICIO datasets, it is evident from fig. 1 that in the most recent years (post 2011) the globalization process has lost momentum, confirming that the global economy entered a "slowbalization" phase (Antràs 2020). Further analytical investigation is required for a comprehensive exploration of these trends. This study's dataset holds the potential to significantly facilitate such research endeavors.

To provide further details, some primary descriptive statistics for the GVC positioning indicators computed using the proposed ICIO datasets are presented in table 2. These statistics are again exclusively focused on the subset of countries that possess data spanning all the datasets within overlapping years.

14 To note that, in this comparative analysis, this study is specifically examining countries and years that are encompassed by all ICIO datasets. Consequently, any observed differences should not be ascribed to developing nations characterized by limited statistical data availability, which can be exclusively found in the EORA dataset.

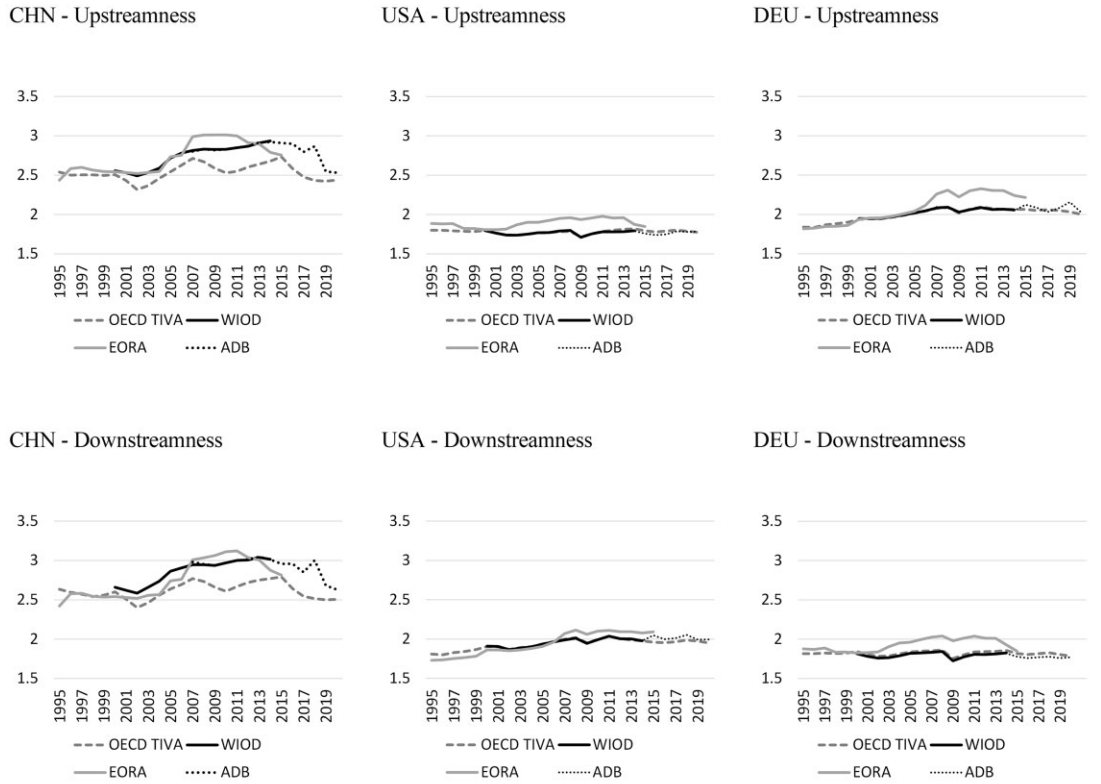
Table 2. Main Descriptive Statistics for the Global Value Chains' Positioning Indicators Computed Using the Reported ICIO Datasets (24 Overlapping Countries)

	Upstreamness					Downstreamness				
	Mean	st.d.	Min	Max	N	Mean	st.d.	Min	Max	N
			1995–1999					**1995–1999**		
EORA	1.909	0.162	1.536	2.600	120	1.907	0.162	1.711	2.582	120
TIVA	1.896	0.217	1.634	2.539	120	1.906	0.238	1.708	2.635	120
LRWIOD	1.929	0.168	1.575	2.559	120	1.913	0.177	1.689	2.663	120
			2000					**2000**		
ADB	1.902	0.174	1.670	2.556	24	1.914	0.184	1.811	2.670	24
EORA	1.907	0.177	1.535	2.542	24	1.911	0.168	1.718	2.541	24
TIVA	1.920	0.233	1.652	2.505	24	1.943	0.260	1.727	2.601	24
LRWIOD	1.947	0.192	1.665	2.523	24	1.944	0.201	1.748	2.640	24
WIOD	1.902	0.174	1.672	2.555	24	1.912	0.182	1.813	2.659	24
			2001–2006					**2001–2006**		
EORA	1.976	0.206	1.544	2.754	144	1.984	0.197	1.670	2.761	144
TIVA	1.938	0.253	1.627	2.627	144	1.968	0.274	1.721	2.694	144
WIOD	1.916	0.214	1.628	2.780	144	1.932	0.231	1.751	2.906	144
			2007–2014					**2007–2014**		
ADB	2.033	0.353	1.672	2.921	192	2.069	0.386	1.726	3.047	192
EORA	2.135	0.349	1.534	3.284	192	2.146	0.357	1.688	3.180	192
TIVA	2.102	0.355	1.604	2.712	192	2.153	0.385	1.733	2.770	192
WIOD	2.033	0.353	1.675	2.934	192	2.066	0.385	1.724	3.039	192
			2015					**2015**		
ADB	2.096	0.437	1.757	2.909	24	2.113	0.445	1.778	2.957	24
EORA	2.088	0.353	1.575	3.114	24	2.098	0.350	1.671	2.956	24
TIVA	2.218	0.443	1.734	2.734	24	2.249	0.464	1.793	2.791	24
			2016–2020					**2016–2020**		
ADB	2.067	0.373	1.701	2.898	120	2.087	0.405	1.759	3.003	120
TIVA	2.123	0.312	1.672	2.585	120	2.159	0.339	1.784	2.642	120
			Total					**Total**		
ADB	2.046	0.363	1.670	2.921	360	2.074	0.393	1.726	3.047	360
EORA	2.051	0.305	1.534	3.284	504	2.059	0.310	1.670	3.180	504
TIVA	2.065	0.332	1.604	2.734	624	2.103	0.359	1.708	2.791	624
LRWIOD	1.932	0.172	1.575	2.559	144	1.919	0.181	1.689	2.663	144
WIOD	1.991	0.314	1.628	2.934	360	2.017	0.343	1.724	3.039	360

Source: Authors' elaboration.

Across the different ICIO datasets, EORA registers, for the same subset of countries, a higher degree of structural complexity, representing the sole ICIO dataset with both indicators reaching three stages in terms of overall positioning after 2007. This result might be driven by the higher number of countries covered as counterparts for each reporting country, which makes the indicators more precise in measuring the actual number of cross-borders stages of production. The Long-run WIOD (LRWIOD) dataset exhibits the lowest degree of data dispersion around the mean (ranging between 0.17–0.18 overall). The actual values of the computed upstreamness and downstreamness indicators for each of the overlapping countries and time periods are reported in table S1.2 in the supplementary online appendix. It should be noted that at the country level the degree of heterogeneity increases (e.g., as expected China is typically positioned about one step away from each endpoint in comparison to the United States across all

Figure 2. GVC Positioning Measures for China, Germany, and the United States: A Comparison across EORA, OECD TiVA, WIOD, and ADB



Source: Authors' elaboration.

the available datasets), although observed differences remain relatively modest as this study is looking at country-level aggregate measures.[15] It is important to highlight that while these values do reflect nuanced distinctions, a discernible trend of relative consistency emerges in the positioning of various countries across the diverse datasets and time spans. To gain insight into this, a comparative analysis of the dynamics of GVC positioning indicators for three key countries within this common subset, namely China, Germany, and the United States, is presented in fig. 2 across EORA, OECD TiVA, WIOD, and ADB datasets. Although the figures are different in detail, both the level gaps and the evolution of the time trends for each country look highly consistent across WIOD, OECD TiVA, and ADB, with the relevant exception of China.

Further support for this is provided by table 3, which illustrates the significant level of correlation among upstreamness and downstreamness measures for the different ICIO datasets. Notably, all datasets exhibit a very strong correlation between them, as the lowest is the one between OECD TiVA, and EORA (slightly above 70 percent).

A more comprehensive examination of the temporal evolution of computed upstreamness and downstreamness indicators across the various world regions is presented in tables 4 and 5. It is important to mention that, in this case, the data originate from different countries across the various ICIO sources,

15 It should also be noted that at the country level it was not possible to discern whether the observed rise in GVC positioning is a result of the overall expansion of GVCs or reflects the upgrading patterns of individual countries.

Table 3. Correlations of Indicators of Upstreamness and Downstreamness across the Different Inter-Country Input-Output Datasets

	Upstreamness					Downstreamness				
	ADB	EORA	TiVA	WIOD LR	WIOD	ADB	EORA	TiVA	WIOD LR	WIOD
ADB	1.000					1.000				
EORA	0.919	1.000				0.917	1.000			
TiVA	0.829	0.732	1.000			0.852	0.724	1.000		
WIOD LR	0.926	0.909	0.810	1.000		0.936	0.937	0.840	1.000	
WIOD	1.000	0.921	0.830	0.927	1.000	0.999	0.919	0.852	0.936	1.000

Source: Authors' elaboration.

making direct detailed comparisons even more challenging (see table S1.3 in the supplementary online appendix for the composition of geographical areas for each ICIO source).[16] It is worth noting that the indicators have been weighted by the relative economic importance of each country within the same regional group, that is, by using the countries' positioning denominator values. As expected, by examining these indicators at the broader, regional level, the average GVC position is relatively consistent across regions, generally hovering around two stages, albeit with some variations. Notably, East Asian and Pacific countries exhibit the most substantial engagement in GVCs, both in terms of upstreamness and downstreamness. The same temporal evolution by income groups is reported in tables 6 and 7 (refer to table S1.4 in the supplementary online appendix for the composition of income groups).[17] To note that, on average, countries in the upper middle-income group are engaged in longer GVCs, both upstream and downstream, compared to the other groups throughout the entire period. High-income countries also exhibit a robust positive correlation with the percentage variation over time of both upstreamness and downstreamness for the entire period 1995–2015 (see table S1.5 in the supplementary online appendix).[18] A snapshot of this evolution over time of both upstreamness and downstreamness, categorized by income group, is offered by fig. 3. It uses the EORA data, which encompasses the largest subgroups of low-income countries. Looking at the position of countries with respect to the 45 degrees line, it is possible to identify which countries have changed their relative position in GVCs over the period. Both upstreamness and downstreamness plots show that, in general, high-income economies have shifted their production toward more "extreme" sectors: most of the countries below the 45° line—thus those countries that have experienced an increase in the positioning metrics—are high income. On the opposite, most of the countries above the 45° line are low-middle income economies, suggesting that such countries have shifted towards less upstream and less downstream sectors.

