OECD EXPERT GROUP ON EXTENDED SUPPLY-USE TABLES

TERMS OF REFERENCE

1. Overview

1. The increasing international fragmentation of production that has occurred in recent decades driven by technological progress, cost, access to resources and markets, trade policy reforms, and indeed emerging economies, has challenged our conventional wisdom on how we look at and interpret trade. Traditional measures of trade, record gross flows of goods and services each and every time they cross borders leading to what many describe as a 'multiple' counting of trade, which may lead to misguided policy measures in a wide range of policy areas.

2. To respond to this challenge on 15 March 2012 the OECD and WTO undertook to collaborate on the development of estimates of trade in value-added (TiVA), **via the construction of a global input-output table,** resulting in a first release of a preliminary database on 16 January 2013 and a subsequent update in May 2013.

3. From the very beginning one of the key objectives of the TiVA initiative has been to raise awareness of the importance of new statistics that are better able to reflect the increasingly global nature of production, driven by Global Value Chains (GVCs). But a second, and equally important, objective has been to mainstream the production of TiVA indicators, **and the underlying Input-Output tables**, from which they are derived, into the global statistical information system and, in turn, to reinforce the significance attached to improving national capacities to develop core national inputs.

4. Significant progress has been made on these fronts since the launch of the database. TiVA has entered the mainstream of the policy debate on GVCS and international and national organisations are investing resources through collaborative networks to create the underlying statistical infrastructure, in particular via the creation of improved national and international supply-use and input-output tables.

5. But further improvements can be made (and are being made) in a number of areas and exploring the feasibility of implementing these improvements is the key objective of the Expert Group on Extended Supply-Use Tables, who will be expected to deliver a series of recommendations at the end of its mandate.

2. Background

6. The use of Input Output tables to provide evidence on Global Value Chains (GVCs), and Globalisation more generally, is now widespread. But globalisation is rapidly changing long-standing assumptions about the relative homogeneity of the production functions (Input-Output technical coefficients) of units classified to a given industrial activity, which is, implicitly, an underlying assumption used in creating Input-Output based indicators. Such assumptions have, of course, always been challenging when considering small and large firms, where economies of scale have always been understood to play a role. But the increasing prevalence of new types of firms such as *Factoryless Producers* and *Processers*, and the

increasing tendency for horizontal, as opposed to vertical, specialisation, particularly for multinational affiliates, has fundamentally challenged these assumptions.

7. The ability of national (and international) Supply-Use and Input-Output tables, based on industrial groupings alone, to describe how demand and supply relationships are related has therefore become more difficult and, because the evidence suggests that firms more greatly integrated into GVCs have higher import content and, often, higher productivity, the use of conventional input-output tables can over-estimate the domestic value-added (and jobs) content of exports – key indicators used in determining benefits from integration into GVCs (see Figures 11 to 18 of Annex 1).

8. Typically, in confronting the problem of heterogeneity, the conventional approach has been to provide more detail by aggregating firms at lower levels of the industrial classification system, for example 3 or 4 digit groupings as opposed to two digit groupings. But this approach may not be optimal, neither in terms of reducing heterogeneity within aggregations (and in a way that best responds to the policy drivers) nor necessarily optimal in terms of processing burdens.

9. The key challenge for the Expert Group therefore is to investigate whether different aggregations of firms may produce **better results** that:

- Minimise heterogeneity within given confidentiality constraints;
- Do not impose significant processing and compilation burdens on statistics institutes;
- Do not require new data collections, or, at the very least, minimise any impact of new data collections on respondents (by taking a holistic view of statistical information gathering).

10. These are not the only constraints or factors that need to be considered however. It is important to take care not to throw the baby out with the bathwater. By this, it is recognised that some features of the conventional 'industrial classification' approach must necessarily be retained. It would serve little purpose for example to devise an optimal system that did not retain some means of classifying firms on the basis of their activity, (e.g. manufacturing versus services) if only because these remain the key prisms that users look through when analysing production.

11. But, as shown below, heterogeneity is not the only issue that can be tackled through an extension to conventional supply-use tables. Two particularly relevant policy drivers are key in this regard. The first concerns the role of foreign affiliates (providing scope to address spill-over effects from foreign direct investment, and also extensions that move us from a value-added to an income view of the world). The second concerns the growing demand to provide more evidence on the role and integration of SMEs within GVCs, notably via indirect channels, and in particular via links through foreign owned resident firms).

12. It's important to keep these policy drivers in mind as their relative importance will help to shape any ultimate recommendation. For example if the ultimate objective is to provide an accounting framework that best reflects the role of SMEs, it is clear that a breakdown by size class will be essential. If on the other hand the ultimate goal is to provide an accounting framework that responds to the investment agenda, then a breakdown by ownership will be essential. Both approaches will of course, by default, lead to improvements in the quality of TiVA estimates, since more detailed breakdowns will always result in better quality estimates, but it should be clear that the respective breakdowns may not necessarily be optimal, given constraints on resources and from confidentiality, with respect to capturing heterogeneity per se.

13. As such, it is more appropriate to describe the key challenge of the Expert Group as follows: to investigate whether different aggregations of firms may produce **better results** that:

- **Minimise heterogeneity within given confidentiality constraints and *in line with policy needs***;

14. Equally, as noted above, a pre-requisite of the Task Force is that the recommendations should not envisage additional data collections beyond those standard collections already managed by National Statistics Institutions and Central Banks.

3. Overview of available data sets to capture heterogeneity

15. A key goal of the Expert Group should be to explore how existing datasets could be incorporated into the standard procedures (statistical information systems) used to create national Supply-Use tables. Three standard datasets collected by many statistics institutes come to mind:

- Structural Business Statistics broken down by Size Class
- Trade by Enterprise Characteristics
- Foreign Affiliate Statistics (FATS)

Structural Business Statistics by size class

16. SBS data (which typically provide information on value-added, employment and production amongst other variables, by detailed industry and standardised size class) already serve as a key input into the creation of national Supply-Use tables. One possible way of exploring issues pertaining to heterogeneity is by breaking down current industry classifications of national supply-use tables into breakdowns that also include a size-class dimension. This recognises the evidence that, typically, the larger the firm the higher the productivity, and also, typically, the larger their direct engagement in global value chains (both in terms of the share of output that is exported and the share of intermediate consumption that is imported, directly and via wholesale intermediaries). It also provides a mechanism to create a new suite of policy relevant indicators/statistics that respond to growing questions concerning the integration of SMEs within GVCs, and, so, a mechanism to identify where (within industries and countries) impediments to integration may exist.

17. There are two distinct, but not insurmountable, challenges inherent in producing breakdowns by size-classes in SU tables:

- **Limited information on sales between size classes**: Although it should be relatively easy to create information for the columns of Use tables broken down by size class, very few countries have access to detailed administrative data that are able to reflect who-to-whom transactions broken down by size class, meaning that transactions in the rows of the Use matrix will necessarily have to be derived via assumptions, anecdotal information, or other non-conventional administrative sources. In some countries however detailed information, collected for tax purposes, does reveal inter-company transactions, which provides a possible source.

- **Limited information on trade by size class**: Crucially, and central to the development of national Supply-Use tables that can (a) be integrated into a global Supply-Use table and (b) provide meaningful information on the true extent of globalisation (and GVCs in particular), SBS data need to also reflect the share of output that is exported and the share of intermediate consumption that is imported by size class. Typically this information does not form part of the standard SBS data collection. However, as shown below, via links to Customs Registers it should be possible to (at least partially) develop estimates (using for example TEC data).

Trade by Enterprise Characteristics (TEC)

18. Data derived through the linking of trade and statistical business registers are increasingly being developed by countries. The following data are typically available by size class and industry:

- Number of Exporting and of Importing Firms, Export values of Exporting firms, Direct Imports by product, Direct Imports by Exporting Firms.

- More recently, a number of countries within the OECD-Eurostat TEC data collection exercise have also begun to collect information breaking flows down by ownership (foreign/domestic) too.

19. Such data provide the building blocks for creating new aggregations of firms within supply-use tables broken down into:

- Firms that have no direct imports and no exports,

- Firms that have no direct imports and export,

- Firms that have direct imports and export,

- Firms that have direct imports and do not export.

20. Regarding heterogeneity of production functions with respect to measuring facets of globalisation, it is clear that such groupings could significantly improve the quality of estimates as they broadly define firm aggregates on the basis of one of the key target indicators of globalisation: *import content of exports*.

21. Linking this information to supply-use tables however also requires links to SBS data in order to have estimates of value-added, production, and intermediate consumption (by product) of the 4 groups of firms listed above.

22. Integrating TEC data with SBS provides a sound basis for the construction of columns within SU tables but a larger challenge concerns the construction of the rows in the Use table. Without very detailed administrative data that shows who-to-whom transactions the only possible way that these rows can be constructed (showing for example intermediate purchases by firms that do not export from firms that do) will be to use assumptions. In cases where exporting firms export most of their output however the impact of these assumptions will be reduced.

23. The biggest challenge however is that TEC provides information only on direct imports and direct exports (as opposed to exports (imports) sold (purchased) via resident intermediaries), while what is needed is the value of exports, and imports used in production.

24. The main issue in this context will be to identify exports (imports) sold (purchased) through intermediaries (wholesalers). This forms one of the key challenges for TEC data. For firms that export through affiliated wholesalers (exporters) it should, in theory, be possible, through profiling, to link the exports back to the producing firm. Where the exports are channelled through unaffiliated intermediaries the challenges are greater, although it may be possible to create estimates using assumptions based on more detailed information on the ISIC classification of industries linked to HS export categories, although this may prove particularly burdensome. For imports, again profiling offers one possible solution for transactions between affiliated firms but for transactions that pass through unaffiliated intermediaries the challenges are clearly larger, and it seems likely that only assumptions (based on more detailed underlying data) will provide a solvable route. Note however that this issue of imports provided by intermediate

domestic distributors is also a challenge in constructing conventional supply-use tables and so in theory it should be possible to estimate the import flows by these new categories of firms. A second order challenge is the identification of imported inputs that are not used in the current year (and instead allocated to inventories) but this is also a challenge with conventional SUTs.

Activities of Multi-National Enterprises/Foreign Affiliate Trade Statistics

25. Foreign Affiliate Statistics also provide a rich source of data that can be used to improve the homogeneity of firm aggregations used in Supply-Use tables. For a given country, Inward FATS data typically collects the following variables by industry grouping and investing country:

- *Turnover, Production, Vale-added, Number of firms, Compensation of employees, Number of employees, Total imports (direct),* and *Total exports (direct)*

26. That being said the availability of data by country varies significantly. Those countries that are typically able to provide many or most of the variables usually have relatively well integrated FATS and SBS data sets, indeed often the FATS data is drawn from SBS data collections.

27. Outward FATS also provide a rich source of information which may prove useful in the future as the work of the Extended Expert Group develops (for example it can be used to provide mirror estimates for other countries) but at this stage, especially given the relatively limited data collection in most countries, it is not envisaged for inclusion in the Task Force's work. However one important, and related, identification variable is worth exploring in this context, namely *domestically owned firms with foreign presence* (in other words domestically owned multinationals, referred to hereafter as *domestic MNE*), as work undertaken in a number of countries through data-linking exercises illustrates that this category of firms often has quite different production functions (and import and export intensities) to domestically owned firms with no foreign presence (referred to hereafter as *domestic other*).

4. Objective and Guiding Principles

Industry Classification

28. Drawing on the above, and available date sources, the challenge is to identify feasible aggregations of firms within supply-use tables that have a greater degree of homogeneity and better respond to the globalisation agenda. A secondary factor that needs to be kept in mind is the ability to create recommendations and standard aggregations that are broadly replicable across countries and lend themselves to being integrated at the global level within a Global Supply-Use table.

29. At present the OECD collects information from countries that target the industrial classification breakdown shown in Table 1 below (used in the TiVA database, although this will move to ISIC Rev 4 in the near future). This (or comparable ISIC Rev 4 or other equivalents) should be considered as the **minimum industry target breakdown** used for the investigation of the Task Force, although, clearly, higher dis-aggregations are welcome.

Table 1: Industry Breakdown for International Input-Output (and Supply-Use) – 2014 Requirements (TiVA)

IO Industries	ISIC Rev.3	Industry
1	01t05	Agriculture, hunting, forestry and fishing
2	10t14	Mining and quarrying
3	15t16	Food products, beverages and tobacco
4	17t19	Textiles, textile products, leather and footwear
5	20	Wood and products of wood and cork
6	21t22	Pulp, paper, paper products, printing and publishing
7	23	Coke, refined petroleum products and nuclear fuel
8	24	Chemicals and chemical products
9	25	Rubber and plastics products
10	26	Other non-metallic mineral products
11	27	Basic metals
12	28	Fabricated metal products except machinery and equipment
13	29	Machinery and equipment n.e.c
14	30,32,33	Computer, electronic and optical products
15	31	Electrical machinery and apparatus n.e.c
16	34	Motor vehicles, trailers and semi-trailers
17	35	Other transport equipment
18	36t37	Manufacturing n.e.c; recycling
19	40t41	Electricity, gas and water supply
20	45	Construction
21	50t52	Wholesale and retail trade; repairs
22	55	Hotels and restaurants
23	60t63	Transport and storage
24	64	Post and telecommunications
25	65t67	Finance and insurance
26	70	Real estate activities
27	71	Renting of machinery and equipment
28	72	Computer and related activities
29	73, 74	Other Business Activities (incl. R&D)
30	75	Public admin. and defence; compulsory social security
31	80	Education
32	85	Health and social work
33	90t93	Other community, social and personal services
34	95	Private households with employed persons

30. That being said, all countries will face challenges presented by confidentiality restrictions and, so, the higher the industrial breakdown provided, the lower the potential for additional publishable

information on size-class, import/export intensity, and ownership. **Preference therefore should be given to producing an industrial breakdown that maximises the ability to provide the supplementary breakdowns desired and shown in more detail below.**

31. At the same time it is clear that some prioritisation of additional breakdowns is needed. Producing, for example, breakdowns of each industrial grouping (even at the relatively aggregated level used in the TiVA database) will inevitably create confidentiality problems if the breakdowns require full combinations of the possible breakdowns suggested above, for example ownership, broken down by export intensity, broken down by import intensity, broken down by size class, would require splits into 36 additional categories even if the information required was restricted to the following defining characteristics:

Table 2: ' Ideal' breakdown of columns and rows in SU tables

Foreign Owned												**Domestically owned MNE**												**Domestic Owned**											
With high Export orientation 'Exporters'						**With low Export orientation 'Non-Exporters'**						**With high Export orientation 'Exporters'**						**With low Export orientation 'Non-Exporters'**						**With high Export orientation 'Exporters'**						**With low Export orientation 'Non-Exporters'**					
Low import orientation			**High import orientation**			**Low import orientation**			**High import orientation**			**Low import orientation**			**High import orientation**			**Low import orientation**			**High import orientation**			**Low import orientation**			**High import orientation**			**Low import orientation**			**High import orientation**		
S	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**

32. **Producing this level of detail will clearly not be possible for most, perhaps all, countries** and indeed would not necessarily be optimal as many of the categories, particularly those concerning foreign owned firms, would have no entries if broken down at every level. Very few foreign owned firms for example are small with no exports or imports. Moreover **it is clear that some redundancies, depending on the country, may be exploitable**. For example, often, foreign owned enterprises have high export intensities and are typically large, so for some countries (and industries) it may be sufficient to merely have a split of an industrial activity into the three categories of ownership foreign, domestic MNE, and domestic other, for example.

Defining Exporters/Non-Exporters and Importers/Non-Importers

33. Some explanatory information is required concerning the allocation of firms into exporting and importing categories. An allocation of firms for example to firms that export and those that do not will not necessarily be optimal in terms of GVC analytical indicators. Many exporting firms for example may export relatively little of their output, and these firms may have very different production functions from those firms with high export intensities. As such the categories above have, by design, some degree of flexibility built in that allows countries to determine what should and should not be considered as 'high export orientation' and 'low export orientation'. Indeed it may be preferable to introduce thresholds, at the national level, that better optimise homogeneity. And, importantly, these thresholds need not be the same across countries. The same also holds for imports.

34. That being said, the simplest approach, certainly with respect to data availability (for example through linking trade and business registers or where information is directly available in structural business statistics), would be to define 'Exporters' as those firms with some export and 'Non-exporters' as those

with no exports and ‘Importers’ as those firms with some direct imports and 'Non-importers' as those with no direct imports.

35. For the exporting category, in most countries the evidence suggests that such a distinction could produce good results as relatively small proportions of firms are directly engaged in exports. However, this may not be the case for all countries and all activities, and, so, introducing a threshold to remove small firms with low export intensities may be desirable. **But, for the purposes of the work of the Expert Group, such a threshold should be decided on a country by country basis,**

36. One other important challenge in this regard concerns the mechanisms used to identify whether firms export (import) or not. Data sources such as TEC and FATS provide estimates of exports (imports) by firms that are direct – in other words the firm itself is responsible for the cross border transaction. But some exports and imports considered as ‘direct’ in a supply-use framework will not be recorded within this standard data collections. Firms may for example choose to export (import) via an independent or affiliated distributor. As such focusing only on the direct transactions observable in TEC and FATS data will lead to underestimates of the true export (import) intensities of the firms.

37. Allocating exports (imports), that pass through affiliated distributors, to the producing (using) firm is possible through profiling and therefore consolidating the exports (imports) of the affiliated distribution unit to those of the producing (using) affiliate. However identifying these transactions when they pass through unaffiliated distributors will be more problematic and will require the development of assumptions. **The EG will be expected to develop ' best-practice' in this area**

Basic Structure of the Supply-Use tables

38. All tables should follow the accounting standards recommended in the 2008 SNA or 1993 SNA.

39. Supply-Use tables should reflect all transactions, between producers and consumers, within the Intermediate and Final Use tables at **Basic Prices**. Taxes and Subsidies on products that form part of the purchaser's price of any transaction should be shown as a separate row within the Supply-Use table.

40. Transactions in the Supply (Make) table should also be recorded at Basic Prices.

41. 2008 SNA and 1993 SNA recommendations on supply-use tables recommend that the column of imports by product shown in the Supply table reflect C.I.F. prices at the product level and F.O.B prices for total imports, with the difference reflected as a separate C.I.F/F.O.B adjustment item (row) or allocated separately to services transactions.

42. International Supply-Use tables however require a different presentation as a balanced system requires that imports and exports are valued at the same price basis, in order to have symmetrical flows of imports and exports. As such import transactions (for goods) by product should be shown at F.O.B. equivalent prices, with the C.I.F components allocated to the appropriate service products. If the C.I.F/F.O.B. adjustment in the supply-use tables are shown as a separate row and not allocated to services, the adjustment should also be allocated to specific services products, ensuring that no negatives remain in the import column.

43. Note that the tables assume the basic price concept for all transactions. If countries prefer to provide tables using a purchasers’ price format this is also acceptable as long as a corresponding column to adjust for margins (with as detailed a split as possible on the industry providing the margin) is also provided in the Supply Table. In addition a supplementary table should be provided showing the value of margins, following the structure of the Use table shown below.

44. Some sectors in some countries, notably agriculture, may contain significant adjustments for the non-observed economy such as subsistence farming. The inability to separately identify such adjustments in Supply-Use tables may skew the results of Input-Output tables generated from them, particularly when analysing areas such as jobs content. Similar complications may also arise when considering other items, such as own-account production of software or R&D. As such countries are encouraged to include an 'of which' item that reflects the size of these adjustments. It is recognised in advance that these items will be difficult to estimate, not least because they are often treated as confidential items, and so their provision should only be considered as being desirable, if possible.

45. Strongly encouraged is the provision of separate estimates **for re-exports**. This should be interpreted in its broadest sense as any imports recorded in the import trade statistics (column of the supply table) that are subsequently exported (re-exports) without any further transformation.

46. In addition countries are asked to provide separate estimates of **non-residents expenditures in the domestic economy** and **resident expenditure abroad**, as these export and import transactions do not cross-borders and so it would be preferable to treats these items separately for the purposes of GVC analysis (as well as for tourism policy making).

Statistical Unit for firms

47. The SNA's preferred unit for compiling industrial statistics is the establishment. But at the same time in the SNA research agenda there is a recognition that this preference may need to be reviewed to take into account the increasing international fragmentation of production that has led to profound changes in classic production function relationships. Further, changes introduced in the 2008 SNA, notably concerning changes in ownership, have moved us closer to a financial perspective, which introduces increased heterogeneity in the production functions of firms allocated to a given industrial sector. This increases the challenges when creating robust indicators that capture global production.

48. Furthermore, many important characteristics that determine the level of firms' engagement in global value chains, such as do you import and/or export, are often not readily measurable at the establishment level, as such information does not appear to be a key variable in many SBS surveys. But, as noted above, via links at the enterprise level between business and trade registers, such information is potentially obtainable.

49. This is also true when thinking about breakdowns of industries into foreign and domestically categories, where information is, again, typically only available at the enterprise level.

50. It's important however that the EG keeps an open mind on this going forward. A change in the statistical unit is not a precondition for moving forward. Many countries, for example, do not compile their SU tables on the basis of the establishment and in those that do additional information may be available that allows the establishment to be retained whilst still capturing information on import and export intensities. What countries are able to do necessarily reflects the underlying statistical information systems and the Task Force should explore all solutions that may be country specific but still replicable - for example, in some countries, it may be preferable to focus on 'legal' units.

Rows vs Columns in an Extended SUT

51. Perhaps the most difficult challenge that will be faced by the Expert Group will be estimating transactions across the rows of the new category of firms. While the surveys that support conventional SUTs are far from perfect they provide a sound basis for the estimation of intermediate consumption by firms, as firms are generally able to provide information on the type of product they use in production **but**

they are typically less able to say (in most countries) from which type of firm they purchased their intermediate inputs. Certainly it is fair to say that firms themselves would not be able to say if they purchased their inputs from an exporting or non-exporting firm for example. Estimating these transactions, or rather, developing robust, replicable, techniques for estimating these flows will form one of the key challenges of the Expert Group.

52. **Recognising these challenges,** and the difficulties that some countries may encounter**, the work of the EG will be to develop SU tables in two stages.**

- **The first stage will be to break down the columns** using one (or variant of) the firm category options shown in Section 6, with the values of exports shown as an 'of-which' item for each category of firm, broken down by detailed product.
- **The second stage will be to estimate the row transactions,** breaking down conventional SU rows into the same firm category options used to break down the SU columns.

