

# OECD-WTO Database on Trade in Value-Added

## FAQs: Background Note

### What is Trade in Value-Added?

*Trade in value-added* describes a statistical approach used to estimate the source(s) of **value** (by country and industry) that is **added** in producing goods and services for export (and import). It recognises that growing global value chains mean that a country's exports increasingly rely on significant intermediate imports (and, so, value added by industries in upstream countries). For example a motor vehicle exported by country A may require significant parts, such as engines, seats etc produced in other countries. In turn these countries will use intermediate inputs imported from other countries, such as steel, rubber etc to produce the parts exported to A. The Trade in value-added approach traces the value added by each industry and country in the production chain and allocates the value-added to these source industries and countries.

### Why is it important?

*To reveal the underlying economic significance of exports and of imports to producing exports*

Traditional measures of trade record gross flows of goods and services each and every time they cross borders. This 'multiple counting' of trade can, to some extent, overstate the importance of exports to GDP. Moreover because, in an accounting sense, imports are treated as a negative item for GDP, gross statistics for imports can paint a misleading picture of their importance to economic growth and competitiveness. They do not for example reveal the role played by imports as inputs for exports. Equally they are not able to reveal the extent of a country's own value-added that is returned in its imports.

*To better reflect who trades with who and the nature of interrelationships between emerging and developed economies*

In the same way, conventional bilateral trade statistics do not typically reflect the full scale of global value chains. A reporting country will record the partner country for its exports on the basis of where the goods and services are directly exported. These exports will in turn be further processed by the importing country before, often, being exported again to another country, either as final goods or as further intermediate goods. Countries towards the beginning of value-chains (upstream) will have direct bilateral trade relationships with countries further one step down the value-chain (downstream) but may have little direct bilateral trade relationships with foreign consumers who purchase the final goods and services. Conventional measures of trade therefore are not able to reveal how increased or lower demand by households, governments and investment in one country impact on value-added generation in other countries. Typically, this means that conventional measures of trade do not reflect the full interdependence of markets and the interdependencies of emerging and more developed economies.

*To provide more meaningful measures of bilateral trade balances*

This different perspective on bilateral trade relationships also has an impact on bilateral trade balances. Countries, for example, at the end of value-chains, will typically record lower surpluses with their direct export markets and lower deficits with their major import markets; reflecting the fact that the country at the end of the value chain acts as an 'intermediary' through which the value-added generated in producing the intermediate imports, passes.

*To better reflect the contribution made by services*

Typically goods dominate international trade (about 80%). But this masks the important role played by services in creating goods. For example, returning to the motor vehicle example, significant intermediate inputs are provided by country A's domestic service providers, in

finance-insurance, R&D, accounting and other business services. Trade in value-added estimates reveal the important contribution made by the services sector (domestic and foreign) in producing goods for export, and so provide better measures of the sources of international competitiveness.

### What is Value-Added?

Value-added reflects the value that is added by industries in producing goods and services. It follows the definition of value-added (in *basic prices*) used in the System of National Accounts (1993 SNA) and is equivalent to the difference between its output (in *basic prices*) and the sum of its intermediate inputs (in *purchasers prices*) of goods and services. It is equivalent to the compensation for labour (*Compensation of Employees*) and compensation for capital (*Operating Surplus*), and also includes a component for '*Other taxes on Production*'. Definitions of *Basic Prices*, *Purchasers Prices*, *Compensation of Employees*, *Operating Surplus*, and *Other Taxes on Production* also follow the definitions in the 1993 SNA.

### How is it measured?

The approach is based on the construction of an input-output table for the world. This is based on official national input output or supply use tables. National Input-output tables reflect the interrelationships between domestic industries and also between industries and final demand categories (households, government, investment and exports). They also reflect how intermediate imports are used in producing goods and services and how imports of final goods are consumed. National input-output tables are not able however to reflect how the intermediate consumption of an industry in one country drives output in another. Using bilateral trade statistics it is possible to estimate these flows. The global table produced by the OECD includes national IO tables for 57 countries. The Rest of the World component is estimated using information on World GDP and input-output relationships observed in developing economies. The industry level of detail used covers 37 industries. For further information on the methodology see: *Trade in Value-Added: Concepts, Methodologies and Challenges*: OECD-WTO 2012.

