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ENHANCING TEC'S POTENTIAL: PROJECT PROPOSAL

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*This paper is for agenda item 7.1 and describes a number of areas where developments can be made to increase the potential of the joint OECD-Eurostat Trade by Enterprise Characteristics Database in order to meet emerging policy needs and to continue to motivate improvements in the quality of TEC data already provided. Delegates are asked to comment on the areas highlighted and to consider the feasibility and prioritisation of issues described.*

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## ENHANCING TEC'S POTENTIAL: PROJECT PROPOSAL

### 1. Introduction

1. The OECD-Eurostat TEC (Trade by Enterprise Characteristics) exercise is a joint project of the OECD and Eurostat which disaggregates trade values (imports and exports) according to the characteristics of trading firms. This is achieved by linking customs data and business statistics at the level of the firm and covers virtually the entire population of a countries' businesses, in particular those that are involved in international trade. Customs data provide volume, value and HS codes of the products traded at the 6 digit level together with the identification code of the business entities involved in the international transaction. This information is then matched with company level information available in countries' business registers; which typically also contain information on firm size and often turnover, activity (industry) and ownership. Linking these two sources of firm-level information provides a mechanism to articulate the characteristics of those firms engaged in international trade. The TEC database 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%20by%20Enterprise%20Characteristics)

2. For reasons of confidentiality, information on individual firms is not available in the TEC database and, so, information is aggregated around two key indicators, the number of enterprises engaged in international trade and trade values, which are further broken down according to the following enterprise characteristics:

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

3. Further aggregations of micro-level data, broken down by export and imports, are also provided within the database:

I. Trade by Size Classes

II. Trade by Top Enterprises

III. Trade by Partner Zones and Countries

IV. Trade by the Number of Partner Countries

V. Trade by Commodity Group and by Economic Activity.

4. Detailed information on the TEC database can be found in the forthcoming Trade Micro-data Handbook (OECD, 2011a).

5. The ability to link existing micro-data to provide new economic indicators, rather than conduct new surveys, has been an area of increasing interest in statistical offices in recent years, reflecting in part the need to minimise burdens on businesses but also the increase in computational power and demands of policy makers; and, for TEC, the policy drivers reflect the needs to better respond to globalisation. The TEC database has provided a significant improvement in this regard but considerable potential remains within the linked underlying micro-data to go further still by developing additional aggregations to those already included, whilst still abiding by statistical disclosure rules. Three areas where potential exists and where there is significant demand are:

- *Distributional information*: Size class breakdowns provide a first step in this direction but other distributional breakdowns, for example based on value-added would be of significant policy interest;
- *Additional Economic characteristics*: considerable interest exists for measures based on value-added for example;
- *Longitudinal data*: The lack of a true longitudinal perspective hampers analyses that focus on growth, productivity and demographics (e.g. entries and exits).

6. This paper proposes a plan of work aimed at meeting the increased policy demands. The paper also identifies areas where improvements in the underlying methodology currently used to produce TEC data could improve the quality and comparability of the database (for example, increased harmonisation in the underlying statistical unit used to define firms).

7. Delegates are invited to:

- Comment on the relevance of the proposed methodological work to improve international comparability of TEC data, including the two areas of research work foreseen by the OECD Secretariat;
- Establish priority areas of work in what concerns the expansion of the dataset in view of:
  - The interest of the proposed topics for your country's policy makers;
  - The feasibility of pursuing these areas of work given the current state of enterprise level trade and business databases;
  - The amount of resources required to implement the work.
- Subject to support for the development of new indicators, delegates are also asked to consider the need for more detailed guidance in the forthcoming Trade Micro-data Handbook.

## 2. Methodological Improvements

8. The TEC database is already fairly standardised across countries. But there is still scope for methodological improvements to further enhance the international comparability of the data. These are:

- Reducing unmatched data;
- Tackling confidentiality;
- Producing an indicator of the total number of enterprises in individual EU Member States (where intra and extra EU trade collection mechanisms present particular difficulties);
- Improving the comparability of trade by commodity group statistics.

***Reducing Unmatched Data***

9. The scope of coverage of traders in customs data and businesses in statistical business registers varies across countries, reflecting, to a large degree, differences in the operational (minimum) thresholds used to include businesses and the legal and administrative thresholds needed to trade and register activities. As such, some (typically small) businesses will not be captured. Any differences in the operational thresholds between the customs data and the statistical business register will therefore translate into an inability to match firms present in one source but not another. Typically this will relate to firms present in the statistical business register but not the customs register even though the firms are engaged in international trade, as the threshold for inclusion in a statistical business register are generally lower than those in customs a register. However these firms are typically small and so not likely to significantly affect the quality of the TEC results in a single country, as shown below - although much depends on the size of the operational thresholds across countries. However there are other reasons why firms present in the customs data may not be able to be matched to those in business registers, reflecting missing or incorrect information relating to the firm, or indeed, differences in the timing of updates of the various registers.

10. For OECD countries, matching rates between trade and business registers are reassuringly high, typically above or very near to 90% for the great majority of countries (Table 1). There are however some unusually low rates in some countries, mainly in relation to the number of of traders (Czech Republic and Greece for intra-EU importers and exporters and Spain for extra-EU importers and exporters). But also in terms of values, even when the matching rates for traders are not especially low, Slovenia for example has a a matching rate slightly above 60% on extra-EU import values but a rate closer to 80% for the number of traders. Germany also has low matching rates in all extra-EU trade flows for values but these are consistent with similarly low matching rates for the number of traders. Countries achieving matching rates above 90% for all indicators are Estonia, Finland, France, Hungary, Italy and Portugal, and so do Denmark, the UK and Turkey in all but one indicator, with the latter being anyway very close to the 90% threshold level.