53. Countries able to develop a full row and column breakdown are however strongly encouraged to do so as one process and not necessarily as a two stage approach.

Estimating Intermediate Imports by category of firm

54. Creating the supporting import flow matrices for Extended SUTs is one of the most critical objectives of the work of the EG. However difficult as this may be, the task is to some extent simpler than estimating domestic transactions, as, irrespective of the breakdown of columns, **it will not be necessary to create an additional breakdown of rows in the import flow matrices beyond those produced for conventional SU tables**. In theory this should therefore be a relatively simple exercise as countries already derive the row and should, at least in principle, be able to split these flows by category of purchasing firm. However, this may not always be the case, particularly for those countries where cruder approaches (e.g. the proportionality assumption) are used to estimate import flow matrices. As such the following provides some pointers that may be useful.

55. Estimates of imports purchased *directly* by firms are available from both standard FATS collections and when links are made between trade and business registers. However information on purchases of intermediate imports through domestic intermediaries (distributors) is typically not collected via these mechanisms. Where the distributor and the purchasing firm are affiliated, profiling can be used to estimate at least part of these '*indirect*' imports. But estimating the additional '*indirect'* imports will necessarily have to be made using assumptions.

56. It is however difficult to be too prescriptive on how intermediate imports should be estimated, as this will vary greatly by country depending on the information set available. As such, **the approach used for estimating 'indirect' intermediate imports purchased directly through intermediaries will be left to the discretion of countries**. Some care will be needed in estimating these flows however to avoid introducing biases in the Supply-Use tables. **Two extreme approaches should be conducted with care**:

- If ' indirect' intermediate imports in a particular product group are significant compared to directly purchased intermediate imports, allocating all 'indirect' intermediate imports to those firms not recording direct imports should be avoided as this may introduce downward biases of the import content of exporting firms.

- If ' indirect' intermediate imports in a particular product group are significant compared to directly purchased intermediate imports, allocating 'indirect' intermediate imports such that the total import to intermediate consumption ratios of all categories of firms in a given industry are equal should

also be avoided as this may provide results that the import content of exporting and non-exporting firms is broadly similar.

57. By way of additional pointers countries are strongly encouraged to develop import-use matrices ensuring at least broad consistency with end-use category estimates that can be derived using detailed trade data.

58. A **key objective of the Task Force will be to identify ' best-practice' in this area.**

Confidentiality

59. In some cases, especially depending on the degree of breakdowns, countries provide, confidentiality restrictions may result in suppressions of data. Where this occurs efforts should be made to create groupings of firms that allow the firm categories to be provided in those cases where the evidence points to significant differences in value-added to output and import to intermediate consumption ratios. This could be done be reallocating some of the firms in one category to another in such a way that the heterogeneity of the different groups is retained, where it exists. If no such heterogeneity is observed, there will be no need to create a separate split but, for these industries the Expert Group is nonetheless encouraged to flag those industries where a split has not been made available because of confidentiality issues and those that have not been made because heterogeneity is not observed.

60. Keeping in mind the core objective to improve our understanding of GVCs, and in particular estimates of the import content of exports, a number of rules of thumb could be operationalised to reduce the breakdowns used without having a significant impact on core estimated indicators.

Rules of thumb for identifying whether splits of industries are necessary

61. **As a general rule of thumb countries should endeavour to provide a breakdown for all industries** *however some simplifying rules could be adopted to minimise processing burdens.*

62. A split of an industry grouping may be omitted:

- If exports by the entire industry are greater than 80% of output, or

- If the import to output **and** value-added to output ratio of each category of firm grouping is not significantly different: if the ratio of the import to output ratio of the firm grouping with the lowest ratio is greater than 75% of the import to output ratio of the firm grouping with the highest ratio **and** where the ratio of the value-added to output ratio of the firm grouping with the lowest ratio is greater than 75% of the value-added to output ratio of the firm grouping with the highest ratio.

63. An ownership breakdown for a given industry may be omitted:

- If foreign ownership reflects more than 80% of total output

64. A size class breakdown may be omitted:

- If one size class is responsible for more than 80% of output and a similar share of exports and imports.

5. Extensions to the Supply-Use Tables

65. The creation of the Expert Group provides an opportunity to consider extensions that could assist policy discussions in different fora.

Better understanding the benefits of Investment (and tackling issues raised by transfers in Intellectual Property and Base Erosion Profit Shifting - BEPS)

66. While the development of TiVA estimates through the construction of 'conventional' international supply-use and input-output tables have been able to shed important light on our understanding of international trade and its relation to activity and competitiveness, in particular the importance of recognising the importance of imports to exports, and, so, the hitherto hidden costs of protectionism as well as the benefits of trade liberalisation, particularly in services, they do not reveal the full picture.

67. With significant shares of exports being driven by foreign affiliates, TiVA estimates have also revealed the importance of going beyond just value-added towards income, in order to capture flows outside of conventional international trade statistics, such as the repatriation of profits related to the use of non-produced knowledge based assets (e.g. brands) and, indeed, the repatriation of profits related to the use of produced knowledge based assets (e.g. software) that are (often incorrectly) not recorded as receipts from exports of services. The creation of the Expert Group, and the exploration of the use of breakdowns of industries into foreign/domestic categories to tackle the issue of heterogeneity, provides an opportunity to also consider whether additional extensions could help tackle these issues.

68. Typically information on property income payments to/from abroad collected as part of the Balance of Payments and SNS sector accounts are only available at the SNA institutional sector. However through the integration of firm level data, which is a central theme of much of what is described above, it is 'potentially' possible to consider compiling additional information that records these income items on an industry basis.

69. At the same time there has been considerable policy attention on BEPS in recent years but very little information is systematically produced as official statistics that provide insights into the phenomena. One important statistic that is typically lacking is *taxes on income paid by firms*.

70. Notwithstanding the fact that *operating surplus* should only be seen as a proxy for taxable profits, including information on *taxes on income* within a supply-use framework could provide these important insights, particularly if the information differentiates between foreign and domestically owned firms. Ideally, in this context, breakdowns of domestically owned firms could also differentiate between domestically owned firms with affiliates abroad and those without. Such a breakdown would of course increase the breakdown of industries presented below, and, so increase the complexity of the work of the Expert Group, so it is not proposed in the core tables presented below.

Jobs

71. Supply-Use tables do not typically include estimates of jobs by industry but they do usually contain breakdowns of value-added into its core components, including compensation of employees and mixed income, providing a mechanism (amongst others) to generate coherent 'TiVA-type' estimates for Jobs (or ideally hours worked). Information on jobs and hours worked data consistent with underlying compensation of employee/mixed income data therefore would not only provide an important extension to TiVA to capture employment (and also future extensions that linked skills data with employment data) but

would, in and of itself, help to accelerate improvements in the coherence of national employment and value-added based estimates, and so productivity estimates.

Additional information on Trade partners

72. Not shown in the schema below, partly reflecting the simplistic illustration and partly reflecting the potential complexities is the possibility **to investigate whether import flow matrices could be made available on the basis of major trading partners**. The same holds for the export column. Such information will significantly improve the ability of supply-use and input-output tables to describe the true nature of interdependencies.

Emissions data

73. A considerable body of work has been produced exploring environmental footprints using input-output approaches. One key measure in this context is CO2 footprints. Collecting data on emissions by industrial classification is already a challenge so producing more detailed data along the lines of the breakdowns below may prove insurmountable for many countries without considerable effort. At this stage therefore the item on CO2 emissions included below should be seen only as a marker but those countries that are able to produce estimates are strongly encouraged to do so, as this would assist also in deliberations on SEEA.

6. Illustrative Extended SUTS

74. This section provides a non-exhaustive overview of the possible variants countries could use to explore the feasibility of producing Extended SUTs. Each variant is also provided in spreadsheet form accompanying these TOR. For each variant two sets of tables are provided. The first corresponds to the information requested in Step 1 above and the second to Step 2. Note that the tables are not intended to be prescriptive; they are merely intended to act as pointers in order to provide a more concrete description of the type of information required.

Export focus – *(Export_focus.XLS)*

75. Perhaps the simplest possible breakdown that could be considered is to break down industries (aggregate firms) into exporting and non-exporting categories, where the definition of what constitutes 'exporting' and 'non-exporting' should be decided at the national level.

'Exporters'	**'Non-Exporters'**

76. This information requires only a link between business and trade registers and structural business statistics but with refinements to ensure that *'indirect'* exports passing through distribution intermediaries are also captured. Linking in this way will provide, in the first instance, estimates for firms engaged in direct exports. However, as described above, the exporter category should also include those firms that export via distributors.

77. . For Stage 1, notwithstanding the difficulties related to indirect and direct exports, this is a relatively trivial breakdown.

78. . For Stage 2, however countries will be asked to provide some guidance on how domestic transactions between categories of firms were measured or estimated.

Ownership focus – *(Ownership_focus.XLS)*

79. This approach capitalises on the availability of FATS/AMNE data and ability to link these firms to statistical business registers. Ideally, even though only an ownership dimension is pursued in this variant, it will still be useful to link data with trade registers in order to estimate the exports by each category of firm.

Foreign Owned	**Domestically owned MNE**	**Domestic Owned**

80. For Stage 1, this is a relatively trivial breakdown. For the export 'of-which' items it would be useful to separately show intra-firm exports (collected within the FATS exercise)

81. . For Stage 2, however countries will be asked to provide some guidance on how domestic transactions between categories of firms were measured or estimated.

82. . Within the import flow matrix it would be desirable to record, where possible, intra-firm imports.

Size classes– *(Size_class_focus.XLS)*

83. Especially for those countries where ownership distinctions cannot be made, but where information is available via the linking of trade registers, business registers and SBS data, or where information on exports are directly collected as part of the SBS exercise, countries could provide the following split

Small	Medium	Large

84. For Stage 1, this is a relatively trivial breakdown.

85. For Stage 2, however countries will be asked to provide some guidance on how domestic transactions between categories of firms were measured or estimated. Some stylised assumptions relating to the interactions between large and smaller firms may be achievable, for example, by assuming that the output for domestic intermediate consumption of small and medium enterprises is destined primarily for larger domestic enterprises. Countries will be asked to provide some guidance on how domestic transactions between categories of firms were measured or estimated.

Hybrid approaches – MNEs and Size

86. Countries are invited to submit their own variants as preferred, reflecting national circumstances. For example processing-non-processing firms; firms operating from trade free zones and other; factory-less producers, etc. One possible hybrid approach worth exploring by countries is to produce a size class breakdown only for those pure domestic enterprises, on the grounds that even if the MNE affiliate (or MNE parent) is small or medium the global enterprise group controlling the production process is typically large, and typically most MNEs (and affiliates) will export and import.

Foreign Owned	Domestically owned MNE	Domestic Owned (Small)	Domestic Owned (Medium)	Domestic Owned (Large)

87. For Stage 1, this is a relatively trivial breakdown. For the export 'of-which' items it would be useful to separately show intra-firm exports (collected within the FATS exercise)

88. For Stage 2, however countries will be asked to provide some guidance on how domestic transactions between categories of firms were measured or estimated.

Additional Extensions

89. Meeting the policy needs for the indicators described in Section 5 above requires further extensions to the accounting framework. For illustration the format and content of such extensions are described separately below. For convenience these additional rows are not shown in the detailed supply and use tables shown below nor are they included in the Excel templates circulated. However where countries are able to provide this information they should so through the addition of the relevant rows in the Excel templates.

Export focus summary tables: Supply Table

Reference Year	Year'														
ISIC Code equivalent	Product	Industry 1		Industry 2	Total domestic output of products at basic prices	Total imports: cif products (fob total)	*memo item: imports at fob prices*	*of which residents expenditure abroad*	*of which reimports*	***Taxes and subsidies on products***	*of which taxes and subsidies on imports*	Distribution margins				Total Supply at Purchasers prices
Please insert ISIC equivalent code below		Exporter	Non-Exporter	Exporter								Wholesale	Retail	Transport	Other	
ISIC ?	**Product (Industry) 1**															
ISIC ?	**Product (Industry) 2**															
cif/fob adjustment																
	Total															

Export focus summary tables: Import Table

Reference Year	Year'	Imports - all transactions at FOB prices													
ISIC Code equivalent	Product	Industry 1		Industry 2		Total intermediate consumption	Household final consumption	*NPISH*	*GGFC*	*GFCF*	*Valuables*	*Changes in Inventories*	Non-residents expenditure	Re-exports	Total Imports
Please insert ISIC equivalent code below		Exporter	Non-Exporter	Exporter	Non-Exporter										
ISIC ?	**Product (Industry) 1**														
ISIC ?	**Product (Industry) 2**														
Total Imports															

Export focus summary tables: Domestic Use Table Purchasers Prices – Stage 1

Reference Year	Year'	Domestic Use at Purchasers prices														
ISIC Code equivalent	**Product**	**Industry 1**		**Industry 2**		**Total intermediate consumption**	**Household final consumption**	***NPISH***	***GGFC***	***GFCF***	***Valuables***	***Changes in Inventories***	***Exports***	*of which non-residents expenditure*	*of which re-exports*	**Total Demand at Purchasers prices**
		Exporter	**Non-Exporter**	**Exporter**	**Non-Exporter**											
ISIC ?	**Product (Industry) 1**															
ISIC ?	**Product (Industry) 2**															
Total Imports																
Total Intermediate consumption at purchasers prices																
Gross Value added - Basic Prices																
Gross Operating surplus																
Mixed Income																
Compensation of Employees																
Other Taxes on Production																
Other subidies on production																
Total Output at Basic Prices																
exports by product																
	Primary product															
	Other products															
	Product (Industry) 1															
	Product (Industry) 2															
own-account production of:																
	software															
	R&D															
	other															

Export focus summary tables: Domestic Use Table Basic Prices – Stage 1

Reference Year	Year'	Domestic Use at Basic prices														
ISIC Code equivalent	Product	Industry 1		Industry 2		Total intermediate consumption	Household final consumption	*NPISH*	*GGFC*	*GFCF*	*Valuables*	*Changes in Inventories*	*Exports*	*of which non-residents expenditure*	*of which re-exports*	Total Demand
Please insert ISIC equivalent code below		Exporter	Non-Exporter	Exporter	Non-Exporter											
ISIC ?	Product (Industry) 1															
ISIC ?	Product (Industry) 2															
Total Imports																
Taxes and Subsidies on Products																
on imports																
on domestic transactions																
Gross Value added - Basic Prices																
Gross Operating surplus																
Mixed Income																
Compensation of Employees																
Other Taxes on Production																
Other subidies on production																
Total Output:Basic Prices																
of which																
exports by product																
	Primary product															
	Other products															
	Product (Industry) 1															
	Product (Industry) 2															
own-account production of:																
	software															
	R&D															
	other															

Export focus summary tables: Domestic Use Table Basic Prices – Stage 2

Reference Year	Year'	Domestic Use at Basic prices												
ISIC Code equivalent	Product	Industry 1		Industry 2		Total intermediate consumption	Household final consumption	*NPISH*	*GGFC*	*GFCF*	*Valuables*	*Changes in Inventories*	*Exports*	*of which non-residents expenditure*	*of which re-exports*	Total Demand
Product	Product produced by:	Exporter	Non-Exporter	Exporter	Non-Exporter											
Product (Industry) 1	Exporter															
	Non-Exporter															
Product (Industry) 2	Exporter															
	Non-Exporter															
Imports																
Taxes and Subsidies on Products																
on imports																
on domestic transactions																
Gross Value added - Basic Prices																
Gross Operating surplus																
Mixed Income																
Compensation of Employees																
Other Taxes on Production																
Other subidies on production																
Total Output:Basic Prices																
of which																
own-account production of:																
software																
R&D																
other																

Ownership focus summary tables: Supply Table

Reference Year	Year'																	
ISIC Code equivalent	Product	Industry 1			Industry 2			Total domestic output of products at basic prices	Total imports: cif products (fob total)	of which intra-firm imports (cif)	*memo item: imports at fob prices*	*of which intra infirm imports (fob)*	*of which residents expenditure abroad*	*of which reimports*	***Taxes and subsidies on products***	*of which taxes and subsidies on imports*	Distribution margins				Total Supply at Purchasers prices
Please insert ISIC equivalent code below		Foreign	Domestic MNE	Domestic ally owned	Foreign	Domestic MNE	Domestic ally owned										Wholesale	Retail	Transport	Other	
ISIC ?	Product (Industry) 1																				
ISIC ?	Product (Industry) 2																				
cif/fob adjustment																					
Total																					

Ownership focus summary tables: Import Table

Reference Year	Year'	Imports - all transactions at FOB prices														
ISIC Code equivalent	Product	Industry 1			Industry 2			Total intermediate consumption	Household final consumption	***NPISH***	***GGFC***	***GFCF***	***Valuables***	***Changes in Inventories***	Non-residents expenditure	Re-exports	Total Imports
Please insert ISIC equivalent code below		Foreign	Domestic MNE	Domestic ally owned	Foreign	Domestic MNE	Domestic ally owned										
ISIC ?	Product (Industry) 1																
	of which intra-firm																
ISIC ?	Product (Industry) 2																
	of which intra-firm																
Total Imports																	
of which intra-firm																	

<u>Ownership focus</u> summary tables: Domestic Use Table Purchasers Prices – Stage 1

Reference Year	Year'	Domestic use at purchasers prices													
ISIC Code equivalent	**Product**	**Industry 1**			**Industry 2**			**Household final consumption**	***NPISH***	***GGFC***	***GFCF***	***Valuables***	***Changes in Inventories***	***Exports***	*of which non-residents expenditure*	*of which re-exports*	*of which intra-firm exports*	**Total Demand at Purchasers prices**
Please insert ISIC equivalent code below		**Foreign**	**Domestic MNE**	**Domestic ally owned**	**Foreign**	**Domestic MNE**	**Domestic ally owned**											
ISIC ?	**Product (Industry) 1**																	
ISIC ?	**Product (Industry) 2**																	
Total Imports																		
Total Intermediate consumption at purchasers prices																		
Gross Value added - Basic Prices																		
Gross Operating surplus																		
Mixed Income																		
Compensation of Employees																		
Other Taxes on Production																		
Other subidies on production																		
Total Output at Basic Prices																		
exports by product																		
	Primary product																	
	Other products																	
	Product (Industry) 1																	
	Product (Industry) 2																	
own-account production of:																		
	software																	
	R&D																	
	other																	

<u>Ownership focus</u> summary tables: Domestic Use Table Basic Prices – Stage 1

Reference Year	Year'	Domestic Use at Basic prices																
ISIC Code equivalent	**Product**	**Industry 1**			**Industry 2**			**Total intermediate consumption**	**Household final consumption**	***NPISH***	***GGFC***	***GFCF***	***Valuables***	***Changes in Inventories***	***Exports***	*of which non-residents expenditure*	*of which re-exports*
Please insert ISIC equivalent code below		**Foreign**	**Domestic MNE**	**Domestic ally owned**	**Foreign**	**Domestic MNE**	**Domestic ally owned**										
ISIC ?	**Product (Industry) 1**																
ISIC ?	**Product (Industry) 2**																
Total Imports																	
Taxes and Subsidies on Products																	
on imports																	
on domestic transactions																	
Gross Value added - Basic Prices																	
Gross Operating surplus																	
Mixed Income																	
Compensation of Employees																	
Other Taxes on Production																	
Other subidies on production																	
Total Output:Basic Prices																	
of which																	
exports by product																	
	Primary product																
	Other products																
	Product (Industry) 1																
	Product (Industry) 2																
own-account production of:																	
	software																
	R&D																
	other																

Ownership focus summary tables: Domestic Use Table Basic Prices – Stage 2

Reference Year	Year'	Domestic Use at Basic prices																	
ISIC Code equivalent	Product	Industry 1			Industry 2			Total intermediate consumption	Household final consumption	*NPISH*	*GGFC*	*GFCF*	*Valuables*	*Changes in Inventories*	*Exports*	*of which non-residents expenditure*	*of which re-exports*	*of which intra-firm exports*	Total Demand
Product	Product produced by:	Foreign	Domestic MNE	Domestic ally owned	Foreign	Domestic MNE	Domestic ally owned												
Product (Industry) 1	Foreign																		
	Domestic MNE																		
	Domestic MNE																		
	Domestically owned																		
Product (Industry) 2	Foreign																		
	Domestic MNE																		
	Domestically owned																		
Total Imports																			
Taxes and Subsidies on Products																			
on imports																			
on domestic transactions																			
Gross Value added - Basic Prices																			
Gross Operating surplus *Mixed Income* *Compensation of Employees* *Other Taxes on Production* *Other subidies on production*																			
Total Output:Basic Prices																			
of which *own-account production of:* *software* *R&D*																			
other																			

Size class focus summary tables: Supply Table

Reference Year	Year'																
ISIC Code equivalent	Product	Industry 1			Industry 2			Total domestic output of products at basic prices	Total imports: cif products (fob total)	of which intra-firm imports (cif)	*memo item: imports at fob prices*	*of which residents expenditure abroad*	*of which reimports*	***Taxes and subsidies on products***	*of which taxes and subsidies on imports*	Distribution margins				Total Supply at Purchasers prices
Please insert ISIC equivalent code below		Small	Medium	Large	Small	Medium	Large									Wholesale	Retail	Transport	Other	
ISIC ?	Product (Industry) 1																			
ISIC ?	Product (Industry) 2																			
cif/fob adjustment																				
Total		Exporter																		

Size class focus summary tables: Import Table

Reference Year	Year'	Imports - all transactions at FOB prices															
ISIC Code equivalent	Product	Industry 1			Industry 2			Total intermediate consumption	Household final consumption	*NPISH*	*GGFC*	*GFCF*	*Valuables*	*Changes in Inventories*	Non-residents expenditure	Re-exports	Total Imports
Please insert ISIC equivalent code below		Small	Medium	Large	Small	Medium	Large										
ISIC ?	Product (Industry) 1																
ISIC ?	Product (Industry) 2																
Total Imports																	

