

Linking Trade Statistics and Business Registers in a Developing Country Context

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Abstract

Traditionally, international trade statistics and business registers have been treated as separate statistical domains, reflecting the viewpoint of both data compilers and data users. Different data sources, methodologies and classifications complicate data linking. Despite the obvious differences, trade and business statistics have common features, starting of course with the fact that in the end it is businesses that make decisions on international trading and on other kinds of international business arrangements, such as FDI, establishing foreign affiliates and outsourcing business functions. This paper shows that linking trade and business statistics offers new insights relevant for policy making and analysis, in particular about the micro-economic foundations of competitiveness and performance of businesses, industries, and national economies in the context of globalization. While such linking exercises are currently mostly done by national statistical systems of developed countries, they can equally well be done in developing countries. Over the last year, the national statistical office of Costa Rica (INEC) and the United Nations Statistics Division (UNSD) linked Costa Rica's existing Customs-based trade statistics and its business register, which is maintained from administrative data sources, specific projects and follow-up telephone interviews. As this experience shows, new micro-level data, new statistical indicators and new insights (for instance about the international orientation of businesses and about trade by enterprise characteristics) can be gained on a continuing and routine basis through this linking procedure, which can be applied in its methods and outcomes in other developing countries.

Keywords: International trade statistics, economic globalization, business registers, basic economic statistics, developing countries

1. Introduction

The internationalization of a national economy covers its cross-border engagements on trade, investment, commercial presence, employment, finances, environment issues and other matters. For planning purposes policy makers have a keen interest to know what the impact is of internationalization on economic growth, job creation, competitiveness and innovation, or what the economic risks are of the cross-border interdependencies. In comparison, the globalization of an economy takes a wider view and shows how this international dimension fits in the global picture through global value chains or other functional integration of internationally dispersed activities (Dicken, 2011). The corresponding policy questions here are, for instance, what are the possibilities of upgrading in the value chains by increasing services, skills and employment, and what are the risks and dependencies of the national economy inside the global value chains?

The information base for the analysis of such policy issues is three-fold: (1) basic statistics on international trade, investment, commercial presence, outsourcing of business functions, transfer of intellectual property products or any other cross-border

relation, (2) the accounting framework of the System of National Accounts, and (3) indicators related to internationalization and economic globalization of countries. New insights and knowledge can be created by integrating the information base both horizontally (through linking all basic data to the business register) and vertically (through input-output tables of national accounts). This integration exercise can be done (in principle) nationally, regionally or internationally.

This paper aims to describe internationalization from the perspective of the enterprises and limits the international dimension to international merchandise trade. It looks for insights into the different characteristics of exporting enterprises compared to non-exporting ones, such as enterprise size, national industry share, product diversification or international market diversifications. The linking of basic trade statistics with the business register enables the analysis of such policy issues.

2. Linking trade and business statistics: Data sources

Traditionally, international merchandise trade statistics (IMTS) has focused on measuring bilateral flows of trade in goods between countries in terms of monetary values and physical quantities. IMTS is a domain of official statistics with very clearly defined and standardized dimensions anchored for a large part in internationally agreed Customs law, for instance, for valuation, country of origin, commodity classification and import and export regimes. Customs records are the main data source, and data collection is usually carried out at the level of individual customs declarations.

On the other hand, business statistics constitute a wide and heterogeneous statistical domain, which main purpose is to provide information on the performance and structure of businesses and industries. Business statistics include sales, inventories, value added, employee compensation, employment, or organization of productive activities, and are derived from multiple sources of information, such as business registers, business surveys, and a variety of administrative records. The underlying classifications and level of detail can be very different across data sources and across countries.

Whereas linking trade and business statistics has the objective to develop new statistical outputs in the context of the increasing internationalization of economic activities, this type of innovation in the production of statistics also responds to the request by governments to increase efficiency and reduce respondents' burden given limited resources. In this regard, IMTS and the business register make use of existing administrative data sources, instead of initiating new data collection programmes. As will be shown in the case of Costa Rica, this linking exercise has the added advantage of improving quality in the compilation of both data sources.

3. Linking trade and business statistics: Global initiatives

The United Nations Statistics Division (UNSD) and the Statistical Office of the European Community (Eurostat) organized a Global Forum on Trade Statistics¹ in cooperation with World Trade Organization (WTO) and the United Nations Conference for Trade and Development (UNCTAD) in February 2011 in Geneva. This Forum, consisting of statisticians, economists and policy makers, questioned the relevance of existing trade statistics and called for improvements by connecting trade information and integrating it with its economic, social, environmental and financial dimensions.

