The Mexican single country E-SUT 2013, Methodology and results

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Abstract

This papers presents the methodology and results for the compilation of a Mexican single country Extended Supply and Use table (E-SUT), it shows the NSO efforts implementing the OECD terms of reference on the subject. The E-SUT disaggregation considered the orientation by activity for 20 sectors: a) Exporters; b) Ownership (domestic and foreign); c) Size of the Economic Unit, and d) foreign and domestic integration on inputs.

The purpose on this paper is just to show the methodology and main problems to the national accounts expert community.

Given the fact of the characteristics of an informal small business economy combined with large enterprises this E-SUT was only possible for a single year and through the exhaustive use of the Economic Census. The economic unit of study is the "establishment" instead of firms.

The E-SUT keep the same structure and GDP of the national SUT, accomplishing the first definition of a satellite account through the activities splitting.

The results of both supply and intermediate demand are presented, the novelty is the deep insight into activities by sector with characteristics above mentioned, even though the limitations to disaggregate by row.

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Introduction

Among the main challenges arising from globalization is the generation of official statistics that provide information on the interdependencies between countries, which are quality, accurate, relevant, comparable and relevant statistics. One recent insight si related to the development of Extended Supply and Use Tables (OECD, 2015).

The purpose of this paper is to expose the compilation and the preliminar analytical results for the E-SUT for Mexico in the most recent base year 2013 that attended also the SNA 2008 implementation. It is remarkable the case given the specific condition of the available sources of information and the use of microdata that allowed the extension of the Supply and Use Tables of Mexico for the base year 2013.

Structure of E-SUT in OECD and Mexican structure

The Supply and Use Tables (SUT) allow us to know the interindustry relations of an economy, displaying production, imports, intermediate demand and final demand with production arranged in principal and secondary production. These tables show, in the columns, the information of industries and, in the rows, those corresponding to the products generated or used by these industries.

It should be noted that the SUT´s granularity and robustness made possible to extend them, to use them as a tool for the measurement of global value chains (GVCs), TiVA and globalization in general.

It is important to notice for the Leontief model, that globalization weakens the assumption of relative homogeneity of the production functions (technical coefficients of supply and use) of the units classified for an industrial activity, in addition to the challenge of considering small and large companies, where it has always been understood that economies of scale play an important role, is that it has been considered to make the SUT´s current extension to continue generating indicators based on the input-output methodology.

The characterization of the Supply and Use Tables in national and international, based on industrial groupings, has become a statistical challenge, because the theoretical and empirical evidence suggests that the most integrated companies in the global value chains have greater imports content and, often, higher productivity. Therefore, the use of conventional supply and use tables may overestimate the national content of the value added (and jobs) of exports, key indicators to determine the benefits of integration with GVCs.

On the other hand, the development of the TiVA estimates through the construction of Extended Supply and Utilization Tables (E-SUT) allows a better understanding of international trade and its relationship with economic activity and competitiveness. In particular, they allow the recognition of the imported content within exports and, therefore, a fraction of the hidden costs of protectionism, as well as the net benefits of trade liberalization, particularly in services.

Attention must be given to the assumptions that face the elaboration of ESUT:

- Minimize heterogeneity within given confidentiality constraints;

