Working Party on International Trade in Goods and Trade in Services Statistics

COLLECTING NEW INDICATORS OF EXPORTING AND IMPORTING FIRMS

To be held on 22-24 October 2012
OECD Headquarters

This document for item 9.1 of the agenda presents for information and discussion, the status of the OECD TEC database as well as plans for collecting new indicators of exporting and importing firms.

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COLLECTING NEW INDICATORS OF EXPORTING AND IMPORTING FIRMS

I. Introduction

1. Although traditional international trade statistics is very useful to understand the bilateral trade relationship between countries, they do not offer any insights on characteristics of actors engaged in the trade. Statisticians have been using micro data from trade and business sectors to identify characteristics of enterprises involved in the international trade for the past couple of decades. OECD jointly with the Eurostat has also been disseminating such information, i.e., characteristics and roles of firms engaged in international trade, via the OECD-Eurostat Trade by Enterprise Characteristics (TEC) database. The OECD-Eurostat TEC database contains aggregated information (due to the confidentiality) on the number of enterprises engaged in international trade and trade values, which are further broken down by four enterprise characteristics, i.e., size, economic sector, partner zones and countries, and number of partner countries. These statistics cover virtually the entire business population of a country, in particular those that are engaged in international trade, and are produced with minimum additional cost, as it is compiled by linking information in trade and business registers already existing in the country.

2. Recently, more detailed information has been requested by the users in order to have a deeper understanding on the nature of global value chains (GVC) such as its magnitude, directions, risks involved if any, etc. Due to an increasing scale, speed and complexity of GVC in world economy, traditional measures of key economic activities (e.g., trade and its balance, employment, productivity, competitiveness, etc.) may lead to improper policy decisions. For example, a possibility of aggregation bias can be resulted from treating domestic-oriented and export-oriented firms homogenously. The fact that firms active in trade are different in their technology (e.g., more capital and skill intensive, more imported intermediate inputs) and in capital/governance structure (e.g., adoption of modern management techniques, including outsourcing/off-shoring, participation of foreign capital leading to repatriation of profit, more intra-firm trade without change of ownership, etc.). Splitting the Input-Output (I/O) tables into two parts (i.e., domestic vs. export oriented industries) would enable data compilers and users to have a clearer idea of this bias which is expected to be important, even in industrialised countries.

3. This requires creation of further links between conventional business and trade micro data or links made for TEC statistics as well as dialogue with national accounts in order to reflect the heterogeneity optimally into the official statistical system.

4. This note presents the nature of the OECD-Eurostat TEC database in the past and at present. It also explains what the current TEC database tells and what it does not, so as to identify areas where the TEC data can be enriched to meet the growing users’ needs of the globalised international community. This note then discusses why and ways in which collection of new indicators for exporting and importing firms should be carried out.
II. The OECD-Eurostat TEC database

Past and present

5. The OECD-Eurostat TEC database is the result of the collective efforts of Eurostat, the OECD, and the participating national statistical offices (NSOs) in disaggregating trade values (i.e., imports and exports) according to the characteristics of the trading enterprises. The TEC database can be seen below and is accessible through the OECD website: [http://stats.oecd.org/Index.aspx >> Globalisation >> Trade by Enterprise Characteristics](http://stats.oecd.org/Index.aspx >> Globalisation >> Trade by Enterprise Characteristics).

6. It is important to acknowledge that the TEC database, in much the same way as conventional business, or business demography statistics are presented, does not show values for individual enterprises, but displays only aggregated micro-data. Individual level data are in principle available in the participating NSOs, with varying degrees of accessibility and confidentiality according to legal restrictions governed by each participating country.

Data Availability at present

7. The TEC database comprises of TEC data with an annual frequency from 2003 to 2009/11 with a varying degree of coverage from a country to another. As Table 1 shows, the TEC database comprise of TEC data (in either ISIC rev. 3 or Rev.4) for 25 OECD member countries (6 non-EU OECD member countries - i.e. Canada, Israel, New Zealand, Norway, Turkey, and the United States; 19 EU OECD member countries – i.e. Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, and Sweden) and 6 non-OECD EU member countries (i.e. Bulgaria, Cyprus, Latvia, Lithuania, Malta, and Romania). TEC data for 25 EU Member States are collected and supplied by Eurostat.
8. TEC data between 2003 and 2007 are presented according to ISIC Rev. 3.1, while ones from 2008 are classified in ISIC Rev. 4. EU Member States display trade values and number of enterprises for intra- and extra-EU partner zones separately. As the Eurostat’s TEC guidelines do not yet include the matching of intra- and extra-EU data sources at the level of the trading enterprises, total trade values (intra-plus extra-) are aggregated by the OECD. However, it is not possible to compute statistics on the number of enterprises for total trade due to the possibility of multiple counting of the number of enterprises. Annex 2 summarises the data available in the TEC database. To date, regarding TEC data in ISIC Rev. 4, data are available up to 2010 for all countries except Turkey whose data are up to 2011.

