

## Part II Conceptual framework for GVC Accounting

---

### Contents

1.	Introduction .....	2
2.	Types of GVCs.....	2
3.	GVC geographical boundary .....	3
4.	GVC Governance .....	4
5.	Classification of business functions .....	9
6.	Classification of GVC participating firms.....	11
7.	Classification of GVC products.....	15
8.	GVC specific multi-partner country Supply and Use Tables .....	19
9.	Linking with KLEMS accounts.....	23
10.	Linking with Extended Supply and Use Tables.....	24
a.	Simple Extensions .....	25
b.	Extensions within Activities .....	25
11.	GVC specific multi-partner country institutional sector accounts.....	27
a.	Institutional sector classification .....	27
b.	GVC specific institutional sector accounts.....	30
c.	GVC specific Multi-partner country institutional sector account .....	34
12.	Cross classification of GVC-SUTs with institutional sector accounts .....	38
13.	Data framework of Multi Partner Supply, Use and Input-Output Tables .....	39
a.	Introduction .....	39
b.	Conceptual and data framework of Multi partner Supply, Use and Input-Output tables.....	40
c.	Building blocks of Inter-country Supply, Use and Input-Output Tables and their interaction ...	41

## 1. Introduction

1. A Global value chain consist of the full range of activities that firms and workers do to bring a product (good or service) from its conception to its end use and beyond. This includes activities such as design, production, marketing, distribution and support to the final consumer. A global value chain operates among multiple firms and geographic spaces. *[based on the description in <https://globalvaluechains.org/concept-tools>]*

2. In order to understand and analyze GVCs within the national accounts framework, a satellite account is developed to describe more in depth specific aspects of GVCs that are otherwise hidden in the conventional accounts. To this end specific elements that determine the scope of the accounts, have to be elaborated, they include:

- a. Type of GVC
- b. GVC relevant geographical boundary
- c. GVC governance
- d. GVC-relevant industry breakdown
- e. GVC-relevant product breakdown
- f. GVC-relevant additional information (e.g. employment, capital, etc.)

3. The Satellite account for GVC consists of a set of multi-partner country Supply and Use Tables (GVC-SUTs) and a set of extended institutional sector accounts. The approach used in the Handbook for the development of a GVC satellite accounts is from a national perspective for a multi partner country presentation of the accounts. As mentioned in the introduction, the focus of this chapter is to elaborate on a framework within the SNA that explicitly identifies economic activities, products and transactions that are specific to a single GVC. These accounts build on a set of information that is generally available (for example, in Large Case Units where profiling is carried out for large multinational enterprises) and needs to be brought together within the context of GVC business functions and governance structure.

4. These accounts can also be compiled as a first approximation using a top down approach by rearranging national SUTs and institutional sector accounts according to the interrelated domestic and cross border production arrangements of the core and supporting functions of the enterprise group networks operating for the industry specific GVC in the compiling country and its partner countries. This first approximation is determined by additional data sources for the proportional breakdown for GVC specific business functions, GVC related intermediate and final products and institutional (sub) sectors reflecting the global enterprise group structure of lead, affiliate and non-affiliate enterprises. .

5. This chapter describes the satellite framework for Global Value Chain by presenting all the elements (as presented above) that are necessary to setup GVC-SUTs and the extended institutional sectoral accounts. The chapter also includes a description of how the compilation of these accounts can be implemented and what indicator can be derived from such a satellite accounts. The relationship between GVC-SUTs and the extended SUTs is presented in Section 12. Section 13 provide a description of the multi-country SUTs and IOTs. Additional information on empirical challenges in the compilation of multicountry SUTs is provided in Annex I. Annex II provide a description of special accounting topics linked to GVCs.

## 2. Types of GVCs

6. GVCs revolve over a specific industry/final product(s). Examples of GVC that have been studied in the literature refer to: automotive industries, electronics, apparels, textiles, fruits and vegetable, etc. Each industry-specific GVC has its own characteristics in terms of GVC governance, activities and products involved, as well as the geographical

boundary. It is therefore important to specify upfront the type of GVC of interest, that is, for which industry the GVC satellite accounts are compiled for.

7. From a national perspective, the choice of which GVC to analyze depends on the importance of the international investment and trade relationships with the partner countries in the GVC in the compiling country. A country may be interested in understanding its upstream and downstream position in a specific GVC, for example, to enhance its participation and upgrading in a specific GVC or to understand the impact of the GVC on the generation of income, employment and productivity of its business functions. With the increasing dominance of the GVC related firms in the level and growth rates of macroeconomic and business statistics indicators, compiling countries are increasingly assessing their level of engagement in GVC specific industries and their international trade and investment relationships with their partner countries.

In selecting the GVC specific industry, flexibility has to be applied. Foremost the economic dominance of specific industry GVCs in the total economy will be a major determining factor for the choice, including the geographical distribution of value added, trade, investment and employment of their core and supporting functions in the domestic economy and partner country markets. Apart from production related considerations, the choice could also take into account the dominance of GVC related enterprises in the financial sector through their exposures to major external risks in capital markets. Moreover, when considering the identification of new pathways of socio-economic development, countries could explore entering in new GVC networks by offering a competitive regulatory environment for foreign direct investment in new technologies or assess how existing upstream and downstream services functions of GVCs can be upgraded.*[Here additional text could be added to provide further criteria for a country to decide which GVC to study. For example, should a country look into its trade statistics and identify, through the largest trade of intermediate products, which GVC they contribute to.]*

### 3. GVC geographical boundary

8. The activities of a GVC are carried out across national boundaries on global scale. Ideally a GVC satellite account would capture detailed information from each economic territory involved in the GVC. However, in practice, this may not be feasible nor practical: the amount of information with the relevant level of detail would not likely be available for all the involved partners from each economic territory associated with the particular GVC.

9. A practical approach for the compilation of a GVC satellite account relies, instead, on the identification of the main relevant players in the GVC. This means establishing, in the initial design of the GVC satellite accounts, a threshold of activity. Let's say, for example, that 10 countries are involved in a specific-industry GVC. It may not be possible or practical to coordinate the statistical activity required to develop a multi-partner country GVC satellite account across all 10 countries. A threshold of activity can be established to include only those countries that contribute the most to the GVC, such as the countries that represent 50% of the inputs into the GVC. For example, if Canada were to develop an automotive GVC satellite account, they may decide to work with the United States and Mexico to develop multi-partner country GVC satellite accounts. While the trade flows between these countries would be explicitly identified, the trade flows between North America (Mexico, US and Canada) and other countries would be collapsed as trade to/from the rest of the world since the share of inputs coming from other countries would be minimal.

10. The compilation of multi-partner country GVC satellite accounts requires a collaborative effort among statistical offices of the countries involved in the GVC. A multi-partner country GVC satellite account will contain a richer set of information: the cost of this additional detail most likely being traded off against the complexity of joint international compilation and timeliness. If countries chose to collaborate in developing a multi-partner country GVC satellite account there are a number of important considerations. First, a GVC satellite account is a collaborative effort among statistical compilers across countries. This is a fundamental change in the way NSOs traditionally develop statistical products. Historically NSOs compiled official statistics independent (albeit with an awareness) of the work performed by NSOs in other countries. When constructing a multi-partner country GVC, NSOs may run up against organizational, governance and legislative constraints. There are a number of best practices and necessary

conditions that should be followed when establishing agreements and appropriate governance structures to undertake international data compilation projects. At a very high level, these necessary conditions include:

- A clearly identified net benefit;
- A willingness to harmonize concepts and data requirements;
- A willingness to coordinate statistical programs;
- A willingness for each partner to adapt;
- A willingness to consult;
- A willingness to implement quality control measures;
- A willingness to incur costs.

11. While developing a single country GVC satellite account may have operational advantages, it does have a number of important analytical drawbacks. A key aggregate of a multi-partner country GVC would be to get a measure of total (global) value added for a specific GVC. This is only possible if multi-partner country GVCs are constructed. In the case of a single country GVC satellite account users are limited to information about the business functions and value added of the GVC within the domestic economy. In a multi-partner country GVC SUT framework, benchmarks can be established for the foreign and domestic value added in imports and exports related to the GVC specific industry as the production structures for the export and import flows are made explicit in the framework.

#### 4. GVC Governance

12. GVCs are characterized by a set of interrelated activities, or business functions, across countries and coordinated by a lead firm, that brings a product from its conception to its final use. The governance structure of a GVC consist of the set of relationships that are in place between the firms involved in the GVC.

13. Different types of firms operate in a GVC, which are distinguished between lead firms and suppliers. Lead firms in GVCs initiate and coordinate the activities of the value added chain. This first-mover status gives them “power in the chain” because they tender contracts, place orders and select suppliers. However, lead firms also hold the ultimate financial risk, as they are contractually (or otherwise) obligated to compensate suppliers and service providers for their work. Lead firms often provide the specifications for the production of parts and components that are inputs into the final product. They may also impose a host of other transaction-specific requirements on suppliers, including financing, cost, delivery, location, and utilization of specific ICT systems and approved vendors. Lead firms are sometimes referred as Original Equipment Manufacturers (OEMs) (see Timothy Sturgeon, Jack Daly, Stacey Frederick, Penny Bamber and Gary Gereffi (2016), Frederick and Gereffi 2011). The lead firm has the ultimate decision-making authority regarding the operation of the supply change. It can be a domestically-owned or a foreign-owned company. Often it is the globally-consolidated parent enterprise in an ownership chain. For national accounting purposes as well as for measuring production and trade in GVCs, the lead firm is assigned to a national territory or country. The lead firm should be located where the ultimate decision-making authority is resident. The best proxy for this concept is probably the location where the board of directors and chief operating officer conduct their affairs.

14. Lead firms therefore organize and coordinate their production activities (business functions) among various suppliers across the world and they may have different ownership and control relationships with different suppliers, which themselves may have other suppliers with different ownership and control relationship. The concept of business governance as applied to GVCs is in essence looking at the specific relationships between lead firms and suppliers, of which the latter can be distinguished in affiliated firms and non-affiliated firms. These concepts need to be bridged into the existing conceptual framework of both BOP/IIP and National Accounts. Box 1 provides the

relevant concepts and definitions in BPM6 and the 2008 SNA that are used to translate business governance of GVCs into an accounting framework.

### Box 1 Statistical units in the Framework of Direct Investment Relationships (FDIR)

A **direct investment relationship** arises when an investor resident in one economy makes an investment that gives control or a significant degree of influence on the management of an enterprise that is resident in another economy.

The concepts described below are useful to understand the types of relationships between enterprises and are taken from the in the BMP6, 2008 SNA and in line with the *OECD Benchmark Definition of Foreign Direct Investment*, fourth edition.

A **direct investor** is an entity or group of related entities that is able to exercise control or a significant degree of influence over another entity that is resident of a different economy. A **direct investment enterprise** is an entity subject to *control* or a *significant degree of influence* by a direct investor.

The concept of *control* and *significant degree of influence* are defined in an immediate direct investment relationship (that is, when direct investor directly owns equity that entitles it to **10 percent or more** of the voting power in the direct investment enterprise) as follows:

*Control* is determined to exist if the direct investor owns more than 50 percent of the voting power in the direct investment enterprise.

A *significant degree of influence* is determined to exist if the direct investor owns from 10 to 50 percent of the voting power in the direct investment enterprise.

A direct investment enterprise is either a subsidiary or an associate:

(a) A **subsidiary** is a direct investment enterprise over which the direct investor is able to exercise control.

(b) An **associate** is a direct investment enterprise over which the direct investor is able to exercise a significant degree of influence, but not control.

Control and influence are defined as above and may arise from an immediate direct relationship or in indirect relationship through a chain of ownership

**Affiliates** of an enterprise consist of:

(a) its direct investor(s), both immediate and indirect;

(b) its direct investment enterprises, whether subsidiaries (including branches and other quasi-corporations), associates, and subsidiaries of associates, both immediate and indirect; and

(c) **fellow enterprises**, that is, those enterprises that are under the control or influence of the same immediate or indirect investor, but neither fellow enterprise controls or influences the other fellow enterprise. Often the direct investor and fellow enterprises are all in different economies, but sometimes the direct investor is in the same economy as one of the fellow enterprises (in which case, it is not a direct investor in that fellow enterprise). This situation is more likely to arise in economies that do not use a local enterprise group as the statistical unit for direct investment purposes.

Therefore **affiliate enterprises** are in a direct investment relationship with each other. Consequently, non-affiliate enterprises are those enterprises which are not in a direct investment relationship with each other.

An important concept for the analysis of GVCs is the **ultimate investor** (or **ultimate controlling parent**), which is the enterprise that has control through a FDI position in the direct investment enterprise. As such the ultimate investor controls the immediate direct investor. It is identified by proceeding up the immediate direct investors ownership chain through the controlling links (ownership of more than 50 per cent of the voting power) until an enterprise is reached that is not controlled by another enterprise. If there is no enterprise that controls the immediate direct investor, then the direct investor is effectively the ultimate investor in the direct investment enterprise. The country in which the ultimate investor is resident is the ultimate investing country in the direct investment enterprise. . In terms of FATS, it is the ultimate controlling institutional unit that is the ultimate investor in a foreign affiliate.

**Enterprise group:** An enterprise group is a set of enterprises controlled by the group head. The group head is a parent legal unit which is not controlled either directly or indirectly by any other legal unit. An enterprise group comprises of the group head and subsidiaries. The subsidiary enterprises of a subsidiary enterprise are considered to

be subsidiaries of the parent enterprise. An enterprise group is an association of enterprises bound together by legal and/or financial links. A group of enterprises can have more than one decision-making centre, especially for policy on production, sales and profits. It may centralize certain aspects of financial management and taxation. It constitutes an economic entity which is empowered to make choices, particularly concerning the units which it comprises.

**Multinational enterprise group:** An enterprise group with at least two enterprises located in different countries and controlled by a group head.

**Group head:** A parent legal unit which is not controlled either directly or indirectly by any other legal unit. Control refers to the dominant influence of a parent unit over the medium and long-term strategies of one or more subsidiaries; ie. the parent unit must be able to influence (directly or indirectly) the decision in the ordinary or extraordinary meetings of all the subsidiaries.

**Global group head:** A group head which is not controlled either directly or indirectly by any other legal unit (not a local group head, which has a foreign parent). This statistical unit is referred to in the GVC framework as the **lead firm** of the multinational enterprise group. Also this statistical unit is referred to the global enterprise in terms of business statistics

Text is based on Chapter 6 of BPM6 and chapter 21 of the 2008 SNA.

15. In the context of the extended framework, lead firms correspond to the concept of **ultimate investor** (or **ultimate controlling parent**), that is the enterprise that has the ultimate control over the enterprises that are in a direct investment relationship. In the BMP6 and 2008 SNA lead firms involved in the production of goods or non-financial services are classified in the Nonfinancial Sector.

16. In practice, however, for large enterprise groups, the concept of “lead firm”, or otherwise referred to as global group head, of a specific GVC may need to be further clarified as it may be that the ultimate investor is an enterprise group spanning several GVCs. Depending the decision-making model within that corporate group, the strategic planning as regards the business lines that define a given GVC may be at the corporate headquarter or may be at the lower level in the corporate structure, such as that of a product division. In order to make the bridge with the statistical units operational, it must be assumed that the concept of a lead firm is equivalent to the concept of ultimate investor or global group head from the FDI literature. This implies that any specialised firms which are controlled by the lead firm and provide financial services to the enterprise group are also in-scope for the industry specific GVC accounts .

