



Meeting of the Expert Group on Business Registers

Session I

Estimation of business population in Mexico in a given year



**National Institute of Statistics and Geography
INEGI – Mexico**

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Objective

To estimate the future number of businesses in a given year, using conditional probabilities obtained through tables of survival, mortality and life expectancy of businesses in Mexico



Background

Mexico conducts Economic Censuses every five years, since 1930.

The above has allowed historical monitoring on businesses' life during the last six Economic Censuses, from 1989 to 2014.

The following demographic indicators were obtained through this historic monitoring:

- The probability of survival, mortality, as well as life expectancy of businesses **from their birth**.

Furthermore:

- The probability of survival, mortality, as well as life expectancy of businesses **once they have reached a given age “x”**.

Background



The demographic indicators are included in the Tables of survival, mortality and life expectancy of businesses in Mexico.

Based on these tables, the **conditional probabilities** of businesses surviving “ y ” more years are obtained, since they are already age “ x ”.

The conditional probabilities are the basis for calculating the projection on the number of businesses in a given year.

Methodology

Step 1: The year for the projection was determined: 2019.

Step 2: In order to perform a more precise projection, the objective population was divided into four segments, since different estimation procedures were used.

Segment	Description
1	Businesses born before 2014, observed in 2014 and that are expected to survive by 2019
2	Businesses born during the period 2014-2018 (inter-census period) and that are expected to survive by 2019
3	Businesses born in 2019
4	Businesses born up to 2018 from the public sector and religious organizations and that are expected to survive by 2019

Methodology

Step 3. Estimation of Segment 1: businesses born before 2014, observed in 2014 and that are expected to survive by 2019.

- Businesses were distributed according to their age, forming 114 generations: from 1900 to 2013.
- The number of businesses from each age were multiplied by their corresponding conditional probability of living five more years.

Thus, the number of businesses expected to survive by 2019 was estimated and was distributed by age, as of five years old.



Methodology

Step 4. Estimation of Segment 2: businesses born during the period 2014-2018 (inter-census period) and that are expected to survive by 2019.

- For every one of the ages from 0 to 4, the average five-year growth observed during the Economic Censuses from 1989 to 2014 was calculated.
- For every age (0-4 years), the number of existing businesses in 2014 was multiplied by their corresponding average five-year growth

We obtained the number of businesses from 0, 1, 2, 3 and 4 years of age that are expected to survive by 2019.