**Table 1. Matching Rates between Trade and Business Registers**

Countries	Ref. year	Intra-EU				Extra-EU				Total			
		Imports		Exports		Imports		Exports		Imports		Exports	
		Value	Number of traders	Value	Number of traders	Value	Number of traders	Value	Number of traders	Value	Number of traders	Value	Number of traders
Austria	2009	98.0%	97.6%	95.3%	98.8%	86.0%	98.8%	92.0%	75.6%	95.4%	.	94.3%	.
Belgium	2009	.	.	.	.	.	.	.	.	.	.	.	.
Canada	2009	.	.	.	.	.	.	.	.	.	.	.	.
Czech Republic	2009	82.2%	54.5%	76.5%	54.9%	79.7%	94.8%	76.4%	82.7%	81.6%	.	76.5%	.
Denmark	2009	89.8%	96.9%	92.2%	96.7%	96.1%	97.9%	98.0%	98.4%	91.7%	.	94.1%	.
Estonia	2009	95.3%	99.7%	95.6%	99.8%	99.1%	99.9%	91.2%	99.6%	96.0%	.	94.3%	.
Finland	2009	93.7%	98.9%	97.0%	98.8%	98.1%	93.1%	97.5%	95.5%	95.3%	.	97.2%	.
France	2009	99.0%	98.4%	99.0%	99.6%	98.3%	93.6%	97.0%	96.4%	98.8%	.	98.3%	.
Germany	2009	87.0%	98.9%	88.9%	98.2%	57.5%	45.7%	64.6%	54.8%	76.6%	.	79.8%	.
Greece	2009	87.6%	63.5%	84.3%	75.6%	.	.	.	.	.	.	.	.
Hungary	2009	97.9%	100.0%	98.9%	100.0%	99.5%	100.0%	95.8%	99.9%	98.4%	.	98.3%	.
Ireland	2009	.	.	.	.	.	.	.	.	.	.	.	.
Italy	2009	96.6%	94.4%	98.0%	93.8%	97.9%	95.8%	94.4%	93.3%	97.1%	.	96.5%	.
Luxembourg	2009	99.2%	99.6%	92.7%	98.9%	85.6%	97.7%	98.3%	98.4%	95.4%	.	93.4%	.
Netherlands	2009	79.6%	98.8%	72.1%	97.8%	79.6%	81.2%	76.9%	86.0%	79.6%	.	73.2%	.
Poland	2009	89.5%	98.0%	87.5%	97.8%	86.9%	99.5%	84.4%	99.3%	88.8%	.	86.8%	.
Portugal	2009	98.0%	99.7%	99.0%	99.7%	98.3%	99.6%	93.5%	99.9%	98.1%	.	97.7%	.
Slovak Republic	2009	93.7%	99.4%	90.6%	99.2%	92.8%	97.9%	88.1%	95.2%	93.5%	.	90.3%	.
Slovenia	2009	96.3%	97.1%	78.8%	89.8%	61.3%	78.5%	81.5%	90.9%	86.1%	.	79.7%	.
Spain	2009	90.7%	78.5%	94.4%	88.4%	93.4%	58.0%	93.5%	65.2%	91.9%	.	94.1%	.
Sweden	2009	86.2%	95.4%	90.5%	95.9%	83.6%	96.0%	92.4%	96.7%	85.4%	.	91.3%	.
Turkey	2009	.	.	.	.	.	.	.	.	89.1%	89.0%	97.2%	97.3%
United Kingdom	2009	95.9%	98.4%	92.2%	98.8%	91.9%	87.8%	94.1%	97.0%	94.1%	.	93.1%	.
United States	2009	.	.	.	.	.	.	.	.	86.6%	.	88.9%	.
Turkey	2010	.	.	.	.	.	.	.	.	99.7%	88.7%	99.6%	95.2%

Source: OECD-Eurostat TEC Database.

11. In what regards OECD EU member countries, matching rates are generally higher for intra-EU trade, although the reverse is true for some countries (e.g. Czech Republic, Denmark, Poland, Portugal, Slovenia and Sweden for intra- *versus* extra-EU exporters). Contrary to previous TEC updates, matching rates for the EU are higher in terms of the number of traders than in associated trade values (Eurostat, 2010b).<sup>1</sup> On average matching ratios in trade values and the number of traders are very high, ranging between 88% for extra-EU import values and 94% for intra-EU exporters. A key concern here is that there may be some structural bias in those traders (and their value) that are included or excluded that could complicate international comparisons, especially if there is some difference in the size (value) of companies included or excluded. The assumption is typically that small enterprises are excluded but in some countries the information on the number of missing traders is higher than the linked values, indicating that the missing traders have higher than average values, which could indicate the existence of some potential, worrying, biases that work in different directions depending on the country.

12. But the notion of unmatched data extends beyond the mere ability to identify firms in both registers. For example for breakdowns by size-class a number of firms are necessarily classified into the “unknown” size-class category. This represents a sizeable share of trade flows and trading firms. For instance, in 2007, for intra-European flows, 16% of enterprises and 13% of imports (arrivals) fell into this category, while for exports (dispatches) these figures amounted to 18% and 13%, respectively.

<sup>1</sup> Exceptions are Austria, Czech Republic, France, Greece, Italy and Spain for intra-EU trade and Finland, France, Germany, Italy, Spain and the UK for extra-EU trade.

13. Some countries<sup>2</sup> however achieve matching rates of 100% or very close to it, which indicate potential scope for improving the linkage exercise. Notwithstanding the fact that this may be partly due to relatively high operational thresholds, the experience in these countries may provide useful information that could be applied more universally.

14. Against this backdrop, it would be useful to list countries' best practices in customs and business registers data and matching procedures. Business registers are largely harmonised among EU Member States. There are however, at the margin, some operational differences between the coverage of business registers, typically depending on administrative (legal) thresholds for company registration. This difference in the scope of business and trade registers is more marked in non-EU OECD countries. The difference in thresholds typically impacts on the coverage of micro and small enterprises. Whilst these are not so important in what regards trade values (as the weight of these enterprises in terms of the values imported or exported by a country are small), they will clearly lead to an underestimation of the number of micro and small enterprises engaged in international trade.

### ***Tackling Confidentiality***

15. Although TEC data is presented at a fairly aggregated level (2 digit level of CPC and ISIC classifications), in some cases, particularly in small countries, data cannot be made available due to confidentiality rules.<sup>3</sup> It's important to note in this context that the greater the number of indicators produced in the TEC database the greater the possibility of secondary disclosure which might arise through matching various aggregations, which will necessarily form an important consideration in the development and detail of extensions to TEC. A more detailed breakdown of one characteristic could come at the cost of less detail in another.

16. Notwithstanding this issue, improvements could be made in some areas to the benefit of users. One particularly important area is harmonisation in the choice of aggregation method needed to avoid confidential disclosure. For instance, as clearly indicated in TEC metadata, Israeli data for ISIC sector 15 includes values for sectors 14 to 16, ISIC sector 17 includes sector 18 and 19, ISIC sector 20 includes also sectors 21 and 22, ISIC sector 25 includes sector 25 and 26, ISIC sector 27 includes sector 28 as well and ISIC sector 29 includes sectors 30 and 31.<sup>4</sup> Some aggregations group quite dissimilar industries. For example, sector 15 aggregates food, beverages and tobacco industries, but also other mining and quarrying. To some extent how countries combine and present sectors depends partly on the relative economic importance of the sectors being aggregated but this differs across countries complicating international comparisons, and, as such, it would be useful to explore if a set of rules could be developed by which sectors could be aggregated. A related issue worth considering is whether these rules could also be developed to prioritise the various indicators. For example, aggregating information across size classes may allow the presentation of information across all sectors. These issues should form part of the TEC research agenda.

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<sup>2</sup> Estonia and Hungary achieved 100% matching rates in 2006 TEC data. In the 2011's update, focusing on 2008-2009 data (with additional 2010 data for Turkey), NSOs did not achieve 100% matching rates in all indicators.

<sup>3</sup> Confidential cells are signalled with a "C" in the TEC database.

<sup>4</sup> This aggregation refers to ISIC Rev. 3.1.

***Producing an indicator on the total number of enterprises for EU Member States***

17. Data for EU Member States is presented for intra- and extra-EU zones whereas non-EU countries report their total trade. This disaggregation makes it possible to detect differences in the structure of EU trade with the rest of the world but it does present complications for the TEC database on indicators related to the number of enterprises.

18. Although it is possible to aggregate trade values, and compute total trade flows, data expressed in terms of the number of enterprises cannot be summed up because of possible double-counting (the same enterprise can be a trader in both intra- and extra- EU trade).<sup>5</sup>

19. Against this backdrop, the direct computation of the number of trading enterprises for total (intra-plus extra-EU) would significantly contribute international comparability, and it would be useful to explore how this could be achieved. An interesting avenue of research that might be achievable in the short-term would be to separate TEC statistics by firms which i) only trade with other EU Member States, ii) export and import from within and outside the EU and iii) and those that , only trade outside the EU.<sup>6</sup>

***Achieving comparable trade by commodity groups statistics***

20. TEC V – TEC by Commodity Groups – displays trade values and the number of enterprises disaggregated by the economic sector of the trading enterprise and type of product traded, according to their CPC classification. It offers an insight into the characteristics of goods a firm exports and/or imports.