¹ see http://unstats.un.org/unsd/trade/s_geneva2011/geneva2011.htm

Because of the Global Forum and related events in the last two year, the United Nations Statistical Commission decided in February 2013 that the measurement of international trade and economic globalization merits a place on its work programme for the coming years². It is the expectation of the global statistical community that this work will lead to new insights through the linking of basic economic statistics to the business register and through the construction of international input-output tables, which will enable the measurement of trade in value-added and other globalization indicators. As for the linking of basic data sources, the resulting micro-level database may reveal, for instance, in which ways exporting firms differ from non-exporting firms and how important exporting firms are for the national economy.

The horizontal and vertical integration of data sources is not completely uncharted territory. Since 2008, Statistics Netherlands produces and publishes results from such horizontal integration of basic data in its Internationalisation Monitor (Statistics Netherlands, 2012). Statistics Italy did so as well. Further background information on this can be derived from the presentations³ made by these two offices at the Statistical Commission in 2013. Vertical integration is needed for the initiative⁴ of WTO and the Organization of Economic Co-operation and Development (OECD) launched on 15 March 2012 to measure trade in value-added. This measurement requires integration of economic data into a national input-output table followed by an integration of these national tables into an international input-output table, from which measures of trade in value-added and other globalization indicators can be derived.

Whereas the linking of economic and other data is already done by a fair number of developed countries, this is not so for developing countries. The next section will explore the linking of trade statistics to the business register in the case of Costa Rica.

4. Linking trade and business statistics: The case of Costa Rica

The Ministry of Foreign Trade of Costa Rica commissioned a project at the beginning of 2012 to the Center on Globalization, Governance, and Competitiveness of Duke University requesting them to map the global value chains of three high priority exporting industries (electronics, medical devices, and aeronautics) and identify Costa Rica's current and potential position in each chain. UNSD collaborates in this project by supporting the National Institute of Statistics and Censuses of Costa Rica (INEC) to link its merchandise trade statistics to the business register with the aim of enabling the regular production and dissemination of indicators on trade by enterprise characteristics.

Costa Rica's business register (DUIE) includes enterprises and establishments that reside in the country, with variables such as legal ID number, location, size, and type of economic activity. The unique ID number of legal units is the key factor which makes it possible to link units from the business register with units on the administrative records of Customs (or of other sources). The statistical units in DUIE are "main enterprise" and "secondary establishments". Both correspond roughly to the definition of local units, whereby multi-location enterprises consist of one main enterprise in one location and one or more secondary establishments in other location(s). One main enterprise can have one or more legal ID numbers, but each legal ID number can only belong to one main enterprise. Secondary establishments can also have one or more legal ID numbers, but a legal ID number can belong at the

² See E/CN.3/2013/33, Decision 44/106, at <http://unstats.un.org/unsd/statcom/sc2013.htm>

³ See http://unstats.un.org/unsd/statcom/statcom_2013/seminars/Trade-Business/default.html

⁴ See <http://www.oecd.org/industry/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm>

same time to various secondary establishments and/or their main enterprise. Given these complications of using establishments, the unit of analysis for the linking exercise needed to be the main enterprise, which encompasses the main enterprise and its secondary establishments (if any).

For the actual linking exercise the detailed export statistics records of the Customs database for the months of July to December 2012 were used together with the records of the DUIE database as of the end of December 2012. This represented 376,894 export records (the exports by government entities were not considered), and information on 48,981 main enterprises.

5. The results for Costa Rica for July-December 2012

As shown in Table 1, 94.4% of the total number of export records in the Customs trade database could be successfully matched, which represented 96.1% of the total value of exports for the second semester of 2012. Specifically, 1,958 legal units in the export database were matched to 1,893 enterprises in the business register (some enterprises comprise more than one legal unit). Most of the 764 legal units from the Customs records that could not be found in the business register correspond to so-called “non-customary” exporters, e.g. individuals declaring exports (in Costa Rica, each individual has also a unique ID number).

Table 1. Coverage of the matches in the export data

	Non-matches	Matches	Total
Number of export records (Customs trade data,base)	20,934 5.6%	355,960 94.4%	376,894 100.0%
Value (Millions of US\$)	131.7 3.9%	3,247.1 96.1%	3,378.8 100.0%
Number of legal units	764	1,958	2,722

As shown in Table 2 at the end of this paper the linking exercise allows comparing exporting enterprises to all enterprises in Costa Rica’s economy by industry sector and by some enterprise characteristics. The total export value of almost 3.4 bln US\$ for the second half of 2012 can be broken down by the main exporting industries of Agriculture, Manufacturing and Wholesale trade, where Manufacturing accounts for about 75% of exports. The link to the business register makes it possible to explore in further detail the number of enterprises involved in the various exporting industries and the number of corresponding employees. For instance, Table 2 shows that while only 14% of the manufacturing enterprises are exporting their goods, they account for 74% of the total number of employees in this economic sector. Similarly, for the Agriculture sector only 8% of the enterprises export, but they account for 45% of the employees. For the whole economy only 4% of the firms are exporting goods, but these firms account for 30% of total employment. This clearly shows that the exporting firms are important for the national economy as employment providers.