17. Supplier firms provide products, such as raw materials, intermediate products or other partially assembled components to the supply chain. A distinction is made between affiliated firms and non-affiliated firms depending on their relationship with the lead firm. Affiliated firms correspond to enterprises that are in a Foreign Direct relationship (FDIR) with the lead firm that is they are under the control or influence of the direct investor or the ultimate controlling parent. Non-affiliated firms are those firms that provide intermediate products to the supply chain as per specification of the lead firm but are not related to the lead firm, that is, they are not under control nor influence of the lead firm.

18. Table 1 summarizes the different categories of firms in the value chain in terms of BOP/IIP and FDI and national accounts. A further sub sectorization of the institutional sectors of the National Accounts is indicated in the table which would explicitly identify the specific firms in the GVC.

**Table 1 GVC Governance types**

GVC concept	BOP/IIP and FDI	National Accounts
<b>Lead Firm</b>	Ultimate controlling parent Classified in S11 when it concerns corporate groups	Ultimate controlling parent Classified in S11 (Head Office) when it concerns corporate groups S.11UP

<p><b>Affiliated firm</b></p> <p>Affiliated firms are defined on the basis of control that the lead firm has directly or indirectly on the affiliated firm.</p> <p>This control derives from direct or indirect ownership and management control and is similar to the concept used in FDI.</p>	<p>Direct Investment Enterprise, Subsidiary (controls &gt; 50% of share votes)</p>	<p>Foreign Controlled Non-Financial Corporation</p> <p>S.11FC</p>
<p><b>Non-affiliated firm</b></p> <p>Non-affiliated firms are defined as being closely (if not uniquely) devoted to the production of goods and services needed in the GVC. They are not owned or controlled directly or indirectly by the lead firm.</p> <p>In order to identify non-affiliated firms a criterion is needed to define the close relationship to the production in a GVC, such as the share of output provided to a single GVC.</p>	<p>Direct Investment Enterprise Associate (influences 10% &lt; 50% of share votes)</p> <p><i>MAYBE ARE PART OF AFFILIATED FIRMS??</i></p>	<p>Foreign Associate Non-Financial Corporation</p> <p>S.11FA</p>
	<p>Other enterprises</p> <p>No influence &lt; 10% of share vote.</p> <p>Unrelated firms are enterprises that fall outside any FDI relationship, either as investor or as investment enterprise.</p>	<p>Nationally Controlled Non-Financial Corporation</p> <p>S.11NA</p>
<p><b>Dedicated Financial Institution</b></p>	<p>Foreign Controlled Captive Financial Institution</p> <p>These are direct investment enterprises that are foreign controlled, e.g. subsidiaries.</p>	<p>Foreign Controlled Captive Financial Institution</p> <p>S.127FC</p>

19. Figure 1 provides a schematic example of a possible ownership and supplier structure that a lead firm may adopt with its suppliers. The GVC encompasses the lead firm and several affiliated supplier firms that each in turn may have several daughter enterprises that contribute to the value chain, as well as unaffiliated firms providing dedicated inputs to the GVC. In order to simplify the example, each of the boxes represents multiple firms contributing to the GVC. The specific functions in the supply chain are allocated between the contributing firms. The assumption about the particular GVC is that there are affiliate firms (denoted as “Affiliate (PT)”) that are engaged in producing inputs to and the final assembly of the product. These affiliates themselves own and control further affiliates (“Affiliates”) and they may channel profits from their affiliates to the lead firm (Pass through investment, PT). Furthermore, non-affiliated firms provide inputs into the GVC. The lead firm is also assumed to be the ultimate controlling parent (UCP).

20. The product in the example in Figure 1 has a high R&D content. The R&D function itself takes place at the lead firm. IPP assets deriving from the R&D function are a comprehensive set of legally protected patents. These IPP assets have been deposited in an IPP repository/licensing enterprise that licenses the use of IPP assets to the affiliated firms in the GVC. The licensing firm therefore receives license fees from the subsidiaries, which it may accumulate as retained earnings or pay out as dividends to the lead firm. Typically, the country in which the licensing corporation has been incorporated offers a lower tax burden than either the country of incorporation of the subsidiaries, or the country of residence of the lead firm.

21. The lead firm has in addition channeled its investment into the affiliated firms through a fully owned intermediate holding corporation in another low tax domicile. This holding corporation (GVC Holding) has a direct or indirect controlling interest in the affiliates participating in the GVC, and in legal terms separates lead firm from the affiliates. Note that in this example, the lead firm through this holding also controls corporations that are outside of the scope of the GVC.

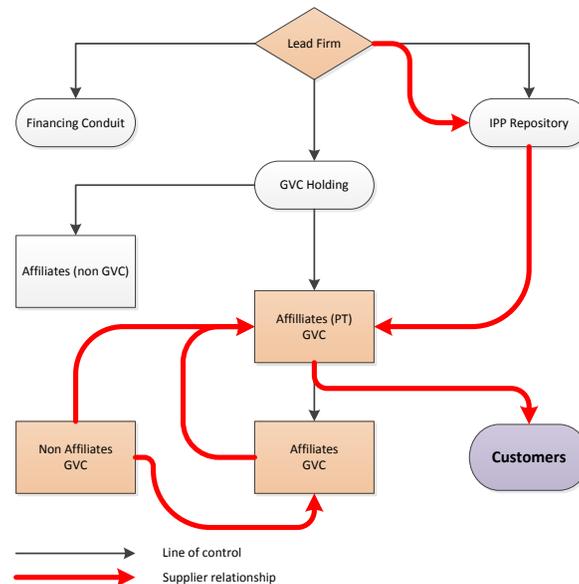
22. Finally, a specialized corporate financial function is embodied in a conduit set up to provide the MNE with financing through access to the debt securities market.

23. The GVC supply relationships are illustrated in Figure 1 by means of the red arrows. The lead firm provides R&D through the licensing firm to its top-level affiliates. Non-affiliates provide inputs into the GVC through both top level

affiliates and the affiliates. And affiliates provide inputs to the top level affiliate that assembles and markets the product to customers. Corporate control / ownership relationships are indicated by means of the black lines.

24. Potentially financial relationships will exist between any of these enterprises. It is of importance to distinguish clearly different financial functions that exist within the GVC and within the MNE structure. These financial functions each will have implications for the shape of the balance sheet of the entities concerned. To distinguish between the production or business line considerations of a GVC, and the concepts required for analyzing the financing and tax considerations of the GVC, such specialized financial entities are taken into account.

Figure 1 Schematic example of a GVC governance structure



25. In this simplified example, several complications occur that may affect our ability to represent the accumulation accounts and balance sheets for a specific GVC if the lead firm controls several GVCs through its MNE structure. In this case, detailed profiling of the lead firm by each business line that makes up a GVC will be required.

26. In the example two mechanisms are introduced by which the MNE may determine its taxes and financial considerations for the firm. These functions may be fulfilled by regular affiliate corporations or by so-called special purpose entities.

27. The first, most generic, function is that of a holding corporation. Typically, such holdings would not introduce a separate management layer, but instead would be passive holdings fully managed by the parent company. Such holdings would indeed be located in low tax economic territories, such that dividends and re-invested earnings of subsidiaries would accrue there.

28. The second function is that of a licensing firm, where the IPP assets have been lodged. The example assumes that this involves direct licensing to the affiliates (PT). License revenues are taxed in the economic territory where the license firm is registered, and subsequently are provided to the lead firm.

**Residence**

29. GVCs are characterized by the fact that the business functions are carried out in different parts of the world. Countries participate in the GVC by leveraging their competitive advantage: usually developing countries offer low

labor costs and raw materials, while wealthier nations with more advanced education systems control research and development, design and marketing.

30. The residence of an economic entity (or an institutional unit) is attributed to the economic territory with which it has the strongest connection, in other words its *centre of predominant economic interest*. Each institutional unit is a resident of one and only one economic territory. In the case of a multiterritory enterprise, it is preferable that separate institutional units be identified for each economy.

31. Since the main feature of the GVC is to record the interrelated activity by economic territory, the concept of residency of the firms engaged in the GVC to be included in the satellite account. This adds a significant amount of complexity to the GVC satellite account since the compiler needs to identify the economic territory of all the non-resident firms. However, in practice, it may suffice to clearly distinguish the residency of GVC-related firms in those territories for which there is a high “interconnectedness” in the GVC.

## 5. Classification of business functions

32. GVCs are characterized by a business line that represents a sequence of business production processes or business functions. This sequence of production arrangements bring a product to its final consumers from its conception. **Business functions** are the activities controlled by the lead firm; they can be divided into core functions and support functions and are undertaken by the lead, affiliate and non-affiliate firms in the GVCs.

33. **Core business functions** are activities of an enterprise in the GVC that yields income: the production of final goods or services intended for the market or for third parties. Usually the core business functions make up the primary activity of the enterprise, but they may also include other (secondary) activities if the enterprise considers these as part of its core functions.

34. **Support business functions** are ancillary supporting activities carried out by the enterprise in order to permit or to facilitate the core business functions of the GVC, its production activity. The outputs (results) of support business functions are not themselves intended directly for the market or for third parties. Support business functions can be further subdivided into:

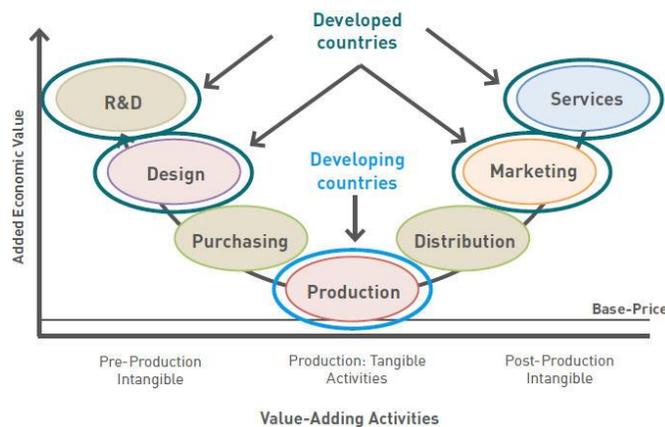
- **distribution and logistics:** transportation activities, warehousing and order processing;
- **marketing, sales and after-sales services:** market research, advertising, direct marketing services (telemarketing), exhibitions, fairs and other marketing or sales services; also included are call-centre services and after-sales services such as help-desks and other customer support services;
- **information and communication technology (ICT) services:** information technology (IT) services and telecommunication (IT services including hardware and software consultancy, customised software data processing and database services, maintenance and repair, web-hosting, as well as other computer-related and information services, but excluding packaged software and hardware);
- **administrative and management functions:** legal services, accounting, book-keeping and auditing, business management and consultancy, human resources (HR) management (e.g. training and education, staff recruitment, provision of temporary personnel, payroll management as well as health and medical services), corporate financial and insurance services; also included are procurement functions;
- **engineering and related technical services:** engineering and related technical consultancy, technical testing, analysis and certification; also included are design services;
- **research & development (R & D):** research and experimental development.

[Note the text above is based on Eurostat See [http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Business\\_functions](http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Business_functions) and [http://ec.europa.eu/eurostat/cache/metadata/en/iss\\_esms.htm](http://ec.europa.eu/eurostat/cache/metadata/en/iss_esms.htm). These business functions will be align with those presented in Chapter 3.

35. The business functions are an integral part of GVCs. The understanding of the governance of the firms participating in the GVC in terms of their business functions is important to understand international production arrangements which are set up to generate and optimize the value for the lead firm by distributing income across the various economic territories it operates. The business functions undertaken in a particular partner country in the GVC allows for the identification, for example, of opportunities for functional upgrading. This upgrading can be realized by gaining competitiveness in higher value added products through skill, capital and process upgrading.

36. Figure 2 presents the typical “smile curve” of GVCs showing how these business functions are generally located with regard to generation of value added of a GVC. This smile curve reflects the higher share of value added generated by upstream and downstream business functions as compared to the core production functions of GVCs

Figure 2 The smile curve of the global value chain



Source: Global Value Chain Analysis: A Primer 2<sup>nd</sup> Edition (Gereffi and Fernandez-Stark, 2016) <to be made consistent with the descriptions of the business functions in para 33

37. In order to construct satellite accounts for GVCs, business functions need to be mapped to the reference classification of economic activities (ISIC Rev. 4). While the mapping of the support business functions may not change when looking at different industry-specific GVCs, the mapping of the core business function depends on the GVC under consideration. For example, if the focus is on the automotive GVC, the core business functions is the manufacture of motor vehicles. For the GVC for textiles, the core function is the production of apparel. Table 2 presents an example of mapping for the automotive GVC.

Table 2 Example of a mapping of business functions in ISIC for the automotive GVC

Core Business function	ISIC Rev.4 code
Production of automotive	ISIC 291- Manufacture of motor vehicles
Support Business function	ISIC Rev.4 code
Distribution and logistics: Transportation activities, warehousing and order processing.	ISIC H - Transportation and storage ISIC 49 - Land transport and transport via pipelines ISIC 50 - Water transport

	<p>ISIC 51 - Air transport</p> <p>ISIC 52 - Warehousing and support activities for transportation</p> <p>ISIC 53 - Postal and courier activities</p>
<p>Marketing, sales and after-sales services:</p> <p>market research, advertising, direct marketing services (telemarketing), exhibitions, fairs and other marketing or sales services; also included are call-centre services and after-sales services such as help-desks and other customer support services.</p>	<p>ISIC 73 - Advertising and market research</p>
<p>Information and communication technology (ICT) services:</p> <p>information technology (IT) services and telecommunication (IT) services including hardware and software consultancy, customised software data processing and database services, maintenance and repair, web-hosting, as well as other computer-related and information services, but excluding packaged software and hardware).</p>	<p>ISIC 62 - Computer programming, consultancy and related activities</p> <p>ISIC 63 - Information service activities</p>
<p>Administrative and management functions:</p> <p>legal services, accounting, book-keeping and auditing, business management and consultancy, human resources (HR) management (e.g. training and education, staff recruitment, provision of temporary personnel, payroll management as well as health and medical services), corporate financial and insurance services; also included are procurement functions.</p>	<p>ISIC 70 - Activities of head offices; management consultancy activities</p> <p>ISIC 69 - Legal and accounting activities</p>
<p>Engineering and related technical services:</p> <p>engineering and related technical consultancy, technical testing, analysis and certification; also included are design services.</p>	<p>ISIC 71 - Architectural and engineering activities; technical testing and analysis</p>
<p>Research &amp; development (R &amp; D):</p> <p>research and experimental development.</p>	<p>ISIC 72 - Scientific research and development</p>

## 6. Classification of GVC participating firms

38. Once GVC of interest is identified and the relevant business activities are classified according to ISIC, the next step is to identify the GVC-participating firms. If access to firm level data is limited then the compiler needs to determine the GVC shares of the industries producing the GVC product(s) and supplying inputs to the GVC. GVC participating firms (or GVC shares) is the group of firms/share of firm’s activity that directly supply inputs, assemble goods / deliver services, and support sales for the GVC. This list of firms/industries becomes the GVC frame for which firm characteristics and activities will be gathered<sup>1</sup>. The concept of a GVC frame establishes the link between the macro aggregates and the micro firm level information. Building the GVC satellite account from the bottom (micro) up has many benefits in terms of both quality and analytical usefulness.