21. In order to produce this dataset, NSOs need to convert HS trade values into CPC equivalents. In principle, this conversion should be done at the HS 6 digit level to CPC 5 digit equivalents, to ensure a more accurate matching. CPC 5 digit categories should then be aggregated at the 2 digit CPC level.

22. However, even at this level of detail there is no conversion between HS and CPC (one-to-one or n-to-one relationships) and only a correspondence table (n-to-n) is available. Consequently, several HS codes at the 6 digit-level go to more than one CPC 5 digit-level, which then translates into several CPC 2 digit-level codes. Thus far, NSOs have relied in a non-rigorous matching, based on expert judgment, either independently or in consultation with the OECD. It may be useful to consider whether it would be advantageous to provide more detailed guidance here to improve comparability, even if the guidance reflects some agreed to conventions.

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<sup>5</sup> The indicators based on intra- and extra-EU traders are also not strictly comparable as the minimum threshold in the Intrastat system results in SMEs being under-represented in intra-EU trade. To mitigate this problem, EU Member States use VAT data to estimate the number of traders and trade value of the smallest traders which are exempted from Intrastat reporting. These traders account for a very limited share of the trade value – at most 3% of the total value by flow – but in terms of number of enterprises they consist of the majority (Eurostat, 2010b). Albeit not perfect, the inclusion of VAT significantly improves intra-EU trade figures.

<sup>6</sup> Further, splitting trade values and the number of enterprises into intra- and extra-EU groups of countries impedes comparability over time, as the perimeter of intra- and extra-EU zones evolves over time with more (trade partner) countries joining the EU. In 2005, when the TEC project was initiated by Eurostat, and albeit in a voluntary basis, there were 25 member states of the European Union. In 2007, the number had risen to 27. For EU member countries, the compilation of TEC is now compulsory for intra-firm trade and as of 2012 for extra-EU trade as well. However, the perimeter of the EU is likely to continue evolving with five countries officially recognised as potential candidates (Croatia, Iceland, Macedonia, Montenegro and Turkey).



23. As for EU countries, data compiled until the reference year of 2008, inclusive, suffered the same methodological problem. The 2011 release, which uses the conversion between CN8 and CPA 2008, and applies to data for the reference year of 2009, revealed itself to be less problematic, as there are no CN codes allocated to two or more CPA codes.

24. For EU countries, which follow the CPA and not the CPC classification, the OECD Secretariat displays the two digit CPA 2 digit figures into CPC equivalents. It is however not possible to establish an exhaustive (correct) correspondence between CPC and CPA codes at this level of aggregation.. Creating a correspondence at a finer level of detail, ( 6 digits CPA and 5 digits CPA codes)<sup>7</sup> would improve matters; although even here some problems would persist, as there is still an n to n correspondence in a few product categories. It would be useful to explore therefore the scope for doing this as it is clear that the correspondence performed at the 2 digit level clearly affects the comparability of EU with non-EU countries data.

### *Other Possible Areas of Methodological Research*

25. There are two methodological issues which may hinder the degree of cross-country comparability of TEC data. These differences concern the choice of the underlying statistical unit chosen to perform the match between the trade and the business register and the system of trade used to compile trade statistics, which is then reflected in the trade register.

### *Differences in Statistical Units*

26. In the 2011 update of TEC data, all countries provided data at the enterprise level. This reflects the OECD recommendation<sup>8</sup> and also Eurostat's guidelines on compiling TEC data, now compulsory for EU Member States. However, what countries do in practice may not always perfectly align with these definitions, reflecting in part legal and administrative requirements and statistical information sets.<sup>9</sup>

27. The Canadian practice, for example, creates links at the level of the establishment, on the grounds that it facilitates tracking exporters and importers over time as, enterprises may change their legal name and identification over time because of mergers and/or acquisitions, but the identification code of establishments are generally stable over time. On the other hand, the focus on the establishment as the statistical unit of measure also presents problems. There is for example a higher probability that an establishment within an enterprise will have its production traded by a separate wholesaling establishment

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<sup>7</sup> The correspondence is available in Eurostat's website: <http://circa.europa.eu/>.

<sup>8</sup> Please see the background document of 3<sup>rd</sup> meeting of the Steering Group on Linking Business and Trade Statistics: STD/TBS/WPTGS(2010)17/ANN1.

<sup>9</sup> The Canadian Business Register contains four unit levels, which can be regarded as forming a hierarchy: at the top, the '**enterprise**', with a complete set of financial statements, which in most cases correspond to legal units. Families of legal units which are consolidated, Statistics Canada selects the highest Canadian parent in a hierarchy of legal entities linked by common ownership, which corresponds to Eurostat's enterprise group concept as opposed to the enterprise concept. Next, the statistical '**company**', which is the lowest level of investment centres and corresponds to the lowest level where operating profit can be calculated, and that has assets and liability elements to measure capital employed, which is broadly the enterprise concept. Below, the statistical '**establishment**', is, in most cases, equivalent to a profit centre and provides data on the value of output, the cost of inputs and labour, which allows to calculate value added (as the sum of profit and salary & wages). The lowest level is the statistical unit '**location**' which is equivalent to the lowest entity within an integrated structure which provides employment and/or revenue data. The statistical concept of 'location' seems to correspond to the EU notion of LKAU - local kind of establishment unit (OECD, 2010b). For more detailed information, see Statistics Canada (2010).

or via its headquarters, creating the loss of the link between the manufacturer (establishment) and its dependency on export markets. The same is true where enterprises are the basis of the statistical unit but the scope is less.

28. Whilst there is no desire to change the underlying principle that the enterprise should form the basis of the statistical unit for the TEC database it would be worthwhile exploring whether additional complementary statistics could be produced on the basis of enterprise groups and establishments.

#### *Issues related to the EU Statistical System*

29. Another source of concern is the adoption of different trade systems in the collection of international trade statistics which is then reflected in TEC data. In the OECD International Trade by Commodity Statistics (ITCS) Database, three EU Member countries (Denmark, Ireland and the UK) follow the general trade system. Other EU Member States follow the special trade system, which is also adopted by Turkey<sup>10</sup> while Italy and France generally follow the special trade system, except for crude petroleum, petroleum products and natural gas. This difference in collecting international trade statistics affects cross-country comparisons of bilateral trade relationships using the TEC database (tables III and IV of TEC, on trade by partner zones and countries and trade by the number of partner countries, respectively).

30. There are two specific recording systems for EU countries: Extrastat (for trade of EU members with partners outside the EU), which is based on customs declarations and Intrastat (which is based on VAT declarations) for trade within the EU.

31. The main difference between the two systems of compiling trade statistics rests in the treatment of warehouse trade. Also, in the case of EU Statistics, imports are attributed to the country of consignment (for instance, an EU Member State where the port of discharge is located) whilst the International Merchandise Trade Statistics recommends to record the country of origin. Although this treatment of trade flows does not affect aggregate trade statistics at the EU level, it affects country level trade statistics in the following ways: i) without the use of additional information, such as interlinked input-output tables, it masks the value/volume of trade flows between countries, ii) introduces biases in the relative weight of product level bilateral trade statistics and iii) inflates the value of intra-EU trade flows.

32. This mismatch, which is referred to 'the Rotterdam effect' due to the importance of Rotterdam as a transit port, has also non-negligible consequences on the analysis of the structure of trade as i) it creates distortions in indicators of revealed comparative advantage, and the direction of the bias remains unknown and ii) it biases studies which match trade with industry indicators, as the trade structure reflects also goods which were produced by third countries. The latter applies especially to EU countries with major ports, such as Belgium, the Netherlands, and Germany.