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

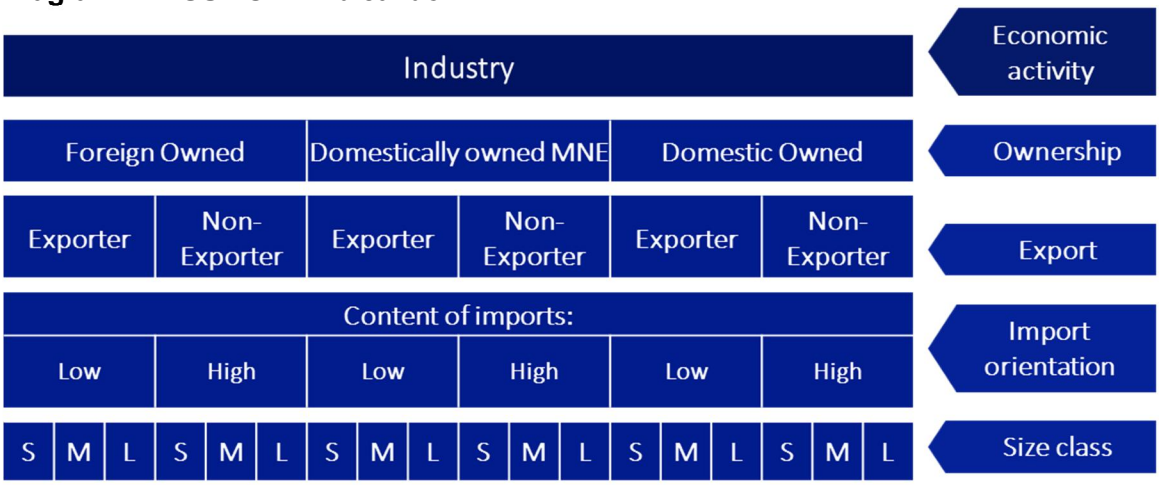
The Extended Supply and Use Tables

The E-SUT shows inter-industrial flows (supply and use) in a more granular manner including the external sector bias, giving special attention to the economic units that interact with other countries. This tables imply different levels of disaggregation aimed at identifying different focus: ownership, export, size of economic unit and the integration of all the focuses.

Compilation of the Mexican E-SUT

The original OECD (2015) proposal has the following disaggregation:

Diagram 1. E-SUT OECD breakdown



Source: Terms of Reference Extended Supply and Use Tables (ToR), OECD, 2014.

The OECD itself points out that producing this level of disaggregation is a challenge, given the confidentiality restrictions that may result in the disaggregation of data or the restriction on the sources of information for the National Statistical Offices. A greater granularity implies greater risks of disseminating information that should be reserved.

In the Mexican case, the main statistical law[1] establishes that the data provided by informants for statistical purposes, to INEGI or to any other State Unit, will be strictly confidential and may not be used for any purpose other than statistical.

In addition, Administrative Units[2] will guarantee the confidentiality and reservation of the data that informants provide, through control procedures and protocols to avoid the publication of private

[1] The System of National Statistical and Geographical Information Law (in Spanish the SNIEG law, article 37)
[2] The Rule for the Assurance of Quality of the Statistical and Geographic Information.

information, as well as control processes for internal and external users who have access to individualized information. Under these precepts, the E-SUT information guarantees the confidentiality of the informants.

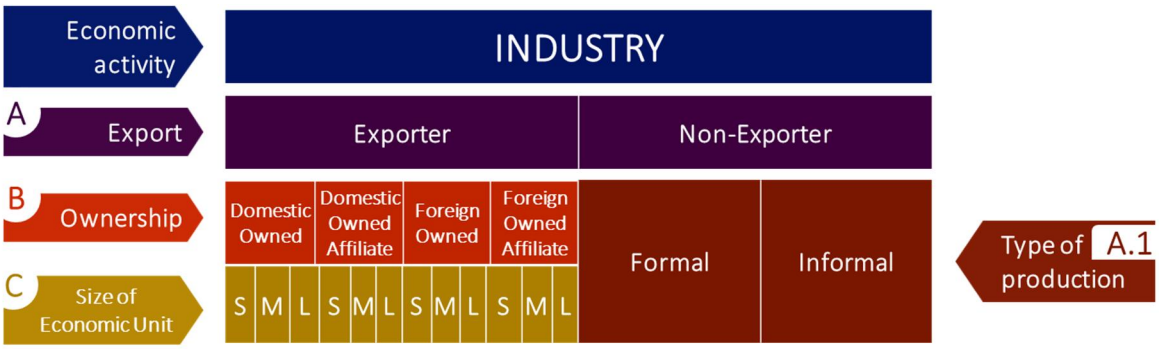
Generally, when facing the problem of heterogeneity, the conventional approach has been to provide more details, adding companies at the lower levels of the industrial classification system. While this is clearly preferable against the limitations of confidentiality restrictions, the approach may not be optimal, either in terms of reducing heterogeneity within the aggregations or in terms of processing burden.

Although heterogeneity presents information with a greater level of detail, there are two additional phenomena that can be studied with the E-SUT. To take into account:

- The role of foreign subsidiaries that cause positive externalities, as well as some extensions that lead from the perspective of value added to the income from the global point of view.
- Growth in demand provides a greater support in the role and integration of SMEs in the Global Value Chains (CGV), via indirect channels through the foreign owners of companies installed in the country.