Size class focus summary tables: Domestic Use Table Purchasers Prices – Stage 1

Reference Year	Year'	Domestic use at purchasers prices														
ISIC Code equivalent	**Product**	**Industry 1**			**Industry 2**			**Household final consumption**	***NPISH***	***GGFC***	***GFCF***	***Valuables***	***Changes in Inventories***	***Exports***	*of which non-residents expenditure*	*of which re-exports*	**Total Demand at Purchasers prices**
Please insert ISIC equivalent code below		**Small**	**Medium**	**Large**	**Small**	**Medium**	**Large**										
ISIC ?	**Product (Industry) 1**																
ISIC ?	**Product (Industry) 2**																
Total Imports																	
Total Intermediate consumption at purchasers prices																	
Gross Value added - Basic Prices																	
Gross Operating surplus																	
Mixed Income																	
Compensation of Employees																	
Other Taxes on Production																	
Other subidies on production																	
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exports by product																	
	Primary product																
	Other products																
	Product (Industry) 1																
	Product (Industry) 2																
own-account production of:																	
	software																
	R&D																
	other																

Size class focus summary tables: Domestic Use Table Basic Prices– Stage 1

Reference Year	Year'	Domestic Use at Basic prices															
ISIC Code equivalent	Product	Industry 1			Industry 2			Total intermediate consumption	Household final consumption	*NPISH*	*GGFC*	*GFCF*	*Valuables*	*Changes in Inventories*	*Exports*	*of which non-residents expenditure*	*of which re-exports*	Total Demand
Please insert ISIC equivalent code below		Small	Medium	Large	Small	Medium	Large											
ISIC ?	Product (Industry) 1																	
ISIC ?	Product (Industry) 2																	
Total Imports																		
Taxes and Subsidies on Products																		
on imports																		
on domestic transactions																		
Gross Value added - Basic Prices																		
Gross Operating surplus																		
Mixed Income																		
Compensation of Employees																		
Other Taxes on Production																		
Other subidies on production																		
Total Output:Basic Prices																		
of which																		
exports by product																		
	Primary product																	
	Other products																	
	Product (Industry) 1																	
	Product (Industry) 2																	
own-account production of:																		
	software																	
	R&D																	
	other																	

Size class focus summary tables: Domestic Use Table Basic Prices– Stage 2

Reference Year	Year'	Domestic Use at Basic prices																
ISIC Code equivalent	Product	Industry 1			Industry 2			Total intermediate consumption	Household final consumption	*NPISH*	*GGFC*	*GFCF*	*Valuables*	*Changes in Inventories*	*Exports*	*of which non-residents expenditure*	*of which re-exports*	Total Demand
Product	Product produced by:	Small	Medium	Large	Small	Medium	Large											
Product (Industry) 1	Small																	
	Medium																	
	Large																	
Product (Industry) 2	Small																	
	Medium																	
	Large																	
Total Imports																		
Taxes and Subsidies on Products																		
on imports																		
on domestic transactions																		
Gross Value added - Basic Prices																		
Gross Operating surplus																		
Mixed Income																		
Compensation of Employees																		
Other Taxes on Production																		
Other subidies on production																		
Total Output:Basic Prices																		
of which																		
own-account production of:																		
	software																	
	R&D																	
	other																	

Extensions to the Supply-Use Framework illustration for exporter category

	Industry 1				Industry 2			
	Foreign		Domestic		Foreign		Domestic	
	Exporter	Non-Exporter	Exporter	Non-Exporter	Exporter	Non-Exporter	Exporter	Non-Exporter
Property income payments - to abraod								
of which								
Interest								
Distributed Income of Corporations								
Reinvested Earnings on FDI								
Investment Income Disbursements								
Property Income payments - to abroad								
of which								
Interest								
Distributed Income of Corporations								
Reinvested Earnings on FDI								
Investment Income Disbursements								
Current taxes on income and wealth								
Employment								
Employees								
Hours worked								
Co2 emissions								

Membership

90. At the time of writing Membership of the Task Force was as follows:

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91. Additional countries are welcome to join on request

Timing and Deliverables

92. The Expert Group has a mandate of two years, with results expected by December 2016, in the shape of a final report with recommendations that describe best practice and propose guidance towards creating possible international standards in this field. One specific goal is to develop a minimum level of industries and further disaggregations that could serve as a 'minimum' information set countries should aim for.

93. The Group will be expected to meet once a year, with the next meeting expected towards the end of 2015 and the final meeting towards the end of 2016 to discuss the final results of the Expert Group.

94. Between meetings discussions will take place via an Electronic Discussion Group co-ordinated by the OECD. A more detailed time-table including deliverables is provided below.

- **October 2014**: First Meeting of the Expert Group
- **End-June 2015**: Country reports on assessment of national data and proposals for the structure of national Supply-Use tables, following the structure of the Tables above, up to at least Step 1.
- **July 2015**: Synthesis Report describing national plans – sources and proposed methods
- **October 2015**: Second meeting of the Expert Group – to discuss provisional supply-use tables (at least Step 1) – challenges, estimation procedures and sharing national experiences – and early considerations on Extensions and Step 2.
- **December 2015: First draft of the Final Report describing best practice** – sources and methods.
- **February 2016:** Draft report (analysis) describing impact of the 'Extended' approach on GVC indicators.
- **April 2016:** Progress update from Expert Group Members, building on best-practice lessons from December 2015.
- **September 2016: Final national 'extended' supply-use tables**
- **October 2016:** Second and final meeting - to discuss the draft report
- **December 2016: Final Report**

Summary of key issues/challenges

- Which statistical unit?
- What information exists (or what assumptions can be used) to estimate/measure direct purchases (and indirect purchases via wholesale intermediaries) of imports by firms?
- What information exists (or what assumptions can be used) to estimate/measure intermediate transactions when the conventional row (product) dimensions of supply-use tables are split into additional firm-type characteristics?
- What complications arise when converting c.i.f. import data to f.o.b. equivalents?
- Implementing the 2008 SNA – the Expert Group provides an opportunity to share experiences on implementing the new 2008 SNA rules on merchanting and goods for processing?
- What is the scope to produce import use matrices separately on the basis of the origin of the import (for example by major trading partner or region)?
- What is the scope to produce export column information broken down by destination?
- What source of information is used for jobs? Is it consistent with compensation of employees (and mixed income) estimates?

Annex I

Abstract

Trade in Value Added, Jobs and Investment

Supply Use Tables in 21st Century Production

Nadim Ahmad and Jennifer Ribarsky, OECD

The increasing international fragmentation of production that has occurred in recent decades driven by technological progress, cost, access to resources and markets, trade policy reforms, and indeed emerging economies, has challenged our conventional wisdom on how we look at and interpret trade. Traditional measures of trade, record gross flows of goods and services each and every time they cross borders leading to what many describe as a 'multiple' counting of trade, which may lead to misguided policy measures. To respond to this challenge a number of initiatives have been launched in recent years that attempt to measure, or perhaps more accurately 'estimate', what has become known as 'trade in value-added'. These have all helped to shed light on the importance of accounting for global value chains and have helped raise awareness of a growing need to mainstream the production of these estimates within the international statistics system. Responding to these challenges on 15 March 2012 the OECD and WTO undertook to collaborate on the development of estimates of trade in value-added (TiVA), resulting in a first release of a preliminary database on 16 January 2013 and a subsequent update in May 2013. This paper describes some of the key results of that work, and the methodology used. It also describes the detailed assumptions behind the methodology to necessarily deal with the treatment of data, and also the initiatives launched to improve the quality of those assumptions and the underlying data. The paper also describes extensions of the work to consider 'trade in jobs', and, proposes a framework to develop Extended national Supply Use tables that capture flows of primary/property income, so providing a mechanism to analyse the links between investment and global value chains. While TiVA estimates have been able to shed important light on our understanding of international trade and its relation to activity and competitiveness, in particular the importance of recognising the importance of imports to exports, and, so, the hitherto hidden costs of protectionism as well as the benefits of trade liberalisation, particularly in services, they do not reveal the full picture. With significant shares of exports being driven by foreign affiliates, TiVA estimates have also revealed the importance of going beyond just value-added towards income, in order to capture flows outside of conventional international trade statistics, such as the repatriation of profits related to the use of non-produced knowledge based assets (e.g. brands) and, indeed, the repatriation of profits related to the use of produced knowledge based assets (e.g. software) that are (often incorrectly) not recorded as receipts from exports of services.

MEASURING TRADE IN VALUE-ADDED AND BEYOND

INTRODUCTION

Global value chains (GVCs) have become a dominant feature of today's global economy. This growing process of international fragmentation of production, driven by technological progress, cost, access to resources and markets, and trade policy reforms, has challenged our conventional wisdom on how we look at and interpret trade and, in particular, the policies that we develop around it. Indeed, taken by themselves, traditional measures of trade, which record gross flows of goods and services each and every time they cross borders, may lead to misguided decisions being taken.

In practice, two main approaches (micro and macro) have been used to shed light on this issue. The former is perhaps best characterized by the well-known Apple iPod example (Dedrick, Kraemer, and Linden 2010), which showed that of the $144 factory-gate price of an iPod dispatched from China, less than 10 percent represented Chinese value added, with the bulk of the components (about $100) being imported from Japan and much of the rest coming from the United States and Korea.

But this stylized approach can generally only be conducted for specific products and, even then, only reveals part of the story related to who benefits from trade and how global value chains work, as it is typically unable to reveal how the intermediate parts are created. For example the message would be significantly different if, for sake of argument, the imported parts from Japan used to make the iPod required significant Chinese content. To deal with the bigger picture and also to capture all of the upstream effects, a number of studies have adopted a macro approach, based on the construction of intercountry or world input-output tables (Hummels et al. 2001; Daudin, Rifflart, and Schweisguth 2009;; Johnson and Noguera 2012; Koopman et al. 2011). And a number of pioneering initiatives, such as those of the Global Trade Analysis Project (GTAP), collaborative efforts between the World Trade Organization (WTO) and the Institute of Developing Economies—Japan External Trade Organization (IDE-JETRO), and the World Input-Output Database (WIOD), have helped accelerate improvements in the underlying statistics used to construct the results.

But these studies and initiatives have generally been one-off in nature and often require the use of nonofficial statistical data. What has been lacking thus far has been a systematic attempt to mainstream the development of statistics in this area. In response to this need, on 15 March 2012, the OECD and WTO joined forces to develop a database of Trade in Value-Added (TiVA) indicators and to mainstream their production within the international statistics system. The first preliminary results from this intiative were released on 16 January 2013, with a further update released in May 2013. Some highlights from this release are presented below. The next release, is scheduled for November 2014, with subsequent releases occurring every year thereafter, reflecting the mainstreaming of the TiVA database within the OECD and WTO core work programmes. These work programmes also envisage, as described below, on-going improvements in the quality of the estimates produced under the 'trade in value-added' umbrella, both at the national level, particularly through motivating capacity building programmes in countries where supply-use or input-output tables are not currentlty available, and the international level, through broader collaborative efforts to improve, for example, bilateral trade statistics.

Ultimately this paper acts, in some ways, as a clarion call that the world is increasingly interconnected and that conventional approaches used to understand how economies work can no longer rely solely on national statistics.

Increasingly, in order to understand how economies work, and how to target and create industrial policies focusing on competitiveness it is necessary to see the whole. National statistics build pictures based on interrelationships between producers and consumers and the rest of the world. But these relationships, particularly those with the rest of the world, have become increasingly more complex, and,

as such, there is an increasing need to consider global production within a global accounting framework. This implies a departure from the traditional role of international organizations as compilers of internationally comparable national statistics, such as national input-output or supply-use tables. Instead, it requires that they bring together these national tables to create a global table.

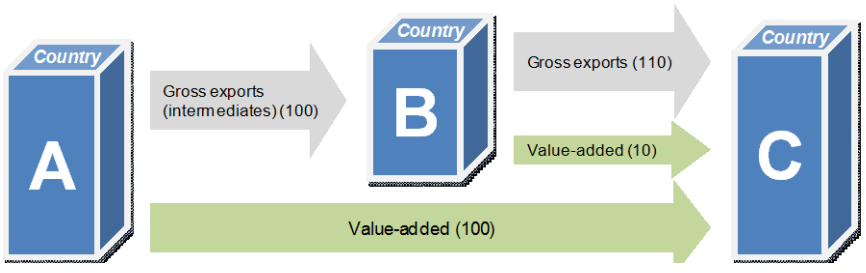
But the emergence of global value chains also raises, arguably profound, questions about the way national statistics are currently compiled. In the same way that international organisations increasingly need to think 'national' in the way they present and compile their statistics, where 'national' reflects the single economic territorty comprising the 'world' or large parts of it, national statistics institutions need to think global. In other words, in the construction of national statistics greater emphasis is needed on the role of the Rest of the World, both as a source of demand and supplier of demand but also with regards to the role of multinationals. This requires a rethink of the way that firms are currently aggregated within statistical information systems to move beyond the classic aggregation based almost exclusively on industrial classification systems towards more meaningful aggregations that better reflect today's 'global factory'. Such considerations are also essential not only to better understand the way that global production is today organised but also to better understand how investment drives global value chains, and in particular how that very same investment can lead to difficulties in interpreting trade flows as well as GDP.

This paper is an attempt to respond to these developments and growing needs. It begins by describing the policy drivers and needs that led to the TiVA initiuative, as well as the underlying methodology and assumptions used to estimate TiVA, before assessing the implications for statistics offices, data collection, and national supply-use tables in particular. It ends by describing a proposal for Extended Supply Use tables that could form the basis of a fully integrated international economic accounting system.

WHAT IS TRADE IN VALUE-ADDED?

The "Trade in Value-Added" initiative addresses the double counting implicit in current gross flows of trade. Instead, it measures flows related to the value that is added (labor compensation, other taxes on production and operating surplus, or profits) by a country in the production of any good or service that is exported (Figure 1).

Figure 1 Exports: Gross and Value-Added Flows



The simple example, shown in Figure 1 above, illustrates this. Country A exports $100 of goods, produced entirely within A, to country B, which further processes them before exporting them to C, where they are consumed. B adds value of $10 to the goods and so exports $110 to C. Conventional measures of trade show total global exports and imports of $210, but only $110 of value-added has been generated in their production. Conventional measures also show that C has a trade deficit of $110 with B, and no trade at all with A, despite the fact that A is the chief beneficiary of C's consumption.

If instead we track flows in value-added, one can recalculate C's trade deficit with B on the basis of the value-added it "purchases" from B as final demand, which reduces its deficit on this basis to $10, and apply the same approach to A's value-added to show C running a deficit of $100 with A. Note that C's overall trade deficit with the world remains at $110. All that has changed is its bilateral positions.

This simple illustration reveals how output in one country can be affected by consumers in another, and by how much. (An example of this is C's consumers driving A's output). However, it can also reveal many other important insights into global value-chains. For example, it shows that B's exports depend significantly on intermediate imports from A, and so reveals that protectionist measures on imports from A could harm its own exporters and hence competitiveness. Indeed, by providing information at the level of specific industries, it is possible to provide insights in other areas too, such as the contribution of the service sector to international trade.

MOTIVATION—HOW CAN MEASURES OF TRADE IN VALUE-ADDED INFORM POLICY MAKING?

Even though the literature on trade in value-added is quite technical, it has attracted a lot of attention from policymakers. What initially seemed a concern for trade statisticians is now understood as a key issue for the policy debate. For example, Pascal Lamy, the Director-General of the World Trade Organization (WTO), noted that "the statistical bias created by attributing commercial value to the last country of origin perverts the true economic dimension of the bilateral trade imbalances. This affects the political debate, and leads to misguided perceptions" (Lamy 2011). Recently, the French Senate devoted a special seminar to the related statistical and policy issues (WTO and Sénat 2011). There are a number of areas where measuring trade in value-added terms brings a new perspective and is likely to have an impact on policies. Seven key areas are described below:

1) **Trade, growth, and competitiveness.** A better understanding of how much domestic value-added is generated by the export of a good or service in a country is crucial for development strategies and industrial policies. Some countries have capitalized on global value chains by developing comparative advantages in specific parts of the value chain. For example, in China, many of its exports involve assembly work, where the foreign content is high. Access to efficient imports therefore matters as much in a world of international fragmentation as access to markets. Conventional gross trade statistics, however, are not able to reveal the foreign content of exports, and so there is a risk that policies to protect industries where gross statistics reveal a comparative advantage may decrease the competitiveness of those very same domestic industries. Because of this, mercantilist-style "beggar thy neighbor" strategies can turn out to be "beggar thyself" miscalculations.

2) **Domestic value-added in imports**. Domestic value-added is found not only in exports but also in imports: Goods and services produced in one domestic industry are intermediates shipped abroad whose value comes back to the domestic economy embodied in the imports of other, and often the same, industries. As a consequence, tariffs, nontariff barriers, and trade measures—such as antidumping rights—can also affect the competitiveness of domestic upstream producers (as well as the competitiveness of downstream producers, as mentioned above), in addition to foreign producers. For example, a study on the European shoe industry undertaken by the Swedish National Board of Trade highlights that shoes "manufactured in Asia" incorporate between 50 and 80 percent of European Union (EU) value-added. In 2006, antidumping rights were introduced by the European Commission on shoes imported from China and Vietnam. An analysis in value-added terms would have revealed that EU value-added was in fact subject to the antidumping rights (Isakson and Verrips 2012).

3) **Improving competitiveness in upstream domestic industries can boost exports**. Looking at trade from a value-added perspective is also a way to better reveal how upstream domestic industries contribute to exports, even if those same industries have little direct international exposure. Gross trade statistics, for example, reveal that less than one-quarter of total global trade is in services. But in value-added terms the share is significantly higher. Goods industries require significant intermediate inputs of services, both from foreign and also domestic suppliers. Looking at trade in value-added terms therefore can reveal that policies to encourage services trade liberalization and more foreign direct investment (and so policies designed to improve access to more efficient services) can improve the export competitiveness of goods industries.

4) **Global imbalances**. Accounting for trade in value-added (specifically accounting for trade in intermediate parts and components), and taking into account "trade in tasks," does not change the overall trade balance of a country with the rest of the world—rather, it redistributes the surpluses and deficits across partner countries. When bilateral trade balances are measured in gross terms, the deficit with final goods producers (or the surplus of exporters of final products) is exaggerated because it incorporates the value of foreign inputs. The underlying imbalance is in fact with the countries who supplied inputs to the final producer. As pressure for rebalancing increases in the context of persistent deficits, there is a risk of protectionist responses that target countries at the end of global value chains on the basis of an inaccurate perception of the origin of trade imbalances. As shown below, the Results from the OECD-WTO database point to significant changes.

5) **The impact of macroeconomic shocks**. The 2008–2009 financial crisis was characterized by a synchronized trade collapse in all economies. Authors have discussed the role of global supply chains in the transmission of what was initially a shock on demand in markets affected by a credit shortage. In particular, the literature has emphasized the "bullwhip effect" of global value chains (Escaith, Lindenberg, and Miroudot 2010; Lee, Padmanabhan, and Whang 1997). When there is a sudden drop in demand, firms delay orders and run down inventories, with the consequence that the fall in demand is amplified along the supply chain and can translate into a standstill for companies located upstream. A better understanding of value-added trade flows would provide tools for policymakers to anticipate the impact of macroeconomic shocks and adopt the right policy responses. Any analysis of the impact of trade on short-term demand is likely to be biased when looking only at gross trade flows. This was recently demonstrated in the aftermath of the natural disaster that hit Japan in March 2011. [1]

6) **Trade and employment**. Several studies on the impact of trade liberalization on labor markets try to estimate the "job content" of trade. Such analysis is only relevant if one looks at the value-added of trade. What the value-added figures can tell us is where exactly jobs are created. Decomposing the value of imports into the contribution of each economy (including the domestic one) can give an idea of who benefits from trade. The EU shoe industry example given above can be interpreted in terms of jobs. Traditional thinking in gross terms would regard imports of shoes manufactured in China and Vietnam by EU shoe retailers as EU jobs lost and transferred to these countries. But in value-added terms, one would have to account for the EU value-added, and while workers may have indeed lost their jobs in the EU at the assembly stage, value-added-based measures would have highlighted the important contribution made by those working in the research, development, design, and marketing activities that exist because of trade (and the fact that this fragmented production process keeps costs low and EU companies competitive). When comparative advantages apply to "tasks" rather than to "final products," the skill composition of labor embedded in the domestic content of exports reflects the relative development level of participating countries. Industrialized countries tend to specialize in high-skilled tasks, which are

[1]. See an application of international IO in Escaith et al. (2011).

better paid and capture a larger share of the total value added. A WTO and IDE-JETRO study on global value chains in East Asia shows that China specializes in low-skilled types of jobs. Japan, on the other hand, has been focusing on export activities intensive in medium- and high-skilled labor while importing goods produced by low-skilled workers. The study also shows that in 2006 the Republic of Korea was adopting a middle-ground position but was also moving closer to the pattern found in Japan (WTO and IDE-JETRO 2011).

7) **Trade and the environment.** Another area where the measurement of trade flows in value-added terms would support policymaking is in the assessment of the environmental impact of trade. For example, concerns over greenhouse gas emissions and their potential role in climate change have triggered research on how trade openness affects CO2 emissions. The unbundling of production and consumption and the international fragmentation of production require a value-added view of trade to understand where imported goods are produced (and hence where CO2 is produced as a consequence of trade). Various OECD studies note that the relocation of industrial activities can have a significant impact on differences in consumption-based and production-based measures of CO2 emissions (Ahmad and Wyckoff 2003; Nakano et al. 2009).

EVIDENCE FROM THE OECD-WTO DATABASE

Currently, the database is based on a global input-output table that brings together national input-output tables for 57 economies, combined with bilateral trade data on goods and services broken down into 37 industries (see Table 1 below), with data currently provided at an aggregated level of 18 industries . The following provides an overview of the key messages provided by the data.[2]

Table 1: TiVA database: Geographical Coverage

Australia	Hungary	Poland	Brunei Darussalam	Philippines
Austria	Iceland	Portugal	Bulgaria	Romania
Belgium	Ireland	Slovak Republic	Cambodia	Russian Federation
Canada	Israel	Slovenia	China	Saudi Arabia
Chile	Italy	Spain	India	Singapore
Czech Republic	Japan	Sweden	Hong Kong, China	South Africa
Denmark	Korea	Switzerland	India	Thailand
Estonia	Luxembourg	Turkey	Indonesia	Viet Nam
Finland	Mexico	United Kingdom	Latvia	Rest of the World
France	Netherlands	United States	Lithuania	
Germany	New Zealand	Argentina	Malaysia	
Greece	Norway	Brazil	Malta	

[2] For more information on the database, see OECD (2013).