33. Understanding how these differences impact on trade flows and their importance to growth for example should be considered as part of any future work-programme on TEC, in particular in relation to work related to measuring flow of trade in value-added.

<sup>10</sup>

The use of different methodologies affects not only the analysis of bilateral and sector level trade flows by policy analysis but also the compilation of national accounts and balance of payment statistics. Against this backdrop, the IMTS Handbook (United Nations, 2011) recommends the adoption of the general trade system.

### 3. Extending the TEC Database by Incorporating New Variables

34. This section develops some possible avenues for the expansion of TEC with the aim of increasing its relevance and ability to inform policy makers.

35. The additional variables which are generally available in OECD countries' business registers and can thus be linked with trade data are:

- Ownership;
- Sales (or Turnover).

36. The topics of current interest in international trade which TEC could contribute to providing a more in-depth understanding are:

- Trade in services;
- Trade in intermediate goods and services and trade in value-added;
- Trade by wholesalers and retailers

37. The rest of this section motivates the inclusion of the variables and treatment of topics described above.

#### *Including more Firm Level Characteristics: Ownership and Turnover*

38. Providing disaggregated trade flows according to the ownership of the trading enterprise will provide a deeper understanding of the actors engaged in international trade. In its analysis of Dutch traders, Statistics Netherlands (2010) matched trade statistics with information on the ownership status (foreign-owned *versus* indigenous), turnover and labour productivity of the trading enterprises. This study found that foreign controlled exporters of merchandise goods were significantly more productive and had a higher average turnover than indigenous exporters: in 2008, the average turnover of foreign controlled exporters was seven times higher than that of indigenous firms. The difference for services exporters was less than threefold. The study found that there were no statistically significant differences in productivity between foreign controlled and indigenous service exporters and importers. The average turnover of indigenous importers of services was about half the turnover of foreign-controlled importers, indicating that, on average, Dutch controlled importers were smaller enterprises relative to their foreign-controlled counterparts.

39. Ownership and turnover information are typically available in business registers and hence including these variables as part of trade micro-data production should be, in principle, quite straightforward. Integrating ownership information in TEC would facilitate the following analysis:

- Computation of export and import propensities by ownership status, i.e., the share of exporting and importing enterprises for the population of foreign-owned enterprises and for indigenous firms. This indicator could be further broken down by economic sector and/or size class;
- Computation of the export and import shares relative to enterprise turnover.<sup>11</sup> This indicator could be further broken down by economic sector, ownership and/or size class. The next step is

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<sup>11</sup> In addition, the weight of imports in total intermediate consumption could also be calculated, which is an interesting indicator for the analysis of trade in value-added, a horizontal OECD project which mobilises three Committees: the Committee on Statistics (CSTAT), the Committee for Industry, Innovation and Entrepreneurship (CIIE) and the Trade Committee. Details of this project can be found in the document presented and discussed in June's CSTAT meeting: STD/CSTAT(2011)5. The computation of this

to use these indicators to distinguish between import and export intensive sectors and enterprises. In particular, it would allow detecting key characteristics of firms more orientated to external markets relative to the ones serving primarily the domestic market.<sup>12</sup>

- Detailed statistics on trade values and the number of trading enterprises by:
  - Economic sector, size class and ownership status. This information would provide an overview of export and import performance of indigenous relative to foreign-owned enterprises;
  - Top enterprises disaggregated by ownership status; computation of export and import shares of these firms relative to the population of trading enterprises would allow detecting the relative weight of foreign-owned and indigenous enterprises in an economy's top exporters and importers;
  - Partner country and ownership status. This information would provide an analysis of the geography of international trade: is there a proximity bias for indigenous firms? This analysis could be supplemented by disaggregating the number of firms and their corresponding trade values by enterprise size class, which would allow an assessment of whether there is a proximity bias for smaller exporters and/or importers;
  - The number of partner countries, broken down by ownership status of the trading enterprise.

### *Implementation*

40. The computation of export and import propensities requires the introduction of two additional tables into the Questionnaire, one for imports and the other for exports. Likewise, publishing export and import shares relative to enterprise turnover requires a further two tables in the Questionnaire.

41. The presentation of detailed statistics on trade values and the number of trading enterprises corresponds to adding a further enterprise characteristic – ownership – to existing TEC datasets (TEC I to TEC IV) and does not involve adding new tables to the TEC Questionnaire.

### ***Adding a longitudinal dimension: new, persistent exporters, and drop-outs***

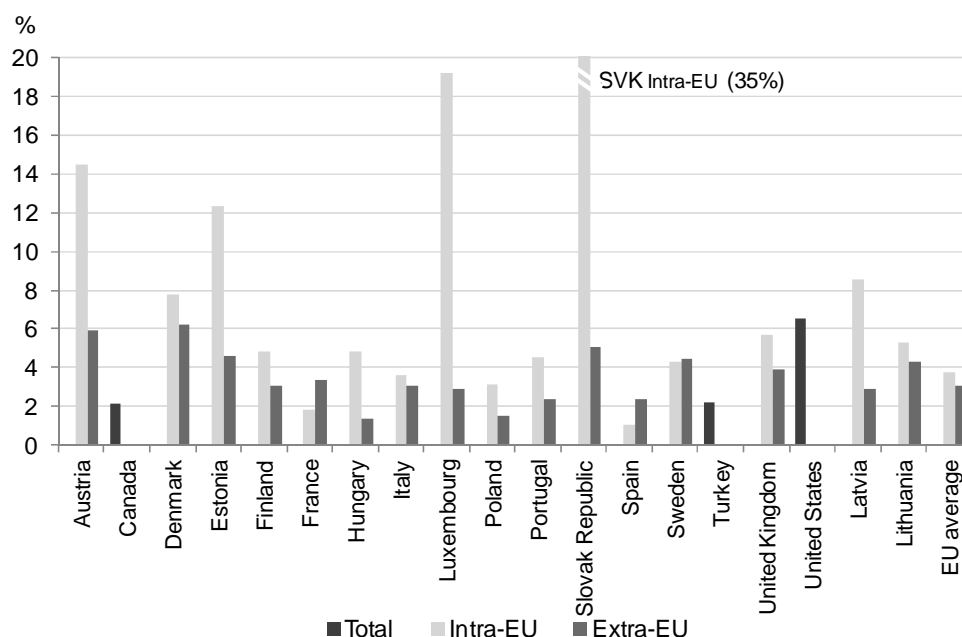
42. Recognising the contribution of exports to economic growth, many governments invest public money in implementing policies aiming at expanding their economies' export base.<sup>13</sup> Indeed, as shown in Figure 1, only a very small proportion of firms engage in cross-border trade. The share of exporting enterprises is higher in smaller economies, such as Slovak Republic, Luxembourg and Austria, but typically, less than 10% of OECD countries' population of firms sell to foreign markets.

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indicator requires information on intermediate consumption, which is typically not available in country's business registers but is available in business surveys. A further complication to the exercise is the fact that a firm may import goods/services which are not used up in production and embodied in the goods/services the firm exports. In the context of the project on measuring trade in value-added, the Secretariat conducted a preliminary investigation of this issue using Turkish firm-level data. The results of this analysis can be found in: STD/TBS/WPTGS(2011)15.