It should be noted that international methodological frameworks make proposals for processes, and / or products considered optimal, that are the result of certain sources of information. Therefore, it must be borne in mind that for each country the results or breakdowns will depend to a large extent on the availability and feasibility of linking the different sources of information, as well as on the institutional regulations that guarantee the protection of data that informants provide. The breakdowns for our country attached to the various profiles mentioned by the OECD ToR are as follows:

Diagram 2. Mexican E-SUT breakdown results



Fuente: elaboración propia con base en los ToR, OCDE, 2014.

Given the Mexican Economy characteristics, the breakdown of the non-export sector in formal and informal was considered, given its importance in the economic activity and employment.

E-SUT compilation

One of the main characteristics of this project is the exhaustive use of the Economic Census and, consequently, the economic unit of study will be the **"establishment".**

Regarding the structure for the presentation of the E-SUT information, the same structure of the SUT will be maintained, but considering a breakdown of activities in the production that is valued at basic prices. Therefore, it is necessary to add trade and transport margins and taxes on products on the Supply side (also extended) plus imports of all goods and services. On the Use side, there will be a breakdown only for the intermediate consumption, while the components of the final demand will appear unopened.

The first breakdown refers to the Export Focus where the establishments that made an export transaction will be identified, because part of their production was destined to the foreign market, they made some kind of export maquila or for the resale of products, and on the other hand, those establishments that registered only production or sales to the national market (non-exporters).

For the conformation and distribution purchasers and basic prices in the supply, an extension index was built, based on the production levels of each breakdown, in order to distribute the margins and the taxes that correspond to each kind of activity. This distribution is consistent for the NAICS codification of economic activities, which implies that all those economic units that have production processes or similar production functions are classified in the same economic activity. This concept based on supply is the one that best responds to the need to have a framework to collect and publish information on inputs and products for statistical purposes.

The next breakdown of the Export Focus is the Ownership Focus, which groups the establishments into four categories: Domestic Owned, Domestic Owned Affiliate, Foreign Owned, and Foreign Owned Affiliate. Finally, each of these categories will be segmented by Size of the Economic Unit Focus: Small, Medium and Large.

For the Non-Exporter economic units, its extension ends with the Type of Production: Formal or Informal.

Export Focus

To complement this definition of goods, it is important to note that only those goods that were produced and / or that include a productive process carried out by residents, should be considered; while, in the services, they must include those corresponding to transportation and insurance made by the residents within the import transactions. (INEGI, 2013).

The data sources that allows de breakdown for the Export Focus are:

- The 2014 Economic Census (EC), which contain basic statistical information of the year 2013, on all goods and commodities and service providers so that can generate economic indicators for Mexico at a geographical, sectoral and thematic level of detail.
- The Foreign Trade Database (FTD) which integrates those transactions that were carried out in 2013 through customs requests and that codify the products in tariff fractions that come from Customs Registries. This Tariff Fraction is a nomenclature for the classification of goods to 8 digits, based on the Harmonized Commodity Designation and Coding System (HS) and defined in the Tariff of the General Import and Export Taxes Law (TIGIE).

The first stage consisted of compiling the total of exports transactions carried out in 2013 and identify the exporter establishments. Subsequently, a whole of this universe of information was

debugged to eliminate data that could be duplicated and those in which the consistency of their identifiers, that is, the Federal Taxpayers Registry (RFC) and the Business Name (BN) were not adequate. With this sample we proceeded to make the connection between the RFC and the BN with the information of the Economic Census. The linkage of both sources of information, EC 2014 and FTD, resulted in a coverage of 84% of the total value of exports of goods. With this process, the exporting economic units of the total economic activity were defined.

The linked establishments, brought:

- Total Census Gross Production (PBTc)
- Classification by Economic Activity.

The **Total Census Gross Production** (PBTc) shares of each economic activity coefficients allow the distribution of Gross Production corresponding to **Exporters** and **Non-Exporters** for each identified establishments.

Once the coefficients were determined, the 1059 NAICS activities were distributed in Exporter for both the Supply and the Intermediate Demand; including Trade and transport margins and the Net Taxes adjusted to the level observed in the 2013 SUT. When adding each one of the breakdowns they are equal to the SUT.