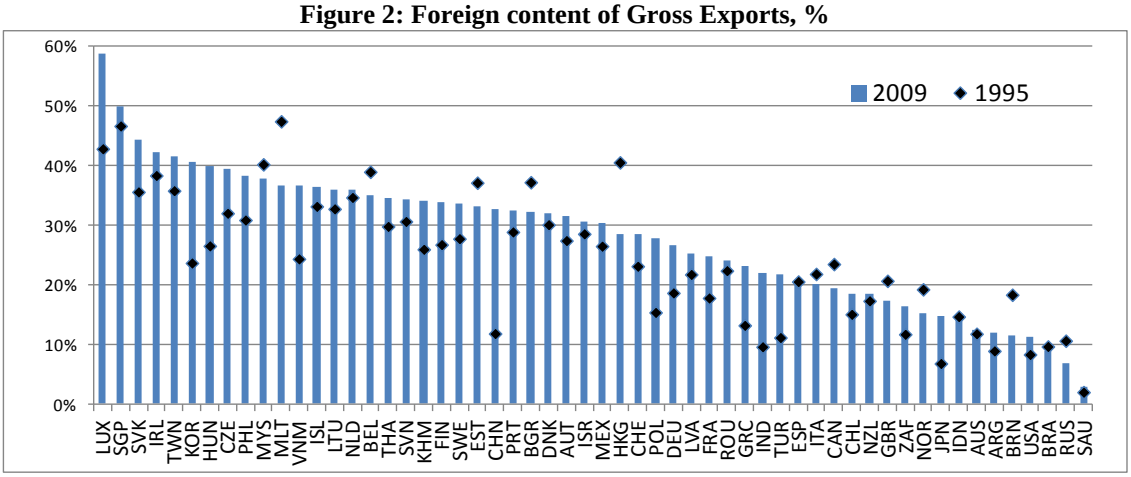
International 'Fragmentation of Production' has increased rapidly in the last two decades

Countries with relatively open and liberal trade regimes and high degrees of foreign investment will be typically expected to have higher foreign content in their exports. But a number of other factors impact on the extent of a country's integration into, and specialisation within, global value chains (GVCs). Larger economies, those with significant mineral resources, and those that are far from foreign markets and suppliers tend to have lower foreign content in their exports than smaller economies, as do those with high specialisation in services. This helps to explain the relative positions of countries shown in Figure 2 below which points to increasing foreign content in the exports of most countries in the last two decades and, so, increasing integration within GVCs.

...for example in Factory Europe and Factory Asia…

In Europe, the foreign content of exports in former transition economies, such as the Czech Republic, Hungary and Slovakia, stood at around 40% in 2009, significantly up in 1995, as these countries began to specialise in stages of the electronic and automotive value chains revolving in large part around Germany where the foreign content of exports rose from one-fifth in 1995 to one-third in 2009.

Figure 2: Foreign content of Gross Exports, %



SOURCE: OECD-WTO Trade in Value-Added (TiVA) Database

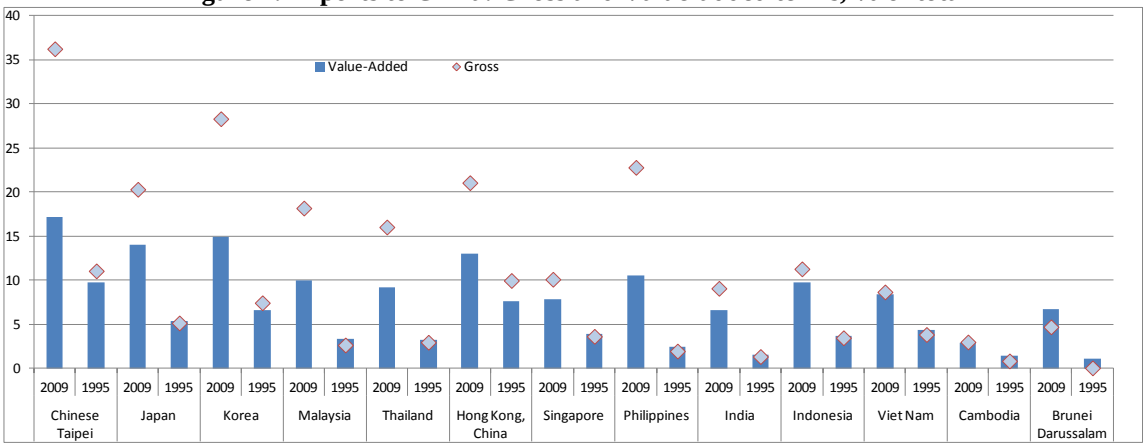
Similar patterns have emerged in Asia, reflecting in particular China's emergence and rapid integration into GVCs since its accession to the WTO in 2001. One-third of all Chinese exports in 2009 reflected foreign content, significantly up from 12% in 1995, reflecting in large part China's specialisation in the assembly and processing of electronic components. Significant changes were seen in other parts of Factory Asia too, such as Korea (41% in 2009) and Japan (15%), where the foreign content of exports doubled over the period. Data also show that the domestic value-added content of China’s exports rose between 2005 and 2009; potentially indicating a move up the value chain, with other low labour cost countries such as Vietnam and Cambodia moving into processing. The database also shows that in most countries, the foreign content of exports fell in 2009 compared to 2008, indicating that the more internationally fragmented the chain the more vulnerable production was to the synchronised slowdown in trade that occurred at the height of the crisis.

...and has changed the pattern of trade - who trades with who?

Bilateral trade balance positions can change significantly when measured in value-added terms, even though the total trade balance is unaffected. China's bilateral trade surplus with the United States was over one-third smaller in value-added terms in 2009, compared to gross based measures for example. This partly reflects the higher share of U.S. value-added imports in Chinese final demand but also the fact that a significant share (one-third) of China's exports reflect foreign content—the "Factory Asia" phenomenon. The data illustrate that significant exports of value-added from Korea and Japan pass through China on their way to final consumers, resulting in significantly smaller Chinese trade deficits with these countries but also typically higher Japanese and Korean trade surpluses with other countries. Similarly, the database shows that Korea's significant trade deficit with Japan in gross terms almost disappears when measured in value-added terms.

Increasing fragmentation of production, driven by trade in intermediates, means that gross measures of trade may distort our interpretation of trade. Typically, gross trade statistics overstate the importance of neighbouring economies, and, so, understate the importance of distant economies driving demand at the end of the chain. In gross terms, 28% of Korea's exports in 2009 went to China (Figure 4) but in value-added terms only 14% of Korea's exports were destined for Chinese final consumers; a difference that in large part reflects China's processing of Korean intermediates for export to third countries like the US. Similar patterns exist for many other economies upstream of China in 2009, such as Malaysia and Thailand, while in Indonesia and Vietnam, which are further downstream, value-added and gross shares were relatively similar, partly reflecting their emergence as processors. Data also show that China had relatively limited integration within GVCs in 1995.

Figure 4: Exports to China: Gross and Value-added terms, % of total



SOURCE: OECD-WTO Trade in Value-Added (TiVA) Database

Value-added trade measures also reveal the growing importance of China as a final destination market. For example, Japan and Korea's value-added exports in 2009 destined for Chinese consumers were two to three times their rate in 1995. The partial corollary of this has been a decline in the importance of Japan as a final destination market, partly reflecting Japan's sluggish nominal economic growth over the 2000s. In value-added terms, 6.2% of the United States' exports in 2009 were destined for China, just shy of the 6.8% exported to Japan. The corresponding figures for 1995 were 2.3% and 12.7% respectively.

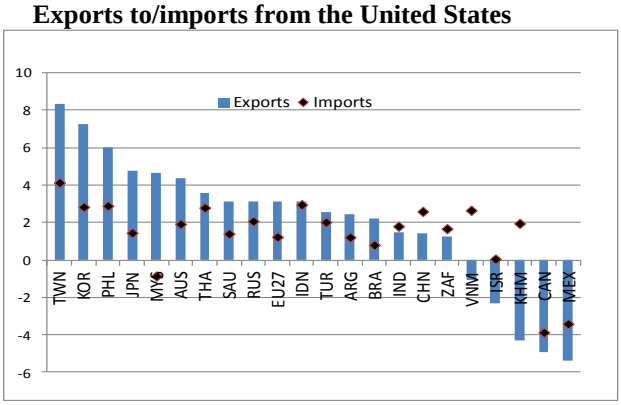
TiVA reveals more trade with the United States but also more North-South trade…

In value-added terms the importance of the United States as a source of imports and also as a destination for exports is higher than gross measures (Figure 5). Export shares, for example, were lower in value-added terms in only four countries in 2009: Vietnam, Israel, Cambodia, Canada and Mexico, partly

reflecting the relatively high degree of integration of these countries in United States production chains. The database also reveals that gross measures of trade may understate North-South trade relationships. Figure5 for example reveals that Brazil is a more important market for OECD and ASEAN economies in value-added terms.

Figure 5: Export and Import shares (Value-added shares minus gross shares), percentage points, 2009

Exports to/imports from the United States



Exports to/imports from Brazil

SOURCE: OECD-WTO Trade in Value-Added (TiVA) Database

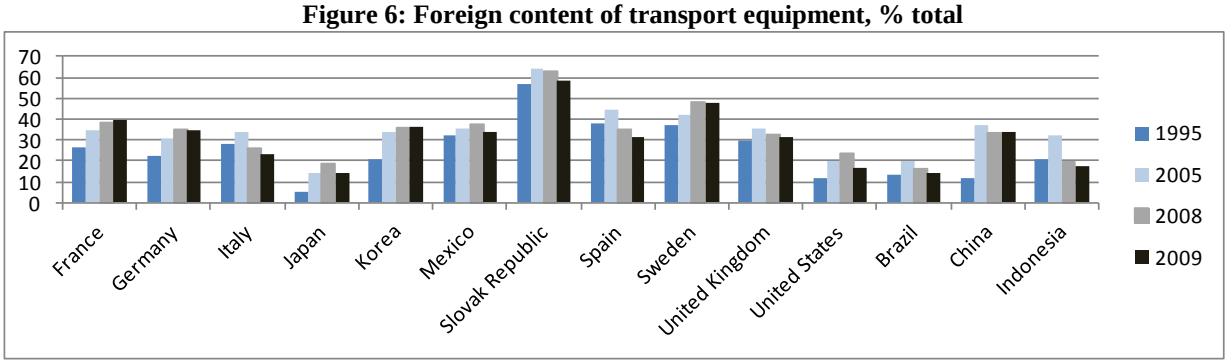
Global rankings change too

Gross trade statistics show that China's share of global exports was 9.4% in 2009, higher than Germany (8.4%) and marginally behind the United States (10.6%), and significantly up on its share in 1995 (2.5%). But it share in global exports in value-added terms, whilst still significant, was lower; rising from 2.8% to 8.3%, marginally ahead of Germany (8.0%) but 3.5 percentage points behind the United States (11.8%). In value-added terms (4.5%) the United Kingdom was the World's 5th largest exporter in 2009 displacing France (4.2%), whilst Korea fell from 8th in gross terms to 11th in value-added terms.

Competitiveness increasingly depends on access to imports

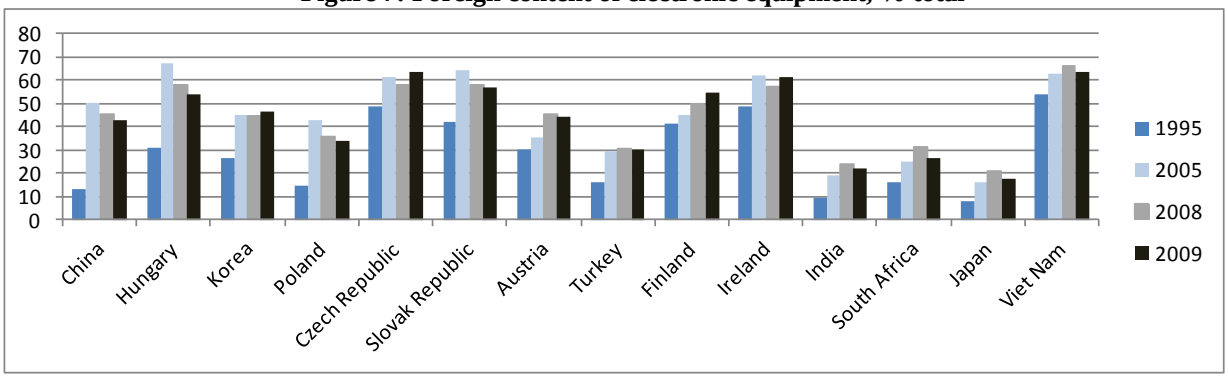
To improve productivity and remain competitive in a world dominated by GVCs requires efficient access to imports of intermediate goods. Figure 2 reveals that the trend in recent years has been for rising foreign content in exports. This comes through more clearly when looking at specific industries.

Figure 6: Foreign content of transport equipment, % total



In the transport equipment sector (Figure 4), the foreign content of exports was high and rose strongly in many countries between 1995 and 2009, nearly doubling in Germany and France.

Figure 7: Foreign content of electronic equipment, % total

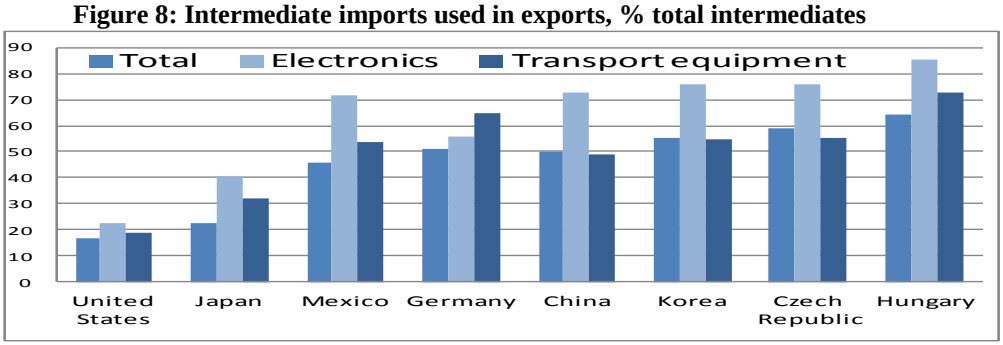


Similar patterns emerge in other industries with high international fragmentation, such as the electronic equipment industry (Figure 7). In China for example, the foreign content of exports trebled between 1995 and 2009, and in Hungary, Korea, India and Japan, it broadly doubled.

And significant shares of intermediate imports are used to produce exports

In most economies, the share of intermediate imports used to produce exports is around one-third. But for some sectors and economies the share can be significantly higher. In Hungary, China, Korea and Mexico for example, around three-quarters of all intermediate imports of electronics are used in producing exports. Shares are generally lower the larger the economy but even in Japan 40% of total intermediate imports of transport parts are used to produce exports.

Figure 8: Intermediate imports used in exports, % total intermediates

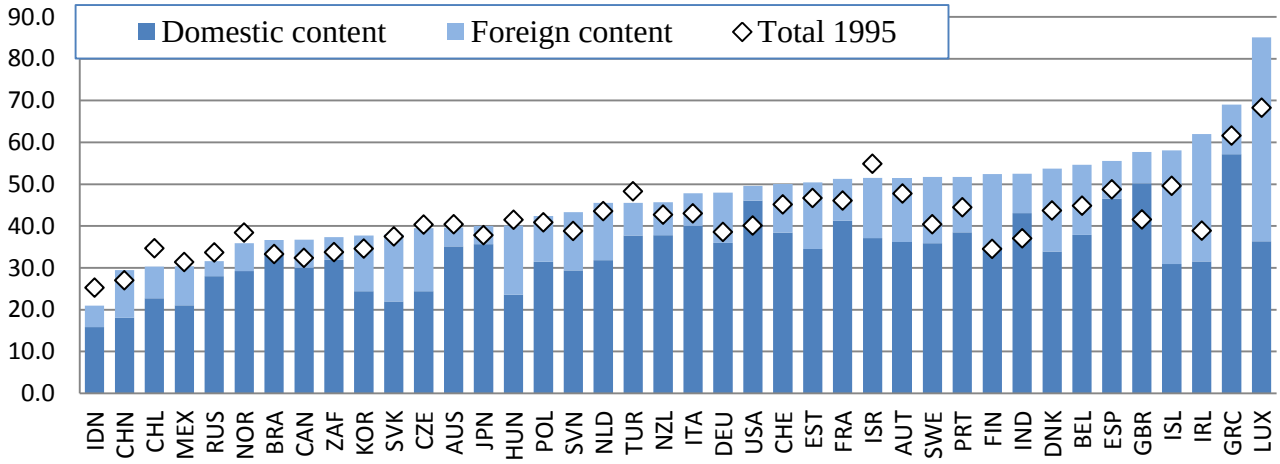


Services matter

Services comprise about two-thirds of GDP in most developed economies. However, based on gross terms, trade in services typically account for less than one-quarter of total trade. This partly reflects the fact that significant shares of services output are generally not tradable—e.g., government services, many personal services, and imputations such as those made in GDP calculations to reflect the rent homeowners are assumed to pay themselves (between 6 and 10 percent of GDP in most developed economies). But accounting for the value-added by services in the production of goods shows that the service sector contributes over 50% of total exports in the United States, the United Kingdom, France, Germany and Italy and nearly one-third in China (Figure 9). A significant contribution (typically one-third in 2009) across all manufactured goods is provided by both foreign and domestic service providers, with the contribution rising between 5 and 10% in many countries since 1995. Typically, emerging economies and other large exporters of natural assets, such as Norway, Chile, and Australia, have the lowest shares of services. But in India, over half of the value of its gross exports originates in the service sector.

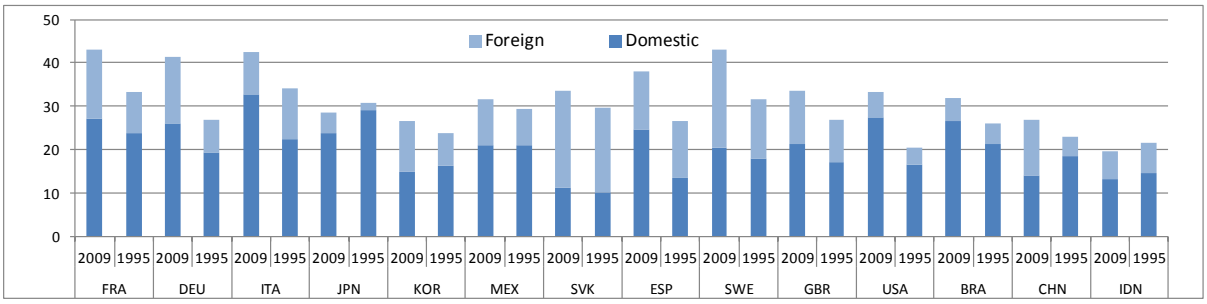
Part of the explanation for the difference between OECD countries and emerging economies can be found in the relatively higher degree of (largely domestic) outsourcing of services by manufacturers in OECD countries in recent decades, suggesting that a similar process could lead to improvements in the competitiveness of emerging economy manufacturers. Figure 9 also reveals a not insignificant contribution to exports coming from foreign service providers

Figure 9: Services content of exports, 2009



In the transport equipment sector, for example, the services content of exports was over 40% in a number of countries, partly reflecting the increased knowledge intensity (e.g. design, R&D, software) of transport equipment. But even these estimates to some extent underestimate the true services 'tasks' and knowledge content, as they only record the upstream value-added purchased, directly and indirectly, from the services sector, and, not the in-house services, including knowledge activities, produced within the transport equipment sector itself. The share of services rose in nearly all countries; indeed in France and Germany the domestic services content rose, despite the more than 10 percentage point fall in the overall domestic value-added content of exports between 1995 and 2009.

Figure 10: Services content of transport equipment



Tangible evidence of the scale of global value chains emerges more clearly when considering specific sectors. For example, between one-third and one-half of the total value of exports of transport parts and equipment by most major producers originated abroad in 2009 (Figure 10), driven by regional production hubs. In the United States and Japan, the shares were only about one-fifth, reflecting the larger scope in those countries of source inputs from domestic providers. However, this was also the case for Italy, and there it may have reflected efficient upstream domestic networks of small and medium enterprises. Interestingly, in 2009, Germany exported 25 percent more transport parts and equipment output than the United States in gross terms but only 5 percent more in value-added terms.

ESTIMATING TRADE IN VALUE-ADDED

Creating a multiregional input output table

As mentioned above, several initiatives have tried to address the issue of the measurement of trade flows in the context of the fragmentation of world production.[3] The most commonly used approach to develop a macro picture is based on global input-output tables, using simple standard Leontief inverses. More detail can be found in a joint report by the OECD and WTO (2012).

Constructing a global table is a data-intensive process and presents numerous challenges. The key challenge is to identify and create links between exports in one country and the purchasing industries (as intermediate consumers) or final-demand consumers in the importing country. In this respect, it is important to note that the data issues faced by the OECD are similar to those confronted by other initiatives, such as IDE-JETRO (which has produced intercountry Input-Output Tables for Asia) or the World Input-Output Database project, with whom (along with the U.S. International Trade Commission) the OECD and WTO have been actively coordinating in order to share experiences and derive a set of best practices.

The data sources at OECD are harmonized input-output tables and bilateral trade coefficients in goods and services, derived from official sources.[4] The model specification and estimation procedures can be summarized as follows:

- Preparation of input-output (IO) tables for reference years, using the latest published data sources—e.g., supply-and-use tables (SUTs), national accounts, and trade statistics.
- Preparation of bilateral merchandise data by end-use categories for reference years. The published trade statistics are adjusted for analytical purposes (such as confidential flows, reexports, waste and scrap products, and valuables). Trade coefficients of utility services are estimated based on cross-border energy transfers. Other trade coefficients of service sectors are based on the OECD Statistics on International Trade in Services and the United Nations (UN) Service Trade statistics. However, many missing flows are currently estimated using econometric model estimates.
- Conversion of "cost, insurance, and freight" (CIF) price-based import figures to "free on board" (FOB) price-based imports to reduce the inconsistency issues of mirror trade. (Because of asymmetry in reporting exports and imports in national trade statistics, imports of Country A from Country B often differ significantly from the exports reported from Country B to Country A). In an international I-O system, trade flows need to be perfectly symmetrical (i.e., the bilateral trade flows should be consistent at the highest relevant level of disaggregation) and consistent with the supply-utilization tables' trade data.
- Creation of import matrices.
- Total adjustment (missing sectors, trade with rest of the world, and other factors) and minimization of discrepancy columns using biproportional methods.