9. Even though data is presented at a fairly aggregated level, with the maximum level of disaggregation never exceeding two digit level of the relevant classification (either products or economic sector) and four enterprise size classes, it can nevertheless collide with country’s confidentiality rules. To ensure compliance with confidentiality rules, including secondary confidentiality, some values have been suppressed. These cells are identified with the control code “C”.

Table 1. Countries listed in OECD-Eurostat TEC database and availability of TEC data

<table>
<thead>
<tr>
<th>Countries listed in TEC database</th>
<th>ISIC Rev3</th>
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</table>

Note: Countries underlined mean those countries listed in TEC database but no TEC are available,
Blank means those countries not listed in TEC database.
Yes: all data are available. No: No data are available; Yes-: some data are available.
The Historical Roles

Eurostat

10. In the mid 1990s, Eurostat set up a Task Force with an aim to develop linkages between trade and business registers and to compile new indicators based on this linkage. The introduction of the Intrastat system in 1993 and of the Business Register Regulation¹ favoured this linkage exercise by setting up a basis for a systematic recording of intra-EU traders, and by harmonising business registers across EU Member States.

11. The first centralised pilot study to test the feasibility of establishing these linkages was launched in 2002. The “Standardisation Exercise”, as it was called, aimed at testing a harmonised methodology, classification and breakdowns. The Eurostat conducted four pilot studies during the reference years of 1999, 2002, 2003, and 2005. EU Member States undertook this linking exercise and provided Eurostat aggregated results (no data on individual enterprises are transmitted to Eurostat.

12. Until the reference year of 2008, EU Member States were asked to compile these data on a voluntary basis. New Intrastat and Extrastat Regulations, which were adopted in March and May 2009 respectively, introduced articles on the annual collection of international trade statistics by enterprise characteristics. According to the Regulations, the compilation of these statistics are mandatory from the reference year 2009 for intra-EU trade and from reference year 2010 for extra-EU trade onwards. The Regulations establish the deadline of 18 months after the reference year to transmit the data to Eurostat.

OECD

13. The success of the Eurostat’s initiative amongst its Member States to develop a database that identified the key economic characteristics of exporting and importing enterprises by linking trade and business registers motivated the OECD to carry out a similar exercise with OECD countries, in close collaboration with Eurostat.

14. The OECD aims at developing internationally comparable TEC statistics which can be used to draw meaningful comparisons and learn from countries different policy experiences and outcomes. In order to provide data that are standardised across countries to the greatest degree possible, the OECD sends out a questionnaire to its non-EU member countries requesting data along Eurostat’s methodological guidelines.

15. When compiling data for the joint OECD-Eurostat TEC database, the OECD converts NACE classifications into ISIC equivalents. Likewise, the OECD applies a correspondence to the CPA (Classification of Products by Activity) data released by Eurostat and the values displayed in TEC follow the CPC product classification. The OECD also aggregates intra- and extra-EU trade values to produce total trade values for the available indicators, similarly to the data displayed to non-EU countries. The “unknown” and “unclassified” categories for EU countries, available in Eurostat’s website, are merged together in the OECD version of the database.

16. Finally, the total number of enterprises that are economically active in each economy in the sectors covered by TEC is added to the database. This information is retrieved from the OECD Structural and Demographic Business Statistics (SDBS) database. The Metadata available in the OECD website is the responsibility of the OECD.

What does it tell?

The Structure of the OECD-Eurostat TEC Database

17. The OECD-Eurostat TEC Database contains information (data and metadata) on annual international trade flows according to characteristics of trading enterprises. It displays two indicators, the number of enterprises engaged in international trade and trade values (i.e., exports and imports), according to the following enterprise characteristics:

- Size;
- Economic sector;
- Partner zones and countries; and
- Number of partner countries.

18. The database also offers information on the propensity to import and export of a country’s enterprises and shows the concentration of trade flows around the large import and export enterprises. Trade values, which are always presented separately for export and imports, are also disaggregated by the economic sector of the trading enterprise and by the type of commodity being traded. Data is organized in five separate datasets:

1. Trade by Size Classes;
2. Trade by Top Enterprises;
3. Trade by Partner Zones and Countries;
4. Trade by the Number of Partner Countries; and
5. Trade by Commodities Groups and by Economic Activity.