39. If access to firm level micro-data is limited, GVC frame can then be constructed using GVC/Industry level ratios or shares. The GVC/Industry level ratios indicate the share of an industries inputs supplied by upstream and downstream GVC suppliers or the share of an industries output that relates to the GVC (as a subsequent input into another production process or as a final consumption good). These ratios can be established through various means. Prior research and industry knowledge can be drawn-upon. Publicly available information related to dominate firms can

<sup>1</sup> While this may seem a significant task it is expected that a GVC will be represented by a small number of large firms. In addition, the expectation is that only those firms directly supplying inputs to the GVC are identified.

be used. Upper and lower bound assumptions might be established. The quality of these GVC assumptions or models will greatly impact the quality of the final estimates. For example, consider the following table which includes output and input information for the manufacture of motor vehicles, trailers and semi-trailers (ISIC rev4 Division 29).

Output	Manufacture of motor vehicles, trailers and semi-trailers	GVC / Industry Ratio	Manufacture of motor vehicles, trailers and semi-trailers (GVC)
Product 1	500	100%	500
Product 2	200	100%	200
Input			
Product 1	200	50%	100
Product 2	400	25%	100

40. Once the GVCs have been identified the next step is to classify the firms according to the role they play within the GVC, namely:

- Lead Firm
- Affiliated Supplying firm
  - o Controlled [*Subsidiary (controlled)*] (??)
  - o Non-controlled [*Associates (influenced)*] (??)
- Non-affiliated supplying firm

41. The lead firm is the firm that ‘controls’ the chain – and is generally located where the board of directors conducts their business. For pragmatic purposes, an affiliated supplier will be considered any firm that is controlled (as per FDI control measures) by the lead firm being the ultimate controlling parent. A non-affiliated supplier will be considered any firm that supplies goods or services to the GVC over which the lead firm has influence but does not hold a controlling interest in the supplying firm. A non-affiliated supplying firm is any firm from which the lead firm obtains inputs but does not have any influence.

42. Continuing with the automotive specific GVC, the first task would be to identify the various automotive global value chains (e.g. Honda, Toyota, General Motors, Ford, etc.) in a multi-partner country GVC framework. Assume that it is determined that there are 5 automobile GVCs coordinated by 5 global lead firms. The next step would be to develop a ‘frame’ of firms/industries that participate in the GVC along with their role and their economic territory (e.g. lead firm located in the US, supplier located in Canada). Next, the relationship between the supplier and the lead firm needs to be established. Is the supplier affiliated or not affiliated with the lead firm or other suppliers in the GVC. The automobile GVC for a given economic territory would therefore represent the sum of the activities of the lead firms, affiliated supplying firms and non-affiliated supplying firms operating in the economic territory. As noted earlier, access to the micro-data required to establish these relationships may be limited. When this is the case, models will need to be developed which extract this information from the industry aggregates. Ratios will need to be developed to breakout the GVC output, input and value added information by GVC governance.

Micro-data approach

Role	Enterprise 1	Enterprise 2	Enterprise 3	Enterprise 4	Enterprise 5
Lead Firm	X				X
Affiliated Supplier – Controlled		X			

Affiliated supplier – not controlled			X		
Non-affiliated supplier				X	

#### Aggregate approach

Role	Industry 1	Industry 2	Industry 3	Industry 4	Industry 5
Lead Firm	X (% share of activity)				X (% share of activity)
Affiliated Supplier – Controlled		X (% share of activity)			
Affiliated supplier – not controlled			X (% share of activity)		
Non-affiliated supplier				X (% share of activity)	

43. The method for compiling the data for a GVC within a given economic territory of a multi-partner country GVC framework involves going back to the firm level data and reclassifying the firm's activities using the GVC classifications

44. To illustrate this approach, assume that it is determined that there are five automotive GVCs operating in Canada (one for each of Honda, Toyota, General Motors, Ford and Hyundai) and there is a single enterprise operating in Canada associated with each GVC. For each of these enterprises it is possible to update their traditional classification (industry and sector) with GVC specific classifications such as business function, governance and residency. In doing so their output, value added, exports, imports and other macroeconomic accounting variables also get classified to these new GVC categories. In cases where access to micro-data is limited this step involves extracting this information from each industry through the use of models, ratios and assumptions.

GVC (Classification)	GVC (Honda) Participating Enterprise 1	GVC (Ford) Participating Enterprise 2	GVC (General Motors) Participating Enterprise 3	GVC (Hyundai) participating Enterprise 4	GVC (Toyota) participating Enterprise 5
Governance	Lead	Affiliated Supplier - controlled	Affiliated Supplier – not controlled	Non-affiliated Supplier	Lead
Business Function	Management	Research and development	Assembly		Management
Industry	Head Office	Research and Development	Motor Vehicle Manufacturing	Motor Vehicle Parts Manufacturing	
Product	Management Services	Research and Development Services	Automobiles	Component parts	
Trade Characteristic	Exporter	Exporter	Exporter	Non-exporter	
Residency	US	US	US	Canadian	

45. In the identification of the firms participating in a GVC, the profiling of MNEs and global enterprise groups is of particular importance. See text box below. Moreover, Large Scale Units are established in NSOs not only to profile the GVC networks operating in the national territory, but also to coordinate the data collection (Part III) and compilation (Part II) along similar lines as recommended in the Handbook.

## Box 2: Large Case Unit: Profiling, data collection and compilation for GVC accounts and business statistics

### **Large Cases Units for GVC Enterprise Groups**

A Large Cases Unit is established nationally to ensure the consistency of the economic data in relation to a small number of very large MNEs or MNE Groups. This is a critical step towards assuring the overall quality of the macro economic aggregates and business statistics produced by a country and ultimately a region.

Large Cases Units (LCUs) already exist in a number of National Statistical Institutes (NSIs) and many more are being created in countries across the EU and in Canada. These LCU units are typically located in either the Business Statistics Directorate or in National Accounts Directorate. They represent an answer by NSIs to the many challenges posed by economic globalisation and the cross-border fragmentation of production and services activities associated with bringing many products from conception to market of final product and beyond (e.g. after sale services, disposal and recycling). As such, they are the ideal sources for building an understanding of GVCs that are operating in an economy, including their cross relationships with partner countries in the value chain. The more significant local and global enterprise group head (lead firms) in a GVC having domicile in the compiling country are covered by the LCU due to the scale of their operations.

The key feature of LCUs is that the unit is engaged in an ongoing consistency assessment across all statistical data from either survey or administrative sources that relate to a particular MNE or MNE Group in different GVC industries. Each client is treated on a case by case basis.

The operations of LCUs can vary from one NSI to another mainly due to institutional arrangements e.g. the Balance of Payments is compiled in the National Central Bank or the statistical system is decentralised by province or where different institutions are responsible for particular statistical domains or products. Consequently, in a country with a highly centralized statistical system, the role of the LCU can extend to data collection and compilation of accounts and business statistics for lead, affiliate and non-affiliate enterprises in a GVC in addition to assuring the consistency of the data.

Typically a LCU will be reviewing practically all the economic and employment data<sup>2</sup> that relate to these selected firms and in some cases collecting and compiling the data too.

The LCU also reviews key administrative sources for these selected GVC related enterprises such as:

- Exports and imports of Goods
- Corporate profits and taxation
- Employee/employment insurance data
- Assets and liabilities

---

<sup>2</sup> Census of Industrial Production, Annual Services Enquiry, Quarterly enquiry to Industry (capital assets and inventories), Quarterly enquiry to Services, Balance of Payments Quarterly enquiry, Monthly Producer and Wholesale Prices, Monthly Production, Monthly Services, Annual Prodcom/ Servcom, Earnings, Hours etc.

Where the data is collected by the LCU, the opportunity to consolidate and rationalise the data collection strategy presents itself. For example, single monthly, quarterly and annual LCU/MNE enquiries are issued. This reduces duplication and response burden.

Another aspect of LCU operations is the need for more developed client relationships that entail ongoing contact and regular face to face meetings etc. For example, a LCU could aim to meet every client company at least once every two years and in some cases more frequently. Ongoing contact ensures that the LCU is fully informed regarding corporate events such as restructurings, large transactions mergers etc.

### **LCUs and GVCs**

When it comes to understanding the operations of the principal national players in GVCs, the LCU is well positioned to deliver all the product and activity data together with providing an understanding of the structural and cross border relationships. The profiling of the entities by the LCU together with the source data provides a comprehensive national picture of the contribution made nationally by a particular MNE that is a member of a GVC.

The LCU data set can also provide information on business functions relationships between national affiliates in a GVC. Furthermore, the LCU micro data linking for the selected companies across merchandise and services trade data, product production, business register, structural and short term business statistics provides detailed insight in contract manufacturing operations. In addition, the flow of intermediate and final products in trade in goods and services and production processes can also be identified and used for the compilation of GVC related macroeconomic accounts and business statistics.

A feature of these GVCs is that they engage in many activities such as merchanting, contract manufacturing and the related factoryless goods manufacturing. These activities are difficult to identify and measure for many compilers and it is only when all the various statistical and administrative data related to a particular entity or MNE Group are subject to consistency checking that questions emerge that ultimately lead to further examination and ultimately lead to identification of the source of the inconsistencies. In this way the quality of a significant portion of the overall macroeconomic accounts and business statistics can be assured.

## **7. Classification of GVC products**

46. For any industry specific GVC of interest is identified, in addition to identify and mapping the participating enterprises in the global enterprise groups and the associated non-affiliated enterprises and their economic activities to ISIC, it is important to identify the relevant intermediate and final products and map them into the standard classification of products, namely the Harmonized System for internationally traded products and the Central Product Classification, CPC Ver. 2.1, for the classification in the SUT framework. The product mapping are based on standardized list of product codes and descriptions for industry specific GVCs. Therefore, the product mapping for the GVC for automotive has different HS and CPC product lists than the product mapping for the GVC for textiles or electronics.

47. Table 3 illustrates the product mapping for a GVC for “passenger vehicles”. The product mapping identifies all the goods related products (from conception to end-use support) that represent the core production activity of this final product (see Table 3) and subsequently identify and map the services related products required to bring a

passenger vehicle to market such as transportation services, research and design, and marketing services (see Table 4).

**Table 3 Motor Vehicle HS Codes**

*[this table will be linked to CPC first. HS codes could be provided in a separate column]*

VC Stage/ Subassembly	HS Codes (2002)	HS Code Descriptions	VC Sector
Passenger vehicles	870321 870322 870323 870324 870331 870332 870333	870321, 870322, 870323, 870324: Other vehicles, with spark-ignition internal combustion reciprocating piston engine <1000cc, 1000 – 1500cc, 1500 – 3000cc, > 3000cc 87033: Other vehicles, with compression-ignition internal combustion piston engine (diesel or semi-diesel) <1500cc, 1500 – 2500cc, >2500cc	--
Body system	870600	8706: Chassis fitted with engines, for the motor vehicles of headings 87.01-87.05	Chassis
Drive train	840733 840734 840820	Reciprocating piston engines used for the propulsion of vehicles of Chapter 87; of a cylinder capacity: > 250 cc ≤ 1,000 cc > 1,000 cc Compression-ignition internal combustion piston engines (diesel or semi-diesel engines); of a kind used for the propulsion of vehicles of Chapter 87	Engine
Body system (suspension)	401110 401211 870831+ 870839+ 870870 870880 870894	401110: New pneumatic tires, of rubber; of a kind used on motor cars 401211: Retreaded tires; of a kind used on motor cars (including station wagons and racing cars) 870831: Mounted brake linings 870839: Other 870870: Road wheels and parts and accessories thereof 870880: Suspension systems and parts (incl. shock absorbers) 870894: Steering wheels, columns and boxes	Tires Brakes^ Wheels Suspension systems and parts (incl. shock absorbers) Steering wheel
Body system (panels)	870710 700711 700721 830230	870710: Bodies (incl. cabs), for motor vehicles of headings 87.01-.05; for the vehicles of heading 87.03 700711: Toughened (tempered) safety glass, of size and shape suitable for use in vehicles, aircraft, spacecraft or vessels 700721: Laminated safety glass... 830230: Other mountings, fittings and similar articles suitable for motor vehicles	Body Panels Windows/ Windshield Metal mountings
Body system (front & rear end modules)	870810 870891 870892  842139 853910	Parts and accessories of the motor vehicles of headings 87.01-87.05; 870810: Bumpers and parts thereof 870891: Radiators 870892: Silencers and exhaust pipes  842139: Filtering or purifying machinery and apparatus for gases; Intake air filters for internal combustion engines; other 853910: Electric filament or discharge lamps, including sealed beam lamp units and ultra-violet or infra-red lamps; arc-lamps; Sealed beam lamp units	Bumpers Radiators Silencers (mufflers)/exhaust Filters Headlights
Body system (interior)	940120 870821 852721 <sup>1</sup> 852729 <sup>1</sup>	940120: Seats of a kind used for motor vehicles 870821: Safety seat belts 85272: Radio-broadcast receivers not capable of operating without an external source of power, of a kind used in motor	Seats Seatbelts^ Electronic Instruments:

VC Stage/ Subassembly	HS Codes (2002)	HS Code Descriptions	VC Sector
	910400	vehicles, including apparatus capable of receiving also radio-telephony or radio-telegraphy 910400: Instrument panel clocks and clocks of a similar type for vehicles, aircraft, spacecraft or vessels.	Radios Clocks
Body system (other)	870829	870829: Parts and accessories of the motor vehicles of headings 87.01-87.05. Other parts and accessories of bodies (including cabs); Other	Other
Drive train	840991 840999	84099: Parts suitable for use solely or principally with the engines of heading 84.07-08.	Engine parts
	870840 870850 870860+ 870893	Parts/accessories of motor vehicles of headings 87.01-05; 870840: Gear boxes 870850: Drive-axles with differential, whether or not provided with other transmission components 870860: Non-driving axles and parts thereof 870893: Other parts/accessories; Clutches & parts thereof	Gear boxes Drive-axles Clutches
	870899	870899: Parts and accessories of the motor vehicles of headings 87.01-87.05. Other parts and accessories; Other	Other Airbags <sup>^</sup>
	8507 <sup>*(6)</sup>	8507: Electric accumulators, including separators therefor, whether or not rectangular (including square) <sup>3</sup>	Batteries & parts (accumulators)
Electrical Equipment	8511 <sup>*(7)</sup>	8511: Electrical ignition or starting equipment of a kind used for spark-ignition or compression-ignition internal combustion engines (for example, ignition magnetos, magneto-dynamos, ignition coils, sparking plugs and glow plugs, starter motors); generators (for example, dynamos, alternators) and cut-outs of a kind used in conjunction with such engines.	Ignition & parts
	854430	854430: Ignition wiring sets and other wiring sets of a kind used in vehicles, aircraft or ships	Wire harnesses
	851220 851230 851240 851290	8512: Electrical lighting or signaling equipment (excl. articles of heading 85.39), windscreen wipers, defrosters and demisters, used for cycles or motor vehicles. NOTE: all of 8512 except 851210 (pertains to bicycles).	Signaling Lighting/visual, sound, windscreen wipers, parts
	841520 <sup>4</sup>	841520: Air conditioning machines, of a kind used for persons, in motor vehicles	Air Conditioners

Notes: (1) also included in electronics definition; (^): designates safety system component; (\*) indicates all 6-digit codes within 4-digit code are included and number in parenthesis is number of 6D codes; (+) indicates HS02 is the last year code is used. Note (9/9/16): verified exact match to Philippines report Table A-6. Motor Vehicle HS Codes except air conditions were not included. Suspension: [https://en.wikipedia.org/wiki/Suspension\\_\(vehicle\)](https://en.wikipedia.org/wiki/Suspension_(vehicle)): the system of tires, tire air, springs, shock absorbers and linkages that connects a vehicle to its wheels and allows relative motion between the two.