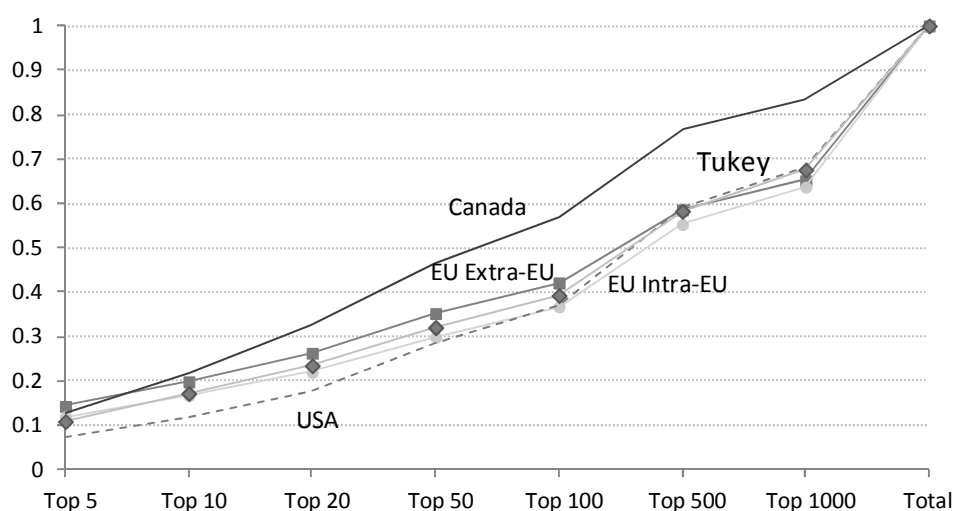
<sup>12</sup> Thresholds that allow defining import and export intensive enterprises (and sectors) would have to be tested and agreed upon. The Secretariat has already conducted a preliminary investigation of this issue, and results are described in the document STD/TBS/WPTGS(2011)15.

<sup>13</sup> For instance, the policy aim of increasing the number of merchandise exporters was at the origin of the development of the Canadian Exporters Register Database (Statistics Canada, 2009).

**Figure 1. Exporting is not everyone's business: export propensities across OECD countries<sup>14</sup>**

Source: OECD-Eurostat TEC Database.

43. Moreover, the bulk of countries' exports are concentrated around a handful of large exporters (Figure 2), with the top 100 exporters exporting on average over 40% of countries' total export value.

**Figure 2. Concentration of Merchandise Exports around the Top Exporting Enterprises.**

<sup>14</sup>

Notes: No 2008 TEC data for Greece, Netherlands and Slovenia, 2009 data for Turkey. 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).

Source: OECD-Eurostat TEC Database.

44. Against this background, policy makers attempt to encourage firms' exports, through a number of policy instruments designed to reduce fixed costs of entry, facilitate market diversification and ensure a lasting presence in export markets. Often, these policies target SMEs, as the evidence shows export propensity increases with firm-size (Figure 3).

45. However, there is mounting evidence of significant entry and exit in the export sector and that success should be measured on the basis of continued and lasting penetration in export markets over time. For instance, a study carried out by the Office of the Chief Economist of the Department of Foreign Affairs and International Trade of Canada (2010) revealed that about 50 percent of exporters who started exporting in 2000 were no longer doing so in 2002. After six years, only a quarter were still exporting. The study also shows some of the dynamics in export paths: new exporters often start out exporting to a single export destination and initially generate very small export sales.

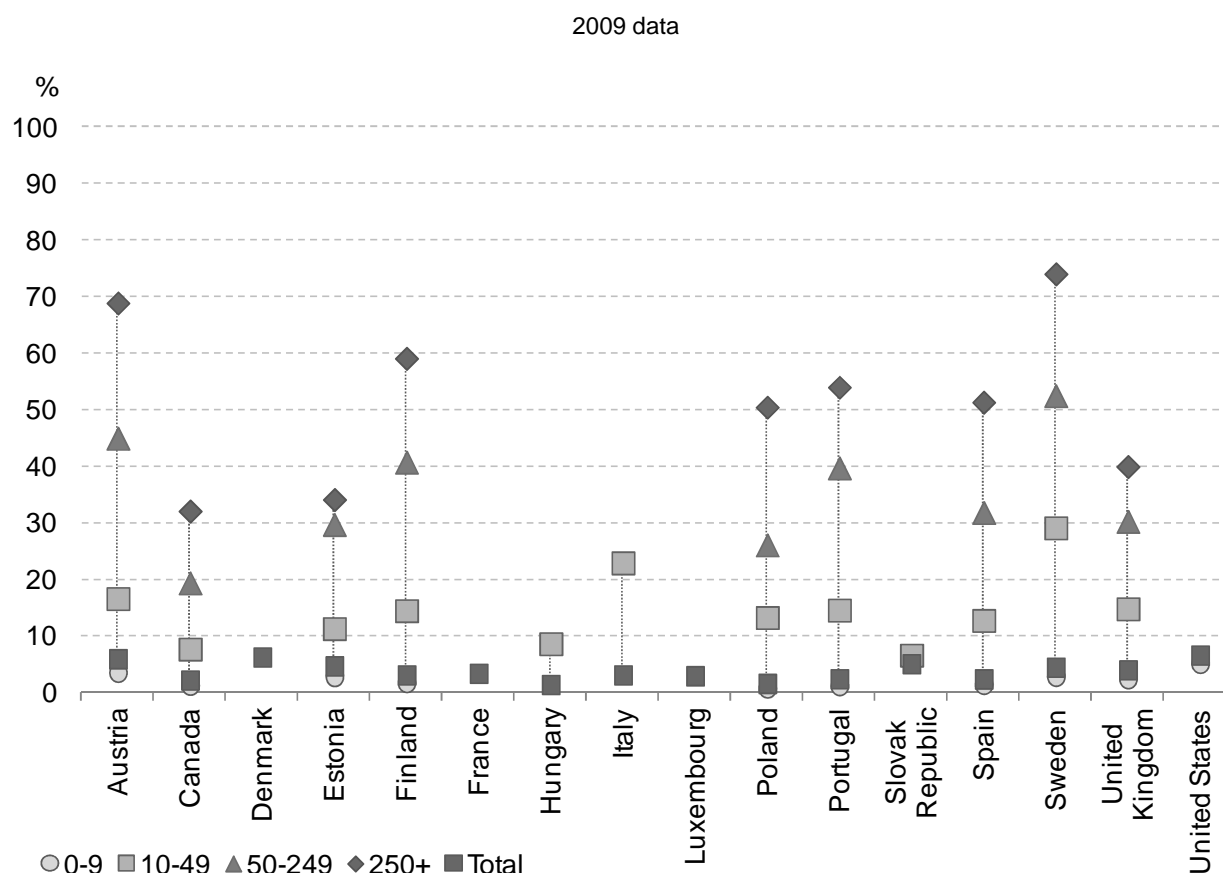
46. Collecting data on persistent exporters and their characteristics would provide valuable information for the design of policies aiming at promoting the participation of firms in international markets. It is also important to shed light on the characteristics of firms that have stopped exporting. With this aim, TEC should provide information on entry and exit rates in international markets.

47. Defining entry into and exits from the market should form part of the work-plan going forward, and this could build on the definitions developed by the OECD and Eurostat in their Handbook on Business Demography Statistics. Entry and exit rates can similarly be calculated for importers. Ideally, the rates could be disaggregated by the following enterprise characteristics:

- Economic sector and enterprise size class (TEC I);
- Economic sector and ownership status.

48. In addition to entry and exit rates another useful indicators of trade dynamics concerns persistent exporters. From a policy perspective, it is important to single out the characteristics of persistent exporters, detect their trajectories in terms of market and product diversification. As such, entry and exit rates need to be supplemented with statistics on first time and persistent exporters.

Figure 3. Propensity to Export Increases with Firm Size



Source: OECD-Eurostat TEC Database.