### What are the underlying assumptions and, by extension, caveats?

Some assumptions are necessarily used in creating global input-output tables and the Trade in Value-Added indicators, and described in more detail in the accompanying methodological note. There are two main assumptions: The Production assumption, which assumes in very simple terms that for a given industry, all firms allocated to that industry use the same goods and services to produce the same outputs; and The Proportionality assumption, which assumes that the proportion of intermediates that an industry purchases from abroad is equal to the ratio of imports to total domestic demand in that product. Because not all firms are equal, and in particular because firms engaged in international trade are typically more likely to use foreign inputs to produce their outputs, the former assumption means that these preliminary estimates give prudent estimates of the share of foreign content (in other words **biased downwards**). **The latter is not expected to generate biases in any particular direction but does mean that greater care is needed in interpreting bilateral trade estimates.**

### Why have you only published data for 40 countries and 18 industries?

This reflects the deliberately prudent nature of the release. As the quality of the underlying data used to construct the global input-output table improves so too will the range of information provided. The 40 countries shown in this preliminary release reflect OECD Membership and for the Non-Member countries, importance to global trade.

### What does this mean for gross trade statistics?

**Gross trade statistics remain important.** Trade in Value-Added estimates provide a new, but [complementary](#), perspective. In a global value chain an understanding of who (and how) contributes value matters but so too does the direct intermediary steps of the chain (the direct bilateral trade relationships). Firms in one country choose to pass their gross exports for further processing to firms in other countries because of a number of factors, including specialisation, availability of natural resources, labour skills etc but also because of access to markets and the ease of doing business and trade (tariffs, regulations, customs requirements etc) with these countries. Moreover gross trade statistics remain important for determining exchange rates.

### What are the plans going forward?

The intention of this initiative is to mainstream the production of Trade in Value-Added estimates and make their production a permanent feature of the international statistics system. Work will continue therefore to improve the coverage of: countries, industries, indicators and years covered. In addition work is already underway to improve the quality of the results, via a number of initiatives including: on-going work on bilateral trade in services with international and national partners; and via the OECD's Working Parties and networks of official statistics, where for example, work to better reflect the heterogeneity of exporting and importing firms within IO tables has recently begun.

In addition the OECD has already begun to explore the development of estimates of "Trade in jobs" - reflecting what type of jobs (skills) and how many are created via trade - and also to consider how the accounting framework could be extended to measure "Trade in Income" - which is a recognition that knowledge based assets play an increasingly important role in value-added creation. Where this knowledge is 'owned' by foreign affiliate firms, the value-added will be recorded in the country where the knowledge resides but profits will often be repatriated elsewhere. Measuring these flows will form an important part of the research programme in coming years.

### How representative is 2009?

The results indicate that global value-chains were particularly affected in 2009 by the synchronised slowdown in international trade that characterised the recent financial crisis, illustrating the sensitivity of global value chains to both supply and demand shocks and best illustrated by increasing domestic value-added to export ratios compared to 2008 data. The very preliminary data, stretching back to 1995, (which will be released in future releases of this database) points to a general trend of increasing international fragmentation of production (i.e. declining lower domestic value-added to export ratios) suggesting some care is needed in interpreting 2009 data.

