

**Meeting of the Group of Experts on Business Registers
Online, 26 – 29 September 2022**

Gerardo Durand
National Institute of Statistics and Geography of Mexico (INEGI)

Session 3. Modernization of the SBR

Mexico's experience in producing subnational figures on exports based on linking trade and business statistics¹

Abstract

Currently, there is an increased demand for granular information about enterprises' participation in international trade and how they are engaged in global production.

Microdata Linking (MDL) is an innovative tool that allows producing more detailed statistical information by using several sources, such as international trade statistics, structural business statistics and other available data linked to the Statistical Business Register of Mexico through a unique identifier. Furthermore, considering the establishment's physical address, it is possible to produce subnational statistics related to the geographical location of productive economic units.

By using MDL, INEGI produces the statistical product "Exports by State", which provides quarterly information on the export value of goods of each of the 32 Mexican states.

The figures derived from Exports by State represent a valuable tool for policymakers to support the design of public policies and the evaluation of the effects of international trade on the production, employment, investment per state, as well as to assess how the domestic economic sectors in each state are engaged in the global supply chains.

In 2021, the states that presented the largest exports are those located in the northern border with the United States, representing more than half of the total exports.

In this regard, INEGI continues exploring the use of several data sources and innovative tools such as MDL to bring new products and further breakdowns into the current statistics, with the aim to reduce response burden and minimize costs due to budget constraints.

Keywords:

Exports, Microdata Linking, Subnational Statistics, Statistical Business Register

¹ For the preparation of this paper the author acknowledges the valuable support of Lázaro Trujillo, José Francisco Cuiriz and Ricardo Gutiérrez from the team of INEGI in charge of the use of economic administrative registers

Introduction

This document presents the methodological process for producing “Exports by State” whose development was based on linking business and trade statistics. For that purpose, Microdata Linking (MDL) provides the main building block for strengthening enterprises’ registers of,² by offering additional characteristics on them, as well as for developing statistics and indicators related to enterprises engaged in international trade, without increasing response burden on respondents.

For carrying out MDL, the Statistical Business Register (SBR) plays a central role in linking data at the micro-level from different data sources, allowing the linkage of trade and business statistics (UNECE, 2018, pp. 55). Also, by using Structural Business Statistics (SBS), the geographical location of the establishments and linking these data to the SBR through a unique identifier, it is possible to produce subnational statistics related to the geographical location of the productive economic units.

Exports by State provides quarterly and annual information on the export value of goods and the contribution of each of the 32 Mexican states to the total foreign trade. The outcomes of this product represent a valuable tool for policymakers to support the design and evaluation of the effects of international trade on production, employment, investment per state, as well as to assess how the domestic economic sectors in each state are engaged in the global supply chains.

Exports by State is based on the use of the physical address, economic activity, and gross output value data that each establishment has declared in the information collected in the SBR and it presents figures on the total value of exports and economic activity. Currently, there is a quarterly time series from 2007Q1 to 2022Q1, which presents exports by enterprises engaged in foreign trade, it is broken down into 26 activity subsectors according to the North American Industry Classification System (NAICS).³

Recent outcomes show that for 2021, the states that presented the largest exports are those located at the northern border with the United States, which contribute with more than half of the total exports. It is shown that manufacturing exports (NAICS 31-33) represented 88.6% of the total, while almost 8% of exports corresponded to the mining sector, particularly, exports related to the Manufacturing of transportation equipment (NAICS 336) accounted for 35.4% of the total value of exports by state.

In this sense, this paper aims to describe a general overview of the methodology followed to construct the figures on Exports by State. The document has four sections: an introduction section, a section describing the methodological aspects, the dissemination and main outcomes of the subnational figures, and finally, the main conclusions and lessons learned.

² Other examples in INEGI using MDL includes:

Profile of Manufacturing Export Enterprises of Mexico (<http://en.www.inegi.org.mx/programas/peme/>; <https://unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.42/2019/mtq1/18.pdf>), and the Early Monthly Estimation of Mexico’s Manufacturing Production Level Using Electric Energy Consumption Data (<https://www.inegi.org.mx/investigacion/imoam/>; <https://rde.inegi.org.mx/index.php/2022/01/03/early-monthly-estimation-of-mexicos-manufacturing-production-level-using-electric-energy-consumption-data/>)

³ The North American Industry Classification System (NAICS), developed in 1997, is the standard industrial classification used by the national statistical agencies of Canada, Mexico, and The United States to classify business establishments for the purpose of collecting, analyzing, and publishing statistical data and allowing a high level of comparability in business statistics among the North American countries.