49. The identification of **persistent exporters** requires deciding on the time horizon over which a continuous presence in export markets should be observed. Given that the objective is to identify the characteristics of successful exporters, with a continuous presence in foreign markets, a medium to long term horizon is perhaps preferable (e.g. a persistent exporter could be defined as an enterprise with positive exports in each of the last 5 years).<sup>15</sup>

50. Entry rates should also be disaggregated by the age of the firm, conventionally defined as the number of years the firm is economically active. Again, this definition could build on the concepts developed in the Handbook on Business Demography Statistics. This indicator will provide a means to identify on how many years it takes on average, for a firm to start exporting. Ideally it would be provided at the sector level for predefined age intervals.

<sup>15</sup>

Another potential problem relates with the statistical unit used for matching trade and business registers: at the enterprise level there can be changes in ownership which affect the analysis of exporters' (importers') dynamics and, possibly, overestimate entry and exit rates. On the other hand, changes in the decision of allocating export (and import) flows to particular establishments within the enterprise perimeter across time may justify the use of enterprise as the statistical unit of reference, or indeed opting for the highest level of aggregation: the enterprise group. The study proposed in the former section on statistical unit can be helpful as it would shed light on the distribution of sub-units with macro-units and allow gauging the percentage of enterprises which are indeed single units.

51. As for **persistent exporters**, TEC should ideally show their share in terms of the number of exporters and international trade flows<sup>16</sup>:

- The number of persistent exporters by economic sector and size class (TEC I);
- The number of persistent exporters by economic sector and partner country (TEC III);
- The number of persistent exporters by the number of partner countries (TEC IV)

#### *Implementation*

52. This activity implies developing a longitudinal database in which the identity of exporters and importers is linked through time so that it is possible to detect firms who have started exporting/importing, firms which have ceased to export/import, and companies which export/import on a consecutive yearly basis.

53. In what regards the TEC Questionnaire, information on entry and exit rates and on persistent exporters should be filled by adding new tables to existing ones. However, this information can be incorporated to existing TEC datasets, which will be enriched by the addition of new variables.

#### *Including Trade in Services*

54. In its *Vision for the Future* on international trade statistics, UNSD, Eurostat, WTO and the OECD define the production of trade micro-data in goods and services as an objective to be achieved by 2020.<sup>17</sup> Indeed, services play a central role in OECD countries' economic activity, accounting for over three-quarters of US, France and UK's GDP. Although trade in services was growing steadily before the global economic downturn, it remains quite modest when compared to its contribution to GDP and to the weight of exports in goods in GDP. Trade in the services sector is a central theme of the Doha trade negotiations as barriers to trade in this sector are still much higher than for goods. Firms deciding to sell overseas face a range of behind-the-border regulatory measures that act as *de facto* barriers to entry over and above the usual geographical, cultural and institutional frictions to international trade. Identifying who is trading in services and the characteristics of the firms that successfully compete in international services' markets would be highly informative for policy makers seeking to enhance trade in services.

#### *Implementation*

55. In TEC, merchandise trade values and the number of enterprises are classified by the economic sector of the trading enterprises, and not by the economic sector of the product being traded. Hence, there are merchandise trade flows allocated to sectors which are typically associated to services such as transportation, financial intermediation or real estate. One option to integrate trade in services in TEC is to maintain the current structure and simply add trade in services values to the existing five datasets. This approach offers an integrated treatment of trade in goods and trade in services statistics; another objective of the *Vision for the Future*. The last TEC dataset, TEC by Commodity Groups, would provide a disaggregation of trade values and the number of enterprises by the economic sector of the trading enterprise and by the nature of the services rendered, as it does now with merchandise trade.

56. Micro-data matching of trade in services databases with business registers should be, in principle, quite straightforward and should not involve significant resources for the countries where the responsibility

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<sup>16</sup> This exercise can also be conducted for importers.

<sup>17</sup> This document is the outcome of the Global Forum on Trade Statistics, held in Geneva on 2-4 February 2011.



of compiling trade in services statistics lies with NSOs. This option would however require the coordination of the existing structures in national administrations in charge of collecting trade in services and trade in goods data. This is vital to create a harmonised database on trade in goods and trade in services and especially to avoid double counting the number of enterprises engaged in international trade.<sup>18</sup> That is, an enterprise which trades simultaneously in goods and in services should not be counted twice as a trading enterprise.

57. Another option is to produce the five TEC datasets separately for trade in services. This option is less ideal as it would increase the probability of double-counting..

58. In either case, the issue of producing international comparable data on cross-border flows of services should be addressed. Some countries still use an International Transaction Reporting System (ITRS), but usually the reporting system is a mixed system with ITRS as well as surveys with no uniform threshold above which trade flows are surveyed.<sup>19</sup>

59. Another issue to take into consideration is the interest in developing a new indicator that would reflect the share of firms that trade simultaneously in goods and in services. Statistics Netherlands recently conducted an analysis of Dutch traders in goods and services which revealed that traders in goods and services are larger (in terms of employee numbers) than enterprises that trade in either goods or services alone.<sup>20</sup> Is this finding confirmed for other countries? It could raise a number of interesting questions which the development of trade in services micro-data would help unveil:

- Are these traders part of (large) business groups and hence acting as trade intermediaries for other firms of the group?
- Are they more likely to be foreign-owned?
- What is their contribution to total national turnover (and value-added)?

### ***Measuring the Value-Added of Exports***

60. Trade in intermediate inputs are a major feature of international trade, as the process of globalisation deepens and firms are increasingly engaged in global value chains (GVCs). According to Miroudot *et al* (2009), world trade is dominated by products which are not consumed but, rather, further used in the production of other goods and services. They estimate that in the mid 2000s intermediate inputs

<sup>18</sup> Central banks are generally in charge of compiling trade in services statistics as a part of BoP information. In OECD countries the practice is quite mixed, with countries such as Australia, Canada, Denmark, Ireland, Norway, Sweden and the United Kingdom relying mostly on NSOs for data collection, or on both NSOs and Central Banks. In other countries such as Austria, South Korea, Italy, Japan, Portugal, Spain and Switzerland, the compilation of trade statistics is the sole responsibility of Central Banks.

<sup>19</sup> An International transactions reporting system (ITRS) “measures individual balance of payments cash transactions passing through the domestic banks and foreign bank accounts of enterprises, and noncash transactions and stock positions. Statistics are compiled from forms submitted by domestic banks to the compilers and from forms submitted by enterprises to the compiler” (OECD Glossary of Statistical Terms; <http://stats.oecd.org/glossary/>. This concept was last updated on August 7, 2002). Even though ITRS is quite comprehensive, for most countries it is complemented with business surveys for specific type of services such as tourism or transportation. Most OECD countries use surveys to compile trade in services statistics, while a relative smaller group relies mostly on the ITRS (e.g. Japan, Portugal, Switzerland, although the latter will move fully to surveys in 2012).

<sup>20</sup> See *Internationalisation Monitor 2010*.

represented 56% of flows of trade in goods and for 73% of flows of trade in services, an average annual growth of 6% for goods and 7% for services since 1995 (in volume terms).

61. Since trade flows are recorded in gross values, trade in intermediates leads to multiple counting and inflated trade statistics. It masks the real contribution of a country's exports to its overall value-added and also the true economic value of bilateral trade imbalances. What is needed therefore is the development of bilateral trade statistics net of intermediate flows, reflecting the value added contribution of domestic producers.