Additional insights for the empirical analysis can be gleaned from assessing the dynamics of the indicators by sectors. However, also in this respect, it is essential to acknowledge that the various ICIO datasets do not share a uniform sectoral classification and exhibit varying degrees of sectoral aggregation. Specifically, while WIOD, OECD TiVA, and ADB datasets can be aligned with the ISIC rev. 4 classification, EORA—standing out for its relatively highly aggregated sectors—can only be matched with ISIC rev.3. Consequently, this precludes direct alignment between EORA and any of the other datasets. Furthermore, to facilitate sectoral comparisons, it is necessary to harmonize all the datasets at the less granular level of disaggregation: for instance, to compare WIOD and OECD TiVA, it is

16 The geographical classification is taken from the World Bank and is available at the following link https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

17 The income classification is also taken from the World Bank and is available at the link reported in footnote 15.

18 The observation that countries and country-industries significantly distant from final demand also tend to be distant from the utilization of primary factors constitutes a "puzzling correlation," already emphasized by Antràs and Chor (2019).

Table 4. Global Value Chains' Upstreamness by Region over Time

Period	1995–1999				2000				2001–2006			
Upstreamness—all countries	**EORA**	**TIVA**	**LRWIOD**	**ADB**	**EORA**	**TIVA**	**LRWIOD**	**WIOD**	**EORA**	**TIVA**	**WIOD**	
East Asia and Pacific	2.004	2.066	2.020	2.051	2.040	2.101	2.045	2.034	2.150	2.175	2.121	
Europe and Central Asia	1.927	1.898	2.015	1.978	1.954	1.943	2.072	1.978	2.003	1.959	1.994	
Latin America and the Caribbean	1.806	1.760	1.804	1.746	1.807	1.790	1.809	1.758	1.852	1.813	1.785	
Middle East and Pacific	1.998	1.924		1.831	2.042	2.020		1.819	1.991	2.110	1.835	
North America	1.865	1.798	1.808	1.810	1.820	1.807	1.821	1.809	1.889	1.769	1.773	
South Asia	1.760	2.119	1.894	1.771	1.768	2.093	1.896	1.801	1.859	2.114	1.923	
Sub-Saharan Africa	1.956	2.081			1.974	2.265			1.990	2.211		
Total	1.918	1.913	1.930	1.922	1.918	1.940	1.949	1.916	1.986	1.961	1.933	

Period	2007–2014				2015			2016–2020		1995–2020				
Upstreamness—all countries	**ADB**	**EORA**	**TIVA**	**WIOD**	**ADB**	**EORA**	**TIVA**	**ADB**	**TIVA**	**ADB**	**EORA**	**TIVA**	**LRWIOD**	**WIOD**
East Asia and Pacific	2.400	2.457	2.418	2.402	2.519	2.420	2.570	2.420	2.372	2.408	2.309	2.353	2.024	2.311
Europe and Central Asia	2.057	2.083	1.999	2.052	2.074	2.033	1.995	2.072	2.008	2.061	2.034	1.980	2.024	2.031
Latin America and the Caribbean	1.803	1.907	1.850	1.830	1.803	1.843	1.796	1.812	1.823	1.804	1.874	1.823	1.805	1.816
Middle East and Pacific	1.952	1.956	2.187	1.935	1.924	1.909	1.879	2.227	1.920	2.068	1.965	2.051		1.901
North America	1.795	1.956	1.795	1.795	1.780	1.862	1.799	1.783	1.793	1.790	1.913	1.790	1.811	1.788
South Asia	1.851	1.995	1.980	1.894	1.855	1.925	1.831	1.777	1.798	1.817	1.934	1.929	1.895	1.898
Sub-Saharan Africa		1.978	2.170			1.899	2.016		2.032		1.971	2.123		
Total	2.058	2.118	2.109	2.053	2.109	2.068	2.201	2.081	2.121	2.066	2.048	2.073	1.934	2.010

Source: Authors' elaboration.

Table 5. Global Value Chains' Downstreamness by Region Over Time

Period	1995–1999				2000				2001–2006					
Downstreamness—all countries	**EORA**	**TIVA**	**LRWIOD**	**ADB**	**EORA**	**TIVA**	**LRWIOD**	**WIOD**	**EORA**	**TIVA**	**WIOD**			
East Asia and Pacific	2.021	2.090	2.012	2.060	2.042	2.129	2.042	2.039	2.151	2.216	2.150			
Europe and Central Asia	1.911	1.884	1.978	1.950	1.946	1.929	2.044	1.947	1.984	1.942	1.956			
Latin America and the Caribbean	1.849	1.765	1.836	1.836	1.850	1.799	1.885	1.848	1.860	1.810	1.836			
Middle East and Pacific	1.917	1.818		2.243	1.892	1.843		2.207	1.839	1.834	2.151			
North America	1.869	1.820	1.791	1.824	1.834	1.848	1.818	1.824	1.926	1.819	1.801			
South Asia	1.751	2.185	1.981	1.863	1.738	2.164	1.980	1.883	1.843	2.224	2.009			
Sub-Saharan Africa	1.889	1.895			1.838	2.027			1.865	1.976				
Total	1.918	1.921	1.914	1.926	1.918	1.955	1.945	1.918	1.986	1.979	1.939			
Period	**2007–2014**				**2015**			**2016–2020**		**1995–2020**				
Downstreamness—all countries	**ADB**	**EORA**	**TIVA**	**WIOD**	**ADB**	**EORA**	**TIVA**	**ADB**	**TIVA**	**ADB**	**EORA**	**TIVA**	**LRWIOD**	**WIOD**
East Asia and Pacific	2.463	2.478	2.493	2.465	2.548	2.439	2.618	2.475	2.428	2.463	2.324	2.412	2.018	2.363
Europe and Central Asia	2.007	2.044	1.984	2.005	2.018	1.996	1.965	2.011	1.983	2.007	2.004	1.962	1.989	1.987
Latin America and the Caribbean	1.873	1.921	1.851	1.875	1.857	1.870	1.815	1.865	1.822	1.868	1.893	1.825	1.845	1.864
Middle East and Pacific	2.434	1.826	1.853	2.419	2.414	1.791	1.751	2.427	1.750	2.425	1.836	1.808		2.337
North America	1.818	2.007	1.836	1.818	1.799	1.906	1.823	1.780	1.812	1.802	1.951	1.824	1.797	1.812
South Asia	2.010	1.993	2.150	2.042	1.983	1.930	1.926	1.956	1.896	1.981	1.929	2.053	1.981	2.031
Sub-Saharan Africa		1.866	1.935			1.798	1.909		1.919		1.862	1.933		
Total	2.076	2.118	2.143	2.068	2.116	2.068	2.225	2.094	2.150	2.081	2.048	2.099	1.919	2.022

Source: Authors' elaboration.

Table 6. Global Value Chains' Upstreamness by Income Group Over Time

Period	1995–1999				2000				2001–2006					
Upstreamness—all countries	**EORA**	**TIVA**	**LRWIOD**	**ADB**	**EORA**	**TIVA**	**LRWIOD**	**WIOD**	**EORA**	**TIVA**	**WIOD**			
High income	1.900	1.855	1.914	1.890	1.896	1.872	1.929	1.887	1.953	1.875	1.885			
Low income	1.934				1.927				1.968					
Lower-middle income	1.873	2.016	1.894	1.798	1.853	2.033	1.896	1.801	1.924	2.056	1.923			
Upper-middle income	2.033	2.123	2.120	2.190	2.065	2.163	2.169	2.171	2.176	2.209	2.265			
Total	1.916	1.913	1.930	1.922	1.916	1.940	1.949	1.916	1.984	1.961	1.933			
Period	**2007–2014**				**2015**			**2016–2020**				**1995–2020**		
Upstreamness—all countries	**ADB**	**EORA**	**TIVA**	**WIOD**	**ADB**	**EORA**	**TIVA**	**ADB**	**TIVA**	**ADB**	**EORA**	**TIVA**	**LRWIOD**	**WIOD**
High income	1.935	2.044	1.924	1.929	1.929	1.985	1.912	1.927	1.912	1.930	1.989	1.901	1.917	1.912
Low income		2.004				1.992					1.987			
Lower-middle income	1.891	1.985	1.983	1.894	1.899	1.917	1.863	1.829	1.857	1.862	1.953	1.943	1.895	1.898
Upper-middle income	2.483	2.382	2.394	2.488	2.604	2.315	2.540	2.498	2.359	2.495	2.299	2.355	2.130	2.435
Total	2.058	2.117	2.109	2.053	2.109	2.067	2.201	2.081	2.121	2.066	2.047	2.073	1.934	2.010

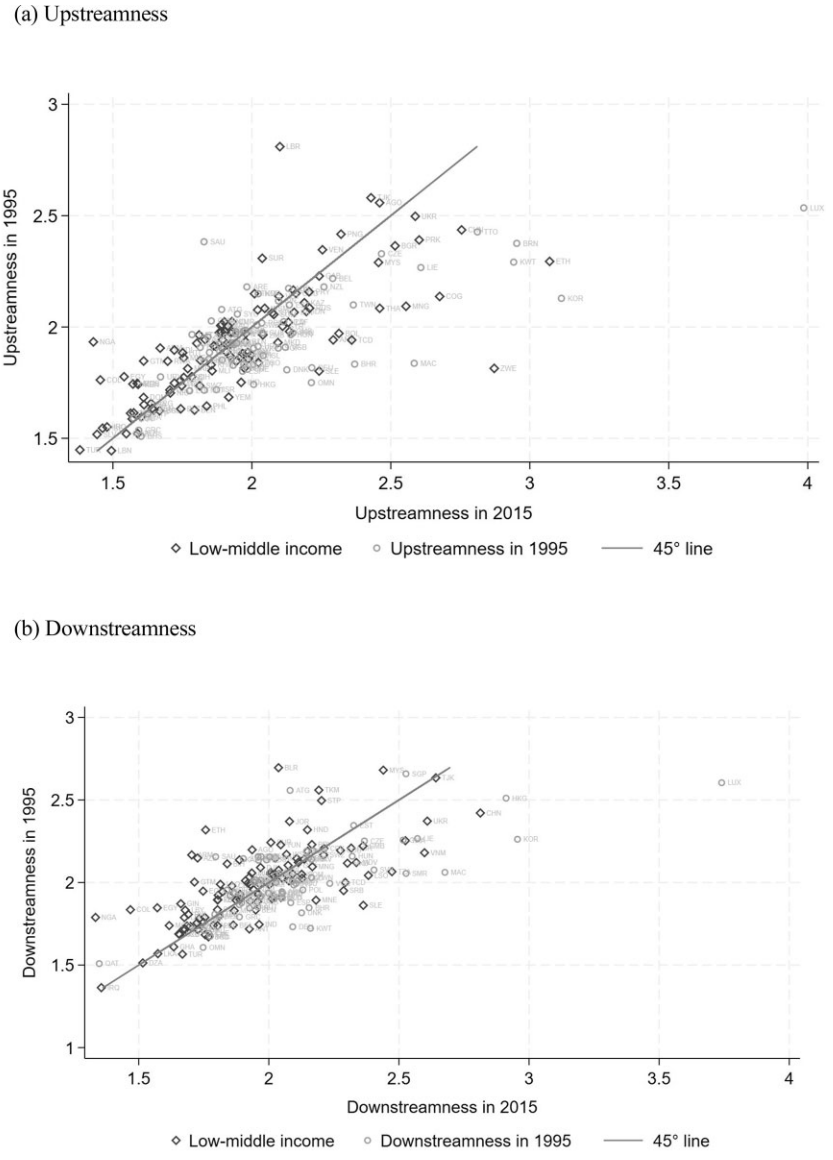
Source: Authors' elaboration.