**Table 4 List of additional GVC-relevant products (support business functions)**

*[I think we need to add this table as it is mentioned in the text and is relevant to the business functions. This table needs to be further developed]*

GVC-relevant products	CPC Ver.2.1 code and description
Distribution and logistics:	

<sup>3</sup> Not sure these are all auto-specific, but Tim includes all of them in auto (4/11/16).

<sup>4</sup> World export value was only \$1.8B in 2014, which is less than 1% of auto-related component exports. Was not incl. in auto in Philippines. All of 8415 was in electrical final products (air conditioners) (12/12/15).

transportation activities, warehousing and order processing	
<b>Marketing, Sales and after-sale services</b>	
Marketing	<p>CPC 837 - Market research and public opinion polling services</p> <p>This subclass includes:</p> <ul style="list-style-type: none"> <li>- market analysis, analysis of competition and the behaviour of consumers</li> <li>- use of research monographs, statistics, econometric models, surveys, etc.</li> <li>- investigation services designed to secure information on public opinions regarding social, economic, political and other issues</li> </ul>
Sales	
<b>Information and communication technology (ICT) services:</b>	
information technology (IT) services and telecommunication (IT services including hardware and software consultancy, customised software data processing and database services, maintenance and repair, web-hosting, as well as other computer-related and information services, but excluding packaged software and hardware);	
<b>Administrative and management functions</b>	
Legal and accounting services	<p>CPC 82 - Legal and accounting services</p> <p>Includes: Legal services, Accounting, auditing and bookkeeping services; Tax consultancy and preparation services; and Insolvency and receivership services</p>
<b>Engineering and related technical services:</b>	<p>CPC 833 - Engineering services</p> <p>This group includes:</p> <ul style="list-style-type: none"> <li>- application of physical laws and principles in the design, development, and utilization of machines, materials, instruments, structures, processes, and systems. Services of this type involve the provision of designs, plans, and studies related to engineering projects.</li> </ul> <p>CPC 834 - Scientific and other technical services</p> <p>This group includes: Geological, geophysical and other prospecting services; Surface surveying and map-making services; Weather forecasting and meteorological services; Technical testing and analysis services</p>
engineering and related technical consultancy, technical testing, analysis and certification; also included are design services;	
<b>Research and development services</b>	
	<p>CPC Division: 81 - Research and development services</p> <p>OR</p> <p>CPC 814 - Research and development originals</p> <p>This subclass includes:</p> <ul style="list-style-type: none"> <li>- scientific originals, i.e. ideas, plans, blueprints, formulas for inventions, products and processes, which can be protected and licensed as industrial property, trade secrets, patents, etc.</li> </ul> <p>Note: The creation of these original works is done on own account, i.e. their production is intended for sale that is undertaken without a contract or known buyer</p>

	This activity is carried out by ISISC Rev. 4 Division: 72 - Scientific research and development
--	---

48. In general, the scope of the GVC must be determined. The scope of the GVC refers to the mapping of participating firms in the supply chain of the GVC. Does the chain include only direct suppliers or suppliers of specialized intermediate goods in the core production activity of the GVC? For example, assume a GVC for automobiles is being developed. It is clear that an automotive parts manufacturer that provides parts to an assembler would be part of the GVC. But what about the steel manufacturer that supplies steel to the parts manufacturer. Should they be included in the GVC? The decision about the GVC reach will vary from satellite account to satellite account and will depend on analytical usefulness and availability of data. Once a decision on the scope of the GVC is taken, preferably in consultation with the compilers in partner countries, the scope of the enterprises included in the multi-partner country GVC satellite should be transparently communicated to the users of the accounts.

### 8. GVC specific multi-partner country Supply and Use Tables

49. Once the mapping of relevant products and business functions is developed, multi-partner country GVC Supply and Use tables can be constructed to explicitly show the supply and use of GVC-relevant products by GVC-specific industries for the GVC-related main partner countries. Therefore, a multi-partner country GVC- SUTs allow to zoom into a global chain of supply and use of products by industries for the specific GVC.

50. The construction of these tables starts from the compilation of national SUTs with a common breakdown of industries and products. The breakdown at industry level explicitly identifies the relevant ISIC divisions/groups for the GVC (see the mapping of business functions in the previous section). Similarly, the breakdown at the product level explicitly identifies the GVC-relevant products. In the case, for example, of the automotive GVC, the industry breakdown will explicitly identify the following activities

- ISIC 291- Manufacture of motor vehicles
- ISIC 49-53 – *referring* to Distribution and logistics
- ISIC 62-63 - *referring* Information and communication technology (ICT) services
- ISIC 69-70 – *referring* to Administrative and management functions
- ISIC 71 – *referring* to Engineering and related technical services
- ISIC 72 – *referring* to Research & development
- ISIC 73 - *referring* Marketing, sales and after-sales services
- ISIC XXX – *referring* to ISIC classes for all the intermediate products in the scope of the GVC

51. In addition, in order to reflect the governance structure in the SUTs, there should be a further breakdown to reflect if the firm is foreign-controlled or nationally-controlled and if the firm is part of the GVC or not. Therefore, for each of the GVC relevant ISIC categories the following breakdown is applied:

ISIC			
Foreign-controlled		Nationally-controlled	
GVC-related	Non GVC-related	GVC-related	Non GVC-related

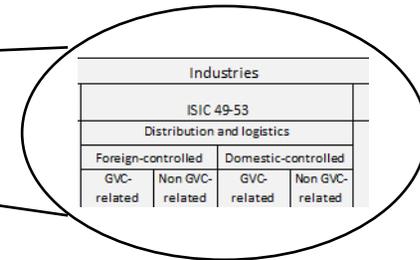
52. The breakdown between foreign- and nationally- controlled is important as to better understand and measure FDI relationships. The distinction between GVC- and non-GVC related firms aims also at capturing the governance structure of GVCs.

53. In a similar way, the list of standardized products explicitly identified in the SUTs reflects the GVC-related products which include the final product of the GVC and the intermediate goods and services that are used for the production of the final product. In addition, because of the multi-country nature of the SUTs the trade of these products between the GVC-partner countries has to be explicitly shown and reconciled. Table 5 presents the layout of GVC-SUTs where the business functions are explicitly identified. Only for these industries, a further breakdown by foreign and nationally controlled and by GVC related and non GVC related enterprises , as shown above, is applied across all business functions.

Table 5 GVC specific Supply and Use Table by business functions and standardized products

Supply Table at basic prices

	Industries										Imports					Total supply at basic prices				
	ISIC 1	...	ISIC 291 Manufacture of motor vehicles	ISIC 49-53 Distribution and logistics	ISIC 73 Marketing, sales and after-sale services	ISIC 62-63 ICT services	ISIC 69-70 Administration and management	ISIC 71 Engineering and related technical	ISIC 72 Research and development	...	Output	Total	from Country B	from Country	from RoW					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)		(16)			
PRODUCTION	...	(1)	...	(2)	...	(3)	CPC 837 Market reseach etc.	(4)	...	(5)	CPC 4911 - Motor vehicles	(6)	...	(7)	...	(8)	...	(9)	Total	(10)
Adjustm	Direct purchases abroad by res	(11)	...	(12)	...	(13)	Total	(14)	...	(15)	...	(16)	...	(17)	...	(18)	...	(19)	...	(20)



Use Table at basic prices

	Industries										FINAL USE								Total use	
	ISIC 1	...	ISIC 291 Manufacture of motor vehicles	ISIC 49-53 Distribution and logistics	ISIC 73 Marketing, sales and after-sale services	ISIC 62-63 ICT services	ISIC 69-70 Administration and management functions	ISIC 71 Engineering and related technical services	ISIC 72 Research and development	...	Output	Final consumption expenditure	Gross capital formation	Exports				Total		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)			(12)	(13)	Total	to Country B			to Country C
PRODUCTION	...	(1)	...	(2)	...	(3)	CPC 837 Market reseach etc.	(4)	...	(5)	CPC 4911 - Motor vehicles	(6)	...	(7)	...	(8)	...	(9)	Total	(10)
Adjustm	Direct purchases abroad by res	(11)	...	(12)	...	(13)	Total	(14)	...	(15)	...	(16)	...	(17)	...	(18)	...	(19)	...	(20)
GVA	Compensation of employees	(13)	...	(14)	...	(15)	Other taxes less subsidies on production	(16)	...	(17)	...	(18)	...	(19)	...	(20)	...	(21)	...	(22)
	Net operating surplus/net mixed income	(16)	...	(17)	...	(18)	Gross operating surplus/gross mixed income	(19)	...	(20)	...	(21)	...	(22)	...	(23)	...	(24)	...	(25)
	GVA	(18)	...	(19)	...	(20)	Total input at basic prices	(21)	...	(22)	...	(23)	...	(24)	...	(25)	...	(26)	...	(27)
	Gross capital formation by asset type	(1)	...	(2)	...	(3)	Capital sock by asset type	(4)	...	(5)	...	(6)	...	(7)	...	(8)	...	(9)	...	(10)
	Labour by relevant breakdown	(3)	...	(4)	...	(5)	TEC Indicators (??)	(6)	...	(7)	...	(8)	...	(9)	...	(10)	...	(11)	...	(12)
	number of enterprises	(5)	...	(6)	...	(7)	size enterprises by size class	(8)	...	(9)	...	(10)	...	(11)	...	(12)	...	(13)	...	(14)

54. In the case, for example, that there are three partner countries in a GVC, the compilation of the GVC multi-country SUTs starts with the compilation in each country of a SUT with a breakdown of industries and products as presented in Table 5 and **Error! Reference source not found.** Once the national SUTs are compiled in each of the GVC partner countries, they are integrated into a GVC multi-partner country SUTs as presented in Table 6

55. Table 7 presents the format of the of a multi-country SUTs in the case of three partner countries. The table shows detailed the bilateral trade between the 3 countries and the trade with other countries appear as trade to and from the Rest of the World. By combining the national SUTs into a common multi-partner country GVC framework, the interrelationships in the production arrangements of the production cycle from conception to final products and in international trade of goods and services from the offshoring of core and supporting functions become apparent. Also, the control structure between participation firms for the coordination of the production processes is made explicit. In addition, the framework shows how imported products from one of the countries are used in the other countries (as intermediate inputs, final consumption or re-exports) from which the benchmarks of foreign and domestic value added in international trade can be determined.

Table 6 Schematic representation of multi-country SUTs (three country case)

		Country A				Country B				Country C				Country A	Country B	Country C	Ctry A	Ctry B	Ctry C	Export to ROW + discrepancies	Total use (basic prices)	Total output (basic prices)									
		Product 1	Product 2	Product 3	Product 4	Product 1	Product 2	Product 3	Product 4	Product 1	Product 2	Product 3	Product 4	Industry 1	Industry 2	Industry 3	Industry 1	Industry 2	Industry 3	Final use 1	Final use 2	Final use 1	Final use 2	Final use 1	Final use 2						
Country A	Product 1	[Grey]																													
	Product 2	[Grey]																													
	Product 3	[Grey]																													
	Product 4	[Grey]																													
Country B	Product 1	[Grey]																													
	Product 2	[Grey]																													
	Product 3	[Grey]																													
	Product 4	[Grey]																													
Country C	Product 1	[Grey]																													
	Product 2	[Grey]																													
	Product 3	[Grey]																													
	Product 4	[Grey]																													
Country A	Industry 1					[Grey]																									
	Industry 2					[Grey]																									
	Industry 3					[Grey]																									
Country B	Industry 1									[Grey]																					
	Industry 2									[Grey]																					
	Industry 3									[Grey]																					
Country C	Industry 1													[Grey]																	
	Industry 2									[Grey]																					
	Industry 3									[Grey]																					
Import from all countries (CIF)																															
Total supply (basic prices)																															
* Net Taxes on products payable to foreign governments																															
Import from Rest of the World (CIF)																															
Net taxes on products																															
Trade and transport margins																															
Total supply (purchasers' prices)																															
Gross value added (basic prices)	Compensation of employees																														
	Operating Surplus																														
	Other gross value added																														
Total input (basic prices)																															

Source: Handbook on Supply, Use and Input-Output Tables with Extensions and Applications, United Nations 2018

56. There are a number of empirical challenges in the compilation of multi country SUTs, such as the reconciliation of trade asymmetries, the estimation of the direct purchase abroad by resident units, the estimation of import flow matrices and distribution margins, merchanting, factoryless good producers, etc. The issues are described in more detail in Part V Annex I and Annex II.

*This section will be further elaborated*

## 9. Linking with KLEMS accounts

**This section needs to be further elaborated**

57. Additional information on labor and capital can be included in the GVC satellite accounts to have a better understanding of productivity and economic growth connected with GVCs. Incorporating the KLEMS accounts and extending the national framework from a country-level production account to a multi-partner country SUT account would significantly increase the analytical value of the GVC accounting framework. Box 3 provides a brief introduction to the KLEMS accounts.

### Box 3 Introduction to KLEMS accounts

A production account at the country level includes data on final expenditures and primary inputs in current and constant prices. In a country-level aggregate production account, the “EMS” in the KLEMS accounts is unnecessary because payments to aggregate capital and labor services embed the entire value chain used to produce final products. That is, including EMS at the aggregate level would be double counting.

An aggregate production account includes information on aggregate production and the sources of growth, but does not permit industry-level comparisons that are important for understanding world production, competitiveness, and comparative advantage. The importance of distinguishing industries in the analysis of growth is intuitive. The production process for Information Technology equipment is much different than the production of hotel accommodations, both on the output side (as evidenced by the different prices for the two outputs) and on the input side as evidenced by the difference skill mix in labor input, asset composition in capital input, and the types of intermediate goods and services used in production. Therefore, comparing aggregate production across countries without accounting for the role of individual industries obscures major differences in economic structures.

The international statistical community has made significant progress on assembling industry-level production account data at the country level. Much of this activity has taken place by a consortium of researchers and economic statisticians within the World KLEMS and EUKLEMS initiatives. These initiatives are described by (Jorgenson, 2012) and (O'Mahoney & Timmer, 2009), with more recent results and analysis presented in (Jorgenson, Fukao, & Timmer, 2016). The major features of these KLEMS accounts are national accounts consistent production account data in current and constant prices at the industry level, decomposed into the inputs used in production: capital (K), labor (L), Energy (E), Materials (M), and Services (S), and productivity. Thus, the KLEMS approach provides an internally consistent decomposition of economic growth across industries within an economy and factors of production used by each industry.

To provide background on industry-level KLEMS accounts, it is instructive to review some of the more recent studies that use this method. (Jorgenson, Ho, & Samuels, 2016) construct an industry-level production account and use the account to analyze the sources of U.S. economic growth over the post-war period in the U.S.. They divide the economy into producers of Information Technology (IT), users of IT, and non-IT industries. This shows the rising contribution of IT production in U.S. GDP growth over the period. The decline in the production of IT equipment in the U.S. reinforces the importance of having comparable accounts for other countries to track world production of IT equipment, which is now mostly imported. The analysis shows the disproportionate share of aggregate productivity growth originated in IT-producing industries since the technology became commercialized. That is, the IT producing sector accounted for about 5% of nominal aggregate value added, but a substantially larger share of aggregate productivity growth. Productivity analysis based on aggregate data would miss this important distinction between IT and other types of production and perhaps erroneously conclude that productivity growth was balanced across sectors of the economy. After presenting an analysis of the sources of GDP growth over the postwar period, the authors argue that accounting for the industry dimension is important in assessing the prospects for economic growth going forward.