62. Although firm level data cannot provide such statistics, as they cannot capture indirect imported inputs embodied in domestically bought inputs or domestically produced content embodied in imports<sup>21</sup>, they do provide a mechanism to identify the value-added of firms involved in exports and so the contribution their exports make to domestic value-added and GDP. In addition, disaggregating this information by enterprise characteristics, such as the economic sector, size and ownership status will allow a deeper understanding of the identity of the firms which are contributing most to value-added creation through exporting. Furthermore the production of these statistics could be incorporated into input-output tables thus improving the accuracy of studies that attempt to measure the contribution of trade to value-added and global value chains.

### *Implementation*

63. The theoretical concept for indentifying the value-added of exporting firms is relatively straightforward: the value all intermediate goods and services which enter in the production process of an exported good needs to be deducted from the value of the exported good (or service) so that only the net contribution of the exporting enterprise to the production of the exported good remains. However, in practice, this is not so simple a task as the data which is required at the enterprise level is not typically available in the business register. As such, computing the value-added embodied in exports will require matching trade registers with underlying business surveys, and these typically do not cover the entire business population of a country. The OECD Statistics Directorate is actively working on this topic, particularly on how to make the theoretical concept operational with existing data and also in the context of confidentiality constraints. Preliminary results, including detailed methodology on how to compile the value-added embodied in exports at the level of the enterprise can be found in STD/TBS/WPTGS(2011)15.

64. Given that the computation of value-added of exporting firms requires matching trade and business registers with business surveys, which can prove to be methodologically more challenging, and also that the resulting indicator may be less comprehensive than the population of traders covered in the TEC database, information for this indicator would likely need to be provided in separate tables in the TEC Questionnaire and be displayed as a separate dataset.

### *Clarifying the Role of Wholesalers and Retailers in International Trade*

65. The TEC database classifies trade flows and the number of trading enterprises according to the sector of activity of the trading enterprise, not that of the particular product which is being traded.<sup>22</sup> This

<sup>21</sup> Input-Output (I-O) tables are able to capture both direct and indirect imported inputs embodied in domestic production. However, conventional I-O tables possess some limitations which can be mitigated by incorporating information from trade micro-data. This issue is part of OECD horizontal work on trade in value-added. See OECD (2011b) for an illustration using Turkish trade micro-data.

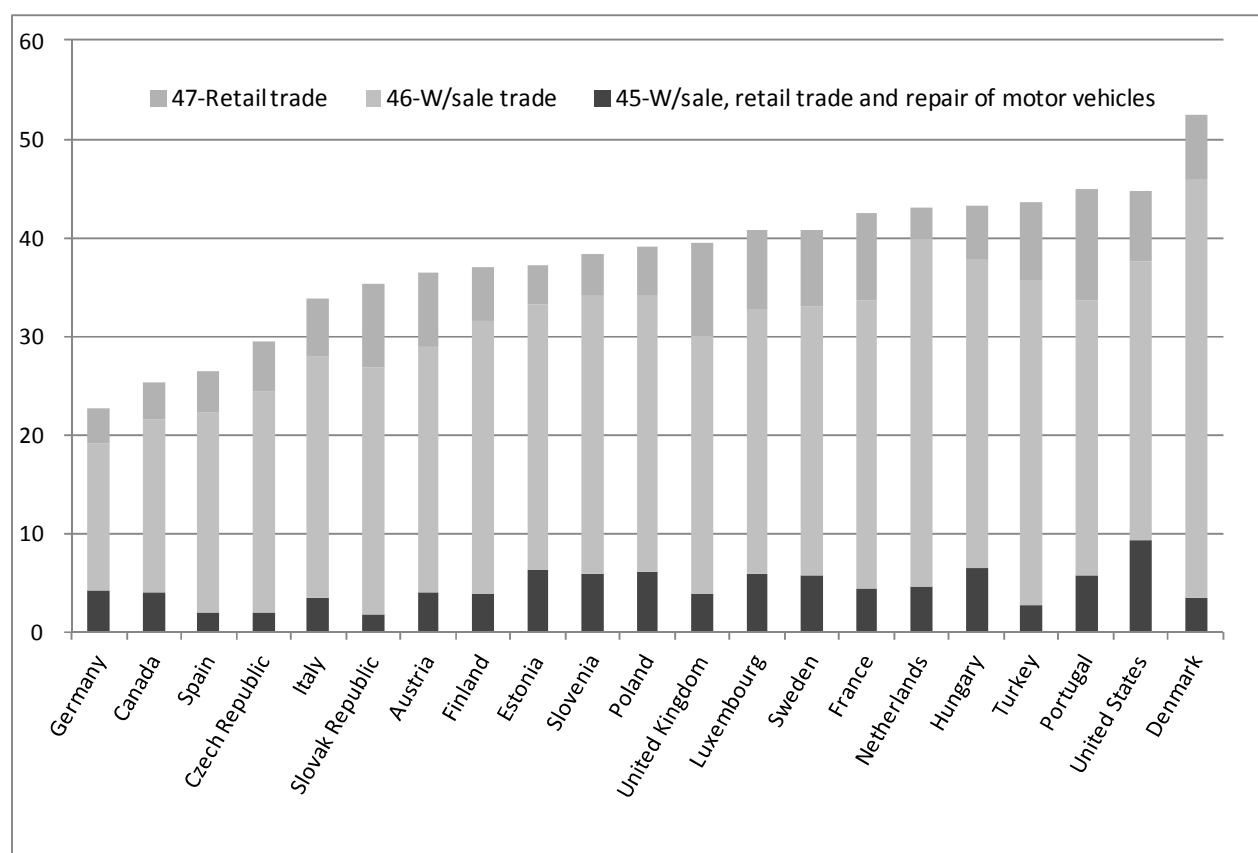
<sup>22</sup> Dataset V, TEC by Commodity Groups offers more detail on the nature of the products traded by enterprises in a given sector of activity.

choice of classification actually uncovers one important stylised fact of international trade: they account for slightly more than 20% of extra-EU exporters in Germany to over 50% of the total number of extra-EU exporting enterprises in Denmark (Figure 4). In fact, the enterprise which exports the good is not necessarily the one which produces it.

66. A similar reasoning applies to imports: the enterprise importing a product is not necessarily the one using it in production (or selling it to final consumers).<sup>23</sup> Figure 5 shows wholesalers and retailers represent over 40% of OECD economies importers, except in Germany, Spain, Slovenia, Canada, and Luxembourg where they represent a share between 20% to 40%.

**Figure 4. Wholesale/Retail Export Enterprises**

2009 data, in percent of the total number of exporters



Source: OECD-Eurostat TEC Database. Note: Data pertains to extra-EU trade for EU countries.

67. Wholesalers and retailers are also responsible for a sizeable share of trade values: although they only sell 10% of Canada's exports, they buy about 40% of the country's imports (Table 3). Their share of total imports is higher than their export share, which nevertheless reaches 25% in the United States.

<sup>23</sup>

Crozet *et al.* (2010) provide a review of the role of wholesalers in international trade. Some studies using official trade micro-data explicitly acknowledge this problem and make the correction by opting for aggregating the data at the level of the business/enterprise group. See, for instance, the study on the exporting behaviour of foreign enterprises in Luxembourg (Schuller and Schwartz, 2010).