Table 7. Global Value Chains' Downstreamness by Income Group Over Time

Period	1995–1999				2000				2001–2006					
Downstreamness—all countries	**EORA**	**TIVA**	**LRWIOD**	**ADB**	**EORA**	**TIVA**	**LRWIOD**	**WIOD**	**EORA**	**TIVA**	**WIOD**			
High income	1.903	1.857	1.889	1.888	1.901	1.879	1.911	1.883	1.963	1.885	1.887			
Low income	1.909				1.839				1.916					
Lower-middle income	1.853	2.069	1.981	1.887	1.791	2.065	1.980	1.883	1.867	2.105	2.009			
Upper-middle income	2.035	2.147	2.180	2.221	2.062	2.202	2.268	2.205	2.150	2.244	2.292			
Total	1.918	1.921	1.914	1.926	1.918	1.955	1.945	1.918	1.986	1.979	1.939			
Period	**2007–2014**				**2015**			**2016–2020**		**1995–2020**				
Downstreamness—all countries	**ADB**	**EORA**	**TIVA**	**WIOD**	**ADB**	**EORA**	**TIVA**	**ADB**	**TIVA**	**ADB**	**EORA**	**TIVA**	**LRWIOD**	**WIOD**
High income	1.938	2.047	1.935	1.932	1.924	1.988	1.909	1.905	1.904	1.923	1.994	1.905	1.892	1.915
Low income		2.001				1.994					1.972			
Lower-middle income	2.065	1.945	2.080	2.042	2.043	1.883	1.949	2.033	1.966	2.045	1.912	2.033	1.981	2.031
Upper-middle income	2.520	2.395	2.452	2.525	2.616	2.323	2.584	2.551	2.412	2.537	2.303	2.406	2.197	2.470
Total	2.076	2.119	2.143	2.068	2.116	2.069	2.225	2.094	2.150	2.081	2.049	2.099	1.919	2.022

Source: Authors' elaboration.

Figure 3. GVC Positioning Measures by Income Group and Their Correlation over Time–1995 and 2015

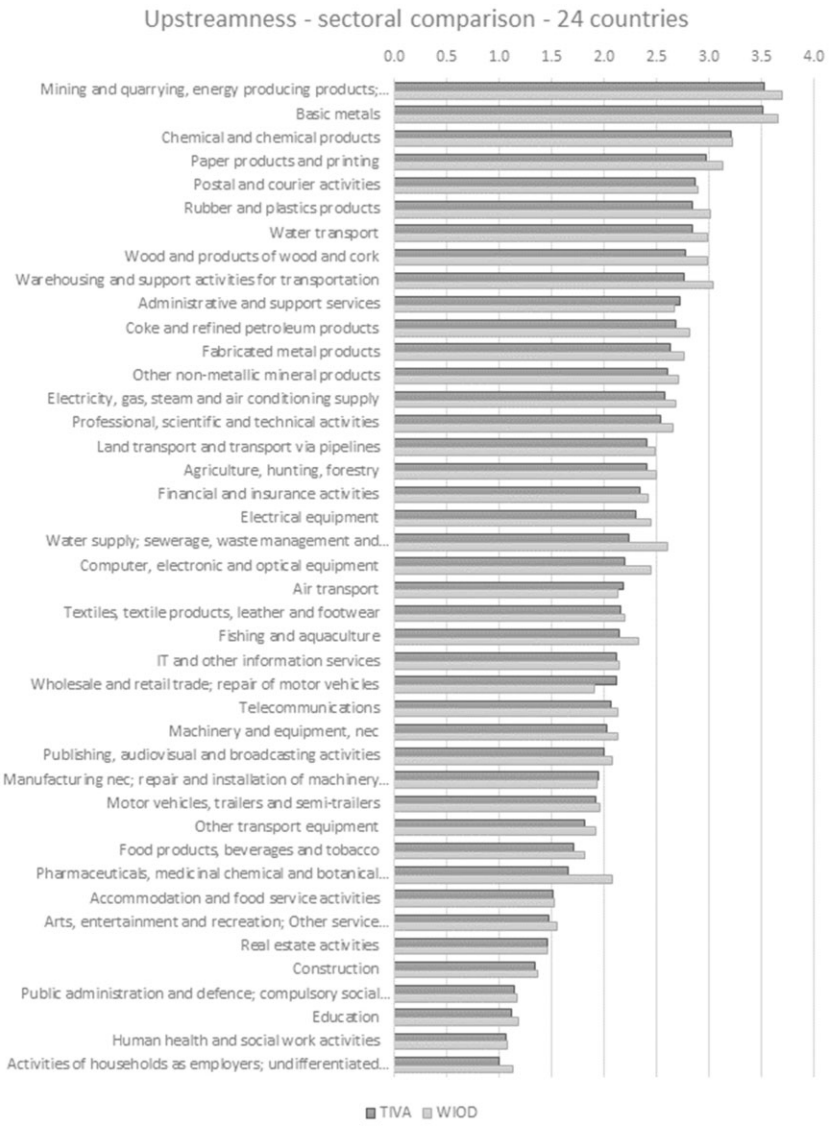


Source: Authors' elaboration using EORA26 data.

necessary to aggregate the 55 sectors from WIOD into the 45 sectors of OECD TiVA (in some circumstances further aggregated), and the same harmonization process applies to other dataset comparisons. A comprehensive breakdown of the comparison involving GVC positioning indicators for overlapping countries and periods, segmented by sectors according to the ISIC rev 4 classification, is provided in tables S1.6–S1.11 in the supplementary online appendix. A snapshot of sectoral comparisons, specifically focusing on WIOD and OECD TiVA datasets, is provided in fig. 4.

To begin, a noteworthy level of consistency in the GVC positioning indicators between the two datasets is also observed at the sectoral level. This indicates that the sectors considered relatively upstream and/or downstream align closely, albeit with WIOD generally exhibiting higher indicators compared to OECD

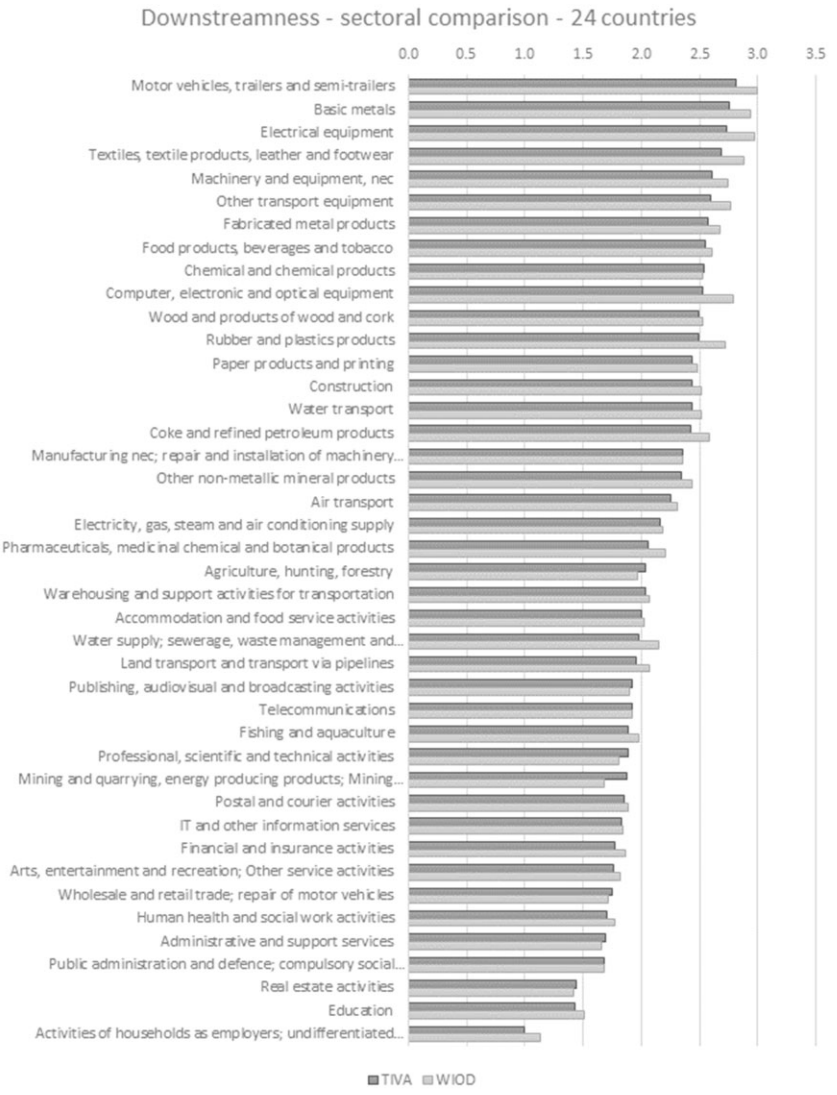
Figure 4. GVC Upstreamness and Downstreamness by Sector (World Average, 2000–2014)



Source: Authors' elaboration.

TiVA overall. Furthermore, as expected, manufacturing sectors are, on average, characterized by longer GVCs than services. All manufacturing sectors exhibit greater chain length in relation to both endpoints of the production chains, typically indicating an average of two stages of production away from each endpoint. This trend remains consistent across manufacturing sectors, exhibiting relatively limited cross-industry variation. In both datasets, the most upstream sectors are Mining and Quarrying, and Basic Metals, two sectors usually involved in the first stages of global value chains. Basic Metals are also listed alongside Motor Vehicles and Electrical Equipment as some of the most downstream industries. This is again consistent with Antràs and Chor's (2019) puzzling correlation and, in this case, is also influenced by the relatively high level of sector aggregation.

Figure 4 – *continued*



5. Conclusions

The availability of new indicators of GVCs positioning at the country and sectoral levels provides an unprecedented opportunity to carry out qualitative and quantitative analyses on different economic aspects related to GVCs. For the sake of future use by other scholars, this work computes and provides access to a new and constantly updated dataset of GVC positioning indicators at the country, country-industry, industry, and aggregate levels, based on the most used global ICIO tables.

Despite the inherent disparities in the characteristics and computation methods of the various ICIO datasets, which prevent straightforward comparisons of the computed GVC position indicators, this paper offers informative insights on these metrics. These encompass overlapping countries and periods, sectors, geographical regions, and income levels. Overall, while acknowledging the existing differences, a commendable degree of consistency among the GVC positioning measures across the diverse ICIO datasets has been observed. Considering this, refraining from attributing inherent superiority to any one

database over the others is essential, as the choice among datasets depends on specific research objectives. Researchers seeking the broadest country coverage, particularly in the context of developing economies, may find the EORA database most suitable. Those placing emphasis on data holding official status and a more refined sectoral breakdown could opt for WIOD, which is, however, not as up to date as the OECD TiVA and ADB datasets. For an historical perspective, the Long-run WIOD seems the most suited.