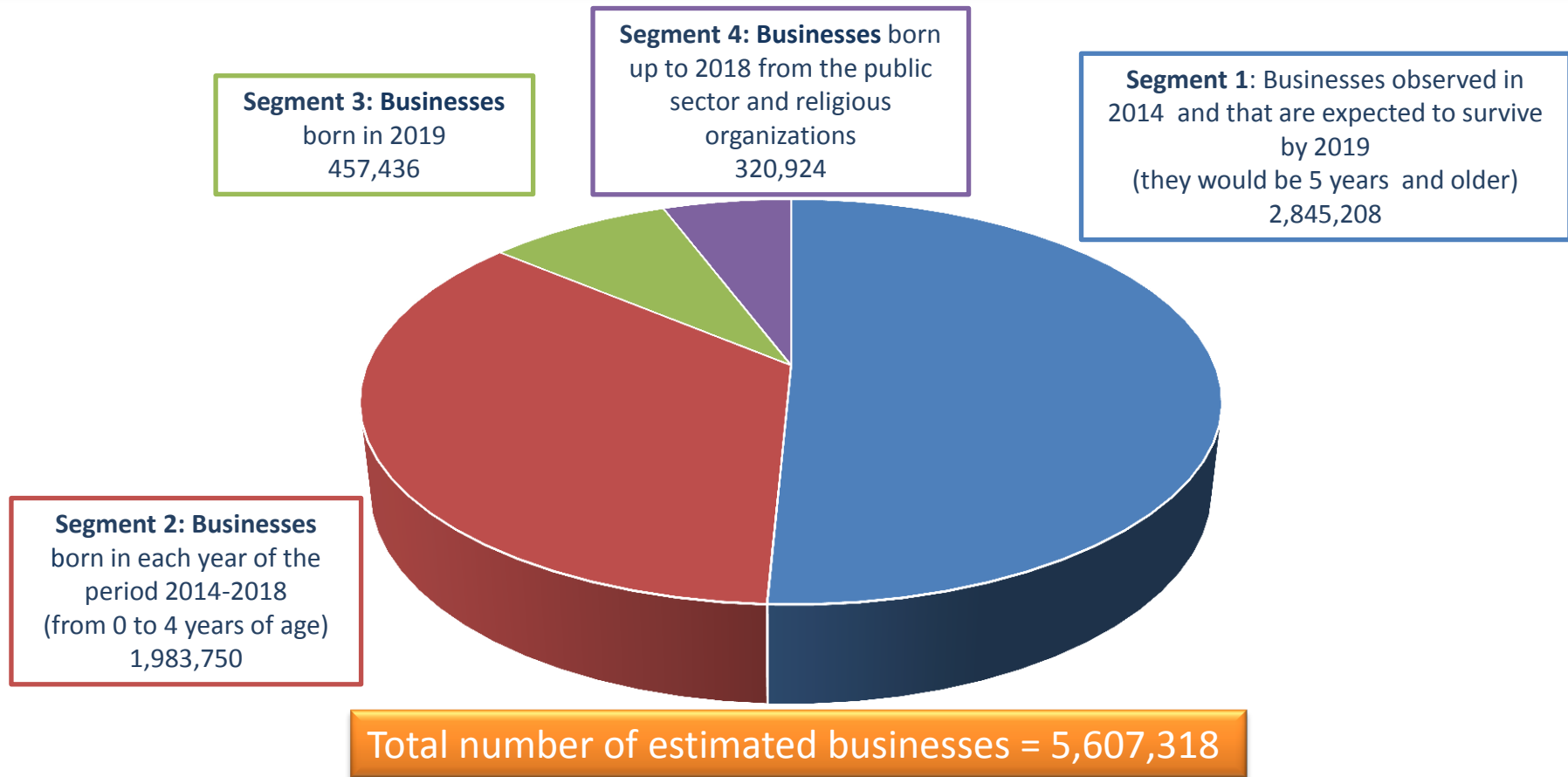
Methodology

Step 5. Estimation of Segments 3 and 4: businesses born in 2019 and businesses born up to 2018 from the public sectors and religious organizations, that are expected to survive by 2019.

- For each segment, the number of businesses was estimated through the ratio that each one had in 2014, regarding to the corresponding total of observed businesses in 2014.



Results obtained through the use of this methodology



Methodology

Step 6: Validation of the method. A simulation process was performed to estimate the number of existing businesses in 2014, based on the existing business population in 2009, with the purpose of comparing it with the number of businesses observed during the 2014 Economic Censuses.

The results were as follows:

Number of businesses observed in the 2014 Economic Censuses A	Estimation 2014 B	Error in the estimation (B/A) - 1
4,948,879	4,962,223	0.0027

The error in the estimation was barely 0.27%, which is considered acceptable.

Result

In order for the projection to be more precise, it was decided to adjust it for 2019, discounting the error observed in the simulation process, and the following result was obtained:

Estimation 2019	Error in the simulation	Adjusted estimation 2019
A	B	$A/(1+B)$
5,607,318	0.0027	5,592,220

This data will be used for planning the next Economic Censuses that will be held in 2019.

Conclusions

1. The proposed methodology enables obtaining good projections on the number of businesses at a given year, and, in addition, their structure by age.
2. The projection methodology can be used in smaller geographical areas for estimating the number of businesses and their structure by age.
3. In the case of INEGI, the methodology was used to estimate the number of businesses that will exist in 2019, the year of the next Economic Censuses. The results obtained have been very useful for:
 - Budget preparation
 - Estimating the amount of human and material resources needed for the Field operation.
 - Development of detailed planning

Conclusions

4. The projections on the number of businesses, and their structure by age, can be used as support for designing public policies aimed at specific groups, for example the attempt of reducing the mortality of younger businesses.