3 . An OECD–World Bank workshop on "New Metrics for Global Value Chains" was held on September 21, 2010. WTO hosted a "Global Forum on Trade Statistics" on February 2–4, 2011, in collaboration with Eurostat, the United Nations Statistics Division (UNSD), and the United Nations Conference on Trade and Development (UNCTAD).

4 . Some research-oriented initiatives have been using the GTAP database for international input-output data. This database is not, however, based on official sources of statistics.

The OECD has been updating and maintaining harmonized I-O tables—that is, splitting intermediate flows into tables of domestic origin and imports—since the mid-1990s. Usually this process follows the rhythm of national releases of benchmark I-O tables. The first edition of the OECD Input-Output Database came out in 1995. It covered 10 OECD countries, and its IO tables spanned the period from the early 1970s to the early 1990s. The first updated edition of this database, released in 2002, increased the country coverage to 18 OECD countries, China, and Brazil, and introduced harmonized tables for the mid-1990s. The database now includes national IO tables for 57 economies (Table 1).

The IO tables show transactions between domestic industries but, as a complement, also include supplementary tables, which break down total imports by user (industry and category of final demand). Some countries provide these import tables in conjunction with their IO tables, but in other cases they are derived from calculations by the OECD.

The OECD's input-output tables are based on an industry-by-industry basis, reflecting the fact that the underlying source data measure both the activities and production of industries. This means that the relationships between total value-added and industrial output are unaffected by the statistical manipulations that will be required to build product-by-product-based input-output tables.

The industry classification used in the current version of OECD's IO database is based on the International Standard Industrial Classification of All Economic Activities, Revision 3 (ISIC Rev.3) (Table 2), meaning that it is compatible with other industry-based analytical data sets, and in particular with the OECD bilateral trade in goods by industry data set (derived from merchandise trade statistics through the standard Harmonized System to ISIC conversion keys). The system, by necessity (in other words, to maximize cross-country comparability), is relatively aggregated. Differentiating between types of companies within a given sector is essential, however, to improve the quality of trade in value-added results (particularly in the context of exporting and nonexporting companies), and so part of future work will be to explore ways to do this, using microdata that could improve the quality of results (which is discussed in more detail in the following setion.

Table 2. OECD Input-Output Industry Classification and Concordance with ISIC

ISIC Rev.3 code		Description
1+2+5	1	Agriculture, hunting, forestry and fishing
10+11+12	2	Mining and quarrying (energy)
13+14	3	Mining and quarrying (non-energy)
15+16	4	Food products, beverages and tobacco
17+18+19	5	Textiles, textile products, leather and footwear
20	6	Wood and products of wood and cork
21+22	7	Pulp, paper, paper products, printing and publishing
23	8	Coke, refined petroleum products and nuclear fuel
24ex2423	9	Chemicals exluding pharmaceuticals
2423	10	Pharmaceuticals
25	11	Rubber and plastics products
26	12	Other non-metallic mineral products
271+2731	13	Iron & steel
272+2732	14	Non-ferrous metals
28	15	Fabricated metal products, except machinery and equipment
29	16	Machinery and equipment, nec
30	17	Office, accounting and computing machinery
31	18	Electrical machinery and apparatus, nec
32	19	Radio, television and communication equipment
33	20	Medical, precision and optical instruments
34	21	Motor vehicles, trailers and semi-trailers
351	22	Building & repairing of ships and boats
353	23	Aircraft and spacecraft
352+359	24	Railroad equipment and transport equipment n.e.c.
36+37	25	Manufacturing nec; recycling (include Furniture)
401	26	Production, collection and distribution of electricity
402	27	Manufacture of gas; distribution of gaseous fuels through mains
403	28	Steam and hot water supply
41	29	Collection, purification and distribution of water
45	30	Construction
50+51+52	31	Wholesale and retail trade; repairs
55	32	Hotels and restaurants
60	33	Land transport; transport via pipelines
61	34	Water transport
62	35	Air transport
63	36	Supporting & auxiliary transport activities; activities of travel agencies
64	37	Post and telecommunications
65+66+67	38	Finance and insurance
70	39	Real estate activities
71	40	Renting of machinery and equipment
72	41	Computer and related activities
73	42	Research and development
74	43	Other Business Activities
75	44	Public administration and defence; compulsory social security
80	45	Education
85	46	Health and social work
90-93	47	Other community, social and personal services
95+99	48	Private households and extra-territorial organisations

In essence, a global IO table is little different from a national IO table except that while the matrix of flows of intermediate goods and services in a national table can be industry × industry, in a global IO table, the rows and columns are country-industry combinations. In addition in a global IO table there are separate columns for each country's final demand. For illustration, Table 3 shows a two-country, two-sector representation.

Table 3. A Simplified ICIO System

		Country A		Country B		Final Demand	
		Sector 1	Sector 2	Sector 1	Sector 2	Country A	Country B
Country A	Sector 1: Goods	Z_{11}^{AA}	Z_{12}^{AA}	Z_{11}^{AB}	Z_{12}^{AB}	F_1^{AA}	F_1^{AB}
	Sector 2: Services	Z_{21}^{AA}	Z_{22}^{AA}	Z_{21}^{AB}	Z_{22}^{AB}	F_2^{AA}	F_2^{AB}
Country B	Sector 1: Goods	Z_{11}^{BA}	Z_{12}^{BA}	Z_{11}^{BB}	Z_{12}^{BB}	F_1^{BA}	F_1^{BB}
	Sector 2: Services	Z_{21}^{BA}	Z_{22}^{BA}	Z_{21}^{BB}	Z_{22}^{BB}	F_2^{BA}	F_2^{BB}
Tax less subsidy on products		NTZ_1^A	NTZ_2^A	NTZ_1^B	NTZ_2^B	NTF^A	NTF^B
International trade margin and insurance		TIZ_1^A	TIZ_2^A	TIZ_1^B	TIZ_2^B	TIF^A	TIF^B
Value-	Labor compensation	VL_1^A	VL_2^A	VL_1^B	VL_2^B		
Added	Operating surplus	VO_1^A	VO_2^A	VO_1^B	VO_2^B		
	Tax less subsidy on production	VT_1^A	VT_2^A	VT_1^B	VT_2^B		
Output		X_1^A	X_2^A	X_1^B	X_2^B		

Most of the components intuitively follow from the row and column headings, but by way of explanation,

Z_{12}^{AB} = Intermediate purchase by Sector 2 of country B from sector 1 of Country A;

F_1^{AB} = Final demand of consumers in Country B of output of sector 1 in country A.

Typically in the above matrix, statistics offices are able to provide most of the blocks required (recalling that supply-use tables can be readily converted to the above format and, moreover, that the above format can be initially constructed as a global supply-use table, which will form the long-term approach to be used by the OECD). But even though some countries are able to estimate the overall import of a given product used by a particular industry, many are not, and none are able to show, systematically, the source of that import (by originating country and industry) by the using industry (or "Final demand" category).

Central to the construction of a global input-output table, therefore, is the estimation of trade flows between industries and consumers across countries. Indeed, these trade flows in intermediate goods and services are the glue that binds together the national individual input-output tables. A positive spin-off of the work is worth mentioning in this content. National estimates of trade (exports and imports) are not coherent across countries, even after adjusting for price differences, CIF, and FOB. The process of constructing a global IO table confronts this issue head-on. The spin-off to the work is therefore a mechanism to reveal where global imbalances lie. The results and policy implications of the work highlight the importance that should be attached to reconciling these flows at the national level. Over the coming years, this will form an important part of the OECD's work program, through its Working Party on Trade in Goods and Services.

Bilateral trade in goods and services and IO balancing

Given the fact that many imports enter countries through intermediaries (wholesalers), it is highly unlikely that countries will ever be able to collect statistics that systematically show the country source and industry destination of all intermediate imports, nor does it seem likely that countries will be able to show which foreign industries consume their intermediate exports. But, as shown below, it is possible, at least in the medium term, for countries to do more in this field by capitalizing on microdata and links between trade and business registers.

In the short term, however, more can be—and is being—done to improve how imports are allocated to using industries. Most countries are able to produce estimates of bilateral trade in goods and

services showing the export of a given good or service to a given partner country. And indeed, most countries are able to further reveal whether any particular import or export of a good (at least, for most imports and exports) was intermediate, an investment, or a consumer good.

In constructing the import (and export) flows of its global IO table, the OECD necessarily uses a number of assumptions. The main assumption used in creating these import matrices is the 'proportionality' assumption, which assumes that the country-of-origin share of a given import consumed by a given industry in a given country is the same for all industries in that country. For countries that are not able to provide any ' import-flow' matrices at all—i.e., the intermediate consumption of imports by product (or industry) by industries—the OECD necessarily assumes that the share of intermediate imports in total intermediate consumption for a given imported product is the same for all using industries. Furthermore, the OECD assumes that this share is equivalent to the overall share of intermediate imports to total intermediates supplied for that product. In all cases the OECD has been able to significantly improve the quality of the assumptions it necessarily uses by creating a new database of bilateral trade (for goods) that breaks down imports (and exports) on the basis of the nature of the traded product (intermediate, household, investment, other). This database is called the Bilateral Trade Database by Industry and End-Use category[5] (BTDIxE), and is derived from the United Nations Statistics Division (UNSD) UN COMTRADE database, where values and quantities of imports and exports are compiled according to product classifications and by partner.

COMTRADE data are classified by declaring country (the country supplying the information), by partner country (the origin of imports or destination of exports), and by product (according to Harmonized System, or HS). Trade flows are stored according to the product classification used by the declaring country at the time of data collection. In general, source data are held according to Standard International Trade Classification (SITC) Revision 2 (Rev. 2) for the time period 1978–1987, the Harmonized System (1988) for 1988–1995, HS Rev. 1 (1996) for 1996–2001, HS Rev. 2 (2002) for 2002–2006, and HS Rev. 3 (2007) from 2007 onwards.

To generate estimates of trade in goods by industry and by end-use category, six-digit product codes from each version of HS from COMTRADE are assigned to a unique ISIC Rev. 3 industry and a unique end-use category—and hence, assigned to a basic class of goods as specified in the System of National Accounts (SNA)[6] (see Table 4).

[5]. For more details, see OECD (2012a).

[6] http://unstats.un.org/unsd/nationalaccount/docs/SNA2008.pdf

Table 4. Current BEC and SNA Classes of Goods

		End-use			
			Final demand goods		
		Intermediate	Household consumption	Industrial capital goods	Other
Products characteristics	Primary products	Food and beverages (111) Industrial supplies (21) Fuels and lubricants (31)			
			Food and beverages (112)		
	Processed unfinished		Food and beverages (122)		
		Fuels and lubricants e.g. gasoline (32)			
		Food and beverages (121) Industrial supplies (22) Parts and components of transport equipments (53) Parts and components of capital goods (42)			
	Processed finished	Packed medicaments (part of 63)			
			Non-industrial transport equipments (522) Non durable consumer goods (63) Semi-durable consumer goods (62) Durable consumer goods for households (61)		
			Durable personal consumer goods e.g. personal computers (part of 61), Mobile phones (part of 41) Passenger motor cars (51) Fixed line phones (part of 62)		
				Capital goods (41) Industrial transport equipments (521)	
	Other				Goods n.e.c (7)

NOTE: Numbers are in Broad Economic Categories (BEC) codes.

SOURCE: UNSD (2013).

Notwithstanding the known problems relating to the asymmetries that exist within bilateral trade statistics (i.e., global exports do not equal global imports), these bilateral statistics form the basis for populating the international flows in goods used in the OECD's global input-output tables , before balancing.

The approach used for bilateral trade in services statistics is in essence similar: Estimates based on official bilateral statistics form the basis for the original estimates of exports and imports by country. However, the quality of bilateral trade in services statistics is notoriously poor, and so the original partner-share coefficients used to populate IO cells of international trade in services are based on Gravity model techniques (see Miroudot, Lanz, and Ragoussis 2009), which are subsequently balanced within the overall system.

Only very few countries have a consistency between bilateral trade flows (imports and exports) by partner country and the corresponding flows shown in their supply-use tables (the basis for the creation of national IO tables), reflecting the fact that, for goods at least, bilateral trade flows follow merchandise trade accounting standards. As such, there are a number of recommendations that follow for official statisticians:

- **Coherent Bilateral Trade and National Accounts data**: Producing bilateral trade flows that are consistent with underlying supply-use tables should form a high priority of national statistics offices.
- **Confidential trade**: In some countries, disclosure rules suppress six-digit HS components in COMTRADE and also higher two-digit HS chapter levels. This should be avoided where possible by adopting other forms of preserving confidentiality, such as suppressing another six-digit category.
- **Reexports**: Adjustments are required for reexports, and for major continental trading hubs these adjustments can be significant. Sufficient data are available to adjust for reported trade between

China and the rest of the world via Hong Kong, but not currently for other major hubs such as Belgium, the Netherlands, and Singapore.

- **dentifying used capital goods**: HS codes, and thus reported trade in COMTRADE, cannot differentiate between new and old capital goods (such as secondhand aircraft and ships). Estimating international trade in these flows in a value-added context requires an elaboration on the input-output framework that allows these flows to be recorded in a way that aligns with total global value-added produced in a given period.
- **Unidentified scrap and waste**: Certain types of waste and scrap do not have separate six-digit HS codes—e.g., PCs and other electrical equipment exported (often to developing countries) for recycling.
- **Better services data**: Moreover, for services, countries are encouraged to provide more detail on partner countries and also on the type of products (following EBOPS 2010[7]).
- **Coherent International Trade data**: Greater efforts are needed to reconcile asymmetries in international trade flows.

  In the absence of the issues outlined above being resolved the OECD's global input-output table must necessarily balance global discrepancies in trade using a quasi automatic (RAS) balancing procedure. This process constrains each country's exports and imports to published national accounts totals, while also constraining estimates of national GDP. Resolving these asymmetries in bilateral trade statistics is a work in progress, and efforts to improve the nature of the balancing process are ongoing (Ahmad, Yamano, and Wang 2013) .

From the above, it is important to stress that the indicators shown in the database are *estimates*. Official gross statistics on international trade produced by national statistics institutions result in inconsistent figures for total global exports and total global imports, inconsistencies that are magnified when bilateral partner country positions are considered. The global input-output tables from which trade in value-added indicators are derived necessarily eliminate these inconsistencies, such as those that reflect different national treatments of reexports and transit trade (e.g., going through hubs such as the Netherlands), to achieve a coherent picture of global trade. For the countries for which data are presented, total exports and imports are consistent with official national accounts estimates.

[7] Extended Balance of Payments Services Classification: see

http://unstats.un.org/unsd/servicetrade/mr/rfCommoditiesList.aspx

GOING FORWARD – IMRPOVING THE QUALITY OF THE ICIO

Taking account of Heterogeneity in TiVA

Indicators created by input-output techniques are limited by the degree of industry disaggregation that the tables provide. The national input-output tables used by the OECD are based on a harmonised set of 37 industries. In simple terms, therefore, any given indicator for a particular industry assumes that all consumers of that industry's output purchase exactly the same shares of products produced by all of the firms allocated to that industry.

In practice, this boils down to (but is not the same thing as) assuming that there exists only one single production technique for all of the firms (and all of the products) in the industry grouping. We know that this is not true and that different firms, even those producing the same products, will have different production techniques (and so technical IO coefficients), and we also know that different firms produce different products and that these products will be destined for different types of consumers and markets. Indeed the changes introduced in the 2008 SNA for 'goods for processing' will mean that significant differences will arise for firms classified to the same industrial sector depending on the degree to which they own or not the intermediate goods used in production.

Of chief concern in this respect is the evidence that points to exports having very different coefficients from the coefficients of goods and services produced for domestic markets (see below), particularly when the exports (typically intermediate) are produced by foreign-owned affiliates in a global value chain. Because exporting firms are generally more integrated into value-added chains, they will typically have higher foreign content ratios, particularly when they are foreign-owned. Generally, therefore, an ability to account for this heterogeneity in producing trade in value-added estimates will result in lower shares of foreign content than might be recorded if more detailed input-output tables were available.

It is important to note, however, that more detail does not necessarily translate into more disaggregated industries. What matters for developing indicators on global value chains is more detail on firms trading internationally. In this sense, given a choice between doubling the number of industries available within current national IO or SU tables or providing a split of existing industries into one group of exporting firms and another of nonexporting firms, the latter may, arguably, be preferable. Globalisation is rapidly changing long-standing assumptions about the relative homogeneity of the production functions (Input-Output technical coefficients) of units classified to a given industrial activity. Such assumptions have, of course, always been challenging when considering small and large firms, where economies of scale have always been understood to play a role. But the increasing prevalence of new types of firms such as Factoryless Producers and Processors, and the increasing tendency for horizontal, as opposed to vertical, specialisation, particularly for multinational affiliates, has fundamentally challenged these assumptions . The ability of national (and international) Supply-Use and Input-Output tables, based on industrial groupings alone, to describe how demand and supply relationships are related has therefore become more difficult.

Ideally, therefore, countries should attempt to construct supply-use or input-output tables that better respond to the challenges presented by GVCs. In a project coordinated the Chinese Ministry of Commerce (the latter in collaboration with the Chinese National Bureau of Statistics) in collaboration with the OECD, an input-output table for China was created that split all of its industrial sectors into three categories: 1) processing firms, 2) other exporting firms, and 3) all other firms (Cuihong et al 2013).

This general approach is being explored by the newly created OECD Expert Group on Extended supply Use tables (see below), where participating countries will explore similar approaches in

constructing their IO or SU tables, using aggregations based on national circumstances. Processing firms form a significant part of China's exporters, so such a classification made sense in the case of China, but this may not be optimal for all countries. For most countries however, implementing such changes in their core statisticual production systems may take some time.

Linking trade and business registers

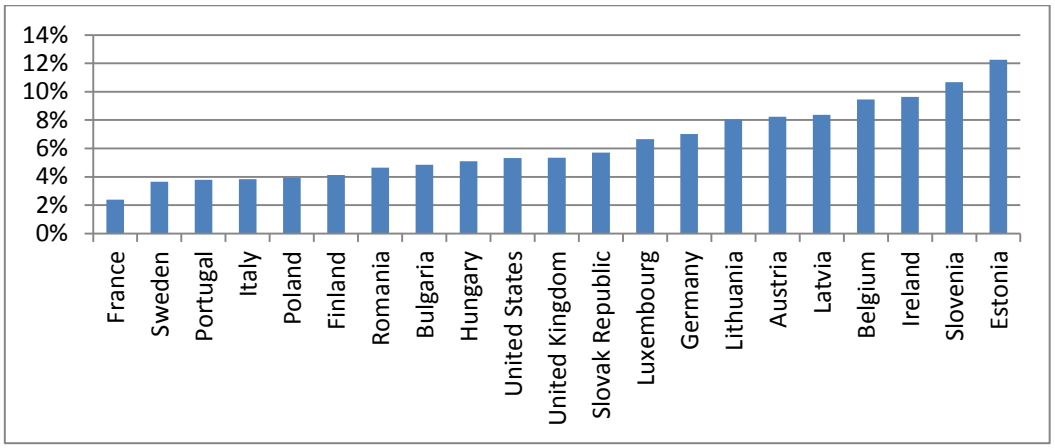
But that is not to say however that the challenges are insurmountable. In many countries significant improvements could be envisaged using readily available data sources. The key pre-requisite however is an ability to link trade and business registers. In this sense many countries have a head start. The long standing OECD-Eurostat Trade by Enterprise Characteristics (TEC) data collection exercise has for example for a number of years compiled indicators based on linked registers.

The TEC exercise collects information on the turnover generated through exports broken down by size class, industry, and partner country. For imports, similar information is provided but with a more limited breakdown on the importing industry, and so the exercise has revealed that there is scope for national statistics offices to aggregate firms, in addition to industrial classifications, on the basis of their exports and/or import intensity. Such aggregations, which could form the basis of publishable structural business statistics, embodied and reflected in official Supply-Use tables can significantly improve the quality of TiVA estimates, and at the same time provide coherent insights into drivers of competitiveness within and across countries. (see, Ahmad, Araújo, Lo Turco, and Maggioni 2011).

But the TEC exercise also reveals that such an approach to contructing Supply-Use tables need not be an 'all or nothing' approach. Significant quality improvements could be envisaged by focusing attention on only specific groups of industries, or indeed specific types of firms such as those that are large and/or foreign owned, as shown below:

Most firms don't export…..

Figure 11: Percentage of firms that export, total economy, 2011



SOURCE: Trade by Enterprise Characteristics Database.

Figure 11 above for example reveals that, in general, relatively few firms export, revealing that significant improvements to TiVA 'type' results could be achieved without necessarily collecting information on a significant number of firms. And for TiVA estimates perhaps the most important

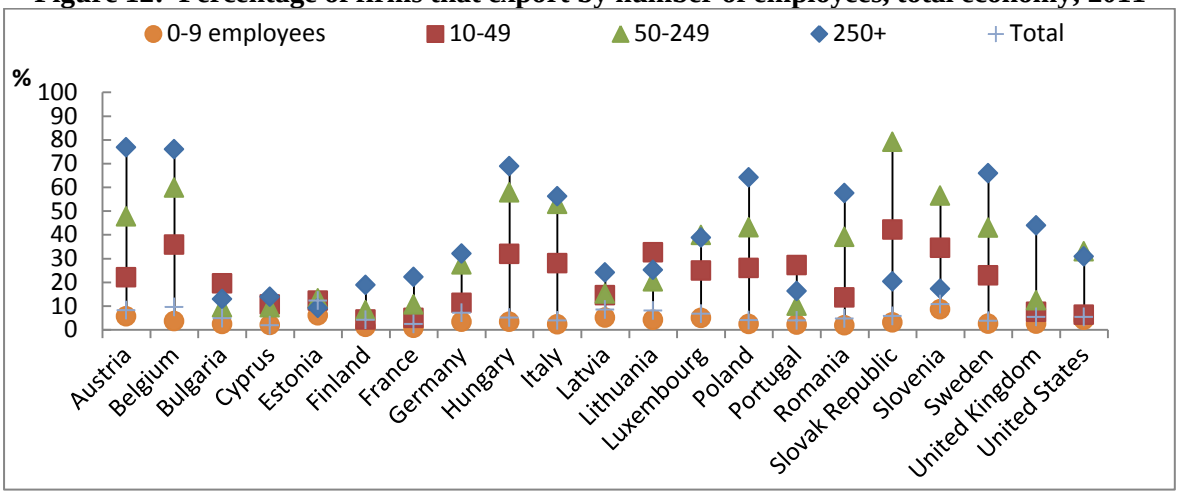
distinction for creating better quality estimates is to differentiate between those firms that export and those that do not.