KLEMS work has now been adopted into official national accounting statistics by Australia, Sweden, Finland, Denmark, Italy, the U.K., the Netherlands, and Mexico. In the U.S., the BEA and BLS produce an integrated industry-level KLEMS production

account that is consistent with the official GDP accounts. This includes internally consistent accounting data on industry output and KLEMS inputs.

The EUKLEMS and World KLEMS consortiums provide proof of concept on implementing country-level production accounts for countries other than the U.S. These datasets are produced by a consortium of academic researchers and statistical offices and now cover about 40 countries using consistent KLEMS methodology. Research studies using these datasets confirm the importance of this data for basic macro-economic analysis. For example, the findings based on the EUKLEMS database in (van Ark, O'Mahony, & Timmer, 2008) show that a large portion of the productivity gap between Europe and the U.S. is driven by a gap in productivity of the service industries leading to an argument for a "single market" for services in Europe.

It is expected that industry specific GVC accounts would provide further insights in the interconnections of sources of growth and productivity.

*Taken from original chapter 4*

58. The GVC satellite accounts therefore can include additional information on labour (in terms of employment, hours worked, or labor quality), capital, energy, and services as well as additional information on the environment such as the use of natural inputs as well as emissions. When this information is incorporated in the multi-partner country GVC SUTs, it greatly enhances its analytical use.

*This section has to be further elaborated in terms of*

*(a) A more refined list of relevant additional information to add (emissions, energy, natural inputs, etc.)*

*(b) A description of conceptual and practical issues related to the compilation of this information*

*(c) Improvements of the description of KLEMS and the links with KLEMS accounts*

## 10. Linking with Extended Supply and Use Tables

59. The compilation of industry specific GVC-SUTs complements the framework of the extended SUTs, but with a greater specification for an industry specific GVC. Compiling GVC-SUTs would benefit the compilation of extended SUTs as they can be viewed as benchmark components of extended SUTs.

60. The compilation of GVC-SUTs requires an in-depth review of the national accounts, trade, business and foreign direct investment statistics, often building on the profiling of multilateral enterprise groups that dominate the economic structures of partner countries, resolving bilateral asymmetries, etc. By using a national approach in collaboration with GVC partner countries, the quality of the national SUT frameworks is greatly enhanced. Below is a description of the extension of the Extended Supply and Use Tables.

61. In the extended SUTs, four distinct types of extensions are considered:

- The first category looks at very simple extensions to the core accounts that require no additional breakdown of activities into categories or grouping of more homogeneous (or rather less heterogeneous) firms.
- The second looks at extensions that split activities into more homogeneous groupings of firms.
- The third looks at extensions that provide links between the core production accounts and the distribution of income account, and also to other important macro-economic variables (such as employment).
- The final extension, perhaps the most difficult to do since it may not always be possible to create such breakdowns with existing information, without assumptions, is the breakdown of products on the basis of distinct category of producer.

## a. Simple Extensions

62. There are a number of relatively simple extensions that can be added to conventional supply-use tables in a way that can greatly improve our ability to analyse and understand globalisation. Perhaps the simplest of these extension is to separately show estimates of goods for processing transactions (manufacturing services on physical inputs owned by others) and re-exports (if import flow tables are not also provided). Such extensions are important for TiVA calculations as re-exports typically have only negligible (often zero) domestic content, while information on goods for processing transactions significantly improve the ability to create coherent global supply-use tables. Such information is even further enhanced if breakdowns of activities also separately differentiate between processing and non- processing production (discussed later). Ideally, for goods for processing transactions, it is also helpful to show the value of those goods that have been imported (but whose ownership has not changed) and the full customs value of goods subsequently exported. Similarly, especially because the process of production is significantly different, it is also useful to show separately the value of merchanting with gross values of exports of goods.

63. A second set of simple extensions, albeit slightly more complicated, as such information is not always available or collected at the detailed product level available in supply-use tables, concerns the estimates of residents' expenditure aboard and non-residents' expenditure. In many countries these are only shown within conventional supply-use tables as additional separate items added to total imports and total exports respectively (with corresponding adjustments made to household final consumption). Again, for the calculation of global supply-use tables, it's important to have these items broken down by product. Tourism satellite accounts often provide a good basis for creating such breakdowns. In many countries these items are added as additional rows in national supply-use tables and so it is not necessarily meaningful to describe additional columns broken down by products as 'of-which' items and so instead the recommendation made here is that they are added as complementary columns. It's important to note that separate breakdowns have a variety of applications, first and foremost for a better understanding of the tourism industry but they also matter greatly for TiVA and trade policy making, as the goods transactions do not (generally) involve tariffs, unlike conventional merchandise trade.

64. A third set of extensions concerns the valuation of imports. Typically, goods transactions are recorded at CIF prices. But global supply-use tables require a common valuation of imports and exports, meaning that import values are also needed at FOB prices. As such a split of imports of goods into a FOB component and a 'CIF' component is also highly desirable. In addition, in order to analyse the impact of tariffs on global value chains, and indeed to help construct import-flow matrices (particularly those derived using the classic proportionality assumption) complementary information on tariffs/duties paid by product is also highly desirable.

65. A fourth set of extensions concerns the geographical breakdown of the import flow matrix within the supply-use framework (an essential step needed on the way to producing input-output tables, national and global). Countries use a variety of methods to derive their import flow matrices. In some, estimates are based on survey estimates or administrative sources but in many they are based on the assumption of proportionality<sup>4</sup> (ideally calculated at the most detailed product level possible, even if this level is more disaggregated than that used in dissemination, and taking into account end-use – BEC – type classifications). Ideally these tables could also be broken down by partner (or at least major partners or regional groupings). In the simplest case this could be done by also applying a proportionality assumption but more refined estimates could be derived through linking exercises; in particular through the linking of trade (customs) and statistical business registers at the firm level.

66. (table to be added)

## b. Extensions within Activities

67. As noted above, the concept of breaking down activities into more homogenous or policy relevant groupings is not new. The 2008 SNA for example describes breakdowns between market and non-market activities and many satellite accounting systems also embody this principle. The approach advocated is to develop aggregations of firms (and splits of activities) into those that best respond to the growing demands presented by globalization.

68. It is important in this respect to note that the approach is deliberately not prescriptive. How countries develop Extended SUTs that meet the statistical challenges presented by globalization necessarily depends on national circumstances. These are in the main driven by statistical capacity but they should also reflect national policy demands.

69. The OECD Expert Group on Extended Supply-Use tables<sup>5</sup>, created in 2014, focused on three broad approaches that could, in theory, be developed by all countries (with varying degrees of complexity). These three approaches were:

- Breakdowns by size-class of firm (statistical unit)
- Breakdowns by trading status (exporter, two-way trader, importer, non-trader)
- Breakdowns by ownership status (foreign owned affiliates, Domestic multinational with affiliates abroad, domestic firm with no foreign affiliates).

70. Participating countries were also asked to consider variants, including combinations, of the above three breakdowns, for example breakdowns by trading status and size class, and also to consider alternative approaches that better reflected national circumstances. For example Chinese tables were broken down into three categories of firms – exporters operating within the Customs Processing regime, other exporters, and non-exporters; Mexican tables were developed by grouping firms on the basis of whether they were a global manufacturer or non-global manufacturer; and Costa Rican tables have been broken down into three categories of firms: firms operating within Free Trade Zones, Other Exporters and all other firms (and work is on-going to extend these breakdowns to include an ownership dimension).

71. Conceptually the breakdown of activities into more distinct (heterogeneous and/or policy relevant groupings) of firms, is relatively trivial to illustrate (Figure 2); it merely involves breaking down existing activities into new disaggregations; where such disaggregations are meaningful.

72. For example it would not be particularly useful, at least with respect to improving homogeneity, to disaggregate a particular activity if the overwhelming majority of output and exports within that activity were conducted by one category of firm. Indeed, in some cases it would not be possible to have disaggregations if the corresponding breakdown resulted in breaches of confidentiality (i.e. statistical disclosure of individual firms). This is another reason why it is preferable not to be prescriptive about the format of Extended SUTs.

73. However, challenges presented by confidentiality do provide an opportunity to consider whether current dissemination strategies are necessarily optimal, from a policy perspective at least. For example it may be preferable to reduce the degree of industrial activity breakdown presented if this provides scope to provide additional breakdowns by other categorizations of firm.

74. Another simple illustration of such an Extended Supply-Use table with two categories of firm. Note the inclusion of additional breakdowns of Fixed Capital Investment, Exports and Imports by the relevant categories of firms and the additional row under output, showing the value of output that is exported. Note also, for ease of exposition, that the additional extensions described in Section 2.1 above are not illustrated below, however it follows that it would be preferable to include these extensions with additional breakdowns by category of firm where relevant. This includes in particular, breakdowns of: Imports of goods under processing arrangements; Exports of manufacturing services on goods owned by others; Customs value of goods exported under processing arrangements; and Adjustments made for merchanting transactions crossing over two periods.

75. One additional extension that would be very useful in this context concerns the geographical breakdown of exports. Standard indicators on GVCs, such as those derived via TiVA, are not able to track the true underlying granularity implicit in the value chain. For example, foreign owned affiliates are more likely to have stronger trade relationships with their parent's resident country than independent firms, both with regards to imports and exports, especially when considering the whole of the value-chain. This can make a significant difference to trade

relationships derived from TiVA measures where the ‘averaging’ effect tends to weaken the strength of those ties. For example, US firms exporting parts for assembly in Mexico often do so with a view to US markets in mind, but current TiVA estimates are not fully able to capture the granularity of these relationships: a breakdown of the origin of imports by category of firm and, correspondingly, the destination of exports by the same categories of firms would greatly improve the quality of TiVA based estimates, such as the US content of Mexico’s exports to the US.

76. One final complementary extension that would be of considerable use relates to capital flow matrices (Figure 4). Although many countries are able to produce estimates of gross fixed capital formation by activity, these are typically only available at a relatively aggregated product level, such as ‘plant and machinery’, ‘intellectual property’ etc., and rarely at the level of product detail provided in conventional supply-use tables. This is a significant statistical lacuna. It necessarily hinders the development of high- quality KLEMS type statistics as by definition it requires relatively aggregated measures of capital stock (derived typically via the Perpetual Inventory Method) but it also limits extensions in the domain of TiVA type statistics.

77. For example, and to illustrate, if Germany only exported capital machinery to China, there would be no German value-added embodied in China’s exports and so Germany’s dependencies with consumption in the Rest of the World on this basis could appear to be misleadingly limited. However a time series of capital flow matrices could be used to construct corresponding measures of capital services such that an extended TiVA system could be developed that recorded Germany’s exports of capital investment goods as a flow of a series of capital services payments (akin to treating the purchase by China as if it was an up-front payment operating lease arrangement rather than an acquisition).

**78. (tables to be added for each of the extensions)**

*This part needs to be further elaborated*

## 11. GVC specific multi-partner country institutional sector accounts

79. The extended GVC institutional sector accounts consist of the sequence of national accounts (e.g. production, generation of income etc.) with a breakdown of the sectors that reflects the governance structure of the GVC. In particular, the extended GVC institutional sector accounts involve extending the following classifications:

- The institutional Sub-sectoring to delineate the GVC business governance
- The BOP/IIP functional classification to describe the direct investment relationship and other GVC specific financing functions in the structure of financial assets and liabilities

80. These extensions and the format of the accounts are described below.

### a. Institutional sector classification

81. The institutional sector classification of the 2008 SNA (and the BoP/IPP) distinguishes the following subsectors:

Institutional Sector Classification	
S11	Non-financial Corporations
S12	Financial Corporations
S13	General Government
S14	Households
S15	Non-profit institutions serving households

82. The extension to the institutional sector framework is largely made to accommodate concepts from FDI. The first extension is the distinction between **foreign-controlled** and **nationally-controlled corporations**, which is

applied to both non-financial corporations (S11) and financial corporations (S12). The foreign controlled corporations are by definition part of an FDIR, and in that context, need to be seen as subsidiaries.

83. As regards nationally controlled non-financial corporations further distinctions are applied. The first sub-category in the breakdown covers all non-financial corporations that are not foreign controlled, but are foreign influenced, the so-called associates. The second sub-category is encompassing direct investors that are themselves no direct investment enterprise. These corporations are labelled as ultimate controlling parent (UCP). The third sub-category reflects nationally controlled corporations that are not in any FDIR, the residual subsector of non-financial corporations, and is labelled other nationally controlled non-financial corporations.

84. As regards the financial corporate sector the distinction between foreign control and national control is less relevant for the development of the extended framework, as we would only want to identify those financial corporations that fulfil a specialized financial function only in the context of the GVC. This would exclude all categories of financial corporations except the category captive financial institutions (S127). This category encompasses such entities such as passive holdings and conduits used in the illustrative example of Figure 1.

85. The additional sector detail would support the lead firm and affiliates distinction, and has the benefit to providing a clear and direct correspondence with FDI concepts.

86. Unaffiliated firms are not controlled by a enterprises related to the lead firm. Their link to the affiliated firms and/or the ultimate controlling parent would be their nearly exclusive supplier relationship with a given value chain and their provision of goods and services to the exact specification by the lead firm. As the level of the GVC specific institutional classification such a distinction is hard to implement, and would be subject to frequent revisions, as trading and manufacturing relationships within GVCs would change. Notably, these types of relationships are difficult to implement in the general business register. The non-affiliated firms would be classified either as associates, when affiliates may have a minority stake into the unaffiliated of more than 10%, but less than 50%, or would be part of the other nationally controlled non-financial corporations sector.

87. In the context of the development of a GVC specific capital and financial account satellite, these two sectors would contain only the identified non-affiliated firms, hence it is not considered necessary to provide an additional sector concept for non-affiliates there.

**Table 7 GVC specific institutional sector classification**

Code	Description
S11	Non-financial corporations
S11(FC)	Foreign Controlled Non-Financial Corporations ("Foreign Subsidiaries")
S11(NC)	Nationally Controlled Non-Financial Corporations
S11(NC.FI)	Foreign Influenced Non-Financial Corporations ("Foreign Associates")
S11(NC.UI)	Ultimate Controlling Parent/Ultimate Investor
S11(NC.ONF)	Other Non-Financial Corporations
S12	Financial Corporations
S12(FC)	Foreign Controlled Financial Corporations
S12(NC)	Nationally Controlled Financial Corporations
S127(FC)	Foreign Controlled Captive Financial Institutions
S127(NC)	Nationally Controlled Captive Financial Corporations
S13	General Government
S14	Households

88. The GVC specific functional classification encompasses and enhances the standard BOP/IIP functional classification. Specifically, in order to support the relationships between affiliated and non-affiliated firms as required for more direct support of GVC analysis a separate category distinct from foreign direct investment needs to be introduced. This category is labelled *other inter-company financing*, and encompasses the same instrument mix as foreign direct investment, although it is expected that the predominant categories are found in Loans (F4) and accounts payable and receivable (F8). It would also include minority interest less than 10% of shareholder voting rights.