The dataset presented in this paper possesses the potential to significantly facilitate research endeavors related to the analyses of GVCs and production networks. The authors are confident that scholars will find value in this work and use the provided indicators to enhance their investigations into GVCs. Furthermore, these insights are expected to prove beneficial for policymakers in the pursuit of informed decision-making processes.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this article.

Data Availability Statement

The global dataset of GVC upstreamness and downstreamness measures presented in this article is available at the following link https://www.tradeconomics.com/position/. Codes to replicate the dataset, as well as to compute positioning measures on other ICIO tables, are available here: https://www.tradeconomics.com/position/docs/position_codes.zip.

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Supplementary Online Appendix

Positioning in Global Value Chains: World Map and Indicators, a New Dataset Available for GVC Analyses

M. Mancini, P. Montalbano, S. Nenci, and D. Vurchio

Additonal Tables

Table S1.1

Table S1.1. Main Characteristics of the ICIO Datasets Used to Compute GVC Positioning Measures

Dataset	Countries	Industries	Years	Data sources	References	Website
EORA	189 countries	26 industries (in the EORA26 version, ISIC - Rev. 3)	1990-2015 (updates for more recent years are available but subject to licensing)	Input-output tables, main aggregate data from national statistical offices, UN National Accounts	Lenzen et al, 2012; and Lenzen et al, 2013	https://www.worldmrio.com
TiVA	76 countries (2022 edition)	45 industries (ISIC Rev. 4)	1995-2020	OECD Inter-Country Input-Output (ICIO)	OECD-WTO (2012) "Trade in Value Added: Concepts, Methodologies and Challenges", Joint OECD-WTO concept note.	https://www.oecd.org/sti/ind/measuring-trade-in-value-added.htm
WIOD	43 countries (2016 release)	56 industries (ISIC Rev. 4)	2000-2014	National Supply-Use tables	Timmer et al., 2015	https://www.rug.nl/ggdc/valuechain/wiod/
Long-run WIOD	25 countries	23 sectors (ISIC Rev. 3.1)	1965-2000	National Input-Output tables	Woltjer et al., 2021	https://www.rug.nl/ggdc/valuechain/long-run-wiod
ADB MRIO	62 countries (with a focus on Asian economies)	35 sectors (ISIC Rev. 3.1)	2000, 2007-2022	An extension of WIOD (the information for the additional Asian countries is derived from estimations produced by researchers, not from official statistics)		https://kidb.adb.org/mrio

Source: Authors' elaboration.

Table S1.3a. Composition of geographical regions by ICIO source.

East Asia and Pacific					Europe_and_Central_Asia					South Asia				
ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD
Australia	Australia	Australia	Australia	Australia	Austria	Albania	Austria	Austria	Austria				India	India
										Bangladesh	Afghanistan	Bangladesh		
Brunei	Brunei	Brunei	China	China	Belgium	Andorra	Belarus	Belgium	Belgium	Bhutan		India		
Darus-	Darus-	Darus-									Bangladesh			
salam	salam	salam												
Cambodia	Cambodia	Cambodia	Hong	Indonesia	Bulgaria	Armenia	Belgium	Denmark	Bulgaria	India	Bhutan	Pakistan		
			Kong SAR											
China	China	China	Japan	Japan	Croatia	Austria	Bulgaria	Finland	Croatia	Maldives	India			
Fiji	China,	Hong	Rep. of	Rep. of	Cyprus	Azerbaijan	Croatia	France	Cyprus	Nepal	Maldives			
	Hong	Kong SAR	Korea	Korea										
	Kong SAR													
Malaysia	China,	Indonesia	Taiwan	Taiwan	Czechia	Belarus	Cyprus	Germany	Czechia	Pakistan	Nepal			
	Macao													
	SAR													
Mongolia	Fiji	Japan			Denmark	Belgium	Czechia	Greece	Denmark	Sri Lanka	Pakistan			
Hong	French	Laos			Estonia	Bosnia	Denmark	Ireland	Estonia		Sri Lanka			
Kong SAR	Polynesia					Herzegov-								
						ina								
Indonesia	Indonesia	Malaysia			Finland	Bulgaria	Estonia	Italy	Finland					
Japan	Japan	Myanmar			France	Cayman	Finland		France					
						Isds		Netherlands						
Lao	Lao	New			Germany	Croatia	France	Portugal	Germany					
People's	People's	Zealand												
Dem. Rep.	Dem. Rep.													
	Malaysia				Greece	Cyprus	Germany	Spain	Greece					
Philippines		Philippines												
Rep. of	Mongolia	Rep. of			Hungary	Czechia	Greece	Sweden	Hungary					
Korea		Korea												
Singapore	Myanmar	Singapore			Ireland	Denmark	Hungary	United	Ireland					
								Kingdom						
Taiwan	New	Taiwan			Italy	Estonia	Iceland		Italy					
	Caledonia													
Thailand	New	Thailand				Finland	Ireland		Latvia					
	Zealand				Kazakhstan									
Viet Nam	Papua	Viet Nam				France	Italy		Lithuania					
	New				Kyrgyzstan									
	Guinea													
	People's				Latvia	Georgia								
	Rep. of						Kazakhstan		Luxembourg					
	Korea													
					Lithuania	Germany	Latvia							
	Philippines								Netherlands					
	Rep. of					Greece	Lithuania		Norway					
	Korea				Luxembourg									
	Samoa					Greenland			Poland					
					Netherlands		Luxembourg							
	Singapore				Norway	Hungary			Portugal					
							Netherlands							

Table S1.3a. Continued

East Asia and Pacific					Europe_and_Central_Asia					South Asia				
ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD
	Taiwan				Poland	Iceland	Norway		Romania					
	Thailand				Portugal	Ireland	Poland		Russian Fed.					
	Vanuatu				Romania	Italy	Portugal		Slovakia					
	Viet Nam				Russian F.	Kazakhstan	Romania		Slovenia					
					Slovakia	Kyrgyzstan	Russian Federation		Spain					
					Slovenia	Latvia	Slovakia		Sweden					
					Spain	Liechtenstein	Slovenia		Switzerland					
					Sweden	Lithuania	Spain		Turkey					
					Switzerland	Luxembourg	Sweden		United Kingdom					
					Turkey	Monaco	Switzerland							
					UK	Montenegro	Turkey							
						Netherlands	Ukraine							
						Norway	United Kingdom							
						Poland								
						Portugal								
						Rep. of Moldova								
						Romania								
						Russian Federation								
						San Marino								
						Serbia								
						Slovakia								
						Slovenia								
						Spain								
						Sweden								
						Switzerland								
						Tajikistan								
						TFYR of Macedo-nia								
						Turkey								
						Turkmenistan								
						Ukraine								
						United Kingdom								
						Uzbekistan								

Table S1.3b. Composition of geographical regions by ICIO source.

Middle East and Pacific					North America					Latin America and the Caribbean				
ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD
Malta	Algeria	Egypt		Malta	Canada	Canada	Canada	Canada	Canada	Brazil	Antigua and Barbuda	Argentina	Brazil	Brazil
	Bahrain	Israel			USA	USA	USA	USA	USA	Mexico	Argentina	Brazil	Mexico	Mexico
	Djibouti	Jordan					**Sub-Saharan Africa**				Aruba	Chile		
	Egypt	Malta			ADB	EORA	TIVA	LRWIOD	WIOD		Bahamas	Colombia		
	Iran	Morocco				Angola					Barbados	Costa Rica		
	Iraq	Saudi Arabia				Benin	Cameroon Côte d'Ivoire				Belize	Mexico		
	Israel	Tunisia				Botswana	Nigeria				Bolivia	Peru		
	Jordan					Burkina Faso	Senegal				Br. Virgin Isds			
	Kuwait					Burundi	South Africa				Brazil			
	Lebanon					Cabo Verde					Chile			
	Libya					Cameroon					Colombia			
	Malta					Central African Rep.					Costa Rica			
	Morocco					Chad					Cuba			
	Oman					Congo					Dominican Rep.			
	Qatar					Côte d'Ivoire					Ecuador			
	Saudi Arabia					Dem. Rep. of the Congo					El Salvador			
	State of Palestine					Eritrea					Guatemala			
	Syria					Eswatini					Guyana			
	Tunisia					Ethiopia					Haiti			
	United Arab Emirates					Gabon					Honduras			
	Yemen					Gambia					Jamaica			
						Ghana					Mexico			
						Guinea					Netherland Ant.			
						Kenya					Nicaragua			

Table S1.3b. Continued

Middle East and Pacific					North America				Latin America and the Caribbean			
ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD
						Lesotho					Panama			
						Liberia					Paraguay			
											Peru			
						Madagascar								
						Malawi					Suriname			
						Mali					Trinidad			
											and			
											Tobago			
											Uruguay			
						Mauritania								
						Mauritius					Venezuela			
						Mozambique								
						Namibia								
						Niger								
						Nigeria								
						Rwanda								
						Sao Tome								
						and								
						Principe								
						Senegal								
						Seychelles								
						Sierra								
						Leone								
						Somalia								
						South								
						Africa								
						South								
						Sudan								
						Sudan								
						Togo								
						Uganda								
						United								
						Rep. of								
						Tanzania								
						Zambia								
						Zimbabwe								

Table S1.4a. Composition of income groups by ICIO source (WB classification).

Low income					Lower middle income				
ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD
	Afghanistan				Bangladesh	Algeria	Bangladesh	India	India
	Burkina Faso				Bhutan	Angola	Cambodia		
	Burundi				Cambodia	Bangladesh	Cameroon		
	Central African Rep.				India	Benin	Côte d'Ivoire		
	Chad				Kyrgyzstan	Bhutan	Egypt		
	Dem. Rep. of the Congo				Laos	Bolivia	India		
	Eritrea				Mongolia	Cabo Verde	Jordan		
	Ethiopia				Nepal	Cambodia	Laos		
	Gambia				Pakistan	Cameroon	Morocco		
	Liberia				Philippines	Congo	Myanmar		
	Madagascar				Sri Lanka	Côte d'Ivoire	Nigeria		
	Malawi				Viet Nam	Djibouti	Pakistan		
	Mali					Egypt	Philippines		
	Mozambique					Eswatini	Senegal		
	N.Korea					Ghana	Tunisia		
	Niger					Guinea	Ukraine		
	Rwanda					Haiti	Viet Nam		
	Sierra Leone					Honduras			
	Somalia					India			
	South Sudan					Iran			
	Sudan					Jordan			
	Syria					Kenya			
	Togo					Kyrgyzstan			
	Uganda					Lao People's Dem. Rep.			
	Yemen					Lebanon			
						Lesotho			
						Mauritania			
						Mongolia			
						Morocco			
						Myanmar			
						Nepal			
						Nicaragua			
						Nigeria			
						Pakistan			
						Papua New Guinea			
						Philippines			
						Samoa			
						Sao Tome and Principe			
						Senegal			
						Sri Lanka			
						Tajikistan			
						Tunisia			
						Ukraine			
						United Rep. of Tanzania			
						Uzbekistan			
						Vanuatu			
						Viet Nam			
						Zambia			
						Zimbabwe			

Table S1.4b. Composition of income groups by ICIO source (WB classification).