Moreover, it's important to note that even in cases where a relatively high proportion of firms do export, efforts to differentiate between exporting and non-exporting firms need not target all sectors. For example if most of the output of a particular sector is exported (which can be broadly assessed by looking only at conventional trade data and conventional supply data) differentiating between exporting and non-exporting firms is unlikely to made a signficant difference.

....but large firms typically do

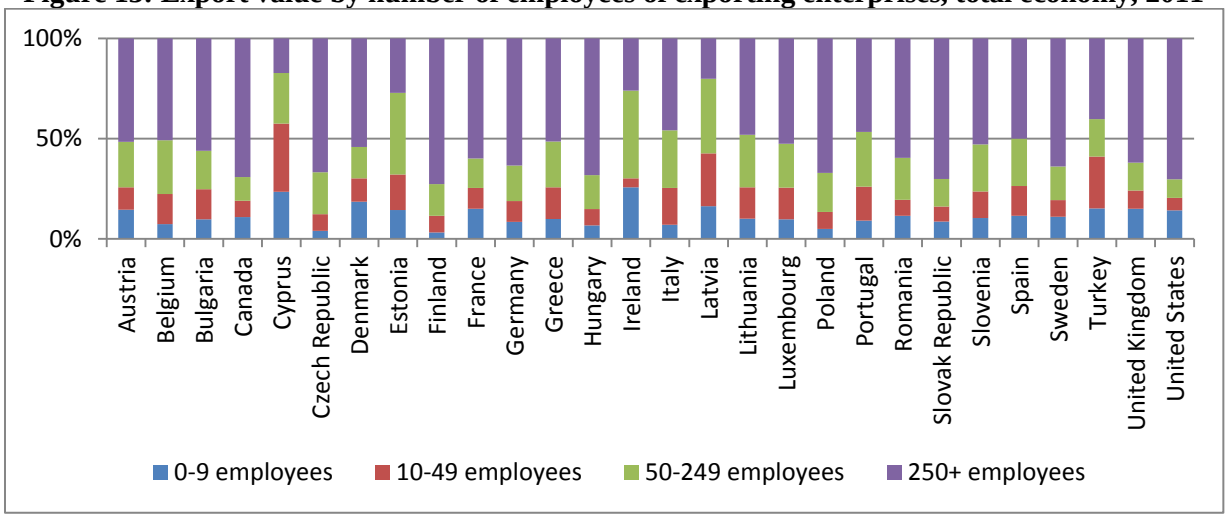
In addition the evidence suggests that targeting only large firms may achieve satisfactory results, since, as shown below (Figure 12), relatively large shares of large firms do export, and are responsible for considerable shares of total exports (Figure 13).

Figure 12: Percentage of firms that export by number of employees, total economy, 2011



SOURCE: Trade by Enterprise Characteristics Database.

Figure 13: Export value by number of employees of exporting enterprises, total economy, 2011

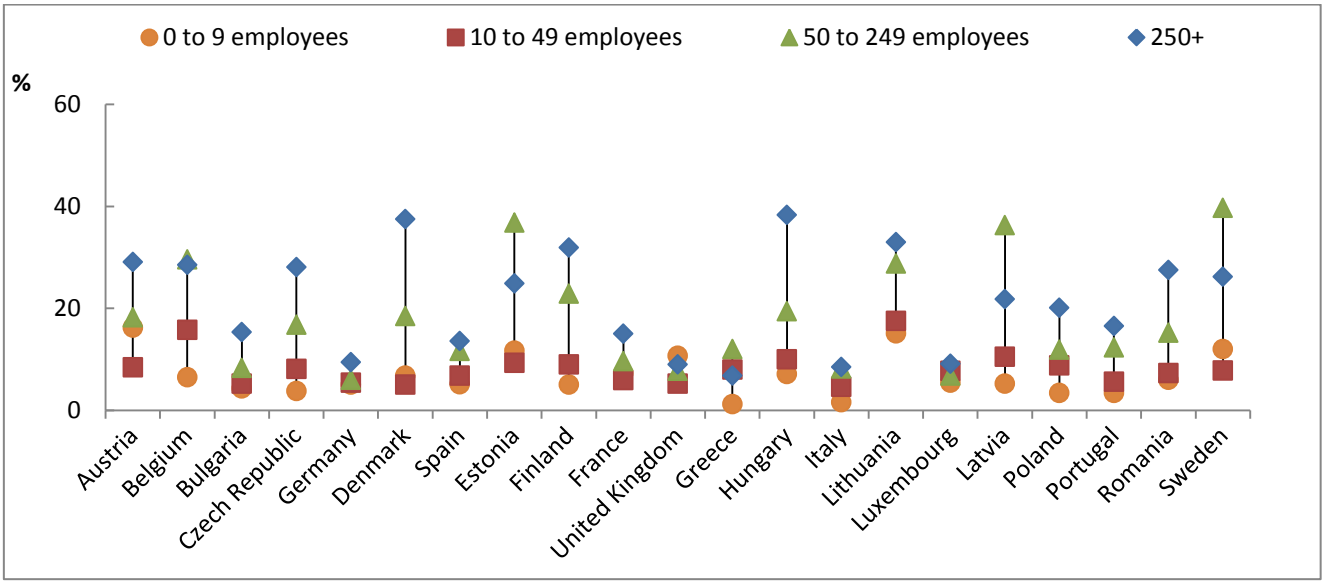


SOURCE: Trade by Enterprise Characteristics Database.

...and generally, the larger the firm the greater the share of output destined for foreign markets

Figure 14 below further reveals that larger firms are generally also much more export intensive with Figure 15 revealing that exporting firms typically also directly import more than non-exporting firms. Despite the fact that Figure 15 does not illustrate the size of indirect imports used in production, the size of the difference (on average twenty-fold) illustrates the importance of differentiating between exporting and non-exporting firms in analyses of GVCs and the downward bias of current TiVA estimates of the import content of exports.

Figure 14: Export to turnover ratios by number of employees of exporting enterprises, total economy, 2011



SOURCE: Estimates obtained by linking data from the OECD Structural and Demographic Business Statistics Database with the Trade by Enterprise Characteristics on the basis of common industry and size classification.

Figure 15: Import values per firm for exporting and non-exporting enterprises, USD thousands, 2011

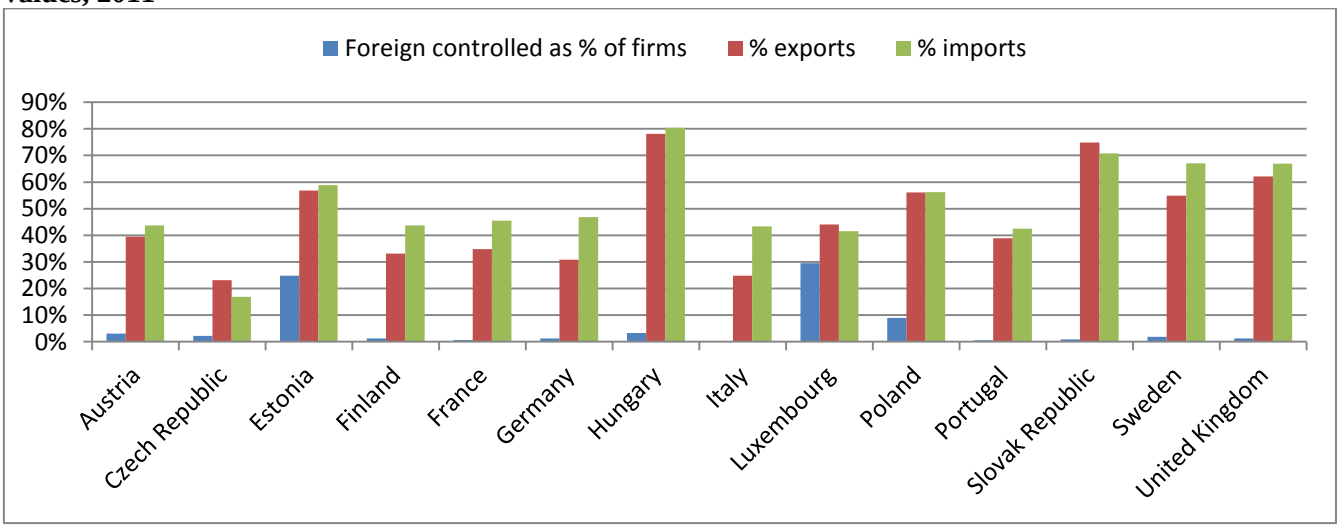
SOURCE: Trade by Enterprise Characteristics Database.

But size need not be the only determining factor

The above illustrates that significant improvements in GVC statistics and indicators can be achieved through focusing on only a small set of firms, for example by focusing on large firms but size need not be the only determining criteria that one need look at to arrive at better TiVA estimates. Another important firm characteristic is ownership. Foreign owned firms also typically import and export more than their domestic counterparts.

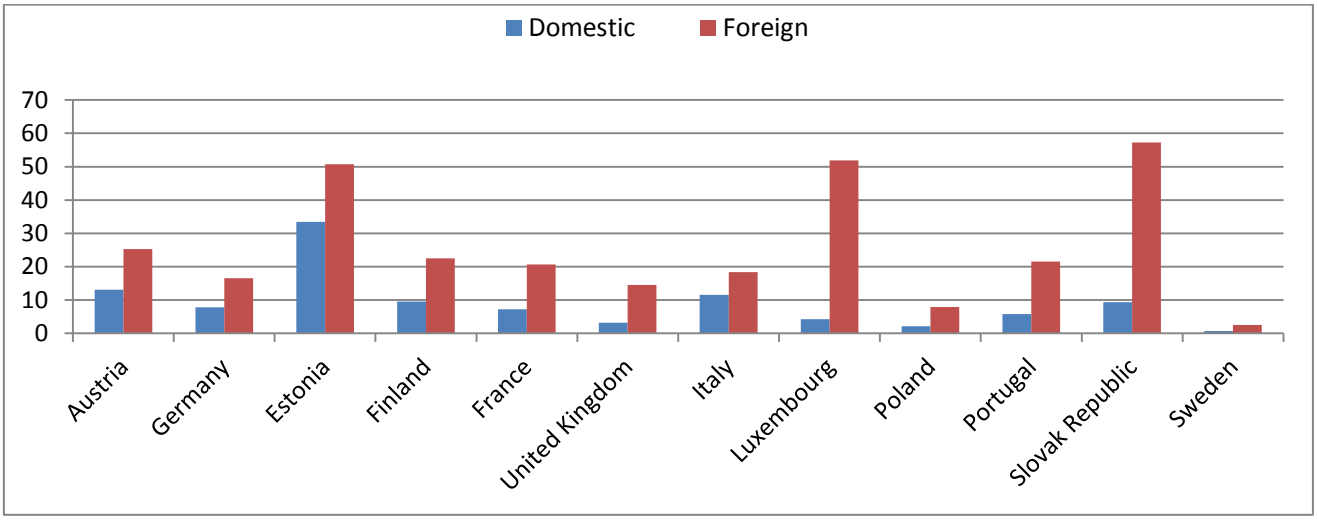
Foreign owned firms typically account for a relatively small share of overall firms but a significant share of overall exports and imports (Figure 16), and have higher export intensities than domestic owned firms (Figure 17).

Figure 16: Share of foreign owned enterprises over total number of enterprises, export and import values, 2011



SOURCE: Trade by Enterprise Characteristics Database.

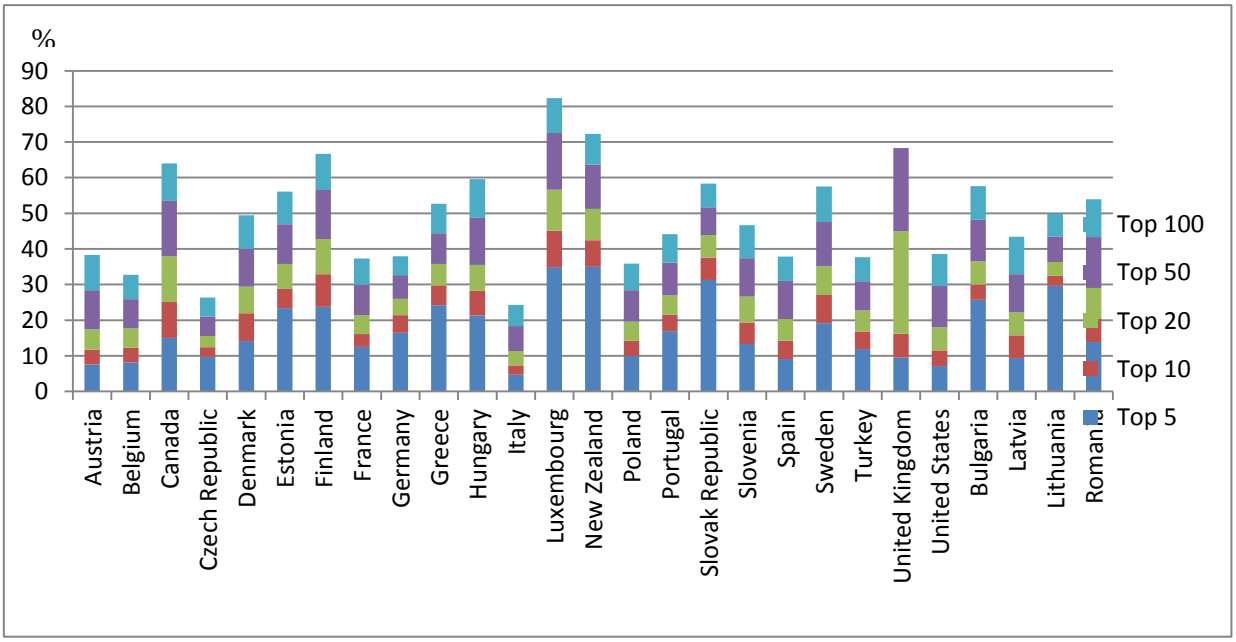
Figure 17: Export to turnover ratios for foreign and domestically owned enterprises, 2011



Source: Estimates obtained by linking turnover information from the OECD Activity of Multinational Enteprises Database (AMNE) to import and export information from the Trade by Enterprise Characteristics Database, using common industry identifier as linking information.

All of the above helps to illustrate that significant improvements in TiVA results can be achieved by focusing on only a small selection of firms. The above reveals two options: large firms and foreign owned firms but their are many other possibilities that could be explored depening on national circumstances, for example processing firms in China (reflecting their legal status and supporting available data) firms registered in export zones, factoryless producers etc. Figure 18 reinforces this point by showing that in many countries a small selection of firms are responsible for significant exports, for example in New Zealand the top 5 firms are responsible for 35% of all exports. This does of course present different challenges when considering publishing data, namely confidentiality restrictions but it is clear that a fresh look at how firms are aggregated is worthwhile

Figure 18: Top exporting firms' share of total export value, 2011



Source: Trade by Enterprise Characteristics Database

Improving country coverage

Many developed economies now regularly develop national Supply-Use tables, on an annual basis, as recommended in the System of National Accounts (the international accounting standard for GDP estimates), and are making significant efforts to improve the coherence of their international trade statistics with trading partners. But in many developing economies, despite the importance of Supply-Use tables for coherent GDP estimation, with all of its implications for national policy making, the situation is very different. This partly explains why the TiVA database currently includes very few economies in Africa and South America.

To a large extent the absence of detailed information for this grouping of countries, described hereafter as the 'Rest of the World' (ROW), has only a limited impact on the quality of the results shown for the 57 economies in the TiVA database, particularly for OECD economies. This partly reflects the relatively low share of exports in intermediates (in value-added terms) from the ROW that are used in exports of the 57 TiVA economies but it also reflects a relatively low degree of integration in global value chains via manufacturing and services activities. Most intermediate exports (from the ROW as a whole) reflect primary production (agriculture, timber, minerals and crude oil) at the upstream part of GVCs, where the foreign content is typically negligible (and so the absence of official national input-output or supply-use tables will only have a negligible effect on TiVA estimates), (see Figures 19 and 20).

Nevertheless, there are a number of reasons why improving the quality of the information on the ROW is important:

- Countries included in the ROW show considerable diversity in their degree of integration into GVCs and in respect of their trading partners: covering countries with high dependencies on mineral exports such as Iraq through to countries with increasing downstream activities, such as

Tunisia and Costa Rica[8] (and the next release of the TiVA database will include these countries together with Colombia and Croatia).

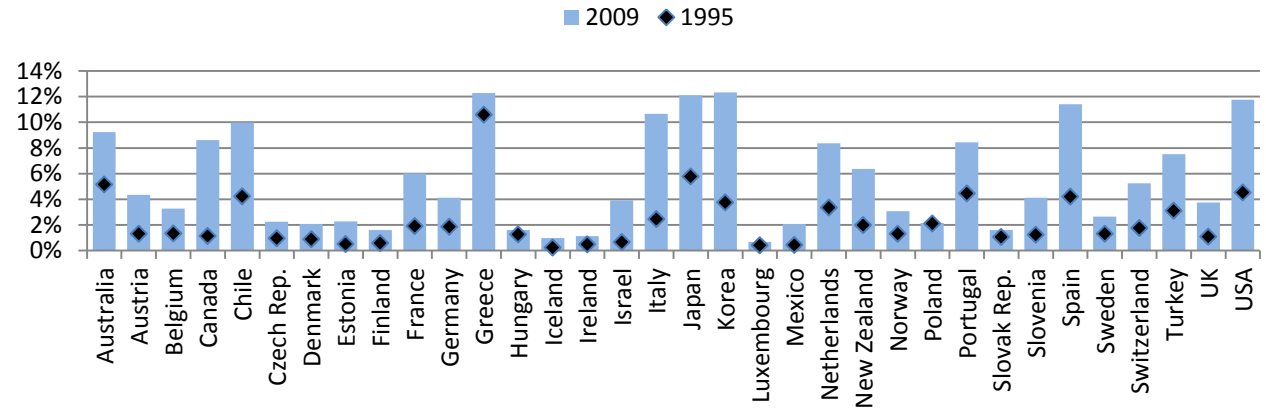
- There is significant demand for better quality information for all developing countries as part of the Aid agenda and in particular the Aid for Trade agenda.
- Although the ROW as a whole, has, to-date, shown limited integration into the secondary and tertiary parts of GVCs (Figure 20), understanding where individual countries are in the value chain in crucial to be able to inform and assess GVC policy making.
- But although current rates of integration in secondary and tertiary activities remain relatively low, consumers in the ROW are important drivers of growth and production in other economies, partly through demand from a growing middle class but also through demand for capital machinery, as the ROW seeks to integrate into GVCs. Figure 21, below, shows that the share of overall exports of domestic value-added driven by demand in the ROW increased in all OECD countries between 1995 and 2009.

But the focus on expanding the coverage of the TiVA database to countries not currently included in the database only tells one part of the story. Improving the quality of the information for countries already in the database is just as important. For example for some of the countries in the database, for example Malaysia, Philippines, Thailand and Viet Nam, official national Supply-Use and Input-Output tables can be relatively old, dating back to 2000 in some cases, requiring extrapolations for more recent years. Improving the regularity and timeliness of production of these tables can have a significant impact on quality.

Thus far the OECD has constructed the ICIO and TiVA estimates using readily available national information. But mainstreaming the process and consolidating the work done thus far requires on-going investment by national statistics agencies. As described below the TiVA strategy is to create additional regional partners and collaborations that will help consolidate the position of the TiVA database as the long term international benchmark for TiVA results and also the underlying ICIO.

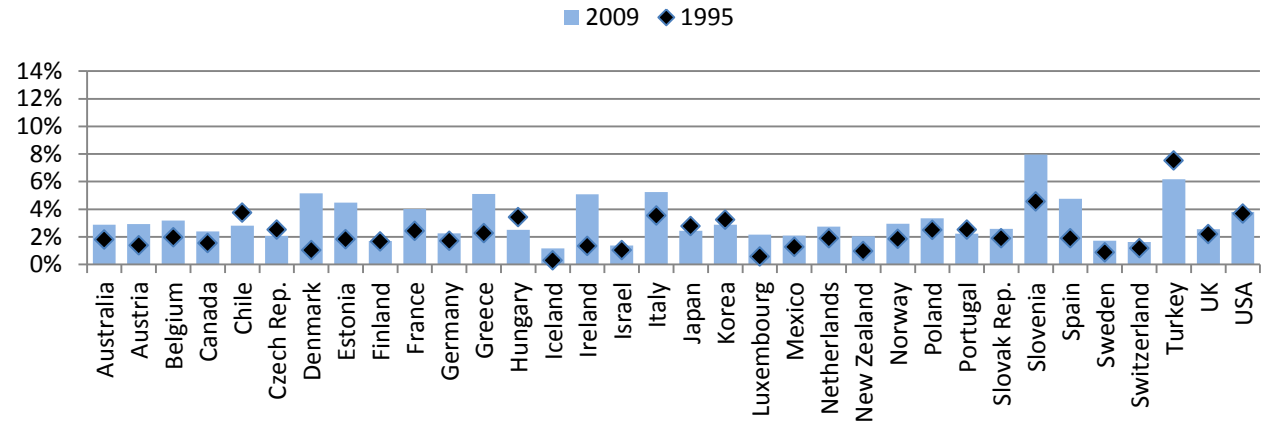
[8] The next release of TiVA scheduled for November 2014 will include Colombia, Costa Rica, Croatia and Tunisia.