Methodological aspects

Microdata Linking (MDL) is an innovative tool that allows producing more detailed statistical information by linking several sources, such as international trade statistics, structural business statistics, and other available data linked to the Statistical Business Register of Mexico⁴ through a unique identifier. Furthermore, by considering the physical address of the establishments, it is possible to produce subnational statistics related to the geographical location of productive economic units.

The observation unit used for the MDL is the enterprise, which is comparable to customs records⁵. Enterprises are classified according to the number of establishments that comprise them:

- Uni-establishment enterprises. Those with only one establishment.
- Multi-establishment enterprises. Enterprises constituted by more than one establishment.

The industrial activity classification used for disseminating the figures of Exports by State is the North American Industry Classification System (NAICS), and the coverage considers 26 subsectors (at 3-digit level). The periodicity for collecting and disseminating these figures is quarterly, and annual for each of the 32 Mexican States.

In this regard, the next subsections illustrate the main data sources, as well as the MDL and production process to construct figures for Exports by State.

Data sources

Exports by State is generated by using the SBR as the backbone for linking the available data in trade statistics to Structural Business Statistics (SBS), considering the physical address information, economic activity, and gross value output of enterprises.

Specifically, the data sources used for developing Export by State are:

- The Statistical Business Register of Mexico (RENEM),⁶ from which enterprises' identification information, location (including physical address and geographical coordinates), industry classification, and other economic variables, such as the number of employees and revenue, is obtained.
- Customs records (monthly)
- Structural Business Statistics (SBS) to obtain additional economic variables that are not considered in the SBR such as,
 - Economic Censuses (on a quinquennial basis)
 - Business Surveys
 - Mining and Metallurgical Industry surveys (annual and monthly)
 - Manufacturing Industry surveys (annual and monthly)
 - Module for Enterprises in the Agriculture Sector, Manufacturing, Trade and Services survey (annual).

⁴ The Statistical Business Register of Mexico is called RENEM (by its acronym in Spanish).

⁵ The customs records are the data source to produce the international merchandise trade statistics in Mexico

⁶ United Nations. (2020, page 18)

- Manufacturing, Maquila and Export Services (IMMEX, by its acronym in Spanish) Statistics (annual and monthly)
- Administrative registers from the National Hydrocarbons Commission.

MDL and the production process

Based on the revision of the abovementioned data sources, the production process followed for the MDL is described in the following steps:

First, identifying the exports value, legal name, physical address, and Tax ID of enterprises that reported trade transactions in the customs records, and which listed either the Mining (NAICS Sector 21) or the Manufacturing (NAICS Sector 31-33) sector as their main economic activity.

For those enterprises in the Agriculture, Forestry, Fishing and Hunting (NAICS Sector 11) sector, information on their main characteristics was collected through a special questionnaire called Module for Enterprises in the Agriculture Sector, Manufacturing, Trade and Services survey. This is a dedicated survey for collecting data on agricultural exports that allows to identify the origin of agricultural products by state.

Secondly, the enterprises identified in step 1 are registered in the SBR in order to obtain their unique identifier, which is known as the Business Statistical Key (CLEE, by its acronym in Spanish), as well as to identify the number and characteristics of the establishments that belong to them.

Thirdly, the gross value output of the set of enterprises is obtained through the MDL between the SBR and the afore mentioned data sources.⁷ Fourthly, the MDL between customs records and business statistics, via the SBR, takes place to obtain the quarterly total value of exports per enterprise.

Fifthly, the gross value output of those establishments that are not included in the data sources used in MLD is estimated. These values are approximated based on the enterprises' shares of gross value output they reported in the last Economic Census.

Sixth, the exports value of each enterprise is allocated based on the physical address information of each of its establishments in the Mexican states. For the enterprises that are encompassed in one establishment, the total value of exports is assigned directly to the state where the establishment is located. However, some estimations are required when the enterprise has more than one establishment (multi-establishment) in the domestic economy.

Therefore, the exports values are assigned according to the gross value output rates of the manufacturing and mining establishments in the total production of the enterprise. Databases are integrated at the establishment level with information on export values, gross value output, employees, and main characteristics (e.g., economic activity, state, unique identifier, among others).

⁷ The Economic Censuses provide quinquennial annual data on the output, revenues and employees for each enterprise and establishment. On the other hand, SBS are used to obtain monthly information on these variables for some of the establishments that are part of the enterprises.