TEC by Size Classes

19. This dataset displays the number of exporting and importing enterprises and their associated trade values disaggregated simultaneously by economic sector (2-digit ISIC). The dataset is presented in five size groups of the trading enterprise (i.e., 0-9, 10-49, 50-249 and more than 250 employees, and total).

20. The Chart 1 shows data for 2008 for all countries except for Turkey used 2009 data. Chart 1 shows ratio of number of exporting enterprises to total number of enterprises. The total number of enterprises taken as reference for the numerator (number of exporting firms) and denominator (total number of enterprises) is the sub-total of the economy comprising industry sectors and business services, excluding hotels/restaurants and financial sectors (ISIC rev.4 B to N, excluding I and K). For Canada the numbers of exporters for size class 0-9 and 250+ exclude confidentialised data for sector H (364 firms).

21. For non-EU countries (i.e., Canada, Turkey and USA), the figures are total trade, while intra- and extra-EU trade for EU Member States. EU average in Chart 1-1 includes the figures of Austria, Denmark, Estonia, Finland, France, Hungary, Italy, Luxembourg, Poland, Portugal, Slovak Republic, Spain, Sweden, United Kingdom, Latvia and Lithuania. The total number of enterprises taken as reference for the numerator (number of exporting firms) and denominator (total number of enterprises) is the sub-total of the economy comprising industry sectors and business services, excluding hotels/restaurants and financial sectors (ISIC rev.4 B to N, excluding I and K). The shares of exporting firms in Chart 1-1 are between about 2 and 6 % of total number of firms. Chart 1-2 shows that larger firms have a higher propensity to export in 2008 and extra-EU traders for EU countries.
**TEC by Top Enterprises**

22. This dataset presents the value of exports and imports by the top exporting and importing enterprises. The dataset is presented in seven groups of Top 5, Top 10, Top 20, Top 50, Top 100, Top 500, Top 1000, and whole enterprises in the economy. Values represent total trade for non-EU OECD Member States and are broken down in intra- and extra-EU for EU Member States. The concentration of trade around the top exporting and importing enterprises is disaggregated along three economic sectors: “industry”, “trade and repair” and “other service sectors”. Total values for the whole economy are also displayed.
23. Chart 2 displays shares of exports of top exporting firms in 2009. The exports of Top 100 enterprises account for large shares of 30-40 percent of total exports. The top enterprises of the US show the lowest shares of the exports regardless of economic activities, while they are highest for Canadian top enterprises. The shares of Top 100 enterprises are highest for other service sectors.

**TEC by Partner Zones and Countries**

24. This dataset shows the number of exporting and importing enterprises and their associated trade values for a selected set of partner countries and zones. The partner countries comprise of all 34 OECD Members States, 7 non-OECD EU Member States and 6 BRIICS countries. The dataset is also presented for about 15 zones. The figures are displayed for the whole economy as well as broken down by three economic sectors: “industry”, “trade and repair” and “other sectors”.

**TEC by the Number of Partner Countries (by Varying Groups of Partner Countries)**

25. This dataset display the number of exporting and importing enterprises and their associated trade values by varying groups of partner countries, e.g. enterprises trading with 1, 2, 3-5, 6-9, 10-14, 15-19, and more than 20 partner countries. Figures comprise world totals for non-EU OECD Member States whereas they are broken down into intra- and extra-EU trade for EU Member States. The figures are also displayed for the whole economy as well as broken down by three economic sectors: “industry”, “trade and repair” and “other sectors”.

26. Chart 3 shows the shares of export values of exporting enterprises with one or more than 14 partner countries in three different sectors (industry, trade and service sectors) and the whole economy for Canada, Estonia, Germany, Greece, Portugal, Slovenia, Turkey, and US as well as EU average in 2009. The chart shows very distinct picture of the shares amongst countries: Germany, US and EU with higher share for firms with more than 14 partner countries; Canada and Portugal with higher share for firms with one partner countries. In US, for example, enterprises which export their products to more than 14 partner countries dominate with more than 75% for whole economy, 85% for industry or around 60% for service sector, while they are around 10% or less in Estonia.
TEC by Commodity Groups

27. This dataset presents the number of exporting and importing enterprises and their associated trade values broken down simultaneously by the economic sector of the trading enterprise and the physical characteristics of the traded commodity, i.e. Central Product Classification (CPC). Figures are disaggregated at the 2 digit level as well as total values for the whole economy. Figures comprise world totals for non-EU Member States whereas they are broken down into intra- and extra-EU trade for EU Member States.