Figure 18: Contribution of ROW Primary producers to Foreign Content of Gross Exports



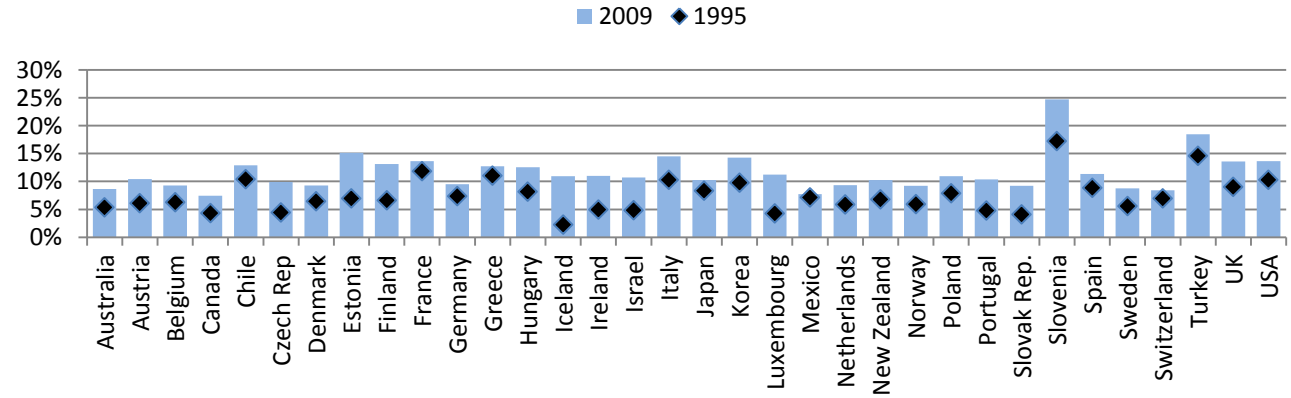
Source OECD-WTO TiVA database

Figure 20: Contribution of ROW Secondary and Tertiary producers to Foreign Content of Gross Exports



Source OECD-WTO TiVA database

Figure 21: Share of Total Domestic Value-Added Exports exported to ROW



Source OECD-WTO TiVA database

GOING BEYOND TRADE IN VALUE ADDED

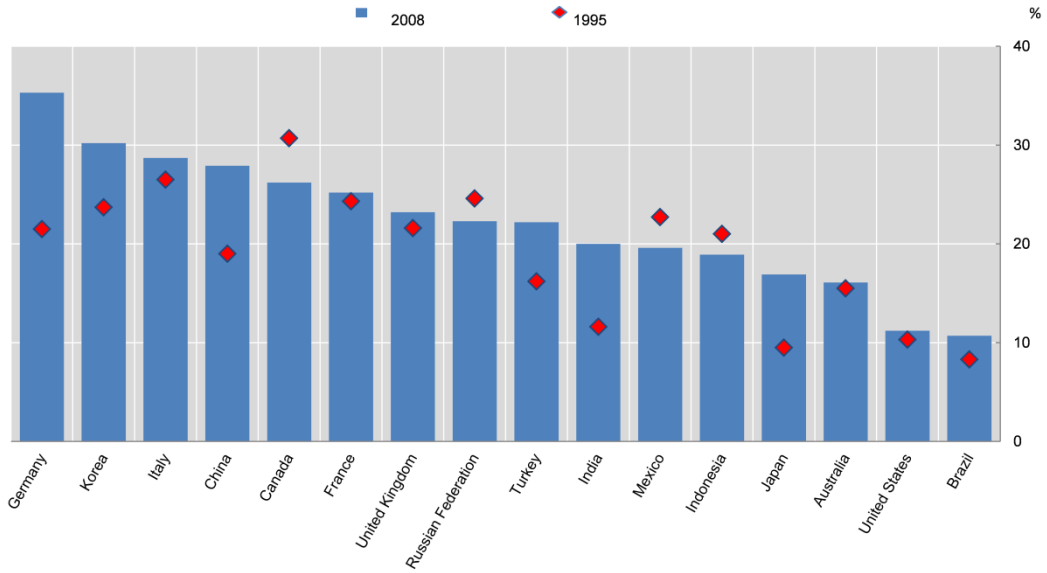
Looking at trade in value-added terms provides a valuable insight into broader notions of competitiveness (in addition to providing insights into trade policies) by illustrating interlinkages between countries and also by illustrating those activities (or tasks) that generate the most value. But additional indicators and insights can be gained by considering extensions to the accounting framework.

Trade in jobs

Supply-Use tables do not typically include estimates of jobs by industry but they do usually contain breakdowns of value-added into its core components, including compensation of employees and mixed income, providing a mechanism (amongst others) to generate coherent 'TiVA-type' estimates for Jobs (or ideally hours worked). Data on jobs and hours worked consistent with underlying compensation of employee/mixed income data would, therefore, not only provide an important extension to TiVA to capture employment (and also future extensions that linked skills data with employment data) but would, in and of itself, help to accelerate improvements in the coherence of national employment and value-added based estimates, and, so, productivity estimates.

Estimates of jobs sustained through foreign final demand have been produced using the ICIO, used for the TiVA database, together with estimates of employment by industry (see Figure 22). Like the TiVA estimates, however, the inability to capture heterogeneity means that some caution is needed in interpretation, particularly as anecdotal evidence suggests that firms engaged in GVCs have higher labour productivity than those not engaged in GVCs.

Figure 22: Jobs in the business sector sustained by foreign final demand, 1995 and 2008



Source: OECD Science, Technology and Industry Scoreboard 2013

Countries have already begun to make improvements in this area, driven by a need to produce coherent productivity estimates by industry, and it is hoped that highlighting the important insights that can be gained by looking at trade in jobs will reinforce and support these national initiatives aimed at improving coherence. Going a step further, it is clear, particularly because international fragmentation has meant industries across countries are less comparable than they used to be (as countries specialize in those stages of

the underlying activity where they have a comparative advantage), that it is increasingly becoming necessary to link jobs statistics to skills statistics.

The OECD's ANSKILL database (forthcoming) provides information on employment and skill composition at the industry level. The database matches industry data at the two-digit level (classified according to the ISIC Rev. 3) to occupations at the two-digit level (classified according to International Standard Classification of Occupations [ISCO]-88). It also includes an additional proxy for skills, in the form of data on the educational attainment of employees (classified on the basis of International Standard Classification of Education [ISCED]-97). The database covers 26 countries, mostly for 1997–2005 although coverage of seven of the countries is much more limited.

For ANSKILL, the ISCO-88 occupation classification corresponds to high, medium, and low-skilled levels, as follows:

- Categories 1 (legislators, senior officials, managers), 2 (professionals), and 3 (technicians and associate professionals) are regarded as high-skilled.
- Categories 4 (clerks), 5 (service workers and shop and market sale workers), 6 (skilled agricultural and fishery workers), and 7 (craft and related trade workers) are regarded as medium-skilled.
- Categories 8 (plant and machine operators and assemblers) and 9 (elementary occupations) are regarded as low-skilled.

The ISCED-97 educational classification maps to high, medium, and low skill levels in ANSKILL as follows:

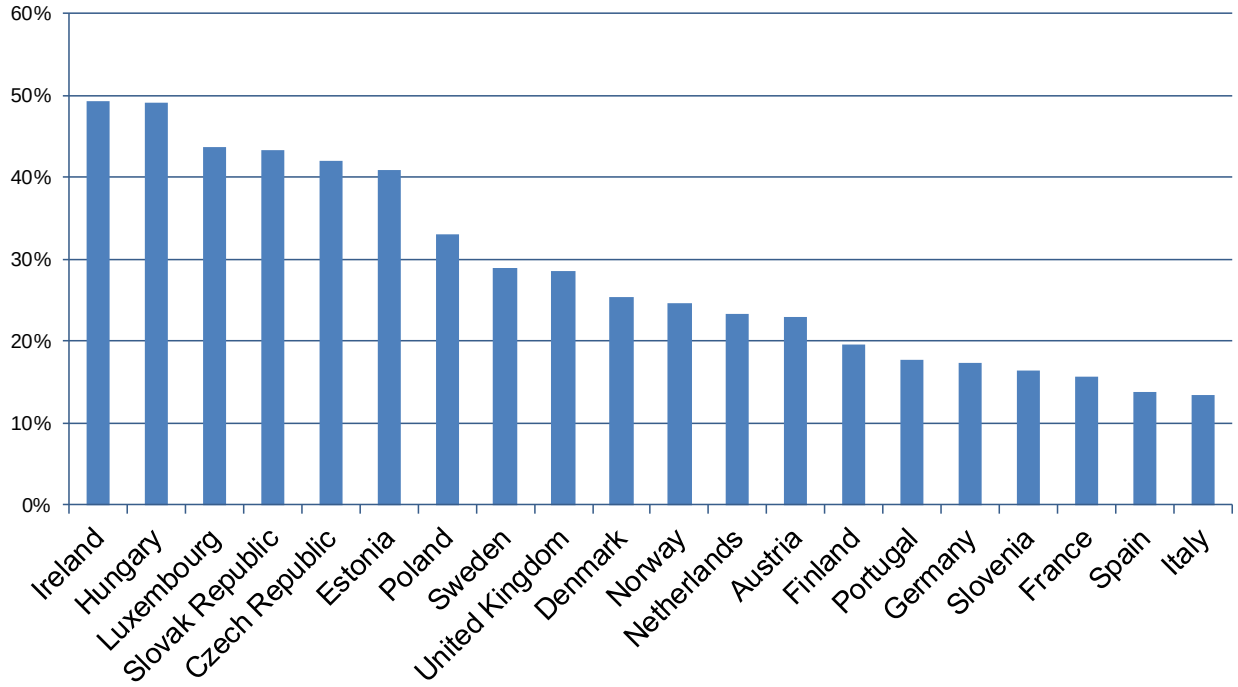
- Categories 1 (primary education) and 2 (lower secondary/second stage of basic education) are regarded as low-skilled.
- Categories 3 (upper secondary education) and 4 (postsecondary nontertiary education) are regarded as medium-skilled.
- Categories 5 (first stage of tertiary education) and 6 (second stage of tertiary education) are regarded as high-skilled.

Accounting for FDI in TiVA

Thus far the TiVA database has been able to provide insights into GVC policy making by creating a narrative around trade. However to fully undertand the nature of GVCs and indeed their drivers, it is important to create a trade-investment story. Multinationals (MNEs) have been important drivers of the growth in GVCs with estimates pointing to around three quarters of total international trade being driven by the top 500 MNEs[9]. Moreover the share of value-added generated by foreign affiliates approaches nearly half of all business sector value-added in some ccountries (Figure 23).

[9] Source: Corpwatch.org

Figure 23: Value-Added of Foreign Affiliates – share of national total, 2009 (ISIC B-N, ex K)



Indeed in many countries the share of income generated by foreign affiliates exceeds that from total exports of services (Figure 24, which shows compare total primary income with total trade in services).

Figure 24: Primary Income receipts versus Exports of Trade in Services (average 2010-2012) USD millions

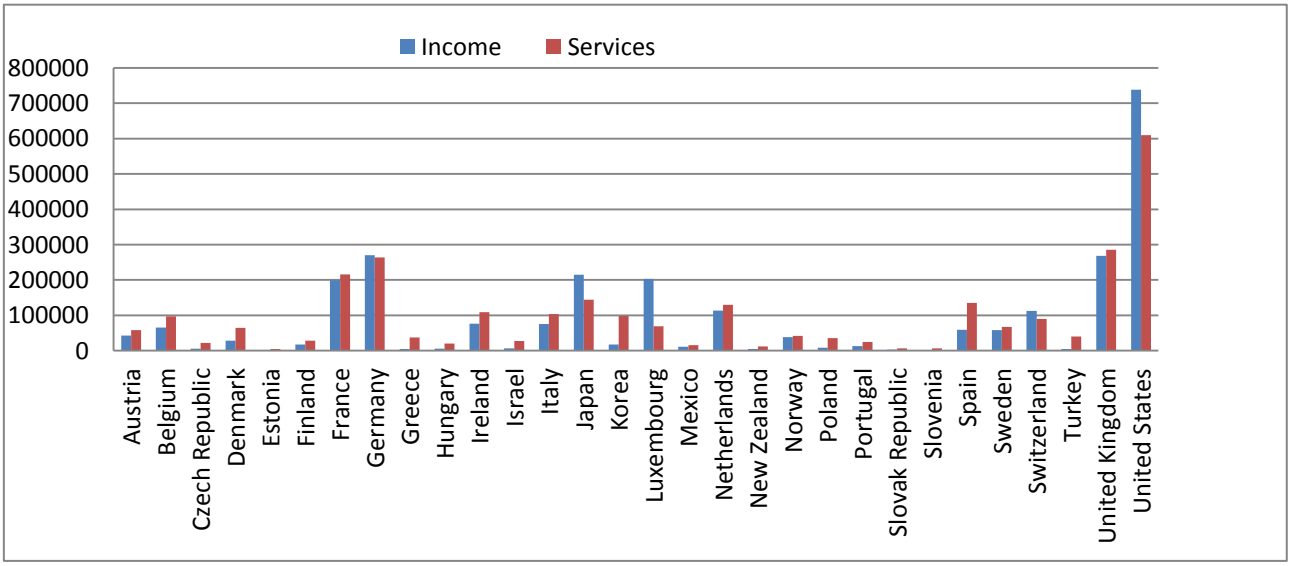
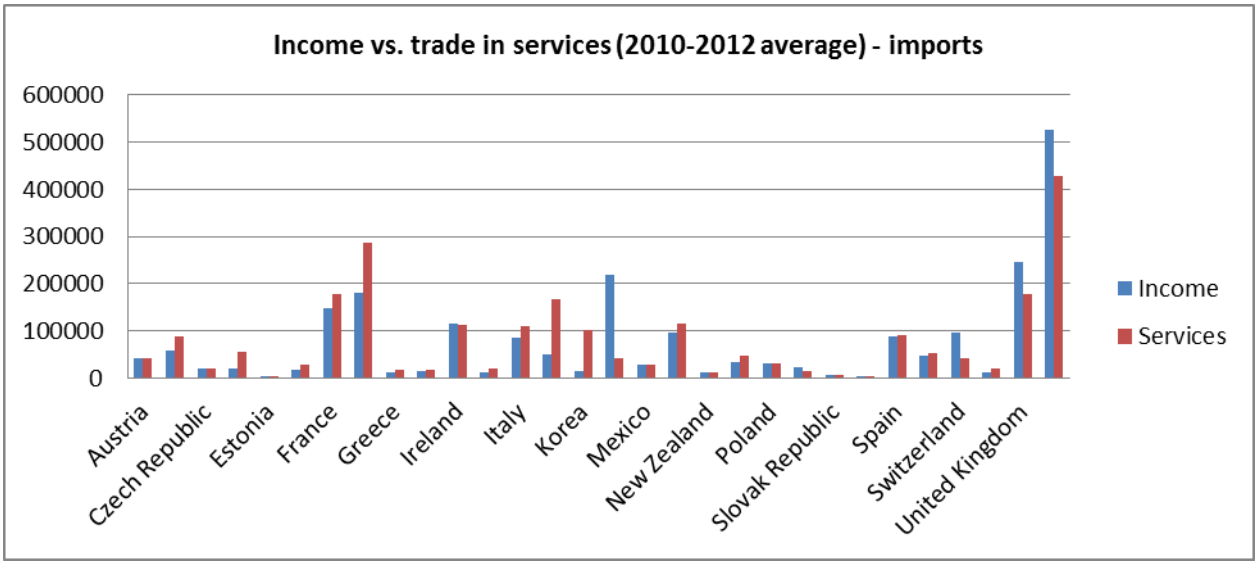


Figure 24: Primary Income payments versus Imports of Trade in Services (average 2010-2012) USD millions



To date the TiVA database does not differentiate value-added generated in an economy's exports between foreign owned and domestically owned firms. But the ability to do this forms an important strand of the future work-programme of the TiVA initiative[10].

Value-added essentially reflects two main components[11] - (i) operating surplus (including mixed income), or compensation for capital, and (ii) compensation for employment. While the latter component largely reflects the direct benefits that accrue and 'stick' within the economy through production[12], the case is not so clear for the former, where foreign affiliates are concerned.

In perfect markets the operating surplus generated by foreign affiliates is equivalent to the return on produced 'tangible' and 'intangible' capital and also non-produced assets used in production[13]. While the National Accounts of countries attribute the ownership of this capital to the affiliated enterprise the ultimate beneficiary of the operating surplus is not necessarily the affiliate but its parent. This has raised questions – often in emerging economies but also in developed economies- about the actual benefits of foreign MNEs to the host economy.

Particularly important in this regard are transactions in intangible assets: those recognised as produced in the System of National Accounts (such as research and development, software, etc.) non-produced (such as brands) and also other knowledge-based capital (such as organisational capital, e.g. management competencies). Often, in international trade in services statistics, payments for the use of these produced and non-produced assets are recorded as purchases (intermediate consumption) by one affiliated enterprise from another. But often they are not, and instead they are implicitly recorded under primary income payments (such as investment income, or reinvested earnings in the Balance of Payments). In the former case, the value-added of the affiliate using the assets is lower, as the value-added generated through ownership of the asset appears on the accounts of the affiliate that owns it. In the latter case, however, the value-added of the affiliate using the asset is higher (as there is no intermediate consumption) with the 'ultimate' beneficiary (the owning affiliate) recording no value-added but instead recieving

[10] See also OECD-WTO TiVA concept note http://www.oecd.org/sti/ind/49894138.pdf

[11] It also includes taxes and subsidies on production.

[12] Not all labour compensation will necessarily stick in the economy, for example for cross-border workers.

[13] Such as land and other intangible assets not recognised as Intellectual Property Products in the SNA.

primary income from the using affiliate. In both cases, however, the ultimate 'income' generated by the asset ends up on the books of the owner.

Furthermore, the distinction between the two scenarios above is often clouded by (a) the ability of the statistical information system to record the flows and (b) transfer pricing and tax incentives of MNEs. So, while the TiVA estimates consistently reflect the way these flows are recorded in a country's national accounts and, so, accurately reflect the share of a country's recorded overall value-added that is generated by its exports, they do not necessarily entirely reflect how countries truly benefit from GVCs, since part of the value-added that is generated does not remain in the economy but is repatriated to parent enterprises. Indeed, in some countries where foreign affiliates generate significant value-added and repatriate significant profits back to parent companies, such as Ireland, the policy focus has switched from GDP to GNI.

This is not however an issue singularly related to knowledge-based assets. Transfer pricing is also prevalent in transactions related to goods. Moreoever, notwithstanding these issues, significant income flows generated by an affiliate can be repatratied to parents via other means, for example as interest payments.

Measuring these flows can provide an important narrative on the links between GVCs and foreign direct investment (as well as providing for estimates that overcome differences in statistical practices for recording trade related to knowledge-based assets). This requires more detailed data beyond the current purely industry-level information in the TiVA database. What is required are additional breakdowns of firms classified on the basis of their ownership (e.g. domestic firms and foreign affiliates, but also exporters and non-exporters).

But these flows are typically not available on a bilateral partner country basis, let alone a partner country-industry basis, which is what is needed to analyze trade in income analogously with trade in value-added.

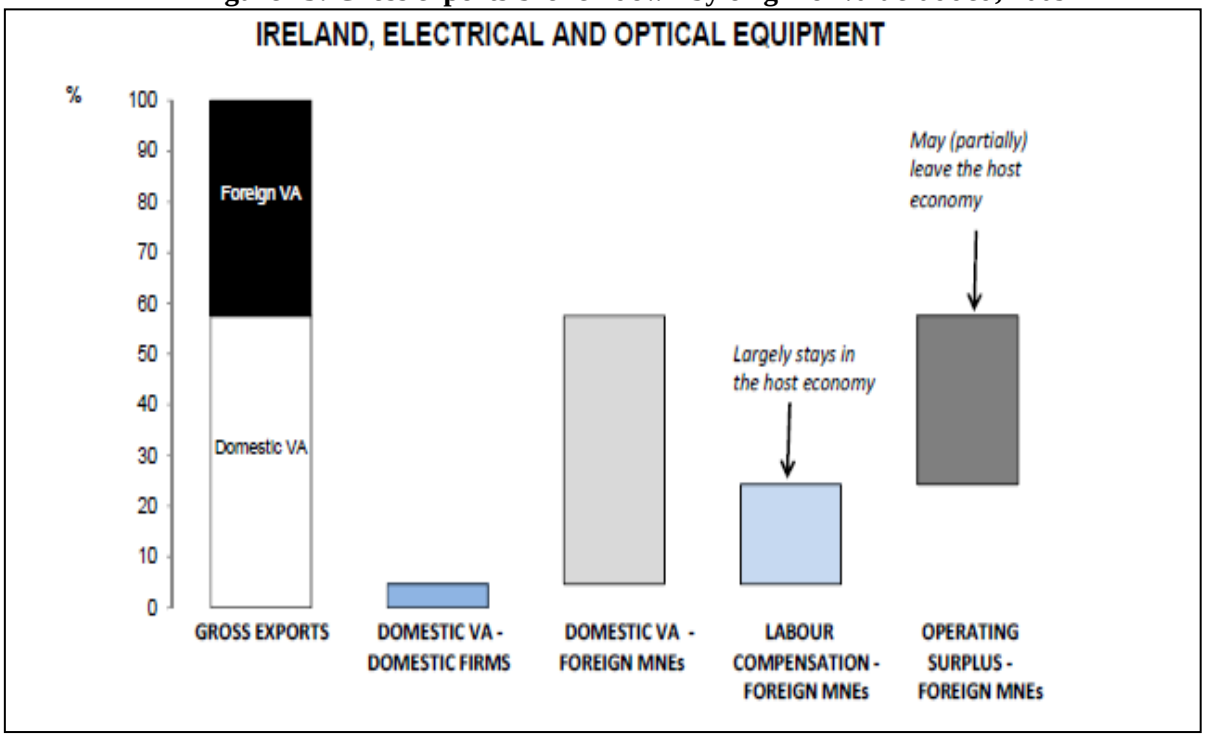
Recording these flows, therefore, is crucial. Part of the solution lies in producing supply-use tables (or indicators) that capture foreign ownership. Clearly it is unlikely that it will be feasible to produce supply-use tables that capture foreign ownership by country for all of the owners of the affiliates. But a separate breakdown of activities in a supply-use table that differentiates between foreign- and domestic-owned firms should be feasible, as it relates to confidentiality rules and burdens.

By supplementing this with bilateral trade in primary income statistics (a from-whom-to-whom framework) broken down by type of income (in particular, reinvested earnings and interest), it should be possible to create extensions to the trade in value-added accounting framework by treating the primary income flows (and components) as if they were services produced by parent companies.