Upper middle income					High income				
ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD
Brazil	South Africa	South Africa	China	Mexico	Australia	Andorra	Australia	USA	Australia
Fiji	TFYR of Macedonia	Bulgaria	Brazil	China	Austria	Antigua & Barbuda	Austria	Australia	Austria
Indonesia	Turkmenistan	Kazakhstan	Mexico	Indonesia	Belgium	Aruba	Belgium	Austria	Belgium
Turkey	Albania	Indonesia		Bulgaria	Brunei Darussalam	Australia	Brunei Darussalam	Belgium	Canada
Thailand	Belarus	Colombia		Brazil	Canada	Austria	Canada	Canada	Croatia
Mexico	Peru	Thailand		Turkey	Hong Kong SAR	Bahamas	Chile	Denmark	Cyprus
Russian Federation	Gabon	Belarus		Russian Fed.	Croatia	Bahrain	Croatia	Finland	Czechia
China	Mauritius	China			Cyprus	Barbados	Cyprus	France	Denmark
Kazakhstan	Montenegro	Costa Rica			Czechia	Belgium	Czechia	Germany	Estonia
Bulgaria	Iraq	Turkey			Denmark	Bermuda	Denmark	Greece	Finland
Malaysia	Fiji	Peru			Estonia	Br. Virgin Isds	Estonia	Hong Kong SAR	France
Maldives	Serbia	Russian Federation			Finland	Brunei Darussalam	Finland	Ireland	Germany
	State of Palestine	Malaysia			France	Canada	France	Italy	Greece
	Kazakhstan	Mexico			Germany	Cayman Isds	Germany	Japan	Hungary
	Ecuador	Brazil			Greece	Chile	Greece	Korea Rep. of	Ireland
	Malaysia	Argentina			Hungary	Croatia	Hong Kong SAR	Netherlands	Italy
	Brazil				Ireland	Cyprus	Hungary	Portugal	Japan
	Rep. of Moldova				Italy	Czechia	Iceland	Spain	Korea Rep. of
	Russian Federation				Japan	Denmark	Ireland	Sweden	Latvia
	Belize				Latvia	Estonia	Israel	Taiwan	Lithuania
	Turkey				Lithuania	Finland	Italy	United Kingdom	Luxembourg
	China				Luxembourg	France	Japan		Malta
	Georgia				Malta	French Polynesia	Korea Rep. of		Netherlands
	Guatemala				Netherlands	Germany	Latvia		Norway
	Argentina				Norway	Greece	Lithuania		Poland
	Libya				Poland	Greenland	Luxembourg		Portugal
	Maldives				Portugal	Guyana	Malta		Romania
	Namibia				Korea Rep. of	Hong Kong SAR	Netherlands		Slovakia
	El Salvador				Romania	Hungary	New Zealand		Slovenia
	Indonesia				Singapore	Iceland	Norway		Spain
	Botswana				Slovakia	Ireland	Poland		Sweden
	Armenia				Slovenia	Israel	Portugal		Switzerland
	Mexico				Spain	Italy	Romania		Taiwan
	Bosnia Herzegovina				Sweden	Japan	Saudi Arabia		United Kingdom
	Thailand				Switzerland	Kuwait	Singapore		USA

Table S1.4b. Continued

Upper middle income					High income				
ADB	EORA	TIVA	LRWIOD	WIOD	ADB	EORA	TIVA	LRWIOD	WIOD
	Suriname				Taiwan	Latvia	Slovakia		
	Costa Rica				United Kingdom	Liechtenstein	Slovenia		
	Colombia				USA	Lithuania	Spain		
	Paraguay					Luxembourg	Sweden		
	Jamaica					Macao SAR	Switzerland		
	Bulgaria					Malta	Taiwan		
	Azerbaijan					Monaco	United Kingdom		
	Cuba					Netherlands	USA		
	Dominican Rep.					New Caledonia			
						New Zealand			
						Norway			
						Oman			
						Panama			
						Poland			
						Portugal			
						Qatar			
						Korea Rep. Of			
						Romania			
						San Marino			
						Saudi Arabia			
						Seychelles			
						Singapore			
						Slovakia			
						Slovenia			
						Spain			
						Sweden			
						Switzerland			
						Taiwan			
						Trinidad and			
						Tobago			
						United Arab			
						Emirates			
						United Kingdom			
						Uruguay			
						USA			

–S1.11

Table S1.11. Downstreamness by ISIC rev. 4 Sectors: A Comparison between ADB and OECD TiVA for Overlapping Countries and Periods

sectors		2000		2007-2014		2015		2016-2020		2000-2020	
		ADB	TIVA	ADB	TIVA	ADB	TIVA	ADB	TIVA	ADB	TIVA
1	Agriculture, hunting, forestry, and fishing	1.907	1.899	1.991	2.066	1.997	2.090	1.904	2.071	1.953	2.021
2	Mining and quarrying	1.796	1.836	1.655	1.833	1.698	2.013	1.857	1.956	1.733	1.879
3	Food, beverages, and tobacco	2.434	2.419	2.664	2.602	2.716	2.625	2.652	2.593	2.655	2.550
4	Textiles and textile products	2.502		2.942		3.024		2.953		2.934	
5	Leather, leather products, and footwear	2.716	2.499	3.194	2.756	3.335	2.913	3.151	2.789	3.172	2.685
6	Wood and products of wood and cork	2.408	2.466	2.614	2.555	2.672	2.573	2.657	2.480	2.624	2.497
7,26,30	Pulp, paper, paper products, printing, and publishing; Other supporting and auxiliary transport activities; activities of travel agencies; Renting of M&Eq and other business activities	1.843	1.866	1.903	1.921	1.930	1.950	1.894	1.893	1.899	1.886
9	Chemicals and chemical products	2.323	2.141	2.518	2.338	2.505	2.368	2.470	2.286	2.493	2.263
10	Rubber and plastics	2.490	2.367	2.768	2.588	2.772	2.551	2.771	2.523	2.758	2.496
11	Other nonmetallic minerals	2.338	2.282	2.492	2.409	2.588	2.469	2.489	2.373	2.490	2.348
12	Basic metals and fabricated metal	2.458	2.360	2.897	2.665	3.002	2.651	2.881	2.714	2.883	2.596
13,16	Machinery, nec; Manufacturing, nec; recycling	2.352	2.294	2.698	2.618	2.801	2.690	2.706	2.588	2.696	2.523
14	Electrical and optical equipment	2.497	2.393	2.995	2.681	3.091	2.733	2.984	2.684	2.976	2.587
15	Transport equipment	2.663	2.603	3.024	2.841	3.117	2.851	3.020	2.803	3.018	2.761
17,34	Electricity, gas, and water supply; Other community, social, and personal services	1.877	1.823	1.993	1.951	2.016	1.949	1.996	1.904	1.992	1.896
18	Construction	2.218	2.210	2.625	2.503	2.747	2.659	2.685	2.525	2.646	2.440

Table S1.11. Continued

sectors		2000		2007-2014		2015		2016-2020		2000-2020	
		ADB	TIVA	ADB	TIVA	ADB	TIVA	ADB	TIVA	ADB	TIVA
19	Sale, maintenance, and repair of motor vehicles and motorcycles; retail sale of fuel	1.741		1.823		1.816		1.758		1.796	
20	Wholesale trade and commission trade, except of motor vehicles and motorcycles	1.712		1.762		1.742		1.742		1.751	
21	Retail trade, except of motor vehicles and motorcycles; repair of household goods	1.605	1.685	1.692	1.774	1.690	1.771	1.692	1.792	1.689	1.752
22	Hotels and restaurants	1.966	1.920	2.062	2.032	2.076	2.012	2.059	2.025	2.058	1.999
23	Inland transport	1.913	1.820	2.117	2.007	2.123	2.001	2.104	2.003	2.106	1.951
24	Water transport	2.376	2.301	2.573	2.466	2.610	2.460	2.616	2.486	2.582	2.431
25	Air transport	2.185	2.214	2.400	2.356	2.351	2.205	2.307	2.204	2.354	2.254
27	Post and telecommunications	1.883	1.924	1.930	1.958	1.969	1.980	1.985	1.931	1.951	1.917
28	Financial intermediation	1.846	1.785	1.832	1.824	1.779	1.770	1.808	1.744	1.820	1.772
29	Real estate activities	1.415	1.413	1.406	1.452	1.401	1.469	1.446	1.450	1.422	1.446
31	Public administration and defense; compulsory social security	1.640	1.641	1.704	1.713	1.700	1.701	1.692	1.690	1.697	1.686
32	Education	1.441	1.403	1.547	1.448	1.620	1.435	1.691	1.443	1.608	1.430
33	Health and social work	1.730	1.660	1.824	1.722	1.883	1.755	1.921	1.729	1.865	1.707
35	Private households with employed persons	1.159	1.000	1.126	1.000	1.126	1.000	1.065	1.000	1.106	1.000
Total		1.914	1.895	2.069	2.021	2.113	2.058	2.087	2.014	2.074	1.981

Source: Authors' computations.

Note: Sectors' positioning measures are weighted according to their relative gross output.