More detailed analysis can be done by breaking down exports by the kind and diversity of products or partner countries. At the same time further characteristics of the enterprises can be taken into account such as the percentage of foreign control or the skill level of the employees.

6. Discussion

Even the general first results of the data linking exercise in Costa Rica give some insights; for instance, the results show that only a relatively small percentage of all

firms in Costa Rica export their products. However, these exporting firms employ a significant amount of people in the formal economy. For more detailed analysis of basic trade flows and the characteristics of enterprises many different tables can be produced. It is up to the country to determine which tables are useful to be produced on a routine basis. In Costa Rica, the national committee for trade statistics, consisting of users and producers, is now officially tasked to come with a proposal which INEC can implement in the future.

The linking exercise has added value in itself since it improves the understanding of the data sources. The analysis showed that the population of exporters contains a relatively large percentage of individuals as exporters, even though the total value exported by this group is low. Furthermore, the ID numbers in the business register associated with main enterprises and secondary establishments needed to be more accurately understood to make the correct decisions in the matching of IDs between the trade data and the business register. The hierarchical link between main enterprise and their secondary establishments made it necessary to do the linking of trade and business statistics at the enterprise level. However, because of the fact that these secondary establishments have additional information in the register it is possible to produce more diverse profiles of main enterprises indicating for instance the various economic activities (and geographical locations) in which they are active.

Finally, the process of analyzing the quality of the business register also revealed that the maintenance of the register should be done as much as possible with use of administrative data sources, because these are most comprehensive and produced on regular intervals. It was further concluded the scheduling of telephone interviews (for the updating of the business register) needs careful planning since biases in the kind of enterprises interviewed may slip in.

7. Conclusions

The measurement of internationalization and economic globalization are high on the agenda of the global statistical community, and linking basic economic statistics, including trade, to the business register is an important part of that agenda. Such linking is done in a number of developed countries, but is relatively new for developing countries. The case of Costa Rica showed that linking of trade to the business register can be successful, if a unique identifier of legal units is available in both the business register and the trade statistics.

The first results of the linking exercise are very positive and showed that exporting firms are the larger firms in Costa Rica and are important for employment and economic growth. The production of routine tables of trade by enterprise characteristics can be done by INEC in the near future in consultation with the other stakeholders. Linking other economic statistics, such as trade in services and FDI statistics, to the micro-level database is possible and is being discussed in Costa Rica. Issues of level of access to the data base and roles of custodians need to be clarified and controlled to avoid confidentiality problems.

References

Dicken, Peter. 2011. *Global Shift: Mapping the Contours of the World Economy*. Sixth edition. London: Sage Publishing.

Statistics Netherlands. 2012. *Internationalisation Monitor 2012*. The Hague/ Heerlen.

Table 2: Exporting enterprises compared to all enterprises

	Main activity	All Business Register		Exporting enterprise		
		No. of firms	No. of employees	No. of firms	No. of employees	Value of exports (US\$)
A	Agriculture, forestry and fishing	3,791	87,982	294	40,283	216,690,448
01	Crop and animal production	3,608	85,069	279	38,698	210,146,426
02	Forestry and logging	132	1,567	8	688	5,289,339
C	Manufacturing	4,257	144,706	598	106,429	2,554,099,671
10	Manufacture of food products	1,078	48,328	137	34,661	447,071,957
13	Manufacture of textiles	144	1,941	16	1,235	14,399,977
14	Manufacture of wearing apparel	559	7,949	25	5,022	42,878,988
17	Manufacture of paper and paper products	56	3,790	23	3,423	57,756,433
20	Manufacture of chemicals	146	5,202	60	4,054	59,030,897
21	Manufacture of pharmaceuticals	36	2,654	19	2,164	21,322,154
22	Manufacture of rubber and plastics products	130	8,483	57	7,270	99,643,577
23	Manufacture of other non-metallic products	152	6,490	25	3,971	51,978,605
25	Manufacture of fabricated metal products	441	6,043	39	2,497	42,358,757
26	Manufacture of computer, electronics	40	6,531	21	6,369	787,049,178
27	Manufacture of electrical equipment	37	4,477	20	4,204	143,662,034
32	Other manufacturing	183	12,936	39	12,066	679,967,494
33	Repair and installation of machinery	156	10,358	13	9,611	14,560,700
G+H	Wholesale and retail trade; Transport, warehousing, and support activities	18,668	201,935	739	55,190	387,741,850
46	Wholesale trade, except motor vehicles	2,471	58,966	591	30,086	349,309,112
47	Retail trade, except of motor vehicles	11,663	88,411	60	17,370	25,826,992
	Other activities	19,227	318,907	186	33,792	63,137,508
	Unkown activity	2,988	15,771	71	864	24,375,886
	Non-matches	-	-	-	-	131,689,763
	TOTAL	48,931	769,301	1,894	236,794	3,378,826,643