Some of the tools to do this already exist. Foreign affiliate trade statistics (FATS) can be combined, for example, with information in supply-use tables that shows breakdowns based on ownership. And there is also scope to link this further to balance-of-payment (BoP) data flows. The OECD Expert Group on Extenddd Supply Use tables will be exploring these issues (see below).

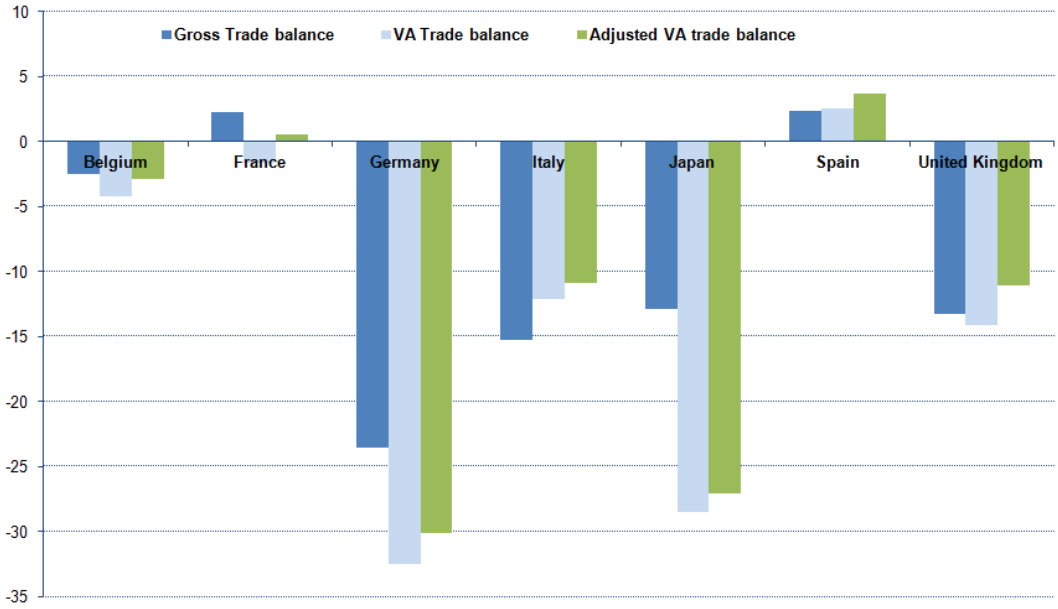
Figures 25 and 26 below provide an illustration of the potential impact this may have on our understanding of trade relationships and indeed investment. Figure 25 breaks down exports of electrical and optical equipment in Ireland into their source components, illustrating the significant differences that could arise in estimates of the domestic content of a country’s exports when one takes an income as opposed to a pure value-added perspective.

Figure 25: Gross exports broken down by origin of value-added, 2009



For illustrative purposes only, Figure 26 reflects the impact such an approach could have on our understanding of trade relationships. It assumes that the operating surplus generated by US owned affiliates in Ireland is considered as being equivalent to 'value-added' generated by US firms. These flows are then treated as exports from the US to those countries consuming the US affiliate exports from Ireland, revealing not insignificant changes in bilateral trade positions. For example for France the trade deficit in value-added terms becomes a trade surplus again, which is what gross flows show.

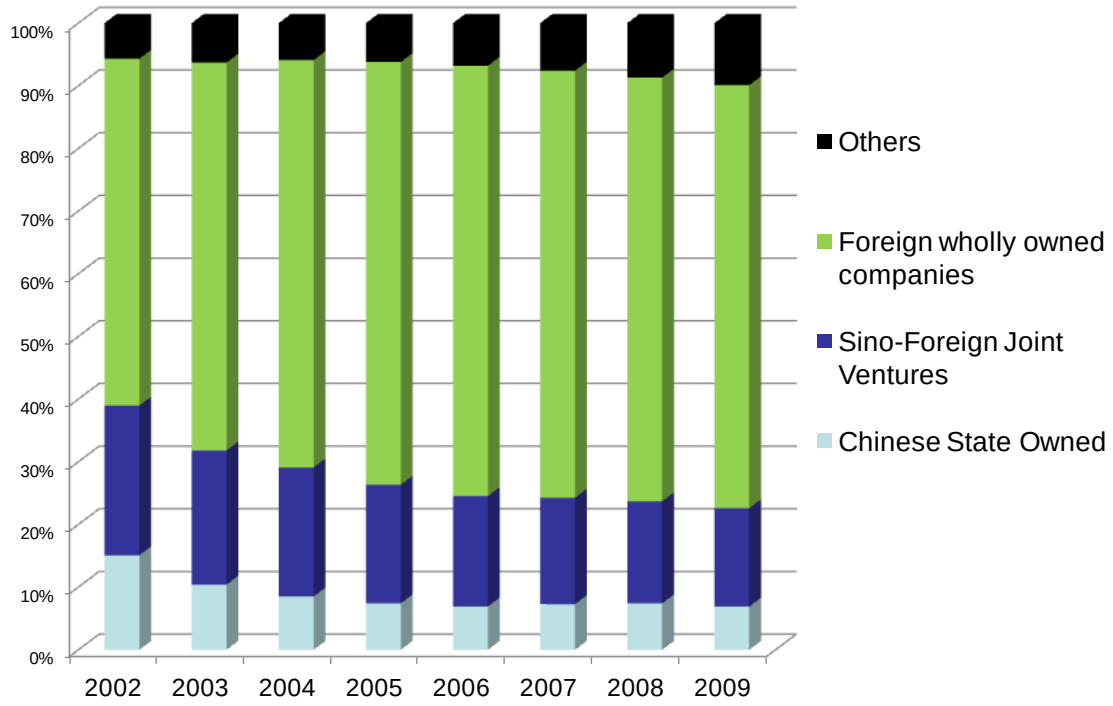
Figure 26: 'Trade balance' adjusted for US affiliates' exports from Ireland, $US bn, 2009



Source: OECD calculations based on the OECD/WTO TiVA database and the OECD AMNE database

To further illustrate the potential impact of accounting for these flows between multinationals about 70 percent of China's gross high-tech exports were made by foreign affiliates in 2009 (Figure 27). Further between 1995 and 2007, Japanese foreign affiliates increased their employment in China eightfold, from just over 100,000 employees to more than 1,000,0000, and in Thailand fourfold, from over 100,000 to over 400,000; the pattern was similar in other Association of Southeast Asian Nations (ASEAN) countries, such as the Philippines, Malaysia, and Indonesia. And from 1995 to 2009, Japan's primary income trade surplus increased by around $100 billion, more than offsetting the $50 billion reduction in its gross trade surplus over the same period.

Figure 27: Chinese High Tech Exports by Ownership (%)



SOURCE: Ministry of Commerce, China.

SUPPLY USE TABLES FOR 21ST CENTURY PRODUCTION

As illustrated above the increasing globalisation of production raises some challenging questions for national statistics, and fundamental and long-standing axioms regarding the nature of production and the way that statistics are necessarily compiled may warrant a rethink. Certainly the evidence suggests that long-standing assumptions concerning homogeneity of firms within industry classifications could be reviewed. The evidence also suggests, particularly for those countries with FATS and TEC data, that an optimal level of aggregation may be achivebale without any significant increase in compilation of reporting burden. But of course such reconsiderations need also take into account constraints such as burdens and confidentiality.

From the evidence presented above however there appears to be sufficient scope to consider, at the very least, aggregating firms on the basis of their degree of integrations within GVCs, whether the defining charactertistics takes some pratical form that specifically groups firms on the basis of their production model (e.g. processing firm, factoryless production), their import/export intensity, or indeed other more general administrative characteristic (such as size, ownership), each of which designed with a view to improving homogeneity.

Suuply-Use tables have become the conventional route with which coherence estimates of the national accounts, trade and production are now systematically compiled in many countries and lend themselves as being the ideal way in which to explore these issues. To respond to these challenges the OECD has created an Expert Group on Extended Supply-Use tables, who will be expected to deliver their findings in the next two years.

An extended framework for Supply-Use tables (see the tables below) that would address the various issues raised above can be summarised as follows – it would entail a breakdown of current industry classifications (2-digit ISIC Rev 3) into one/some/all of new sub categories that aggregate firms on the basis of (a) ownership, (b) export intensity and (c) size. Further breakdowns to be explored could include import intensities. Similar breakdowns to those adopted for industries will also be required for the product (rows) of the Supply-Use tables, which will be non-trivial.

While large parts of the extended Supply-Use tables could be created within the OECD using information currently available from AMNE and TEC statistics, together with detailed structural business statistics, this could only be done with a number of assumptions, and only for a limited set of countries. Moreover, as described above, the challenges presented by globalisation for statistics have ramifications that go beyond international statistics, such as TiVA, but they also impact on national statistics, where extended Supply-Use tables could play a significant role in creating a fully coherent picture of official statistics on production, trade and foreign direct investment.

The format of the extended Supply-Use tables shown below are illustrative, and an optimal breakdown need not be the same for all countries. As highlighted above and stressed here again, different criteria could be used to aggregate units based on the underlying statistical information system and prevalence of the types of firms engaged in GVCs. For example, as part of the TiVA initiative, a consortium of institutions led by the Chinese Ministry of Commerce has developed Input-Output tables for China that break down industries into three additional categories: *Processing firms*, *Other Exporters*, and *Firms producing goods and services for domestic markets*. More recently work has been conducted to extend this to looking at ownership[14]. Mexico has also recently extended its Supply-Use tables by

[14] Ma, Hong, Zhi Wang and Kunfu Zhu, 2013, "Domestic Value-added in China's Exports and its Distribution by Firm Ownership," paper presented at the AEA meetings in San Diego.

including a new category of *Global Manufacturing* and Costa Rica is considering the possibility of producing extended tables that separately categorise firms operating from Export Zones.

One additional point is worth making here. TEC and AMNE data use the 'enterprise' as the statistical unit. By contrast, the 2008 SNA still gives preference to establishments. There is however an increasing recognition that the arguments for such a preference have been weakened because of the changing nature of production and indeed because of the changes made in the SNA itself regarding economic ownership. This is further recognised in the 2008 SNA Research Agenda, where explicit references are made for the need to reconsider the establishment preference, taking into account the 'basic source information' and changes in the underlying accounting principles of 'Input-Output' tables, whose emphasis has moved from a *physical* perspective to an *economic* perspective. Such a view is further strengthened with the increasing tendency to develop *industry by industry* Input-Output tables, which forms the basis of the TiVA initiative.

Supply Table

An illustrative example of an extended Supply table is shown below. It follows the standard presentation for conventional Supply tables. The key difference reflects the criteria used to aggregate firms. Conventional Supply tables aggregate firms according to their industry classification, partly reflecting the assumption that these firms are broadly homogeneous. Attempts to better capture heterogeneity typically proceed by having more refined aggregations industries (i.e. 3- or 4-digit ISIC rather than 2-digit). However, an objective of the Expert Group on Extended Supply Use tables will be to determine whether this is necessarily optimal, particularly with regards to the challenges, described above, presented by global production.

The example continues to aggregate firms using the conventional manner of industrial classifications systems (ISIC or equivalent) but tackle 'heterogeneity' by adopting additional aggregation criteria that focus on a firm's 'exposure' to global production, such as: ownership - foreign or domestic; export intensity; size; and also although this is not described below for simplicity, a firms' import intensities.

						Imports fob									
			Domestic		Foreign		Domestic		Foreign						
			Exporter	Non-exporter	Exporter	Non-exporter	Exporter	Non-exporter	Exporter	Non-exporter					
			Size		Size		Size		Size		*of which*	**Margin**	Import duties		Total supply
Domestic	Exporter										*Residents expenditure abroad*	By margin industry: wholesale, retail, transport etc	By importing unit characteristic	Taxes and subsidies on products	
	Non-exporter	Size													
Foreign	Exporter														
	Non-exporter	Size													

Use Table

Similarly, an extended Use table could be explored using the same classification criteria, as shown below.

The table includes a number of additional items that could be incorporated and that could provide evidence for other policy issues (discussed above), such as Jobs, and Trade in Income related to Foreign Direct Investment, and also Base Erosion rofit Shifting (BEPS) and Environmental Issues.

			Domestic		Foreign						Exports		
			Exporter	Non-exporter	Exporter	Non-exporter	HHFC+ NPISH	GGFC	GFCF	Inventories	Domestic	Foreign	of which
			Size		Size						Size		
Domestic	Exporter	Size	**USE - broken down by domestic and imports**										
	Non-exporter												
Foreign	Exporter	Size											
	Non-exporter												

Value added
of which *C of E* *GOS*
Output
Property income payments to abroad
of which *Interest* *Distributed income of corporations* *Reinvested earnings on FDI,* *Investment income disbursements*
Property income receipts from abroad
of which *Interest* *distributed income of corporations* *Reinvested earnings on FDI,* *Investment income disbursements*
Current taxes on income, wealth etc
Employment
Hours worked
Emissions

	non-residents expenditure
	merchanting

Naturally, the more detailed the breakdowns of firms the greater the likelihood that confidentiality constraints may be breached. Hence, the importance to arrive at an optimal level of disaggregation that satisfies confidentiality constraints. For example, while size class dimensions are particularly important to understand how small and medium enterprises integrate (indirectly) within GVCs, it seems more likely than not that for most countries such information will be too demanding, particularly as information on the intermediate consumption of the output of small firms by large firms will not be typically available without specialised surveys. Challenges are also likely to be faced by countries in developing aggregations based on the import intensities of firms, where data are currently scarce, but the approach used by TEC to link trade and business registers has demonstrated that this situation could be improved. Additional challenges arise for recording transactions between domestic and foreign owned firms.

Annex B provides a number of additional issues that will be explored by the Expert Group on Extended Supply Use tables.

MAINSTREAMING ICIO AND TIVA

From the very beginning one of the key objectives of the TiVA initiative has been to raise awareness of the importance of new statistics that are better able to reflect the increasingly global nature of production, driven by what is often characterised as the 'international fragmentation of production' or more commonly, Global Value Chains (GVCs). But a second, and equally important, objective has been to mainstream the production of TiVA indicators into the global statistical information system and in turn to reinforce the significance attached to improving national capacities to develop the core national inputs needed to produce TiVA estimates of the highest quality.

Whilst this first objective has been largely met, the second will take some time. However, with high-level ministerial support[15], and strong backing from national statistics institutions at the OECD's 2014 Committee for Statistics and Statistical Policy, the OECD and WTO have dedicated resources to continue to produce the TiVA database and the underlying ICIO on a permanent basis. The next release of the TiVA

15 http://www.oecd.org/mcm/2014-ministerial-council-statement.htm, http://mddb.apec.org/Documents/2014/SOM/SOM2/14_som2_049anx05.pdf http://www.oecd.org/about/Stocktaking%20Seminar%20on%20GVCs_Outcomes.pdf

database is scheduled for November 2014, at which point the underlying ICIO will also be released. Thereafter the TiVA database and the ICIOs will be updated every year, with continuous improvements for quality (timeliness, country coverage, homogeneity, bilateral trade, jobs, skills and 'income').

This is a big undertaking but the momentum of the TiVA agenda has helped to highlight the importance of moving in this direction and has helped build momentum at the national level and other international organisations, such as APEC, Eurostat UNECLAC, UNESCWA, and USND, amongst others, who have expressed strong interest in collaborating with the OECD-WTO TiVA initiative, in addition to those agencies and bodies who have provided strong support and assistance to the initiative thus far, such as USITC, IDE-JETRO, WIOD and MOFCOM, as well as scores of national agencies.

The Extended Supply-Use table presented above will form an important driver of this work going forward but notwithstanding these developments much can be done by countries now to improve quality and to facilitate their inclusion in the TiVA database and the ICIO. Annex A provides an overview of the type of information required, and countries are invited to contact tiva.contact@oecd.org or the authors if they require more information on how this could be achieved.

ANNEX A

National Data Requirements: Ideal data set <u>for current TiVA requirements</u>

In an ideal environment countries would be able to provide the following annual data, on a timely basis (preferably one to two years after the reference period to which the data refer), with data going back to 1995.

- An annual time series of Supply-Use tables, with **at least** the industry (and equivalent product) coverage described above in Table 2.
    - The tables should be compiled in accordance with the 1993 or 2008 SNA. If data are compiled according to the 2008 SNA countries should provide supplementary information describing how merchandise trade statistics have been adjusted to reflect the recent changes introduced in the 2008 SNA for 'Goods for Processing'. Additional information should also be provided describing adjustments made for 'Merchanting'.
    - The SNA recommends that all Intermediate Consumption transactions in Use tables are recorded on a "Purchasers Price' basis. For the purposes of TiVA all intermediate consumption transactions should also be made available on a "Basic Prices' basis, with complementary tables showing the difference between Basic Prices, split into a "Distribution Margin' component and a "Taxes and Subsidies' component. Ideally these two sub-components should be made available at a detailed as level as possible. So, for example, the Distribution component can be split separately into Margins provided by Wholesalers, Retailers, Transport and Other industries as relevant. Similarly Taxes and Subsidies could be split by the specific type of tax or subsidy, in particular any import taxes.
    - Similar breakdowns of Purchasers Price transactions – into at least a Margin and Taxes/Subsidies component - should also be provided for all categories of Final Demand (Household Final Consumption, General Government Final Consumption, Non-Profit Institutions Serving Households, Gross Fixed Capital Formation, Valuables, Changes in Inventories and Exports).
    - The Use table should be split into two components: A domestic component showing all purchases of goods and services provided directly by domestic industries; and an Import component, showing all purchases of imported goods and services.
    - Within the Supply-Use table: Residents expenditure abroad should be shown separately as part of total imports and broken down into specific products. Non-Residents expenditure in the host economy should also be shown separately and also broken down by specific products.
    - The Supply part of the Supply-Use table must include the "Make' matrix which shows the types of products produced by industries in Basic Prices. Supplementary columns for Imports, Distribution margins, and Taxes and Subsidies should also be included, as specified in the SNA.
    - Imports in the Supply column should be provided on both a *C.I.F* basis, with total imports on a F.O.B basis. The *C.I.F F.O.B* adjustment should be broken down into a complementary column allocated to each specific product such that all transactions in

goods are shown on a F.O.B basis. If possible any information on the country source of the C.I.F. component should be provided.

- Bilateral Trade in Goods (Merchandise Trade Statistics) should be produced on a detailed HS 6 digit basis. Transactions should be shown on both an F.O.B and C.I.F. basis.

    - Data should be made as coherent as possible with partner countries.
    - Data should also be made available on an aggregated basis at the same product level used in the Supply-Use tables. The concordance relationship used to aggregate HS products to the more detailed product groupings in the Supply Use tables should also be provided.
    - A description of any adjustments made to HS import and export merchandise trade data to arrive at the Import and Export column data used in the Supply Use tables should be provided, in particular for transactions concerning 'Goods for Processing' and 'Merchanting' if relevant.
    - Confidential trade: In some countries, disclosure rules suppress six-digit HS components in and also higher two-digit HS chapter levels. This should be avoided where possible by adopting other forms of preserving confidentiality, such as suppressing another six-digit category.
    - Information on Re-export data should also be provided - by product, origin and destination - differentiating between transit trade and trade passing through entrepots where distribution margins are often incurred.
    - HS codes, and thus reported trade in COMTRADE, cannot differentiate between new and old capital goods (such as second-hand aircraft, ships, and cars). Any additional information that can be provided to identify these flows should be provided.
    - Unidentified scrap and waste: Certain types of waste and scrap do not have separate six-digit HS codes—e.g., PCs and other electrical equipment exported (often to developing countries) for recycling. Any additional information that can be provided to identify these flows should be provided

- Bilateral Trade in Services data, at least at the 2-digit level described in the Extended Balance of Payments Services Classification (EBOPS 2010) should be provided.

    - Data should be made as coherent as possible with partner countries.
    - Additional information should specify whether data follow the Sixth Edition of the Balance of Payments and International Investment Position Manual (BPM6) or BPM5.

- Industry by Industry Input-Output tables on at least a five yearly basis.

    - The tables should be compiled in basic prices and provided with a separate Import flow matrix, consistent with the Import matrix derived from the Use tables above.

- All data should be consistent with published National Accounts at the time of their release. Any significant revisions made to the National Accounts but not to the Supply-Use or Input-Output tables should be flagged-up.

National Data Requirements: Minimum data set <u>for current TiVA requirements</u>

The bare minimum for a country's integration into the TiVA dataset is the existence of an official national Supply-Use or Input-Output table.

- Tables should be made available using the industry breakdown shown in Table 1. Where this is not possible every attempt must be made to ensure that industries at the 2 digit ISIC level of classification are not grouped together when both industries are significant exporters (more than 5% of total exports).
- To supplement the table, countries should also provide a time-series of value-added and gross output by industry at as detailed a level as possible. This information should be at basic prices.
- The table(s) must be for a relatively recent period. No later than 2000.

It is important to note that whilst the minimum data requirements will allow inclusion in the TiVA database, the more data provided, and the closer to the ideal data requirements, the greater the quality of TiVA data for the country in question.

ANNEX B

Trade in CO2 (and other emissions)

One additional extension that follows from the accounting framework presented above and that is included in the Extended Supply Use table is carbon footprints. Carbon footprint calculations are typically estimated using IO tables (Ahmad and Wyckoff 2003).

Incorporating capital flows

Other areas where extensions to the accounting framework would be desirable include the contribution made by capital more generally. Because of the way capital (gross fixed capital formation) is recorded in the accounting system analyses that look at trade in value-added do not fully capture how production across countries is linked and how capital goods (and services) produced in one country contribute to the value-added in another. For example, all the value-added exported by Japan in producing machinery for manufacturers in China will be recorded as Chinese imports from Japan. But, arguably, the capital service values embodied in the goods produced and exported by China should show Japan as the beneficiary. This requires high quality capital flow (and capital stock) matrices.

Distribution sectors and trade

One final area of work that merits attention concerns the value added by distributors through sales of final imported goods. The estimates of trade in value-added do not reveal how cheap imports are also important to retailers, who are able to generate domestic value-added through sales to consumers. Tariff measures will necessarily impose additional costs on these goods which, all other things being equal, could suppress demand and so in turn lead to lower value-added in the distribution sectors. The OECD is also considering how these estimates could be incorporated within its accounting framework, using margin rates for all products in national supply-use tables, and through this usage motivating the further development of such data.

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