Table 8 GVC specific functional classification

Item	Description
Direct Investment	<p><i>Foreign Direct investment is a category of investment associated with a resident in one economy having control or a significant degree of influence on the management of another enterprise in another economy.</i></p> <p>As well as the equity that gives rise to control or influence, direct investment also includes financial investment between indirectly controlled enterprises including so-called fellow enterprises, may include regards debt and may involve reverse investment.</p> <p>A direct investment enterprise is assumed to be controlled when 50% of its equity is held by its parent (Subsidiary) and is assumed to be under influence (Associate) when the investor holds between 10% and 50% of the equity is held.</p>
Pass through funds	<p><i>“Pass-through funds” or “funds in transit” are funds that pass through an enterprise resident in an economy to an affiliate in another economy, so that the funds do not stay in the economy of that enterprise. These funds are often associated with direct investment. Such flows have little impact on the economy they pass through. Special purpose entities, holding companies, and financial institutions that serve other nonfinancial affiliates are particularly associated with funds in transit, but other enterprises may also have pass-through funds in direct investment flows.</i></p>
Other direct investment	
Other Intercompany Financing	<i>Other intercompany financing</i>
Non-intercompany Financing	Encompasses Other Investment, Portfolio Investment, Reserves and Derivatives
Other Investment (less OIF)	<p>BPM6 : 6.61</p> <p><i>Other investment <b>less OIF</b> is a residual category that includes positions and transactions other than those included in direct investment, <b>other intercompany financing</b>, portfolio investment, financial derivatives and employee stock options, and reserve assets. To the extent that the following classes of financial assets and liabilities are not included under direct investment <b>other intercompany financing</b> or reserve assets, other investment includes:</i></p> <ul style="list-style-type: none"> <li>(a) <i>other equity;</i></li> <li>(b) <i>currency and deposits;</i></li> <li>(c) <i>loans (including use of IMF credit and loans from the IMF);</i></li> <li>(d) <i>nonlife insurance technical reserves, life insurance and annuities entitlements, pension entitlements, and provisions for calls under standardized guarantees;</i></li> <li>(e) <i>trade credit and advances;</i></li> <li>(f) <i>other accounts receivable/payable; and</i></li> <li>(g) <i>SDR allocations (SDR holdings are included in reserve assets).</i></li> </ul>
Portfolio Investment (less OIF)	<p>BPM6 : 6.54</p> <p><i>Portfolio investment is defined as cross border transactions and positions involving debt or equity securities, other than those included in direct investment, <b>other intercompany financing</b> or reserve assets</i></p>
Derivatives	<p>BPM6 : 6.58</p> <p><i>The definition of the functional category financial derivatives and employee stock options (other than reserves) largely coincides with the corresponding financial instrument class. The difference in coverage between the functional category and the financial instrument is that financial derivatives associated with reserve asset management are excluded from</i></p>

		<i>the functional category and included in reserve assets. This category is identified separately from the other categories because it relates to risk transfer, rather than supply of funds or other resources.</i>
	Reserves	BPM6 : 6.64 <i>Reserve assets are those external assets that are readily available to and controlled by monetary authorities for meeting balance of payments financing needs, for intervention in exchange markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, and serving as a basis for foreign borrowing).</i>

**b. GVC specific institutional sector accounts**

89. The extended institutional sector accounts introduce additional detail in regard to the types of institutional units and in regard to the financial assets and liabilities through distinguishing additional functional detail.

90. In GVC the case of an affiliated corporation that also involves a pass through function in channelling income from its subsidiaries to the lead firm is highlighted in the examples below.

91. In Figure 3 the transition of value added into income is presented, in showing the sequence of the income and use of income accounts for this specific affiliate as well as the related counterpart entries to the affiliate. The presentation is therefore not complete, it merely intends to illustrate how the affiliate would be incorporated in the extended framework. A similar example could be constructed for each of the corporations that make up the GVC. The presentation follows the standard national accounts sequence of accounts [reference].

92. In the generation of income account, gross value added (101) is broken down in its primary cost components, compensation of employees (30), taxes less subsidies (5) on production and gross operating surplus (66). The primary income account details how the gross operating surplus of the corporation is distributed, and how it may be augmented by income streams that derive from investments in other corporations.

93. In this example the first step is to allow for the consumption of fixed capital (32), such that we allow for the economic use of gross fixed capital, which reduces the gross operating surplus to a net operating surplus of 34. Subsequently property income flows are presented. These property incomes are directly linked to specific financial assets and liabilities on the balance sheet. As in the example balance sheet, we can therefore apply a functional classification to the income flows, distinguishing between FDI related property income, other intercompany (e.g. with non-related enterprises), and other property income.

94. The major component of these income flows are the income received in the form of dividends from its subsidiary. This is shown as an entry on the resources (credit) side under the heading distributed income of corporations (67). As the subsidiary is incorporated in another domicile, the counterpart entry to this is the entry in the external sector account under Uses (Debit). The corporation immediately transfers this amount to its immediate parent (GVC Holding) in the form of dividends. This corresponds to the income derived from so-called pass through investment. The affiliate however also has generated a gross margin on its own operations. These funds are re-invested in the company. In the national accounts and balance of payments re-invested earnings from foreign investment receive a specific treatment, in that such earnings are treated as if they were dividends that are reinvested, e.g. corporate net savings are set to zero, and the reinvested earnings are calculated as a residual. The re-invested earnings are thus calculated as 16, and recorded as a use of income (Debit). A negligible part of this is due to minority holdings, which is excluded from the imputation. The counterpart is an entry in the external account on the resources side (Credit).

Figure 3 GVC specific Current Account: Transformation of Value Added to Income

	Assets								Liabilities							
	Foreign Controlled				National Controlled				Foreign Controlled				National Controlled			
	S-FCC	S-FIN-CAP	S-UIC	S-FIC	S-OTH	S-FIN	S-OTH	S-FCC	S-FIN-CAP	S-UIC	S-FIC	S-OTH	S-FIN	S-OTH		
Foreign Controlled Non-financial Corporations Foreign Subsidiaries	Foreign Controlled Captive Financial Institutions	Ultimate Investor	Foreign Influenced Non-financial Corporations (Foreign Associates)	Other Non Financial Corp	Financial Corporations excl foreign controlled captive corporations	Other Sectors	External Sector	Foreign Controlled Non-financial Corporations Foreign Subsidiaries	Foreign Controlled Captive Financial Institutions	Ultimate Investor	Foreign Influenced Non-financial Corporations (Foreign Associates)	Other Non Financial Corp	Financial Corporations excl foreign controlled captive corporations	Other Sectors	External Sector	
Gross Value Added								109								
Compensation of Employees	30															
Taxes and Subsidies on production and imports	5															
Gross Operating Surplus	74															
Gross Operating Surplus								74								
Consumption of Fixed Capital	32															
Property Income, FDI																
Interest	8														8	
Distributed Income of Corporations	67						67	67							67	
Reinvested Earnings on FDI	10														10	
Property Income, other intercompany financing																
Interest						1		1								
Distributed Income of Corporations						2		2								
Other Property Income																
Other Property Income																
Interest	15												11	0	4	
Distributed Income of Corporations																
Other Property Income																
Balance of Primary Incomes (Net)	12															
Balance of Primary Incomes (Net)								12								
Current taxes on income and wealth	12												12			
Social Contributions																
Other Current transfers																
Disposable Income (Net)	0															
Disposable Income (Net)								0								
Final Consumption																
Savings	0															

95. The Affiliate (PT) has some minor property income from its relations with other, non-related non-financial corporations, from trade credit and minority shareholding in unrelated firms, which are recorded under other intercompany financing.

96. Affiliate (PT) has engaged in bank borrowing, on which it pays interest (15), which is recorded under other property income, to domestic financial institutions (11) and abroad (4). This leads to the net balance of primary incomes to 12.

97. This balance of primary incomes is transferred into the secondary income distribution account. For Affiliate PT the only relevant entry here is the amount of income and wealth taxes paid (12), leading to a disposable income equal to 0. Net savings, the balance item of the use of income accounts is also equal to 0, as there are no entries foreseen for corporations in this account. Net savings is equal to 0 due to the imputation for re-invested earnings described above.

98. Figure 4 presents the accumulation accounts, the combined capital and financial account, for Affiliate (PT).

99. The structure of the capital account is relatively simple. It shows in the aggregate gross fixed capital formation (GFCF) (46) less consumption of fixed capital (32). With savings at 0, this leads to a net borrowing of 14. These net investments are combined with the total financial investment recorded in the financial account (21), through re-invested earnings (10), lending from related non-resident firms (6) accounts receivable from related firms (2) as well as some financing under the other accounts.

100. Notable is the pass through investment recorded under direct foreign investment in equity from the GVC holding through Affiliate (PT) into Affiliate (15). There is an investment under other inter-company financing, related to talking a minority interest in a non-affiliated corporation (3), and a decrease in intercompany loans (-6). Under other investment, Affiliate (PT) has a net investment of 9, split across currency and deposits, debt securities, loans and other accounts payable, and a net financing of (-2).

Figure 4 GVC specific Accumulation Account: Foreign Controlled Non-financial corporations (Affiliates)

	Assets							Liabilities								
	Foreign Controlled		National Controlled			S-FIN	S-OTH	External Sector	Foreign Controlled		National Controlled			S-FIN	S-OTH	External Sector
S-FCC	S-FIN-CAP	S-UIC	S-FIC	S-OTH	S-FCC				S-FIN-CAP	S-UIC	S-FIC	S-OTH	S-FIN			
	Foreign Controlled Non-financial Corporations Foreign Subsidiaries	Foreign Controlled Captive Financial Institutions	Ultimate Investor	Foreign Influenced Non-Financial Corporations (Foreign Associates)	Other Non Financial Corp	Financial Corporations excl foreign controlled captive corporations	Other Sectors	External Sector	Foreign Controlled Non-financial Corporations Foreign Subsidiaries	Foreign Controlled Captive Financial Institutions	Ultimate Investor	Foreign Influenced Non-Financial Corporations (Foreign Associates)	Other Non Financial Corp	Financial Corporations excl foreign controlled captive corporations	Other Sectors	External Sector
	0								0							
Non Financial Assets																
GFCF	46															
CFC	-32															
Inventories																
Non-produced Assets																
Capital Transfers	0								0							
Net Lending (+) / Net Borrowing (-)	-14								-14							
Net Lending (+) / Net Borrowing (-)																
Foreign Direct Investment																
Debt Securities																
Loans								6	6							
Insurance Technical Reserves																
Equity	15								15							15
Equity (Reinvested Earnings)									10							
Other Accounts									2							
Other Inter company financing																
Equity (Minority)	3												2			
Loans	-6												-6			
Other Accounts																
Other Investment, Portfolio Investment and Reserves																
Reserves																
Currency and Deposits	-5															
Debt Securities	7															
Loans	5															
Insurance Technical Reserves																
Equity																
Derivatives																
Other Accounts	2					4			4			1				1
Net Worth																
Total	21	0	0	0	4	0	0	31	21	0	0	0	-3	4	0	19

101. Figure 5 presents the Balance Sheet for Affiliate (PT). It reflects the information provided in Figure 1. Affiliate (PT) is a nearly wholly owned subsidiary of GVC Holding (FDI, Equity liability 1020, total equity 1050 liability). A salient feature of the example is that a large part of the equity liability of Affiliate (PT) reflects an investment by Affiliate (PT) in Affiliate (785), which is characterized as passthrough funds, or capital in transit, also registered under FDI.

102. Affiliate (PT) also has a sizable debt (380) with regards to another corporation in the group, namely the conduit established to attract debt security financing on behalf of the group. It finances also through within group accounts payable (40).

103. Under other investment, portfolio, Affiliate (PT) finances itself through bank lending (380), minority equity (40) and other accounts.

Figure 5 GVC specific Balance Sheet: Foreign Controlled Non-financial corporations (Affiliates)

	Assets								Liabilities									
	Foreign Controlled Corporations			National Controlled Corporations			S-FIN	S-OTH	External Sector	Foreign Controlled Corporations			National Controlled Corporations			S-FIN	S-OTH	External Sector
	S-FCC	S-FIN-CAPT	S-FIN-CAPT	S-UIC	S-FIC	S-OTHC				S-FCC	S-FIN-CAPT	S-FIN-CAPT	S-UIC	S-FIC	S-OTHC			
Foreign Controlled Non-financial Corporations Foreign Subsidiaries	Foreign Controlled Captive Financial Institutions	Foreign Controlled Captive Financial Institutions	Ultimate Investor	Foreign Influenced Non- Financial Corporations (Foreign Associates)	Other Non Financial Corp	Financial Corporations excl foreign controlled captive corporations	Other Sectors	External Sector	Foreign Controlled Non- financial Corporations Foreign Subsidiaries	Foreign Controlled Captive Financial Institutions	Foreign Controlled Captive Financial Institutions	Ultimate Investor	Foreign Influenced Non- Financial Corporations (Foreign Associates)	Other Non Financial Corp	Financial Corporations excl foreign controlled captive corporations	Other Sectors	External Sector	
Non Financial Assets																		
Produced Assets	825																	
Non-produced Assets	125																	
Foreign Direct Investment																		
Debt Securities																		
Loans								380										
Insurance Technical Reserves																		
Equity	785							1,020										785
Other Accounts								40										
Other Inter company financing																		
Equity (Minority)	15													15				
Loans	15													15				
Other Accounts																		
Other Investment, Portfolio Investment and Reserves																		
Reserves																		
Currency and Deposits	20																	
Debt Securities	36																	
Loans	0						296	0	102									36
Insurance Technical Reserves																		
Equity																		
Derivatives								30										
Other Accounts	25					18								25				
Net Worth																		
Total	1,846	0	0	0	0	18	296	30	1,542	1,846	0	0	0	55	20	0	0	861

104. The asset side of the balance sheet is characterised by the large investment in non-financial assets (gross 725, net 600), as well as the fully owned Affiliate (FDI equity 785). It has a minority interest in a non-affiliated firm, which it has also provided with a loan. Under other investment, there are deposits at banks (20), an investment in short term debt securities (36) and accounts receivable (25).

Exemplification of the extended framework (numerical example to be further developed and described)

### c. GVC specific Multi-partner country institutional sector account

105. The step to global accounts involves not only the inclusion of FDI in the context of the national accounts, but enlarges the scope to encompass (a) full or partial geographical coverage of the accounts, showing country or regional aggregates, and (b) full bilateral mapping between the countries / regions and institutional sectors distinguished for all instrument and functional types.

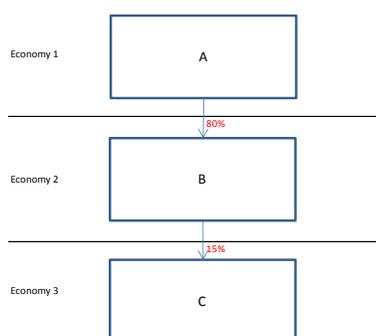
106. This would provide a highly detailed framework, essentially a “from whom to whom” representation<sup>5</sup> incorporating the full detail by institutional sector and geography.

107. In the presentation below, we present a suggestion for global institutional sector accounts’ balance sheets, the same approach can obviously also be used to present the transaction accounts and other flows.