III. Motivation for collecting new indicators of firms engaged in international trade

28. GVC is a value chain in which value-adding activities of firms are carried out in different geographical locations to bring out a product. All the activities from conception to complete production are included in the value chain such as design, R&D, manufacturing, assembly, marketing, management, and distribution as well as support to the final consumer. GVC is of particular interests as its value-adding activity spread over wide geographical areas and carried out by various firms with varying degrees of
characteristics such location, ownership, size class, intensity of trade, etc. And, thus, the production process of the firms under the GVC differs from those of the traditional firms due to the following differences:

- Sectoral differences: some sectors are more integrated into the global community than others;
- Geographical differences: different regions or countries are playing different roles in global market – produce more intermediate or final products; or more production or more consumption;
- Differences in firm characteristics: firms can sell their products in domestic or international market; firms are owned by domestic or international entrepreneur, etc.
- Differences in the use of intermediate input: firms can use a range of different types or portions of intermediate input produced domestically by them or other firms; or internationally by own foreign affiliate or other foreign firms;
- Differences in roles in the production cycle and sales of the products; and
- Differences in types of labour required: use more of physical labour or skilled labour.

29. Although GVC had been prevailing for ages, it did not receive much attention until recent decades as its impact on global community was almost negligible. GVC, however, has been proliferating for the past couple of decades with an unprecedented scale, speed and complexity. As a consequence of the accelerated GVC, heterogeneity of firms has become wider and generated a great deal of concerns on reliability and usefulness of the existing official statistics regarding emerging policy issues.

**What do conventional and TEC statistics not tell?**

30. As mentioned in the previous sections, the dynamics of globalisation poses new challenges for economic and policy analysis. The liberalisation of trade policies and capital controls, coupled with the reduction in transport, communication and information costs has led to an important reduction of trade costs and allowed a reorientation or firms’ production strategies in recent decades. As a result, production processes are increasingly fragmented and each production stage is assigned to the most cost-effective location, while ‘service links’ (transportation and communication services) ensure the co-ordination among the several stages of internationally integrated production process, a phenomena which has became known as international fragmentation of production.

31. Vertical fragmentation of the production process challenges the conventional way of compiling international trade statistics. Trade statistics record the full value of the good each time it crosses borders, including embodied intermediate goods and services. This leads to multiple counting which will be larger the more production processes are sliced into individual stages and with each stage occurring in a different country. At the same time, firms engaged in international trade may use different shares of imported intermediate input from those of the firms supplying their products only to domestic markets. In addition, the shares of imported intermediate input may be higher for the firms with larger shares of exports.

32. Although the OECD-Eurostat TEC database contains some information (e.g. data and metadata for number of trading enterprises and their trading values by economic activities and size classes), it does not fully reflect all the necessary information to capture the nature and consequences of GVC. This means that it is necessary to collect more detailed information on the enterprises engaged in international trade by extending the contents of the OECD-Eurostat TEC database to incorporate several new indicators such as value-added, output, total employment and compensation of employees, and direct imports of firms broken down by export intensity and ownership of the enterprises engaged in trade. It also means, in the longer term, the development of statistical information systems, and related outputs such as supply-use tables, that recognise the within-sector heterogeneity that exists between those firms that are
part of global production chains and those that are not. Importantly the developments are designed to build on data that typically exists and are already collected by national statistics institutes and, so, in theory, should not imply extra burdens on business respondents.

33. In order to develop the more detailed indicators on importing and exporting firms, it is necessary to have sound understanding on characteristics of exporting firms, extent of exporting firms’ integration into GVCs (i.e., how much do they import), ownership of the exporting firms, amount of value-added and employment of exporting firms. Thus, this section reviews the nature of GVC and of the heterogeneity and characteristics of exporting firms. It also discusses how exporting firms are integrated into global value chains and their ownership structures, and how GVC is linked with productivity and competitiveness, and with trade in value added.

Collection of new indicators to follow economic performance of firms engaged in international trade

34. Vertical fragmentation of the production process challenges the conventional way of compiling international trade statistics. Trade statistics record the full value of the good each time it crosses borders, including embodied intermediate goods and services. This leads to multiple counting which will be larger the more production processes are sliced into individual stages and with each stage occurring in a different country.

35. This multiple counting masks the value-added contribution made by exports as well as the identification of the products any country truly has a comparative advantage in. In order to capture this emergent feature of international trade and to gauge each country’s real contribution of the goods and services it exports, there is an increasing recognition that measures of trade in the underlying value-added embodied in a product are needed to better reflect the actual contribution trade makes to an economy, in terms of GDP, employment, etc.