### How have you dealt with internationally inconsistent official trade statistics?

It is a well known that the international trade statistics produced by national authorities are not globally consistent: total global gross exports do not equal total global gross imports. This inconsistency is larger when bilateral trade flows are considered and larger still when those flows are looked at on a detailed product level. Even if total gross exports from country A equal those imported by country B, there may still be differences when these flows are looked at on a product by product level. The global input-output tables used to produce Trade in Value-Added indicators necessarily resolve all of these inconsistencies. The results of this balancing will form the basis of dialogue with national statistics institutions as part of on-going international efforts to reconcile international trade statistics; particularly in the area of trade in services where official statistics on bilateral trade data are notoriously weak. [The balancing does not introduce any directional or structural bias but, clearly, the quality of TIVA results will be significantly improved as global inconsistencies reduce.](#) This is not expected to have a significant impact on overall foreign content estimates broken down by industry but bilateral trade in value-added estimates will be affected.

### **Will you be publishing the implicit bilateral gross trade flows that have been balanced in the global input-output table?**

In time yes. The balancing process necessarily implies changes from official national statistics on bilateral trade. For some countries this will necessarily mean larger changes than for others. Releasing the bilateral trade statistics now would unintentionally turn the spotlight onto the official gross trade statistics produced by some countries, which is not the intention of this release. The purpose is to investigate what the world looks like when trade flows are recorded on a value-added basis and not to compare the quality of official bilateral trade statistics produced by countries. In this sense one should note that Figures 1 in the series of country notes produced to accompany this release take as a starting point the bilateral trade statistics one is able to construct using officially available national sources, based where available on the reporting country's perspective. However we have chosen to publish the bilateral gross trade balances that derive from the balanced global input-output table: (a) because of the importance of this comparison and (b) because bilateral gross trade balances reflect differences between (typically) two large numbers (gross exports and gross imports), limiting the scope for misinterpreting any balancing adjustment as a view on the quality of any country's official statistics. Through a process of dialogue with national institutions we will continue to working with countries to improve the quality of bilateral trade statistics.

### **Given global inconsistencies in international trade, why not produce TIVA estimates at a later date?**

The pace of change in global value chains requires action sooner rather than later. Developing policies based on gross trade statistics alone could lead to misplaced trade policies and indeed industrial policies. The preliminary estimates released in the TIVA database are designed to complement the traditional gross measures and heighten awareness of the changed landscape, stimulating the development of better policies that better recognise the role of global value chains. In turn this raised awareness will also stimulate, accelerate, and give higher priority to the need to improve underlying national statistics on international trade and input-output tables. As the work progresses therefore the quality of the results will improve.

That said, it is important to put all of the caveats described above into some perspective. Notwithstanding the significance of the estimates in stimulating better policies and better data, the preliminary estimates, especially for the more aggregated indicators are considered to be of sufficient quality. [Indicators related to the services content of exports by industry, the foreign content of exports by industry, and the general messages conveyed by bilateral trade relationships \(namely directional changes in bilateral trade balances\)](#) are considered to be of good quality. Those relating to detailed bilateral trade flows and relationships, such as the origin of foreign value-added, will be more greatly affected by the assumptions above but where improvements are foreseen.

### **How can the new data be used for the negotiation of trade agreements?**

At this stage, the database is intended to provide insights on the importance of focusing on GVCs when developing trade policies. It is not currently sufficiently disaggregated enough to be able to provide information on specific goods or services that would benefit from further trade liberalisation but it does paint a compelling picture all the same of the important benefits that could be gained through liberalisation, particularly in services. The database also reveals the importance of intermediate imports to export competitiveness and so highlights the potential for counter-productive protectionist measures. Moreover the database provides an important tool to reveal that relatively low tariff rates applied on gross trade flows may not be so insignificant when looked at through a value-added lens, particularly when one considers the multiplicative impact of tariffs as intermediate goods and services pass through the value-chain: see also *Trade Policy Implications of Global Value Chains*, which accompanies this note.

## What indicators are provided?

In this first release the following indicators are provided for 40 countries (OECD countries, Russian Federation, Brazil, China, India, Indonesia, and South Africa) with a breakdown into 18 industries.