108. Here we choose to present the global accounts in four tables, representing the following categories

- Foreign Direct Investment (Figure 7)
- Other Investment, Portfolio Investment and Reserves (Figure 8)
- Non-financial assets and net worth (Figure 9)
- Total assets (Figure 10)

Figure 6 Example FDI ownership chain



Source BD4, Chart 3.1

<sup>5</sup> See Shestra, Mink, Fassler (2012) on an elaboration of the from Whom to Whom concepts

Figure 7 From whom to whom matrix for FDI

			Liabilities												Total Assets
			Economy 1				Economy 2				Economy 3				
			S-FDI	S-ONF	S-OTH	NF	S-FDI	S-ONF	S-OTH	NF	S-FDI	S-ONF	S-OTH	NF	
Assets	Economy 1	DI Enterprises													-
		Other Corp					80								80
		Other Sectors													-
		Net Worth													-
	Economy 2	DI Enterprises									40				40
		Other Corp													-
		Other Sectors													-
		Net Worth													-
	Economy 3	DI Enterprises													-
		Other Corp													-
		Other Sectors													-
		Net Worth													-
Total Liabilities			-	-	-	-	80	-	-	-	40	-	-	-	

Figure 8 From whom to whom matrix on Other Investment, Derivatives, Portfolio Investment and Official Reserves

			Liabilities												Total Assets
			Economy 1				Economy 2				Economy 3				
			S-FDI	S-ONF	S-OTH	NF	S-FDI	S-ONF	S-OTH	NF	S-FDI	S-ONF	S-OTH	NF	
Assets	Economy 1	DI Enterprises													-
		Other Corp													-
		Other Sectors		70											70
		Net Worth													-
	Economy 2	DI Enterprises													-
		Other Corp													-
		Other Sectors					25								25
		Net Worth													-
	Economy 3	DI Enterprises													-
		Other Corp													-
		Other Sectors													-
		Net Worth													-
Total Liabilities			-	70	-	-	25	-	-	-	-	-	-	-	

109. Each table is conceived as a two tier from whom to whom table. It contains the geographical detail as the top level classification. The examples presented in Figure 6 limits themselves to 3 economies only, obviously a fully specified set of global accounts would provide for an exhaustive geographical classification. The second classification introduced an institutional sector breakdown of three sectors, an FDI enterprise sector, a non FDI corporate sector, and other sectors. The other sectors encompass the financial corporations, government, household and NPISH sectors, such that the tables do not get overly complicated. The assets are represented in the rows, and the liabilities are represented in the columns. Each entry represents simultaneously an asset and a liability.

110. The example contained in Figure 7 is that of a direct investment chain, spanning 3 economies, where a non-financial corporation in economy 1 has obtained an 80% shareholding in a non-financial corporation in economy 2, which thereby constitutes FDI. This enterprise subsequently takes a 100% stake in a non-financial corporation in economy 3.

111. The example resembles one presented in BD4 explaining the span of control<sup>6</sup>, and enhanced to cover also the non-FDI components of each of the involved institutional units.

Figure 9 Non-financial assets and net worth matrix

	NFA/NW		Liabilities												Total Assets
			Economy 1				Economy 2				Economy 3				
			S-FDI	S-ONF	S-OTH	NF	S-FDI	S-ONF	S-OTH	NF	S-FDI	S-ONF	S-OTH	NF	
Assets	Economy 1	DI Enterprises				-									-
		Other Corp													-
		Other Sectors													-
		Net Worth	10	70											80
	Economy 2	DI Enterprises								100					100
		Other Corp													-
		Other Sectors													-
		Net Worth					- 5		25						20
	Economy 3	DI Enterprises												50	50
		Other Corp													-
		Other Sectors													-
		Net Worth									10				10
Total Liabilities			-	10	70		- 5	-	25		10	-	-		

Figure 10 From whom to whom matrix for balance sheet totals

	Total		Liabilities												Total Assets
			Economy 1				Economy 2				Economy 3				
			S-FDI	S-ONF	S-OTH	NF	S-FDI	S-ONF	S-OTH	NF	S-FDI	S-ONF	S-OTH	NF	
Assets	Economy 1	DI Enterprises	-	-	-	-	-	-	-	-	-	-	-	-	-
		Other Corp	-	-	-	-	80	-	-	-	-	-	-	-	80
		Other Sectors	-	70	-	-	-	-	-	-	-	-	-	-	70
		Net Worth	-	10	70		-	-	-		-	-	-		
	Economy 2	DI Enterprises	-	-	-	-	-	-	-	100	40	-	-	-	140
		Other Corp	-	-	-	-	-	-	-	-	-	-	-	-	-
		Other Sectors	-	-	-	-	25	-	-	-	-	-	-	-	25
		Net Worth	-	-	-		- 5	-	25		-	-	-		
	Economy 3	DI Enterprises	-	-	-	-	-	-	-	-	-	-	-	50	50
		Other Corp	-	-	-	-	-	-	-	-	-	-	-	-	-
		Other Sectors	-	-	-	-	-	-	-	-	-	-	-	-	-
		Net Worth	-	-	-		-	-	-		10	-	-		
Total Liabilities			-	80	70		100	-	25		50	-	-		

112. The example identifies the internal consistency for the sectors and counterpart sectors involved across the different tables. This can be seen in the balance sheet total table (Figure 5), where rows and corresponding columns have the same total. As regards the domestic counterpart sectors, these are made to balance using a balancing entry in net worth.

113. As the example is partial (e.g. focusing only on describing a single FDI chain, and its immediate counterparts), consistency is enforced by accommodating balances for counterpart sectors in net worth.

114. Figure 4 presents the FDI from whom to whom matrix. It is clear that only recognizes cross border positions (e.g. the off diagonal submatrices in the matrix), and within these sub-matrices, only involving assets and liabilities of the separately identified FDI sector vis á vis its investors. Figure 5 completes the financial balance sheet

<sup>6</sup> BD4, Chapter 3, Figure 3.1, pp 53.

presentation by reporting on other investment, portfolio investment, official reserves and derivatives as a single functional category, showing the linkages between FDI enterprises and other sectors outside the scope of the FDI relationships. This matrix inter alia shows the degree to which DI enterprises are linked with other sectors in domestic and international financial and credit markets.

115. In as much that this matrix can be broken down by instruments, newly developed micro statistics such as SHS can be considered in obtaining the required breakdowns for securities. The development of highly granular databases with regards to loans might complement such data sets.

116. Figure 5 extends the analysis into non-financial assets and net worth. Non-financial assets may encompass a broad variety, some of which, such as land, are not mobile between economic territories, and some of which are mobile such as intellectual property, and may have a significant economic impact. As non-financial assets are indeed only recorded as assets, they have no counterparty sector, and are constrained to the domestic economy (e.g. the diagonal sub-matrices). Although the field of non-financial assets statistics is still being developed<sup>7</sup>, their importance is being emphasised in the context of the G20 recommendations on data gaps.

117. Figure 11 then presents the GVC specific multi-partner country institutional sector account whom table, summarising both FDI and non FDI positions, non-financial assets and net worth, and explicitly showing the linkages of FDI enterprises with non FDI sectors, and the international network of FDI and non-FDI financing, as well as the implications as regards the holdings of non-financial assets globally.

Figure 11 GVC specific multi-partner country institutional sector accounts

FDI positions

	FDI	Liabilities															Total Assets						
		Economy 1					Economy 2					Economy 3											
		S-FDI	S-ONF	S-FIN	S-OTH	NF	S-FDI	S-ONF	S-FIN	S-OTH	NF	S-FDI	S-ONF	S-FIN	S-OTH	NF							
Assets	Economy 1	DI Enterprises						100										80					-
		Other Corp																					180
		Financials																					-
		Other Sectors																					-
	Net Worth																					-	
	Economy 2	DI Enterprises		50																			50
		Other Corp																					-
		Financials																					-
		Other Sectors																					-
	Net Worth																					-	
	Economy 3	DI Enterprises			10																		10
		Other Corp																					-
Financials																						-	
Other Sectors																						-	
Net Worth																					-		
Total Liabilities				60			100										80					-	

Total positions

	Total	Liabilities															Total Assets					
		Economy 1					Economy 2					Economy 3										
		S-FDI	S-ONF	S-FIN	S-OTH	NF	S-FDI	S-ONF	S-FIN	S-OTH	NF	S-FDI	S-ONF	S-FIN	S-OTH	NF						
Assets	Economy 1	DI Enterprises	-	-	-	-	100	100	-	-	-	-	-	-	-	80	-	-	-	-	-	280
		Other Corp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Financials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Other Sectors	-	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	220
	Net Worth	-	-	-	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Economy 2	DI Enterprises	-	50	-	-	-	-	-	-	-	50	-	-	-	-	-	-	-	-	-	100
		Other Corp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Financials	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Other Sectors	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Net Worth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Economy 3	DI Enterprises	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	80
		Other Corp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Financials		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Other Sectors		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Net Worth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Total Liabilities		-	280	-	220	-	100	-	-	-	-	-	-	-	80	-	-	-	-	-	-	

<sup>7</sup> See for instance the requirements in Eurostat's ESA2010 transmission programme, Table 26

In order to ensure the consistency of data in the GVC SUTs and in the extended accounts, it is useful to build a linking table between the SUTs and the institutional sectors as shown in Table 9. This table would allow to see more clearly the governance of the GVC industries explicitly identified in the SUTs by linking them to the institutional sector breakdown of the extended accounts.

## 12. Cross classification of GVC-SUTs with institutional sector accounts

As an enterprise always belongs to an institutional unit, it is possible to link the production activities of industries and institutional sectors. Output of an institutional unit is equal to the sum of the outputs of the individual enterprises of which the institutional unit is composed. To clarify relationships and contents of industries and sectors, the GVC accounting system calls for the cross classification of output, intermediate consumption (broken down by domestic and import component) and value added by both industry and sector. Table 10 illustrates this cross classification from which critical GVC related indicators can be obtained. This table can be further extended by labour and capital good information.

Table 9 Cross classification of GVC Supply and Use Tables and GVC Institutional Sector Accounts

Sectors	Industries								total
	ISIC 1	...	ISIC 291		...	ISIC 49-53		...	
			Core business function			Distribution and logistics			
			Foreign-controlled	Domestic-controlled		Foreign-controlled	Domestic-controlled		
			GVC-related	Non GVC-related		GVC-related	Non GVC-related		
<b>Foreign Controlled Corporations</b>									
<b>Foreign Controlled Non-financial Corporations Foreign Subsidiaries</b>									
Total output									
Intermediate consumption									
GVA at basic prices									
⋮									
<b>Foreign Controlled Captive Financial Institutions</b>									
Total output									
Intermediate consumption									
GVA at basic prices									
⋮									
<b>Nationally Controlled Corporations</b>									
<b>Ultimate Controlling Parent/Ultimate Investor</b>									
⋮									
<b>Foreign Influenced Non-Financial Corporations (Foreign Associates)</b>									
⋮									
<b>Other Non-financial Corporations</b>									
⋮									
<b>Other Corporations</b>									
<b>Financial Corporations excl. foreign Controlled Captive Corporations</b>									
⋮									
<b>Other Sector</b>									
⋮									
<b>Total Economy</b>									
⋮									

Table 10 Cross Table of GVC specific multi-partner country SUT and institutional sector accounts

MULTI-country Table linking the Institutional Sector Accounts and the Supply and Use Tables																
Sectors	Industries														total	
	ISIC 1	...	ISIC 291		ISIC 49-53											...
			Core business function		Distribution and logistics											
			Foreign-controlled	Domestic-controlled	Foreign-controlled					Domestic-controlled						
				GVC-related			Non GVC-related			GVC-related			Non GVC-related			
Sectors					Country A	Country B	Country C	Country A	Country B	Country C	Country A	Country B	Country C	Country A	Country B	Country C
<b>Foreign Controlled Corporations</b>																
<b>Foreign Controlled Non-financial Corporations Foreign Subsidiaries</b>																
Total output																
Intermediate consumption																
GVA at basic prices																
...																
<b>Foreign Controlled Captive Financial Institutions</b>																
Total output																
Intermediate consumption																
GVA at basic prices																
...																
<b>Nationally Controlled Corporations</b>																
<b>Ultimate Controlling Parent/Ultimate Investor</b>																
...																
<b>Foreign Influenced Non-Financial Corporations (Foreign Associates)</b>																
...																
<b>Other Non-financial Corporations/Corporations</b>																
...																
<b>Other Corporations</b>																
<b>Financial Corporations excl. foreign Controlled Captive Corporations</b>																
...																
<b>Other Sector</b>																
...																
<b>Total Economy</b>																

### 13. Data framework of Multi Partner Supply, Use and Input-Output Tables

#### a. Introduction

118. Global value chains (GVCs) have become a dominant feature of today’s global economy, challenging conventional wisdom regarding trade and trade policy, as well as the analyses of production *within* economies, which is increasingly dependent upon relationships with producers and consumers abroad. In today’s economy, intermediate products produced in country A are increasingly sent to country B before being further processed and sent on to other downstream countries, including potentially country A itself, before finally arriving at country Z. This means that national (extended) SUTs, are, on their own, no longer able to provide fully comprehensive insights on all global inter-dependencies between final consumers and producers, or indeed the nature of global production

119. To better understand these relationships multi-partner Supply, Use and Input-Output tables (SUIOTs) are required; such tables can range from global to regional and from regional to industry-specific The OECD developed the [OECD-WTO Trade in Value-Added database](#) on the basis of a global Inter-country Input-Output table (ICIO)<sup>8</sup>. But constructing global SUIOTs is far from a simple exercise, requiring the harmonisation of many national datasets with common classification systems and common conceptual accounting standards, as well as, and perhaps most importantly, the reconciliation of bilateral international trade statistics.

120. Multi-partner SUIOTs can also be developed for highly integrated regions covering various countries such as the NAFTA (United States, Canada and Mexico), the European Union (FIGARO9 Project) and the APEC countries. The OECD and the respective international partners are developing an initiative in order to generate such tables collaboratively, ensuring that they are fully consistent with the OECD’s global ICIO tables while leveraging the efforts of all partners involved.

121. These tables can also be developed as industry-specific multi-partner SUIOTs, attempting to provide an integrated picture of inter-dependencies among the main trading partners in an industry-specific global value

<sup>8</sup> See <http://oe.cd/icio> for the OECD’s annual global ICIO tables covering the period 1995-2011. Other examples include [WIOD](#), [EORA](#), [GTAP](#) and [Exiobase](#).

<sup>9</sup> Full International and Global Accounts for Research in Input- Output analysis

chain. With such purpose, this section provides an overview of how global (and regional) SUIOTs can be constructed as well as the conceptual and practical data challenges that need to be overcome in their construction.

## b. Conceptual and data framework of Multi partner Supply, Use and Input-Output tables

122. Inter-country Supply, Use and Input-Output tables are based on four pillars of data sources: National Accounts, a national Input-Output framework, international trade in goods and services statistics and business statistics.

123. The extension from national to inter-country SUIOTs consists in the split of the national SUTs imports of intermediate and final goods and services among countries of origin (and exporting industries), which in turn produces an indirect estimation of exports of intermediate and final goods and services by country of destination (and importing industry). It could also be the other way round, i.e. by splitting national SUTs exports by country of destination and by type of use (intermediate or final), imports of goods and services among countries of origin (and exporting industries) can be derived indirectly. The OECD recommends the latter option due to the fact that both exports in the national SUTs (at purchaser's prices) and in merchandise trade statistics are valued at FOB (free on board), which is the appropriate valuation for the first step of the construction of an inter-country SUT. The two approaches should not differ, in principle, as long as the view of bilateral trade among countries is balanced at the level of each good or service and both exports and imports are valued in FOB. However, this is not the case in the real world, mostly due to trade asymmetries and the different valuation of exports (FOB) and imports (CIF).