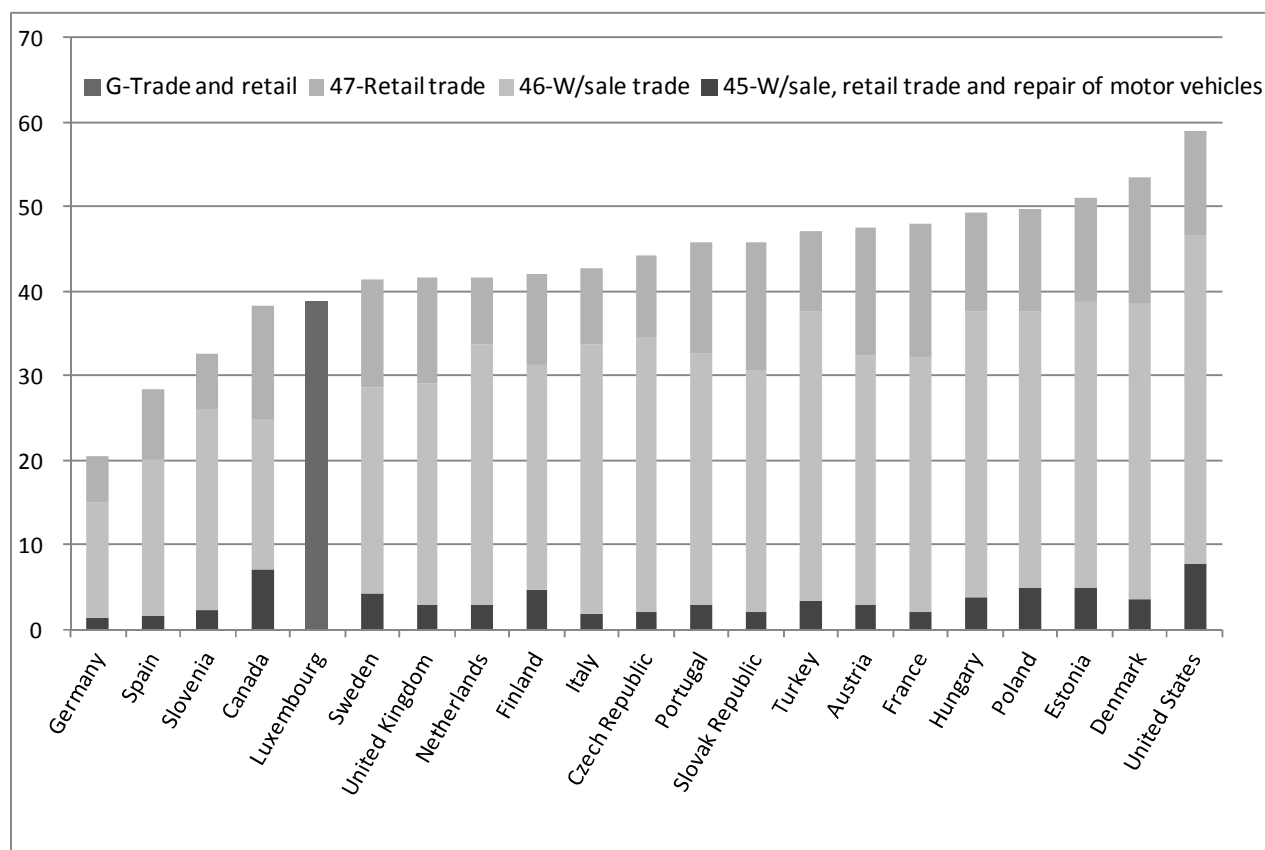
68. The role of wholesalers and retailers in international trade constitutes a black box which needs to be clarified. Do SMEs channel their exports through wholesalers? Are wholesalers channelling exports or acting as the purchasing arm of manufacturers? Are they part of domestic or international manufacturing groups? Do large manufacturing firms establish retailers abroad to channel their exports?

69. Two pieces of information should be included in the TEC work programme: linking wholesalers/retailers to the manufacturing part of the company and understanding whether wholesalers/retailers import goods produced by a (foreign-based) manufacturer. This requires knowing the following about the trading enterprise:

- Whether it is part of a larger business group;
- The main producing activities of this group;
- Ownership status of the business group.

**Figure 5. Wholesale/Retail Import Enterprises**

2009 data, in percent of the total number of importers



Source: OECD-Eurostat TEC Database.

### Implementation

70. The possibility of linking wholesalers and retailers activities to the manufacturing part of the business/enterprise groups depends on the availability of ownership data in Business Registers. For instance, in its Recommendations Handbook (2010a) Eurostat requests that Business Registers of EU

Member States identify the enterprises belonging to enterprise groups by linking the identity numbers of these companies to the headquarters of the group. It also asks for information on the principal and secondary (this item is optional) activities of resident groups and foreign controlled groups (in the domestic country) and where the definition of domestically and foreign controlled groups is determined by the country where the global decision centre of the group is placed.

71. For NSOs which already compile this information in their business registers it will be a straightforward task to incorporate it into the TEC data. This exercise should then focus on exporting and importing enterprises belonging to section G of ISIC 4 Classification (wholesale and retail trade; repair of motor vehicles and motorcycles).

**Table 2. Merchandise Trade by Enterprise Economic Sectors (2009)**

<b>% of total exports</b>	Agriculture	Industry	Trade	Services	Unspecified	Total
Canada	1.6%	71.6%	10.5%	16.4%	-	100.0%
Turkey	0.1%	59.9%	34.5%	5.5%	-	100.0%
United States	0.4%	63.0%	25.1%	11.5%	-	100.0%
EU average	0.4%	56.8%	19.3%	11.0%	12.5%	100.0%
<b>% of total imports</b>	Agriculture	Industry	Trade	Services	Unspecified	Total
Canada	0.5%	48.5%	40.8%	10.3%	-	100.0%
Turkey	0.0%	54.6%	31.5%	13.9%	-	100.0%
United States	0.1%	47.0%	41.6%	11.3%	-	100.0%
EU average	0.2%	37.5%	38.3%	12.8%	11.1%	100.0%

Source: OECD-Eurostat TEC Database.

72. In what regards the TEC Questionnaire and the display of enterprise group data in TEC, it should be done in separate tables as it involves firms in a subset of economic sectors and for which data may not necessarily be population based, but rather survey based, at least for some countries.

#### **4. Concluding Remarks**

73. This paper describes a number of areas where developments can be made to increase the potential of the joint OECD-Eurostat Trade by Enterprise Characteristics Database. The final objective is to tailor TEC data in such a way that it is able to answer some key analytical and policy relevant questions on OECD countries' traders and their characteristics.

74. In order to advance in this direction the paper proposes a road map organised into two working areas: firstly, it lists some possible methodological improvements that can further increase the quality of TEC data. The second area of work intends to broaden the scope of the database and enrich it with indicators which are informative to address specific key areas of interest for policy makers.

75. In view of limited resources, and given that TEC data already achieves an acceptable level of quality, a possible avenue is to concentrate efforts on extending the database to tackle current hot topics. This strategy can potentially draw more attention to TEC data (and to trade micro-data in general) which can in turn mobilise more resources in the future. In this line of reasoning, a cost efficient way is to start by building indicators for which data is readily available in business registers. These areas include (i) adding more firm level characteristics (ownership and turnover) and (ii) clarifying the role of wholesalers and

retailers, although the latter requires more data manipulation than the former (linking enterprise trade micro-data with business/enterprise group information).

76. Two additional areas of research are recommended, for their importance in the current policy debate: these are (i) using trade micro-data to improve estimates of trade in value-added measures derived through inter-linked national input-output tables and (ii) extending TEC to trade in services. The first activity is part of an horizontal OECD project, to be developed jointly with CIIE and the Committee of Trade and is supported by CSTAT. The second activity has the merit of including in TEC all trade flows, thereby greatly enhancing its potential use. Moreover, services account for an increasing share of OECD countries' GDP while its weight on international trade flows is slacking as compared to merchandise trade.

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