The Non-Exporter was obtained by the difference of the total economy minus the result of the Export, and also splitted into formal and informal sector with the information available from the Measurement of the Informal Economy 2013. (INEGI, 2013).

The coefficients determined the total production volume of those economic units belonging to "Exporter", the rest was destined to the "Non-Exporter", distributed according to the criteria established to identify the economic units corresponding to each breakdown.

Given the sources there are two information gaps, in the EC there is no information for Agriculture and for the FTD, there are no data for Services.

To solve, the level of exports by product and / or service corresponding to each type of activity involved is directly imputed. That is, for agriculture, the level of exports is the same as the production level of the profile of the exporter. For services, the value of Services of the Balance of Payments.

In the SUT the distribution by type of production in formal, informal, craft and processing was determined for an exhaustive analysis of the activities, considering that each type has different characteristics. (INEGI, 2013a). In the E-SUT the Non-Exporter is opened by type of production in Formal and Informal.

The universe of study was made by all those non-exporting determined economic units, disaggregated from the Economic Census, in which economic units that registered exports and those that did not present export data are selected to make the subsequent breakdown.

The opening of this profile, the same treatment of the Measurement of the Informal Economy (MEI) was taken for the distribution in Informal Non-Exporter Sector, and Formal Non-Exporter Sector.

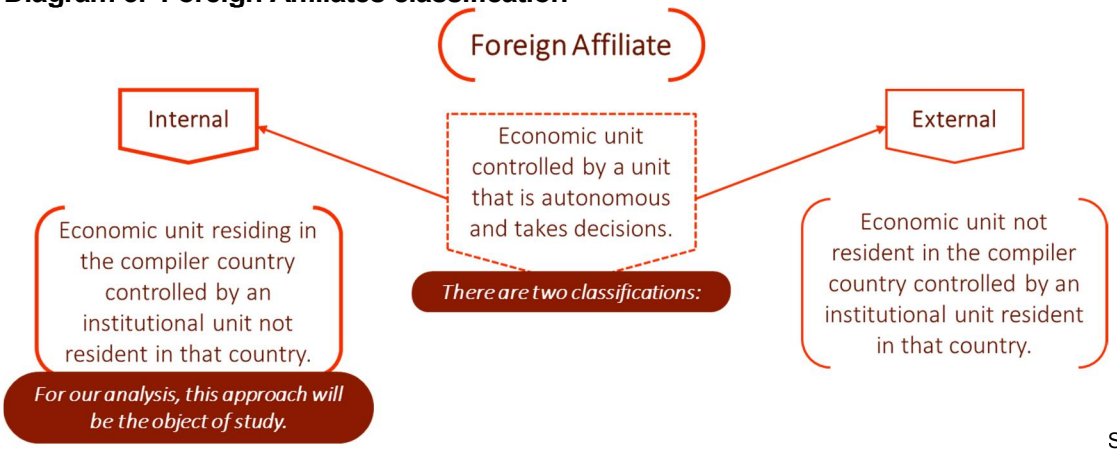
The breakdown was based mainly on the compilation and treatment of the Informal Sector, that is, the production accounts, income generation and the paid and unpaid job positions required by the non-incorporated companies owned by households that do not have the protection of the legal and institutional framework (social security payments, social benefits, Bookkeeping), which produce goods and services.

With the delimitation of the Informal Non-Exporter, the corresponding part of the Formal Non-Exporter was obtained through the difference.

Ownership

To treat the Ownership the subsidiaries were extracted, through the linkage of the micro data and the information of the Economic Census 2014. A subsidiary economic unit is one that is controlled directly or indirectly by a parent company. According to the issued by Eurostat (2012) the definitions are taken and the following groups were identified:

Diagram 3. Foreign Affiliates classification



Source:
Own elaboration with EUROSTAT data, methodologies & working papers, 2009. INEGI, 2018.

The Internal Foreign Affiliates are the object of study of this breakdown, the following four classifications were obtained that allow an appropriate processing of the information provided by the 2014 Economic Census,

The criteria considered for the classification Ownership of economic units by category were:

- Domestic owned: Economic units with foreign equity share less than or equal to 50% and do not belong to any corporate group.
- Domestic owned affiliate: Economic units with participation of foreign capital less than or equal to 50% and belonging to a corporate group.
- Foreign owned: Economic units with foreign equity share more than 50% and belonging to any corporate group.
- Foreign owned affiliate: Economic units with foreign equity share more than 50% and belonging to a corporate group.