Table S1.2. GVC Positioning Indicators (Upstreamness and Downstreamness) across Time Periods (Only for Overlapping Countries and Periods)

Period	1995-1999			2000					2001-2006			2007-2014				2015			2016-2020	
Upstreamness	EORA	TIVA	WIOD LR	ADB	EORA	TIVA	WIOD LR	WIOD	EORA	TIVA	WIOD	ADB	EORA	TIVA	WIOD	ADB	EORA	TIVA	ADB	TIVA
AUS	2.181	2.009	2.189	2.196	2.125	2.058	2.239	2.193	2.246	2.101	2.187	2.247	2.190	2.165	2.256	2.197	2.132	2.112	2.296	2.209
AUT	1.861	1.801	1.948	1.900	1.905	1.863	2.012	1.901	1.972	1.919	1.945	2.049	2.062	2.009	2.044	2.030	2.006	1.998	2.036	1.997
BEL	2.222	2.089	2.178	2.131	2.232	2.146	2.285	2.134	2.296	2.147	2.126	2.179	2.357	2.141	2.174	2.184	2.291	2.126	2.178	2.134
BRA	1.846	1.713	1.848	1.822	1.931	1.839	1.937	1.846	2.008	1.941	1.920	1.866	2.060	1.890	1.899	1.818	1.998	1.827	1.862	1.865
CAN	1.985	1.882	1.998	2.005	1.998	1.971	2.088	2.009	2.065	1.941	1.986	1.996	2.047	1.912	2.000	2.068	1.982	1.859	1.980	1.867
CHN	2.546	2.509	2.510	2.556	2.542	2.505	2.523	2.555	2.603	2.457	2.607	2.854	2.953	2.621	2.857	2.909	2.755	2.734	2.727	2.471
DEU	1.840	1.865	1.920	1.947	1.938	1.936	1.988	1.947	2.009	1.983	1.988	2.070	2.283	2.069	2.068	2.123	2.216	2.065	2.076	2.039
DNK	1.824	1.821	1.912	1.848	1.904	1.888	2.012	1.847	1.928	1.888	1.875	1.934	2.143	1.897	1.929	1.927	2.126	1.874	1.954	1.881
ESP	1.827	1.816	2.045	1.841	1.858	1.852	2.051	1.840	1.946	1.907	1.935	1.932	1.968	1.876	1.928	1.968	1.966	1.861	1.943	1.864
FIN	2.126	2.026	2.214	2.132	2.139	2.097	2.305	2.140	2.167	2.038	2.091	2.073	2.171	1.994	2.073	2.100	2.096	1.960	2.092	1.983
FRA	1.951	1.824	1.964	1.896	1.960	1.872	2.030	1.895	1.966	1.864	1.885	1.884	1.974	1.846	1.880	1.904	1.885	1.847	1.919	1.862
GBR	1.973	1.835	2.098	1.932	1.949	1.851	2.116	1.933	1.963	1.850	1.920	1.948	2.005	1.887	1.943	1.919	1.970	1.853	1.910	1.861
GRC	1.541	1.667	1.605	1.717	1.535	1.652	1.665	1.718	1.555	1.651	1.726	1.767	1.573	1.685	1.765	1.843	1.593	1.734	1.849	1.704
IND	1.747	2.248	1.896	1.799	1.757	2.205	1.896	1.801	1.849	2.219	1.913	1.895	2.036	2.065	1.900	1.889	1.961	1.876	1.810	1.834
IRL	1.852	2.283	2.172	2.075	1.894	2.288	2.238	2.076	1.905	2.205	2.073	2.110	1.934	2.266	2.106	2.084	1.893	2.282	2.154	2.230
ITA	1.969	1.945	2.081	1.984	1.949	1.978	2.142	1.982	1.968	1.973	1.991	2.002	1.989	1.941	1.997	1.981	1.942	1.926	1.968	1.956
JPN	1.833	1.766	1.881	1.877	1.867	1.762	1.877	1.875	1.885	1.776	1.884	1.894	1.961	1.827	1.887	1.853	1.926	1.840	1.861	1.833
KOR	2.181	2.030	2.222	2.096	2.154	2.047	2.270	2.092	2.314	2.029	2.107	2.294	3.130	2.189	2.292	2.395	3.114	2.207	2.314	2.179
MEX	1.613	1.785	1.740	1.670	1.587	1.764	1.694	1.672	1.614	1.732	1.652	1.702	1.642	1.771	1.707	1.779	1.575	1.739	1.731	1.755
NLD	2.043	2.028	2.148	2.126	2.064	2.067	2.186	2.129	2.131	2.060	2.045	2.151	2.180	2.079	2.151	2.327	2.115	2.091	2.361	2.085
PRT	1.834	1.895	2.031	1.839	1.877	1.874	2.018	1.839	1.850	1.850	1.864	1.919	1.896	1.834	1.918	1.927	1.933	1.809	1.956	1.819
SWE	1.980	1.983	2.146	2.007	1.986	2.013	2.179	2.013	2.039	1.994	2.011	2.070	2.098	2.027	2.072	2.082	2.018	1.991	2.118	1.988
TWN	2.074	2.015	2.087	1.991	2.177	2.017	2.106	1.992	2.242	2.052	2.064	2.262	2.386	2.232	2.268	2.360	2.365	2.239	2.271	2.186
USA	1.859	1.793	1.796	1.796	1.807	1.796	1.803	1.796	1.870	1.754	1.755	1.773	1.946	1.782	1.773	1.757	1.847	1.794	1.768	1.787

Table S1.2. Continued

Period	1995-1999			2000					2001-2006			2007-2014				2015			2016-2020	
	EORA	TIVA	WIOD LR	ADB	EORA	TIVA	WIOD LR	WIOD	EORA	TIVA	WIOD	ADB	EORA	TIVA	WIOD	ADB	EORA	TIVA	ADB	TIVA
Downstreamness																				
AUS	2.152	1.946	2.119	2.069	2.066	1.997	2.128	2.068	2.19	2.04	2.09	2.064	2.055	2.014	2.065	2.056	1.991	1.967	2.048	1.986
AUT	1.876	1.796	1.851	1.858	1.895	1.836	1.900	1.857	1.94	1.89	1.91	2.001	2.028	1.998	1.998	2.091	1.958	1.970	2.036	1.971
BEL	2.159	2.055	2.140	2.075	2.168	2.100	2.223	2.075	2.19	2.08	2.04	2.124	2.224	2.120	2.117	2.225	2.152	2.082	2.211	2.095
BRA	1.888	1.730	1.853	1.851	1.966	1.867	1.966	1.873	2.02	1.92	1.90	1.895	2.076	1.892	1.893	1.850	2.018	1.838	1.852	1.826
CAN	1.999	1.836	1.901	1.929	1.953	1.896	1.974	1.929	2.00	1.88	1.92	1.952	2.019	1.873	1.955	2.066	1.999	1.870	1.943	1.866
CHN	2.532	2.580	2.597	2.670	2.541	2.601	2.640	2.659	2.61	2.54	2.73	2.989	3.032	2.710	2.983	2.957	2.813	2.791	2.825	2.542
DEU	1.754	1.829	1.888	1.914	1.862	1.906	1.968	1.911	1.89	1.91	1.91	1.999	2.090	1.997	1.996	2.048	2.092	1.960	2.011	1.967
DNK	1.828	1.814	1.899	1.867	1.916	1.840	1.948	1.865	1.95	1.87	1.90	1.971	2.154	1.929	1.969	1.970	2.126	1.902	1.959	1.903
ESP	1.930	1.903	2.056	1.961	2.003	1.980	2.076	1.962	2.07	2.04	2.04	2.023	2.113	1.956	2.019	2.051	2.084	1.893	1.982	1.898
FIN	2.005	1.900	2.020	1.997	1.996	1.960	2.083	1.993	2.01	1.94	1.98	2.050	1.999	1.992	2.040	2.035	1.946	1.946	2.045	1.972
FRA	1.942	1.815	1.916	1.907	1.968	1.876	1.998	1.900	1.94	1.87	1.90	1.931	1.935	1.902	1.926	1.941	1.851	1.886	1.945	1.899
GBR	1.995	1.817	2.077	1.898	1.970	1.827	2.105	1.896	1.99	1.83	1.89	1.932	2.050	1.873	1.929	1.876	1.970	1.847	1.880	1.845
GRC	1.801	1.793	1.713	1.811	1.825	1.805	1.748	1.813	1.83	1.78	1.79	1.770	1.889	1.774	1.771	1.845	1.887	1.793	1.830	1.808
IND	1.737	2.309	1.983	1.883	1.727	2.268	1.980	1.883	1.83	2.32	2.00	2.045	2.030	2.234	2.047	2.006	1.963	1.953	1.973	1.914
IRL	2.183	2.325	2.214	2.074	2.154	2.274	2.221	2.067	2.15	2.26	2.07	2.089	2.239	2.314	2.079	1.978	2.170	2.231	1.995	2.240
ITA	2.004	1.966	2.045	2.014	2.002	2.034	2.124	2.012	2.01	2.03	2.01	2.058	2.009	2.042	2.052	2.016	1.948	1.996	1.997	1.997
JPN	1.818	1.740	1.861	1.861	1.844	1.727	1.855	1.857	1.85	1.75	1.88	1.929	1.916	1.840	1.923	1.899	1.926	1.831	1.885	1.819
KOR	2.286	2.077	2.246	2.161	2.255	2.089	2.316	2.155	2.37	2.11	2.20	2.428	3.027	2.329	2.426	2.462	2.956	2.249	2.324	2.221
MEX	1.727	1.799	1.811	1.821	1.718	1.784	1.815	1.824	1.70	1.76	1.78	1.837	1.728	1.817	1.848	1.868	1.671	1.793	1.883	1.814
NLD	1.923	1.935	2.036	1.955	1.952	1.967	2.067	1.946	2.05	1.94	1.92	2.010	2.105	1.994	2.005	2.089	2.051	2.027	2.095	2.028
PRT	2.019	2.066	2.140	2.057	2.005	2.054	2.143	2.061	2.05	2.00	2.02	1.992	2.071	1.975	1.994	1.941	2.028	1.915	1.982	1.927
SWE	1.949	1.914	2.019	1.940	1.994	1.936	2.060	1.938	2.00	1.93	1.92	1.949	2.049	1.967	1.947	1.943	1.966	1.927	1.969	1.934
TWN	1.989	2.005	2.058	2.019	1.948	1.990	2.027	2.006	2.07	2.00	2.03	2.175	2.181	2.171	2.171	2.121	2.164	2.034	2.078	2.052
USA	1.862	1.819	1.784	1.818	1.826	1.845	1.809	1.817	1.91	1.81	1.79	1.804	2.006	1.832	1.803	1.778	1.895	1.819	1.768	1.808

Source: Authors' computations.

Table S1.5. Correlations between the Percentage Variation of both Upstreamness and Downstreamness by Country Income Group for the Period 1995–2015

	dep variable:			
	ΔU%	**ΔU%**	**ΔD%**	**ΔD%**
ln GDP pc	0.021**		0.022**	
	(0.010)		(0.011)	
high_income=1		0.060***		0.067***
		(0.019)		(0.022)
cons	−0.161*	−0.014	−0.196**	−0.038**
	(0.093)	(0.015)	(0.099)	(0.018)
R2	0.05	0.04	0.04	0.04
N	170	188	170	188

Source: Authors' computations.

Note: Robust standard errors in parentheses: ***p < 0.01, **p < 0.05, *p < 0.1.