36. The development of these statistics is vital for many other policy dimensions and forms the basis of the OECD-WTO initiative to measure trade in value-added terms. The use of Input-Output tables to determine the foreign content of exports at the industry level is now widespread and has the great advantage of providing a comprehensive estimate, as both direct and indirect imports (embedded in domestic inputs) are included in the calculation of value-added. However, as currently developed, the use of official Input-Output tables in analysis requires one to assume homogeneity in firms allocated to a particular industry. But global production chains challenge this assumption. It is clear that firms engaged in global production networks, particularly processing firms, have typically higher intermediate consumption of imports than those engaged in production for domestic markets. As such conventional Input-Output tables can lead to biased estimates of the contribution made by exports to overall economic growth and employment.

37. Firm-level (micro) data can overcome some of the limitations of industry level analyses by providing a finer level of detail of the sectoral aggregation in input-output tables, particularly (in the context of the analysis of trade in value-added) if the finer level focuses on creating new levels of 'homogeneity' centred around the export and import intensity of firms. But notwithstanding the incentives to produce better quality and more disaggregated Input-Output tables, additional information and indicators on the nature and economic characteristics of firms engaged in international trade would provide a significant boost to trade analysts. For example, many countries, as part of the OECD-Eurostat TEC, already produce some indicators on the characteristics of importing and exporting firms. This exercise collects information on the turnover generated through exports broken down by size class, industry and

\[2\] See [www.oecd.org/trade/valueadded](http://www.oecd.org/trade/valueadded) for OECD work on trade in value added.
partner country. For imports similar information is provided but with a more limited breakdown on the importing industry.

38. But these indicators only begin to scratch at the surface of the potential, if links to structural business statistics can be made. With these further links, information on the direct value-added of exporting firms could be created, as could information on employment, and further down the line, skills. In addition indicators broken down by whether the firms are foreign or domestically owned would also be useful. Moreover information that linked the information on importing firms with those of exporting firms would provide vital information on the nature of global production chains – importantly, for those countries that have already produced TEC statistics, this information, albeit on the basis of turnover flows, could be developed without using links to structural business statistics.

The Variables

39. In the short run, seven variables are considered to be collected. They are as follow:

- **Number of statistical units** participating or otherwise in exports. Ideally the statistical unit concept used should be consistent with that used in preparing supply-use and input-output tables in the national accounts and structural business statistics. As such the choice of statistical unit is at own discretion.
- **Value-added** valued using basic price concept generated by firms in national currency.
- **Value of exports** valued using f.o.b. concept generated by firms in national currency.
- **Output** valued using basic price concept generated by firms in national currency.
- **Total employment** of firms. The valuation of headcounts should ideally be on a Full Time Equivalent basis.
- **Total compensation of employees** of firms.
- **Direct imports** of firms valued using c.i.f. concept in national currency.

Breakdowns

40. Thus, seven variables, described above should be broken-down by industry, size class and ownership (and of course by the export intensities). Recognising that disclosure rules will restrict what can realistically be produced for public use, the following describes how the information should be prioritised:

- **Priority 1**: Industries (Preferably, ISIC rev. 4);
- **Priority 2**: Export intensities (exports as a per cent of output);
- **Priority 3**: Ownership (breakdowns into foreign/domestic ownership);
- **Priority 4**: Size Class breakdowns (preferably by number of employees).

41. As there exist no standardised breakdown for the export intensity (*i.e.*, share of output generated by exports), three different options of breakdown can be proposed as follows (with an order of preference):

- A breakdown by export-intensity quartiles: (0%, >0- 25%; >25-50%, >50-75%; and 75% plus);
- A more aggregated breakdown of export intensity (0%, >0-50%; 50% plus); or
- Firms that export (more than 0% of output is exported) and firms that don't (0% of output is exported).
Expected enhancement in data availability

42. Once the variables are collected according to the four breakdowns, noticeable improvements are envisaged for the firms engaged in international trade. At present, the OECD-Eurostat TEC database comprises statistical units, exports and import for exporting and importing firms (as well as firms of the whole economy only for statistical units) by their size classes and economic activities. As a result of new data collection, as illustrated in Chart 4, the enhancement of the data availability for statistical units in comparison with those in the TEC database are additional information on value-added and output generated by firms; total employment and total compensation of employees of firms broken down by industrial classification, size class, export intensity and ownership of the firms engaged in trade.

Chart 4. Expected data availability of enterprises engaged in international trade

43. In the long-run, using additional information, further developments can be made for statistical information systems, and related outputs such as trade in value added and supply-use tables. These statistics should reflect the within-sector heterogeneity that exists between those firms that are part of global production chains and those that are not.
## ANNEX 1: SHARES OR CONCENTRATION OF EXPORTS BY TOP ENTERPRISES (2009)

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