### Gross Trade Indicators

Variable Name	Variable Description	Comments
EXGR	Gross Exports by Industry, USD	<p>All variables are consistent with official National Accounts estimates of total gross exports and total gross imports and GDP estimates. Estimates by Industry are based on the balanced pattern of trade derived within the global input-output database (see below).</p> <p><i>Bilateral gross trade flows (between partner countries) of exports and imports are not shown as current official statistics on bilateral trade are not globally coherent. The global input-output table underlying the TiVA database imposes coherence in bilateral gross flows, which may be released in future database releases after consultation with national statistics institutes (NSIs).</i></p> <p>The underlying gross bilateral trade statistics used to arrive at the balanced picture of trade in the TiVA database are however available for both goods (OECD's <i>Bilateral Trade by Industry and End-Use database</i> BTDIxE) and services (OECD's <i>Trade in Services by Partner Country database</i>, TISP) and can be found on the OECD's statistics portal OECD.Stat.</p>
IMGR	Gross Imports by Industry, USD	
EXGR_GDP	EXGR as a per cent of GDP	
IMGR_GDP	IMGR as a per cent of GDP	
TSGR	Bilateral Trade balances by Partner Country, USD	<p>TSGR is equivalent to EXGR minus IMGR. Bilateral trade positions in TSGR are also shown in the TiVA database. These bilateral trade balances broadly align with 'official' bilateral trade balances produced by NSIs. However there are often differences between TiVA estimates and these 'official' estimates'. These reflect:</p> <ul style="list-style-type: none"> <li>• Treatment of re-exports and transit trade through e.g. Netherlands, Hong Kong, China, Singapore and NAFTA.</li> <li>• Global inconsistencies between exports and imports of trade in goods and services between partner countries, reported in official statistics.</li> <li>• Coverage and quality issues, particularly in official bilateral trade in services statistics, such as missing data.</li> </ul> <p>The main focus for bilateral trade balances in the TiVA database should be on differences between TSGR and TSVAFD (see TSVAFD-TSGR).</p>
TSGR_GDP	TSGR as a per cent of GDP	

### Gross Trade Decomposition (Value-Added embodied in Gross Trade Flows)

Variable Name	Variable Description	Comments
EXGRDVA	Total Domestic Value-Added embodied in gross exports (by Industry), USD	Total Domestic value-added content of exports is broken down into three components, described below as EXGR_DDC, EXGR_IDC and EXGR_RIM).
EXGRDVA_EX	EXGRDVA as per cent of EXGR (by Industry), %	This reflects the domestic value-added embodied in exports as a per cent of exports. It provides a simple measure that illustrates how much value-added is generated throughout the economy for a given unit of exports. The lower the ratio the higher the foreign content and so the higher the importance of imports to exports.
EXGR_DDC	Direct Industry Value-Added (by Industry), USD	This reflects the direct contribution made by an industry in producing a good or service for export.
EXGR_IDC	Indirect Domestic Value-Added (by Industry), USD.	This reflects the indirect contribution of domestic supplier industries made through domestic (upstream) transactions.
EXGR_RIM	Re-imported Domestic Value-Added (by Industry), USD	This reflects the domestic value-added that was exported in goods and services used to produce the intermediate imports of goods and services used by the industry in question.
EXGR_FVA	Foreign Value-Added share of gross exports, by country of origin (USD)	This reflects the foreign value-added embodied in imports broken down by country of origin.
EXGR_DDCSH	EXGR_DDC as a % of EXGR (by Industry).	The share reflects how much value-added is generated in an industry per unit of its total gross exports.
EXGR_IDCSH	EXGR_IDC as a % of EXGR (by Industry).	The share reflects the value-added created in upstream industries providing domestic inputs to the exporting industry.
EXGR_RIMSH	EXGR_RIM as a % of EXGR (by Industry).	The share reflects the value-added created in upstream domestic industries providing indirect intermediate inputs, via international, as opposed to domestic, value-chains to the industry in question. The indicator provides a measure of how protectionist measures may impact on domestic industries that provide inputs to imports.
EXGR_FVASH	EXGR_FVA as a % of EXGR (by Industry).	This is equivalent to 1 minus EXGRDVA_EX

### Intermediate Imports

Variable Name	Variable Description	Comments
REI	Intermediate Imports embodied in Exports, as a per cent of total intermediate imports, (by Industry, %).	This reflects the share of intermediate imports that are used (indirectly and directly) in producing goods and services for export, as a per cent of total intermediate imports (by import category). The indicator provides a measure of the importance of intermediate imports to produce goods and services for export and their role as a source of international competitiveness.