The main input for the linkage of information between the FTD and the 2014 EC, is the database

of subsidiaries (BDFiliales), which was extracted from the 2014 EC. This database contains the variables with foreign capital within the social capital shares for each economic unit; the base contains more than 205 thousand records, while the FTD showed more than 34 thousand records per unique fiscal ID.

A subset of 8,528 unique fiscal ID records were obtained from the economic units. In addition to this information, each of the individuals were investigated, as well as in the public sector to add 1,595 records obtained. On the other hand, to strengthen the universe of study, the information from questionnaires P00 and E00 with 26 records was added.

There were gather a total of 42,504 economic units contained in the 2014 Economic Censuses were considered with information regarding the ownership focus.

From the universe of study generated with the linkages between the FTD and the 2014 EC, the Total Gross Production of the establishments was obtained, which, by classifying them by type of activity, allowed calculating the distribution coefficients for the various openings, in order to determine the distribution in the four levels of this focus. This calculation was carried out for both Supply and Use.

The **2014 economic censuses** were processed to identify the Size of the economic unit, it offers the information regarding the number of employees.

In diagram 4, a summary of these criteria is presented. The COUE extend this last stage through the registry of the employment.

Diagram 4. Size criteria

Country	Criteria	Micro	Small	Medium	Large
MEXICO	Annual Sales (Million pesos)	Until $4.00	From $4.01 to $100.00	From $100.01 to $250.00	Greater than $250.00
	Employed Personnel	0 to 10	11 to 50	51 to 250	More than 250
EUROPEAN UNION	Annual Balance Sheet (MD€)	Fewer than € 2.00	Greater than €2.00 and fewer than € 10.00	Fewer than €43.00	Greater than €50.00
	Employed Personnel	Until 9	Until 49	Until 249	250 or more.
CANADA	Gross Annual Income CAD (Million)	N.A.	Until $ 5.00	N.A.	N.A.
	Employed Personnel	1 to 5	6 to 100	100 to 499	More than 500
USA	Other criteria	SBA stablished two standards widely used for size with 500 employments for most of manufacturing and mining industries and $7 millions about average annual receipts for most of non manufacturing industries.			
	Employed Personnel	N.A.	Until 250	From 250 to 500	More than 500

Source: Own elaboration, INEGI, 2018.

The split was generated for all economic activity and not only for the economic units oriented abroad.

To breakdown this focus in the Extended Supply and Use Tables, it was determined that the Total Employed Personnel (TEP) variable is consistent for setting up the criteria, which are shown in the following diagram:

Diagram 5. Size of the economic unit specific criteria

Source: Own elaboration, 2014 Economic Census.

Given the heterogeneous behaviour of the national economy, different sources of information were required to calculate a vector of coefficients that allows the distribution by size of the economic unit. Such is the case of the Agricultural Sector and the Public Sector; which used complementary variables for their breakdown.

Private sector or state owned stablishments

Most of the economic units that make up the national economy are classified in these sectors, so that through the census information economic units were linked by size and Gross Production (TGP) according to their activity class, whereby the corresponding distribution coefficients were obtained.

A. Agricultural sector

For the processing of this sector, information was used from the National Agricultural Survey (NAS) 2012, which allowed to establish criteria under the following two assumptions:

- Hectares for crops.
- Heads for cattle.

These parameters were used as ideal reference since they are more stable units of measure compared to the personnel employed in this sector.

Finally, the information of the NAS considers the following parameters analysed by sector specialists:

Diagram 5. Parameters for the measurement of size in units of the agricultural sector, crops and cattles

Crops	
Size	Hectares
Small	0 to 5
Medium	from 6 to 20
Large	More than 21

Source: Own elaboration with information from the 2012 NAS.

Cattle		
Size	Bovine (Heads)	Porcine (Heads)
Small	1 to 10	1 to 15
Medium	11 to 120	16 to 150
Large	More than 120	More than 150

Source: Own elaboration with information from the 2012 NAS.

B. Public sector

Public sector activities are not restricted only to Legislative, governmental and justice administration activities, and activities of international and extraterritorial organizations 93 NAICS sector code, but also can be found in sectors such as: 54, Professional, scientific, and technical services, 61 Educational services, 62 Health care and social assistance services, 71 Cultural and sporting recreation services and other recreation services. The EC only collect the number of employees

La captura censal de información del sector público proporciona únicamente el número de personal ocupado, es decir, no registra valores de la TGP, por lo que estos coeficientes se calcularon exclusivamente con el TEP.