The next step is to carry out a micro-validation and a macro-validation process. The micro-validation process is performed to identify data at the enterprise and establishment level, which verifies the information according to the trends and variations of their production processes. On the other hand, the macro-validation process is based on comparing results of exports by state and by economic activity, coverage, trends and comparing data across other statistical sources, such as business surveys not considered above. Finally, quarterly Exports by State figures are disseminated three months after the reference period.

The main outcomes obtained by the abovementioned production process, are described in the following section.

Dissemination and main outcomes

This sections briefly introduces the dissemination efforts related to the Exports by State product, as well as the main outcomes observed.

Dissemination

Exports by State disseminates annual (series 2007-2021) and quarterly (2007Q1-2022Q1) statistical information on the exporting activity of the 32 Mexican States. The following products on Exports by State have been developed and are available at INEGI's official website.⁸

- Methodological document
- Metadata (annual and quarterly)
- Tabular data (quarterly and annual information on exports by state, sector and subsector of industrial activity)
- Open data (annual and quarterly)
- Other interactive tools (indicators bank, dynamic graphs, among others)

Main outcomes

Some of the latest results from 2021 show:

- The states that reported the largest exports are those located at the northern border with the United States, accounting for more than half of the total exports (439.8 billions of USD), particularly, Chihuahua with 13.3%, Coahuila 12.2%, Baja California 10.9%, Nuevo Leon 9.4%, and Tamaulipas 7.4%. (Annex A.I).
- Exports related to Manufacturing of transportation equipment (NAICS 336) accounted for 35.4% of the total value of exports by state. The states with the highest participation in the total exports of subsector Manufacturing of transportation equipment were Coahuila de Zaragoza, Guanajuato, Nuevo Leon, Chihuahua, and Puebla. Together accounted for 60% of the exports registered by this subsector (Annex A. II).
- Regarding, the agricultural products (NAICS 11: Agriculture, Forestry, Fishing and Hunting) the Crop Production Subsector (NAICS 111) is the most relevant, representing 92.6% of the sector exports value in 2021. For this year, the five top states (Michoacán de Ocampo, Sinaloa, Sonora, Baja California, and Jalisco) accounted for 71.5% of the total exports in the subsector. (Annex A.III)

⁸ Consulted in July 2021 of: http://en.www.inegi.org.mx/programas/exporta_ef/#Datos_abiertos

When comparing 2007 with 2021, the following is observed:

- For the most relevant Subsector (NAICS 336), there is a shift in the participation of the States that present the most dynamic exporting activity. For instance, the main states in 2007 were Coahuila (15.9%), Chihuahua (12.4%) and Puebla (11.1%), while in 2021 it was Coahuila (22.2%), followed by Guanajuato (12.3%) and Nuevo Leon (9.4%).
- The behaviour of the five largest exporter states shows that in the reference period (2007 - 2021), they accounted for more than 50% of national exports, where Chihuahua went from third place in 2007 to first place in 2021 with a share of 13.3%. In the case of Coahuila, it climbed four positions: from sixth to second place, with a 12.2% share, Baja California fell from first to third place and had a 10.9% share. Nuevo León moved from fifth to fourth place with a 9.4% share and Tamaulipas dropped one position from fourth to fifth place with a 7.4% share. (Annex A.IV)

Conclusions

In conclusion, by using tools such as MDL and taking advantage of the physical address of the establishments, INEGI produces quarterly, annual and subnational figures on the exporting activity of goods for each of the Mexican states, which are presented with a breakdown of 26 NAICS Subsectors (3 digit-level). Currently, results for Exports by State present data on a time series from 2007 to 2021.

One of the main outcomes show that for 2021, the states that presented the largest exports are those located at the northern border with the United States and encompass more than half of the total exports. The main subsector is Transportation Equipment and Manufacturing (NAICS 336), which accounted for 35.4% of the total value of exports by state.

The figures derived from Exports by State represent a valuable tool for policymakers to support the design of public policies and the evaluation of the effects of international trade on the gross value output, employment, investment per state as well as to assess how the domestic economic sectors in each state are engaged in the global supply chains.

Innovative tools such as MDL, and the use of information from different statistical domains, makes it possible to offer new statistical products and more detailed information for our users, reducing the response burden and minimizing costs due to budget constraints. In this regard, INEGI continues exploring the access and use of new and current available data sources and innovative tools for strengthening the statistical infrastructure.