Table S1.6. Upstreamness by ISIC rev. 4 Sectors: A Comparison between OECD TiVA and WIOD for Overlapping Countries and Periods

sectors		2000		2001-2006		2007-2014		2000-2014	
		TIVA	WIOD	TIVA	WIOD	TIVA	WIOD	TIVA	WIOD
1	Agriculture, hunting, forestry	2.184	2.211	2.232	2.272	2.458	2.603	2.408	2.498
2	Fishing and aquaculture	1.801	2.133	1.854	2.158	2.255	2.408	2.153	2.333
3to5	Mining and quarrying, energy producing products; Mining and quarrying, non-energy producing products; Mining support service activities	3.239	3.410	3.290	3.432	3.552	3.795	3.525	3.701
6	Food products, beverages and tobacco	1.519	1.629	1.552	1.664	1.752	1.910	1.718	1.820
7	Textiles, textile products, leather and footwear	1.862	1.973	1.853	1.978	2.177	2.323	2.160	2.198
8	Wood and products of wood and cork	2.656	2.714	2.693	2.775	2.847	3.121	2.772	2.992
9	Paper products and printing	2.907	3.054	2.894	3.044	3.019	3.200	2.977	3.134
10	Coke and refined petroleum products	2.459	2.569	2.461	2.582	2.744	2.922	2.693	2.816
11	Chemical and chemical products	2.970	3.030	2.994	3.050	3.296	3.329	3.211	3.232
12	Pharmaceuticals, medicinal chemical and botanical products	1.594	2.082	1.588	2.063	1.662	2.092	1.659	2.082
13	Rubber and plastics products	2.689	2.858	2.704	2.886	2.895	3.103	2.847	3.018
14	Other non-metallic mineral products	2.498	2.645	2.586	2.646	2.635	2.740	2.601	2.708
15	Basic metals	3.435	3.497	3.499	3.573	3.543	3.703	3.510	3.658
16	Fabricated metal products	2.553	2.631	2.582	2.670	2.686	2.833	2.639	2.769
17	Computer, electronic and optical equipment	2.040	2.214	2.046	2.285	2.216	2.553	2.194	2.449
18	Electrical equipment	2.291	2.243	2.272	2.284	2.270	2.540	2.307	2.447
19	Machinery and equipment, nec	1.921	1.934	1.939	1.998	2.027	2.211	2.022	2.136
20	Motor vehicles, trailers and semi-trailers	1.873	1.872	1.903	1.887	1.947	2.018	1.917	1.968
21	Other transport equipment	1.822	1.848	1.815	1.887	1.807	1.940	1.821	1.921
22	Manufacturing nec; repair and installation of machinery and equipment	1.901	1.851	1.899	1.842	1.965	2.004	1.943	1.942
23	Electricity, gas, steam and air conditioning supply	2.412	2.469	2.418	2.539	2.661	2.783	2.582	2.691
24	Water supply; sewerage, waste management and remediation activities	2.026	2.459	2.133	2.491	2.265	2.675	2.244	2.607
25	Construction	1.305	1.315	1.361	1.359	1.368	1.384	1.341	1.373

Table S1.6. Continued

sectors		2000		2001-2006		2007-2014		2000-2014	
		TIVA	WIOD	TIVA	WIOD	TIVA	WIOD	TIVA	WIOD
26	Wholesale and retail trade; repair of motor vehicles	2.042	1.822	2.041	1.832	2.157	1.954	2.119	1.909
27	Land transport and transport via pipelines	2.232	2.348	2.305	2.394	2.470	2.544	2.409	2.490
28	Water transport	2.639	2.812	2.689	2.899	2.895	3.037	2.842	2.985
29	Air transport	2.096	1.988	2.131	2.026	2.218	2.208	2.184	2.136
30	Warehousing and support activities for transportation	2.604	2.910	2.685	2.967	2.822	3.077	2.768	3.038
31	Postal and courier activities	2.838	2.832	2.838	2.855	2.886	2.937	2.873	2.903
32	Accommodation and food service activities	1.494	1.492	1.465	1.480	1.503	1.563	1.515	1.533
33	Publishing, audiovisual and broadcasting activities	2.020	2.112	2.002	2.065	2.018	2.091	2.001	2.083
34	Telecommunications	2.172	2.182	2.135	2.147	2.051	2.122	2.073	2.133
35	IT and other information services	2.087	2.095	2.103	2.119	2.113	2.162	2.124	2.146
36	Financial and insurance activities	2.211	2.325	2.228	2.336	2.393	2.476	2.348	2.424
37	Real estate activities	1.417	1.420	1.440	1.454	1.457	1.474	1.460	1.466
38	Professional, scientific and technical activities	2.473	2.594	2.488	2.605	2.568	2.683	2.540	2.655
39	Administrative and support services	2.653	2.667	2.666	2.654	2.768	2.693	2.724	2.679
40	Public administration and defence; compulsory social security	1.126	1.177	1.126	1.167	1.147	1.172	1.143	1.171
41	Education	1.111	1.162	1.119	1.175	1.116	1.181	1.115	1.179
42	Human health and social work activities	1.060	1.073	1.061	1.078	1.062	1.082	1.061	1.080
43to44	Arts, entertainment and recreation; Other service activities	1.490	1.506	1.484	1.513	1.465	1.587	1.474	1.560
45	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	1.000	1.407	1.000	1.133	1.000	1.123	1.000	1.139
Total		1.879	1.902	1.888	1.916	1.983	2.033	1.956	1.991

Source: Authors' computations.

Note: Sectors' positioning measures are weighted according to their relative gross output.

Table S1.7. Downstreamness by ISIC rev. 4 Sectors: A Comparison between WIOD and OECD TiVA for Overlapping Countries and Periods

Sectors		2000		2001-2006		2007-2014		2000-2014	
		TIVA	WIOD	TIVA	WIOD	TIVA	WIOD	TIVA	WIOD
1	Agriculture, hunting, forestry	1.918	1.917	1.954	1.938	2.078	1.984	2.034	1.967
2	Fishing and aquaculture	1.711	1.915	1.766	1.938	1.933	1.995	1.889	1.976
3to5	Mining and quarrying, energy producing products; Mining and quarrying, non-energy producing products; Mining support service activities	1.836	1.797	1.858	1.751	1.833	1.653	1.879	1.683
6	Food products, beverages and tobacco	2.419	2.444	2.454	2.486	2.602	2.675	2.550	2.607
7	Textiles, textile products, leather and footwear	2.499	2.547	2.562	2.679	2.756	3.005	2.685	2.881
8	Wood and products of wood and cork	2.466	2.371	2.466	2.441	2.555	2.598	2.497	2.531
9	Paper products and printing	2.275	2.355	2.316	2.379	2.488	2.560	2.440	2.486
10	Coke and refined petroleum products	2.314	2.497	2.286	2.473	2.466	2.631	2.423	2.585
11	Chemical and chemical products	2.414	2.377	2.463	2.414	2.654	2.595	2.536	2.529
12	Pharmaceuticals, medicinal chemical and botanical products	1.895	2.121	1.935	2.119	2.099	2.258	2.057	2.209
13	Rubber and plastics products	2.367	2.500	2.422	2.589	2.588	2.806	2.496	2.719
14	Other non-metallic mineral products	2.282	2.342	2.298	2.319	2.409	2.499	2.348	2.430
15	Basic metals	2.555	2.592	2.682	2.747	2.874	3.015	2.752	2.939
16	Fabricated metal products	2.319	2.381	2.416	2.478	2.625	2.793	2.569	2.676
17	Computer, electronic and optical equipment	2.374	2.465	2.417	2.591	2.594	2.929	2.526	2.791
18	Electrical equipment	2.459	2.535	2.513	2.651	2.844	3.134	2.726	2.966
19	Machinery and equipment, nec	2.358	2.440	2.466	2.544	2.713	2.857	2.610	2.749
20	Motor vehicles, trailers and semi-trailers	2.654	2.748	2.702	2.799	2.891	3.101	2.807	2.990
21	Other transport equipment	2.394	2.423	2.432	2.507	2.681	2.887	2.600	2.770
22	Manufacturing nec; repair and installation of machinery and equipment	2.187	2.235	2.241	2.272	2.415	2.412	2.352	2.355
23	Electricity, gas, steam and air conditioning supply	1.958	2.019	1.994	2.050	2.261	2.252	2.156	2.178
24	Water supply; sewerage, waste management and remediation activities	1.861	2.143	1.928	2.148	2.012	2.160	1.983	2.155
25	Construction	2.210	2.215	2.268	2.303	2.503	2.626	2.440	2.513

Table S1.7. Continued

Sectors		2000		2001-2006		2007-2014		2000-2014	
		TIVA	WIOD	TIVA	WIOD	TIVA	WIOD	TIVA	WIOD
26	Wholesale and retail trade; repair of motor vehicles	1.685	1.664	1.715	1.682	1.774	1.737	1.752	1.716
27	Land transport and transport via pipelines	1.820	1.918	1.877	1.976	2.007	2.123	1.951	2.068
28	Water transport	2.301	2.361	2.357	2.404	2.466	2.575	2.431	2.515
29	Air transport	2.214	2.177	2.239	2.196	2.356	2.390	2.254	2.312
30	Warehousing and support activities for transportation	1.938	1.969	1.985	2.022	2.054	2.096	2.033	2.069
31	Postal and courier activities	1.691	1.782	1.770	1.814	1.905	1.931	1.848	1.882
32	Accommodation and food service activities	1.920	1.969	1.947	1.967	2.032	2.064	1.999	2.028
33	Publishing, audiovisual and broadcasting activities	2.028	2.017	1.950	1.927	1.928	1.875	1.922	1.901
34	Telecommunications	1.939	1.913	1.913	1.906	1.960	1.930	1.921	1.921
35	IT and other information services	1.782	1.840	1.716	1.757	1.886	1.871	1.825	1.836
36	Financial and insurance activities	1.785	1.870	1.755	1.831	1.824	1.886	1.772	1.867
37	Real estate activities	1.413	1.411	1.455	1.440	1.452	1.401	1.446	1.414
38	Professional, scientific and technical activities	1.789	1.724	1.788	1.752	1.916	1.840	1.882	1.808
39	Administrative and support services	1.710	1.611	1.689	1.588	1.730	1.702	1.691	1.662
40	Public administration and defence; compulsory social security	1.641	1.639	1.672	1.652	1.713	1.700	1.686	1.682
41	Education	1.403	1.440	1.412	1.442	1.448	1.544	1.430	1.510
42	Human health and social work activities	1.660	1.717	1.667	1.722	1.722	1.800	1.707	1.773
43to44	Arts, entertainment and recreation; Other service activities	1.763	1.742	1.784	1.768	1.799	1.845	1.767	1.816
45	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	1.000	1.160	1.000	1.159	1.000	1.126	1.000	1.138
Total		1.895	1.912	1.911	1.932	2.021	2.066	1.981	2.017

Source: Authors' computations.

Note: Sectors' positioning measures are weighted according to their relative gross output.