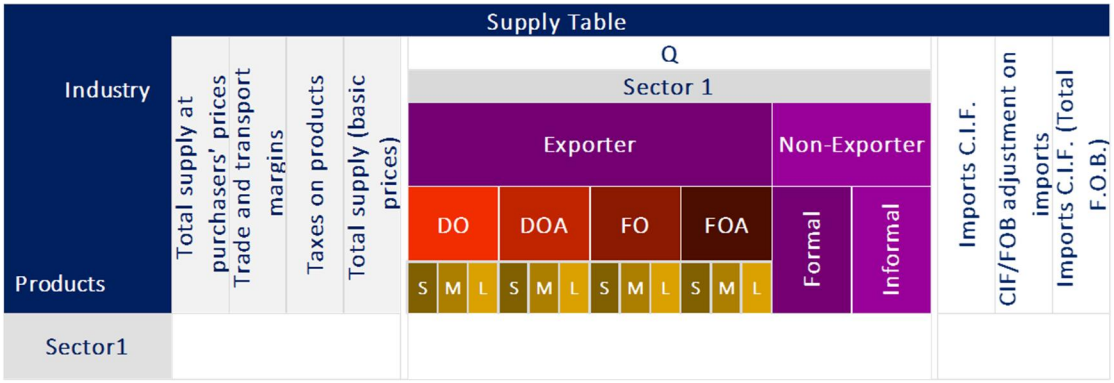
In the case of the private and public sectors including public corporations, the distribution coefficients were calculated based on the participation of the Census Gross Production Value by activity type and size of the economic unit in the year of reference 2013.

For the agricultural sector, the employed personnel were also used, however, the complementary criteria of hectares for crops and heads for livestock were resumed.

Extended Supply Use Tables compilation

To allow the knowledge and the extension of each one of these economic sectors in an integrated point of view offers an even more specific vision for the analysis. We can know the volume of intermediate consumption of the medium economic units that have foreign control and have an export profile. Next, the integrated structure of the E-SUT is presented both for the Supply and for the Use:

Diagram 5. Integrated Supply

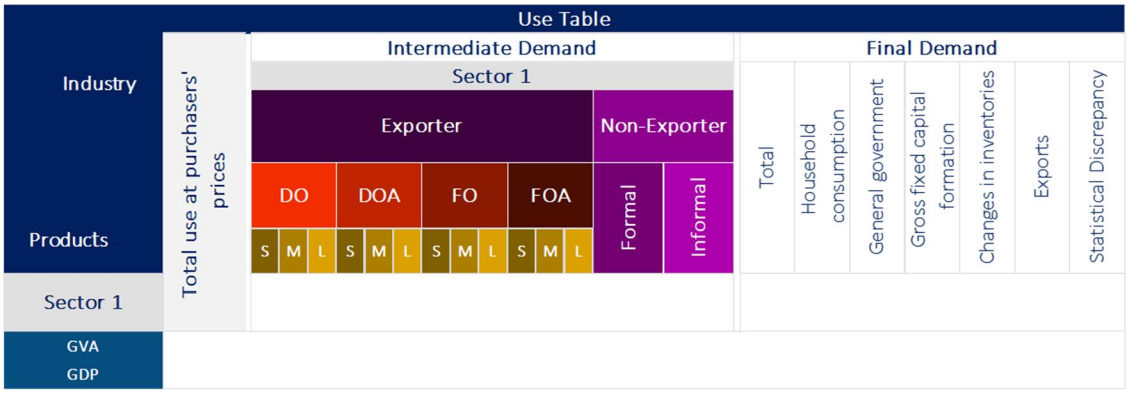


DO: Domestic owned.
DOA: Domestic owned affiliate.
FO: Foreign owned.
FOA: Foreign owned affiliate.

S: Small
M: Medium
L: Large

Source: Own elaboration, INEGI, 2018.

Integrated Use Table



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S: Small
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L: Large

Source: Own elaboration, INEGI, 2018.

Mexican E-SUT Analysis

(forthcoming)

Conclusions

(forthcoming)

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