References

INEGI. (2018). *Síntesis Metodológica del Sistema de Clasificación Industrial de América del Norte*. [electronic versión], 2018 edition. Aguascalientes, Mexico. Consulted in June 2022 of http://en.www.inegi.org.mx/contenidos/productos/prod_serv/contenidos/espanol/bvinegi/productos/nueva_estruc/702825099701.pdf

INEGI. (2019). *Balanza Comercial de Mercancías de México 2019. Síntesis Metodológica*. [electronic version], 2019 edition. Aguascalientes, Mexico. Consulted in June 2022 of <https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=702825189976>

INEGI. (2020). *Exportaciones Trimestrales por Entidad Federativa (ETEF). Síntesis Metodológica*. [electronic versión], 2020 edition. Aguascalientes, Mexico. Consulted in June 2022 of <https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=702825197438>

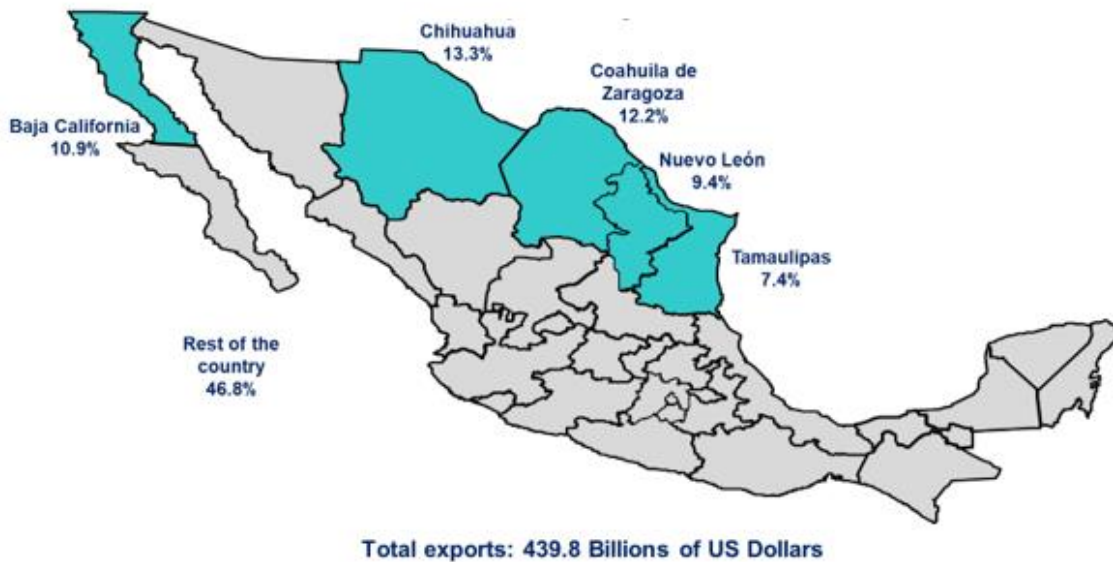
United Nations. (2020). *United Nations Guidelines on Statistical Business Registers (final draft prior official editing)* [electronic version], 2022 edition. New York. Consulted in June 2021 of https://unstats.un.org/unsd/business-stat/SBR/Documents/UN_Guidelines_on_SBR.pdf

UNECE. (2018). *Guidelines on the use of statistical business registers for business demography and entrepreneurship statistics*. Consulted in July 2022. Pag. 55. <https://unece.org/fileadmin/DAM/stats/publications/2018/ECECESSTAT20185.pdf>

Annex

Annex A.I

Share of exports by state, 2021



Source: INEGI

Annex A.II

Exports by state, subsector 336 Transportation Equipment Manufacturing, 2021



Source: INEGI

Annex A.III

Exports by State, subsector 11 Agriculture, 2022



Source: INEGI

Annex A.IV

Ranking of the share of total exports by state

2007				2021			
States	USD billions	Share	Ranking	States	USD billions	Share	Ranking
Baja California	31.9	13.4	1	Chihuahua	58.5	13.3	1
Campeche	29.1	12.2	2	Coahuila	53.5	12.2	2
Chihuahua	28.1	11.8	3	Baja California	48.0	10.9	3
Tamaulipas	22.5	9.5	4	Nuevo León	41.5	9.4	4
Nuevo León	19.8	8.3	5	Tamaulipas	32.6	7.4	5
Coahuila	17.5	7.3	6	Guanajuato	27.0	6.1	6
Jalisco	14.4	6.1	7	Jalisco	23.2	5.3	7
Sonora	13.0	5.5	8	Sonora	20.8	4.7	8
México	8.6	3.6	9	México	17.5	4.0	9
Tabasco	8.3	3.5	10	Campeche	15.4	3.5	10
Rest of the country	44.7	18.8		Rest of the country	101.8	23.2	

Source: INEGI