Table S1.8. Upstreamness by ISIC rev. 4 Sectors: A Comparison between ADB and WIOD for Overlapping Countries and Periods

sectors		2000		2007-2014		2000-2014	
		ADB	WIOD	ADB	WIOD	ADB	WIOD
1	Agriculture, hunting, forestry, and fishing	2.192	2.205	2.610	2.589	2.626	2.486
2	Mining and quarrying	3.343	3.410	3.704	3.795	3.765	3.701
3	Food, beverages, and tobacco	1.635	1.629	1.918	1.910	1.965	1.820
4to5	Textiles and textile products; Leather, leather products, and footwear	1.971	1.973	2.320	2.323	2.360	2.198
6	Wood and products of wood and cork	2.699	2.714	3.102	3.121	3.113	2.992
7	Pulp, paper, paper products, printing, and publishing	2.642	2.634	2.712	2.650	2.731	2.618
8	Coke, refined petroleum, and nuclear fuel	2.539	2.569	2.847	2.922	2.907	2.816
9	Chemicals and chemical products	2.773	2.736	2.992	2.927	3.003	2.854
10	Rubber and plastics	2.849	2.858	3.085	3.103	3.155	3.018
11	Other nonmetallic minerals	2.644	2.645	2.738	2.740	2.719	2.708
12	Basic metals and fabricated metal	3.018	2.974	3.319	3.262	3.290	3.189
13	Machinery, nec	1.964	1.974	2.206	2.225	2.196	2.153
14	Electrical and optical equipment	2.211	2.222	2.531	2.549	2.561	2.449
15	Transport equipment	1.856	1.865	1.975	1.994	1.966	1.954
16	Manufacturing, nec; recycling	1.734	1.748	1.885	1.900	1.922	1.838
17	Electricity, gas, and water supply	2.420	2.439	2.702	2.720	2.729	2.639
18	Construction	1.314	1.315	1.383	1.384	1.371	1.373
19	Sale, maintenance, and repair of motor vehicles and motorcycles; retail sale of fuel	1.721	1.728	1.804	1.811	1.800	1.773
20	Wholesale trade and commission trade, except of motor vehicles and motorcycles	2.121	2.128	2.276	2.289	2.306	2.231
21	Retail trade, except of motor vehicles and motorcycles; repair of household goods	1.483	1.486	1.544	1.550	1.583	1.536
22	Hotels and restaurants	1.494	1.492	1.565	1.563	1.594	1.533
23	Inland transport	2.333	2.348	2.523	2.544	2.544	2.490
24	Water transport	2.786	2.812	3.021	3.037	3.071	2.985
25	Air transport	1.988	1.988	2.204	2.208	2.215	2.136
26	Other supporting and auxiliary transport activities; activities of travel agencies	2.905	2.910	3.067	3.077	3.111	3.038
27	Post and telecommunications	2.289	2.294	2.253	2.246	2.271	2.254
28	Financial intermediation	2.327	2.325	2.464	2.476	2.508	2.424
29	Real estate activities	1.423	1.420	1.476	1.474	1.498	1.466
30	Renting of M&Eq and other business activities	2.556	2.528	2.613	2.578	2.620	2.559
31	Public administration and defense; compulsory social security	1.176	1.177	1.169	1.172	1.158	1.171
32	Education	1.162	1.162	1.183	1.181	1.198	1.179
33	Health and social work	1.074	1.073	1.082	1.082	1.082	1.080
34	Other community, social, and personal services	1.748	1.629	1.840	1.749	1.856	1.712
35	Private households with employed persons	1.406	1.407	1.122	1.123	1.148	1.139
Total		1.902	1.902	2.033	2.033	2.046	1.991

Source: Authors' computations.

Note: Sectors' positioning measures are weighted according to their relative gross output.

Table S1.9. Downstreamness by ISIC rev. 4 Sectors: A Comparison between ADB and WIOD for Overlapping Countries and Periods

sectors		2000		2007-2014		2000-2014	
		ADB	WIOD	ADB	WIOD	ADB	WIOD
1	Agriculture, hunting, forestry, and fishing	1.907	1.916	1.991	1.985	1.953	1.968
2	Mining and quarrying	1.796	1.797	1.655	1.653	1.733	1.683
3	Food, beverages, and tobacco	2.434	2.444	2.664	2.675	2.655	2.607
4to5	Textiles and textile products; Leather, leather products, and footwear	2.542	2.547	2.996	3.005	2.985	2.881
6	Wood and products of wood and cork	2.408	2.371	2.614	2.598	2.624	2.531
7	Pulp, paper, paper products, printing, and publishing	2.191	2.137	2.179	2.061	2.141	2.060
8	Coke, refined petroleum, and nuclear fuel	2.453	2.497	2.602	2.631	2.653	2.585
9	Chemicals and chemical products	2.323	2.275	2.518	2.450	2.493	2.392
10	Rubber and plastics	2.490	2.500	2.768	2.806	2.758	2.719
11	Other nonmetallic minerals	2.338	2.342	2.492	2.499	2.490	2.430
12	Basic metals and fabricated metal	2.458	2.407	2.897	2.837	2.883	2.722
13	Machinery, nec	2.403	2.411	2.791	2.806	2.798	2.702
14	Electrical and optical equipment	2.497	2.484	2.995	2.999	2.976	2.848
15	Transport equipment	2.663	2.680	3.024	3.045	3.018	2.936
16	Manufacturing, nec; recycling	2.250	2.254	2.444	2.453	2.405	2.388
17	Electricity, gas, and water supply	2.008	2.006	2.240	2.228	2.226	2.159
18	Construction	2.218	2.215	2.625	2.626	2.646	2.513
19	Sale, maintenance, and repair of motor vehicles and motorcycles; retail sale of fuel	1.741	1.746	1.823	1.831	1.796	1.802
20	Wholesale trade and commission trade, except of motor vehicles and motorcycles	1.712	1.710	1.762	1.765	1.751	1.749
21	Retail trade, except of motor vehicles and motorcycles; repair of household goods	1.605	1.606	1.692	1.693	1.689	1.668
22	Hotels and restaurants	1.966	1.969	2.062	2.064	2.058	2.028
23	Inland transport	1.913	1.918	2.117	2.123	2.106	2.068
24	Water transport	2.376	2.361	2.573	2.575	2.582	2.515
25	Air transport	2.185	2.177	2.400	2.390	2.354	2.312
26	Other supporting and auxiliary transport activities; activities of travel agencies	1.972	1.969	2.096	2.096	2.113	2.069
27	Post and telecommunications	1.883	1.907	1.930	1.930	1.951	1.920
28	Financial intermediation	1.846	1.870	1.832	1.886	1.820	1.867
29	Real estate activities	1.415	1.411	1.406	1.401	1.422	1.414
30	Renting of M&Eq and other business activities	1.739	1.765	1.839	1.830	1.845	1.801
31	Public administration and defense; compulsory social security	1.640	1.639	1.704	1.700	1.697	1.682
32	Education	1.441	1.440	1.547	1.544	1.608	1.510
33	Health and social work	1.730	1.717	1.824	1.800	1.865	1.773
34	Other community, social, and personal services	1.833	1.775	1.905	1.867	1.910	1.841
35	Private households with employed persons	1.159	1.160	1.126	1.126	1.106	1.138
Total		1.914	1.912	2.069	2.066	2.074	2.017

Source: Authors' computations.

Note: Sectors' positioning measures are weighted according to their relative gross output.

Table S1.10. Upstreamness by ISIC rev. 4 Sectors: A Comparison between ADB and OECD TiVA for Overlapping Countries and Periods

sectors		2000		2007-2014		2015		2016-2020		2000-2020	
		ADB	TIVA	ADB	TIVA	ADB	TIVA	ADB	TIVA	ADB	TIVA
1	Agriculture, hunting, forestry, and fishing	2.192	2.156	2.610	2.444	2.775	2.676	2.646	2.446	2.626	2.390
2	Mining and quarrying	3.343	3.239	3.704	3.552	3.995	3.715	3.852	3.689	3.765	3.525
3	Food, beverages, and tobacco	1.635	1.519	1.918	1.752	2.078	1.978	2.037	1.819	1.965	1.718
4	Textiles and textile products	2.011		2.363		2.587		2.456		2.398	
5	Leather, leather products, and footwear	1.712	1.862	2.081	2.177	2.342	2.367	2.243	2.448	2.149	2.160
6	Wood and products of wood and cork	2.699	2.656	3.102	2.847	3.268	2.906	3.138	2.795	3.113	2.772
7,26,30	Pulp, paper, paper products, printing, and publishing; Other supporting and auxiliary transport activities; activities of travel agencies; Renting of M&Eq and other business activities	2.591	2.470	2.658	2.547	2.687	2.569	2.685	2.532	2.669	2.520
8	Coke, refined petroleum, and nuclear fuel	2.539	2.459	2.847	2.744	3.027	2.841	3.002	2.844	2.907	2.693
9	Chemicals and chemical products	2.773	2.467	2.992	2.703	3.058	2.802	3.027	2.729	3.003	2.641
10	Rubber and plastics	2.849	2.689	3.085	2.895	3.185	3.029	3.266	2.962	3.155	2.847
11	Other nonmetallic minerals	2.644	2.498	2.738	2.635	2.774	2.663	2.695	2.604	2.719	2.601
12	Basic metals and fabricated metal	3.018	2.940	3.319	3.127	3.385	3.172	3.258	3.097	3.290	3.071
13,16	Machinery, nec; Manufacturing, nec; recycling	1.887	1.912	2.116	2.004	2.207	2.098	2.129	2.059	2.119	1.991
14	Electrical and optical equipment	2.211	2.111	2.531	2.234	2.694	2.385	2.614	2.360	2.561	2.230
15	Transport equipment	1.856	1.860	1.975	1.908	2.015	1.963	1.955	1.894	1.966	1.892
17,34	Electricity, gas, and water supply; Other community, social, and personal services	1.977	1.888	2.138	2.009	2.192	2.101	2.195	2.045	2.158	1.982
18	Construction	1.314	1.305	1.383	1.368	1.362	1.339	1.362	1.312	1.371	1.341
19	Sale, maintenance, and repair of motor vehicles and motorcycles; retail sale of fuel	1.721		1.804		1.791		1.806		1.800	

Table S1.10. Continued

sectors		2000		2007-2014		2015		2016-2020		2000-2020	
		ADB	TIVA	ADB	TIVA	ADB	TIVA	ADB	TIVA	ADB	TIVA
20	Wholesale trade and commission trade, except of motor vehicles and motorcycles	2.121		2.276		2.384		2.346		2.306	
21	Retail trade, except of motor vehicles and motorcycles; repair of household goods	1.483	2.042	1.544	2.157	1.588	2.206	1.644	2.156	1.583	2.119
22	Hotels and restaurants	1.494	1.494	1.565	1.503	1.624	1.601	1.638	1.569	1.594	1.515
23	Inland transport	2.333	2.232	2.523	2.470	2.625	2.517	2.576	2.471	2.544	2.409
24	Water transport	2.786	2.639	3.021	2.895	3.188	3.045	3.157	2.934	3.071	2.842
25	Air transport	1.988	2.096	2.204	2.218	2.239	2.264	2.247	2.219	2.215	2.184
27	Post and telecommunications	2.289	2.324	2.253	2.217	2.277	2.222	2.293	2.209	2.271	2.241
28	Financial intermediation	2.327	2.211	2.464	2.393	2.571	2.499	2.564	2.400	2.508	2.348
29	Real estate activities	1.423	1.417	1.476	1.457	1.497	1.492	1.534	1.501	1.498	1.460
31	Public administration and defense; compulsory social security	1.176	1.126	1.169	1.147	1.180	1.161	1.137	1.154	1.158	1.143
32	Education	1.162	1.111	1.183	1.116	1.191	1.123	1.221	1.115	1.198	1.115
33	Health and social work	1.074	1.060	1.082	1.062	1.078	1.062	1.083	1.059	1.082	1.061
35	Private households with employed persons	1.406	1.000	1.122	1.000	1.133	1.000	1.164	1.000	1.148	1.000
Total		1.902	1.879	2.033	1.983	2.096	2.041	2.067	1.996	2.046	1.956

Source: Authors' computations.

Note: Sectors' positioning measures are weighted according to their relative gross output.