124. Besides National Accounts and national SUIOTs, international trade in goods and services constitute the third pillar for the construction of inter-country SUIOTs. Even though there are efforts to overcome bilateral trade asymmetries among countries, the problem still remains. The differences between exports (imports) and mirror exports (imports) can be attributed to<sup>10</sup>: product misclassification<sup>11</sup>, time lag between exports and imports (e.g., goods leaving country A in 2016 might only reach country B in 2017); goods passing through third countries (i.e.: transit trade, re-exports); goods entering Customs warehousing for several months; unallocated trade flows or goods being classified differently; countries having different trade systems (General versus Special Trade System); and goods passing through industrial processing zones that may or may not be recorded by the exporting country.

125. One way or another, the construction of inter-country SUIOTs requires a balanced view of bilateral trade statistics among countries and for every good or service. Current efforts to accomplish such balanced view of trade are through meetings between country representatives to get insight into the differences recorded by their trade statistics.

126. Business statistics can complement inter-country SUIOTs with supplementary information on the size of firms, their exporter status, their ownership and type of use (end-use or intermediate use) of their goods and services consumed. Moreover, the collection of firm level data on GVC specific industries such as foreign direct investment inflows and outflows, property income received and paid, operating surpluses, gross value added, output, financial and non-financial assets, exports and imports of processing goods, among others is absolutely crucial for the construction of the GVC extended accounts and their presentation in a way permitting the role of impact of GVCs to be analysed within a given economy and within a regional or global economy. Moreover, collecting additional

---

<sup>10</sup> Jansen, R. (2014) "Asymmetries in bilateral trade statistics", International Conference on Measurement of Trade and Economic Globalization, organized by INEGI and UNSD in cooperation with OECD, WTO and Eurostat. Aguascalientes (México). <https://unstats.un.org/unsd/trade/events/2014/mexico/presentations/xviii-UNSD-Asymmetries-in-bilateral-trade-statistics.pdf>

<sup>11</sup> User guide on European statistics on international trade in goods, [2016 Edition](#); Balance of Payments and International Investment Position Manual [Sixth Edition \(BPM6\)](#)

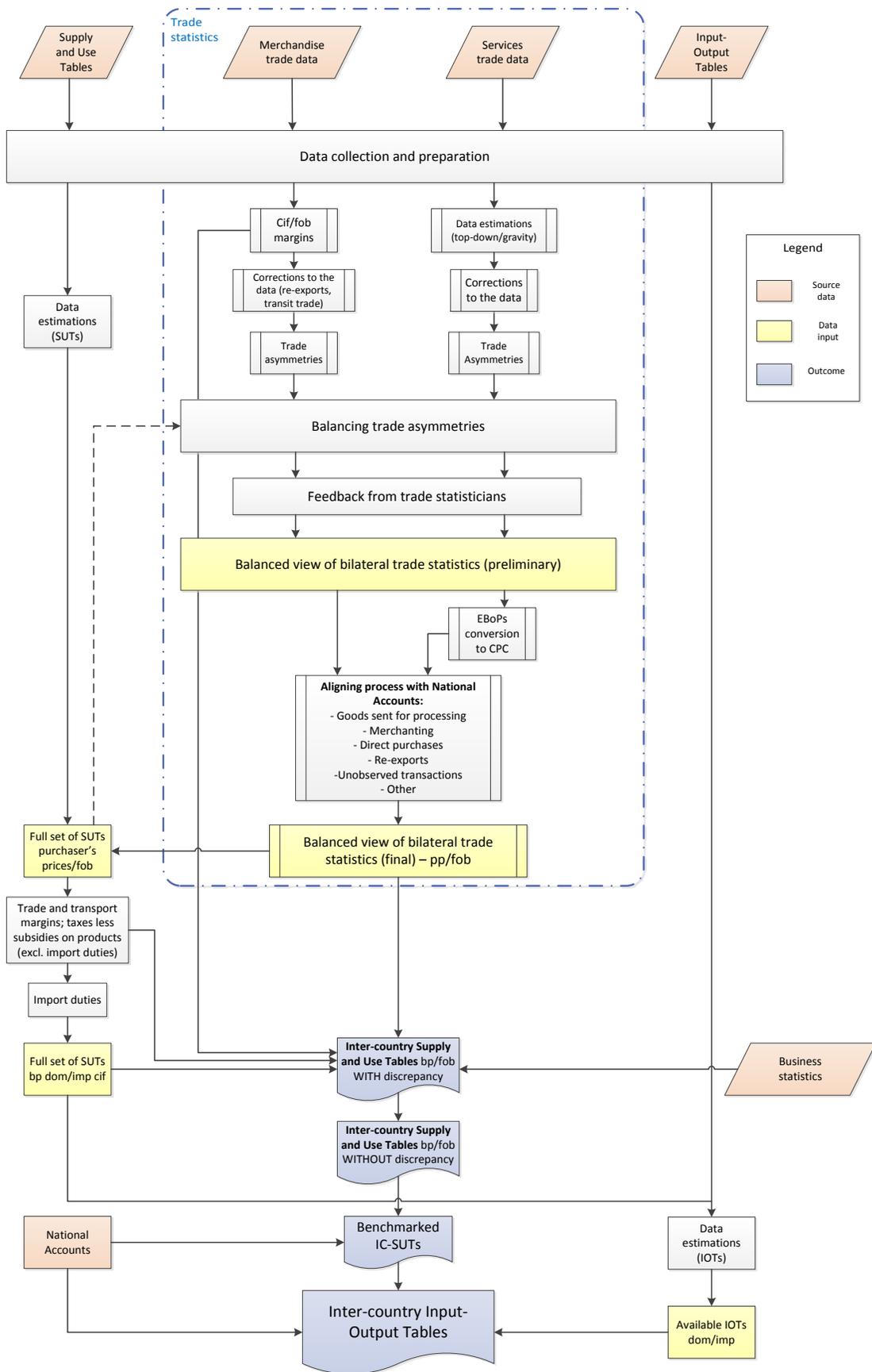
information on countries of origin and destination of goods and services for intermediate and final uses separately would really make a difference in the construction of multi-partner GVC extended accounts for a specific industry.

### c. Building blocks of Inter-country Supply, Use and Input-Output Tables and their interaction

127. The construction of inter-country SUIOTs involves different building blocks that are shown in Figure II.1. The full process pivots around four main building blocks of (official) source data (in orange boxes): National Accounts (as benchmark), a national Supply and Use and Input Output framework, international merchandise (goods) and services trade data and business statistics. All of them are used to construct the three main data inputs (in yellow boxes) feeding the construction process of inter-country SUIOTs, i.e. a balanced view of bilateral trade (for goods and services), a full set of national Supply and Use tables and a full set of national Input-Output tables. The desired output data is shown in blue boxes.

128. By definition, inter-country SUIOTs are valued at basic prices, including both exports and imports. The importance of basic prices relies on the fact that, unlike purchaser's prices, basic prices do not include trade and transport margins (TTM) and taxes less subsidies (TLS) on products. All these features would distort the input structures of the inter-country Use table in such a way that any kind of further input-output analysis in terms of GVC would not be possible.

**Figure 13.1** Building blocks for the construction of inter-country SUIOTs



he

129. Use tables are generally shown in purchaser's price, which means the price users pay for goods and services for final use or intermediate inputs (including TTM and TLS). This is consistent with the way information is collected, i.e. mostly through surveys to producer firms and consumers. With the appropriate reallocation of trade and transport margins from the goods to the corresponding trade and transport sectors and the reallocation of the associated taxes less subsidies on products into a separate row, Use tables can also be shown in basic prices. As in merchandise trade statistics, exports are shown in FOB prices (free on board), including all domestic trade and transport margins from the factory to the border, also including any domestic related tax or subsidy on the products sold. Imports are shown in CIF values in the Supply table at basic prices as part of the adjustments from basic to purchaser's prices, thus including international trade margins and freight and insurance costs of international transportation.

130. At national level, it is therefore crucial to have a set of Supply and Use tables both at purchaser's prices and at basic prices for the construction of inter-country SUIOTs. Ideally, fully-fledged matrices of trade and transport margins as well as taxes less subsidies on products (with import duties separated) would be desirable.

131. Regarding national Input-Output tables, they are not strictly necessary for the construction of inter-country IOTs provided the existence of inter-country SUTs. That is, for instance, the experience of the OECD, which produces industry by industry global ICIO tables on the basis of their previously estimated inter-country SUTs. Standard models described in the Eurostat's Manual on Supply, Use and Input-Output Tables (Eurostat, 2008) such as the product technology assumption (model A) and the industry technology assumption (model B) can serve to produce on a piecemeal basis (country-wise) a product by product inter-country IOTs. Alternatively, fixed industry (model C) or fixed product (model D) sales structure assumptions can be used to produce industry by industry inter-country IOTs. The OECD uses model D in their construction of global ICIO tables. However, the situation can be more difficult when official national input-output tables are available and consequently, certain parts of the estimated inter-country IOTs need to be benchmarked.

132. While National Accounts and national Input-Output frameworks portray individual pictures of the national economies around the globe, a balanced view of bilateral trade brings all of them together into a consistent framework. Goods and services deserve a different treatment even when both suffer from the same problem of bilateral trade asymmetries, i.e. whenever the export values reported by one country does not match the value (mirror exports) reported by its counterpart. The same applies for imports. Besides, in some cases, the information is unobserved, unallocated or confidential, which may imply additional estimations in order to have a complete dataset.

133. For merchandise trade statistics, exports are valued in FOB<sup>12</sup> and imports are valued in CIF<sup>13</sup>. Consequently, one of the main reasons for a trade asymmetry in goods is just the different valuation, which should be somehow corrected before starting to find solutions for the asymmetries. The OECD has recently published a dataset with CIF-FOB valuation adjustments<sup>14</sup>, which can be very helpful for this purpose.

134. Inter-country SUTs require the identification of the country of origin and destination when dealing with bilateral trade. Particularly in the case of re-exports, for instance, the re-exporter country is not the country of origin or, in other words, the country that produced the re-exported goods. Hence, some adjustments should be made in merchandise trade data so that to reflect appropriately the geographical allocation of exports and imports to the producer country. For the European Union, quasi-transit trade have to be also addressed with the same purpose. Only once all these adjustments have been made, the treatment of bilateral trade asymmetries should be carried out.

---

<sup>12</sup> Free on board; the buyer has to bear all costs and risks of loss or of damage to the goods from the border (e.g. port of shipment).

<sup>13</sup> Cost, insurance and freight; the seller must pay the costs, insurance and freight necessary to bring the goods to destination (e.g. port of destination).

<sup>14</sup> [https://stats.oecd.org/Index.aspx?DataSetCode=MEI\\_TRD](https://stats.oecd.org/Index.aspx?DataSetCode=MEI_TRD)

135. The number and size of bilateral trade asymmetries can be huge and overwhelming. So, the best strategy would be to address manually the largest differences and try to find a consensus on a single figure. All remaining differences can be further reconciled based on a symmetry index (or reliability index) used to compute a weighted average of the two reported values available for each bilateral trade flow. The weights are based on the proportion of each country's total trade that approximately match the other partner's reported trade. This process follows the same philosophy as the OECD reconciliation methodology (Fortanier and Sarrazin, 2016).

136. Regarding international services trade data, there are various reasons why the availability and quality of services trade data are unsatisfactory, certainly when compared to merchandise trade statistics. Unlike goods which can be seen and physically measured and observed as they cross borders, services transactions can be delivered via a variety of modes (Rueda-Cantucho et al, 2016) and typically only the financial flows are observable, although not free from difficulty in trying to single out the corresponding services delivered (Fortanier et al, 2016). Hence, a variety of different data sources and estimation techniques are necessarily used in practice, and these can be sometimes different by country. Data confidentiality and the different classification of services (EBOPS vs. CPA/CPC) can complicate the scheme, too. Once a complete (although unbalanced) dataset of bilateral trade flows of services data is achieved, the same balancing approach and principle (symmetry index) set out in Fortanier and Sarrazin (2016) is recommended to be applied to estimate a single value for each bilateral trade flow. Manual adjustments are recommended as well for the largest asymmetries provided sufficient time and resources.

137. It is also recommendable to check the quality of the results obtained from the balanced view of trade with national or international trade statisticians, wherever possible, both for goods and services trade. Ideally, a feedback loop could be established in order to derive a first preliminary balanced dataset.

138. According to Ahmad (2017), there are still two sources of differences between the balanced view of bilateral trade in goods and services and the comparable view of imports and exports shown in National Accounts (and national SUTs): an unallocated component, reflecting the outcome of the balancing process (that can be allocated on a proportional basis if needed for analytical purposes); and the adjustments needed to align the concepts underlying the balanced bilateral trade estimates with the concepts and coverage of the SNA. Regarding concepts, differences include the treatment of goods sent abroad for processing and merchanting activities; and differences in coverage, include imputations of unobserved trade (e.g. smuggling, low level trade below a certain threshold used by Customs officials), re-exports and purchases by non-residents in the recording economy.

139. Once all these adjustments are made (see more details in the next section), the adjusted balanced view of bilateral trade (in FOB values and at purchaser's prices) has to be firstly confronted<sup>15</sup> and benchmarked against the export values of the national Use table at purchaser's prices (also in FOB values) allowing for a discrepancy item in those cases where the full match is not possible (this should be normally the case).

140. Secondly, a set of national SUTs at basic prices with a distinction between domestic and import uses is required. Domestic Use tables would be placed along the main diagonal of the inter-country Use table.

141. National import flow matrices are valued CIF<sup>16</sup> so they should be converted to FOB<sup>17</sup> values in order to use the previous adjusted and benchmarked balanced view of trade. For instance, the CIF-FOB valuation adjustments database developed by the OECD can be used for this purpose. As a result, the derived national import flows do not necessarily have to match those of the balanced international trade import figures, although these discrepancies could be reduced (but not eliminated completely) through transparent and replicable conversion matrices where the main idea is to allocate differences across products in a way that preserves each country's recorded imports by industry and the geographical allocation of the balanced view of trade.

---

<sup>15</sup> Sometimes, this confrontation may lead back to revise the solutions given to the trade asymmetries.

<sup>16</sup> But in basic prices of the importing country

<sup>17</sup> But still including domestic margins and TLS of the exporting country from the factory to the border

142. Export values would still need to be converted from FOB to basic prices by reallocating distribution margins and taxes less subsidies on products (excluding import duties) in the exporting countries.

143. The ultimate result of the full process is therefore an inter-country SUT valued at basic prices that can be converted to inter-country IOTs using standard methods already commented and described in Eurostat (2008).

144. The final inter-country SUIOTs may contain a column (and a row) of discrepancies, as a result of the decision to fully constrain the system to the officially published GDP of each country, and the fact that the sum of global exports included in these GDP numbers is larger than the sum of global imports (i.e., there are 'exports to the moon'). Depending on (regional) needs and preferences, this discrepancy column can either remain as such, and even be used as an indicator to identify areas where further work to reconcile national and bilateral statistics is necessary, or can be eliminated by a final, simple balancing procedure (e.g. GRAS). This discrepancy may also include vintage problems between the official SUTs figures and revised figures of GDP and other macroeconomic variables that did not lead to the corresponding changes in the SUTs<sup>18</sup>. Therefore, an additional benchmark to the latest figures of National Accounts might be needed at the very end of the process. Again, this can be implemented by a final simple balancing procedure.

---

<sup>18</sup> One should note that revision practices are not harmonised among countries when it comes to align the latest GDP figures and the latest available SUIOTs. Therefore a decision shall be taken in building up inter-country SUIOTs.