## Value-Added embodied in Final Domestic Demand

Variable Name	Variable Description	Comments
FDDVA	Domestic Value-Added embodied in Foreign Final Domestic Demand, by importing country and exporting industry, USD	Value-Added embodied in Foreign Final Domestic Demand shows how industries export value both through direct final exports and via indirect exports of intermediates through other countries to foreign final consumers (households, charities, government, and as investment). They reflect how industries (upstream in a value-chain) are connected to consumers in other countries, even where no direct trade relationship exists. The indicator illustrates therefore the full upstream impact of final demand in foreign markets to domestic output. It can most readily be interpreted as 'exports of value-added'.
FDDVASH	FDDVA by importing country and exporting industry as a per cent of total FDDVA, %	
FDDVA_GDP	FDDVA as a per cent of GDP, by importing country and exporting industry	
FDVVA	Foreign Value-Added embodied in Final Domestic Demand, by origin country and origin industry, USD	Foreign Value-Added embodied in Final Domestic Demand shows for a final good or service (purchased by households, government, non-profit institutions serving households, or as investment) where foreign value-added originates. It is the 'import' corollary of FDDVA and shows how industries abroad (upstream in a value-chain) are connected to consumers at home, even where no direct trade relationship exists. It can most readily be interpreted as 'imports of value-added'
FDVASH	FDDVA by origin country and origin industry as a per cent of total FDDVA, %	
FDVVA_GDP	FDDVA as a per cent of GDP, by origin country and origin industry	
TSVAFD	Bilateral Trade balances in value-added by Partner Country (FDDVA minus FDFVA), USD	The bilateral trade position in value-added terms.
TSVAFD_GDP	Bilateral Trade balances in value-added by Partner Country (FDDVA minus FDFVA), % GDP	

## Services

Variable Name	Variable Description	Comments
EXGR_SVAC	Total Domestic Value-Added of the services sector (only) embodied in gross exports (by Industry), USD	Total Domestic value-added content of exports is broken down into three components, described below as EXGR_DDC_SV, EXGR_IDC_SV and EXGR_RIM_SV. Their definitions follow from their whole economy counterparts described above EXGR_DDC, EXGR_IDC and EXGR_RIM.
EXGRDVA_EX	EXGRDVA as per cent of EXGR (by Industry), %	This reflects the services domestic value-added embodied in exports as a per cent of exports. It provides a simple measure that illustrates the real underlying contribution made by services to exports.
EXGR_DDC_SV	Direct Services Value-Added (by Industry), USD	This reflects the direct services value-added made by an industry in producing a good or service for export. By definition it will be zero for all non-services industries.
EXGR_IDC_SV	Indirect Domestic Services Value-Added (by Industry), USD.	This reflects the indirect contribution of domestic service suppliers made through domestic (upstream) transactions, for exports.
EXGR_RIM_SV	Re-imported Services Domestic Value-Added (by Industry), USD	This reflects the domestic services value-added that was exported in goods and services used to produce the intermediate imports of goods and services used by the industry in question.
EXGR_FVA_SV	Foreign Services Value-Added share of gross exports, by country of origin (USD)	This reflects the foreign services value-added embodied in imports broken down by country of origin.
SERV_VAFD	Domestic Services Value-Added embodied in Foreign Final Domestic Demand, by origin country and origin industry, as % of total final demand in the importing country	