

JOINT EUROSTAT/UNECE WORK SESSION ON  
DEMOGRAPHIC PROJECTIONS

# PREPARING POPULATION PROJECTIONS IN DEVELOPING COUNTRIES

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# Introduction

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## Population Projections requires:

- Population base
- Levels, trends and structures of demographic variables.

**In Developed Countries information can be taken almost directly from the available data sources,**

**In Latin-American countries information requires a careful analysis in order to prepare population projections, this analysis is made using the so called Demographic conciliation**



# Demographic conciliation

**Indirect method which reconstructed the demographic dynamics of the recent past, in a period limited by two population censuses**

## **Objective:**

To build throughout components method a consistent set of estimates of population demographic dynamics, for a period in the past, based on all available basic information.

Determines the bulk of demographic needs

- Base population
- Recent, levels, trends and structures of main demographic variables



# Demographic conciliation

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Description:

**Choosing a recent period**, delimited by two censuses. Could include more intermediate censuses.

**Simultaneous location of the population data** by age and sex of all censuses included at one time point, using forward/backward projections.

**Selecting “initial values”**. There are many values for each age-sex, as many as included censuses, responsible needs to make a case by case choice.



# Demographic conciliation

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Although considers some basic principles, is:

- subjective
- Arbitrary

If several experts apply this process independently, they would hardly get the same results.



# Demographic conciliation in Mexico. 1990-2010

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Includes five censuses, then there are five estimates for each age-sex population

In selecting initial values, to eliminate subjectivity, specific criteria were established:

- from 0 thru 4 years old, maximum value was selected
- from 5 years and over, the maximum and census 2010 were averaged

**Arbitrariness persists**



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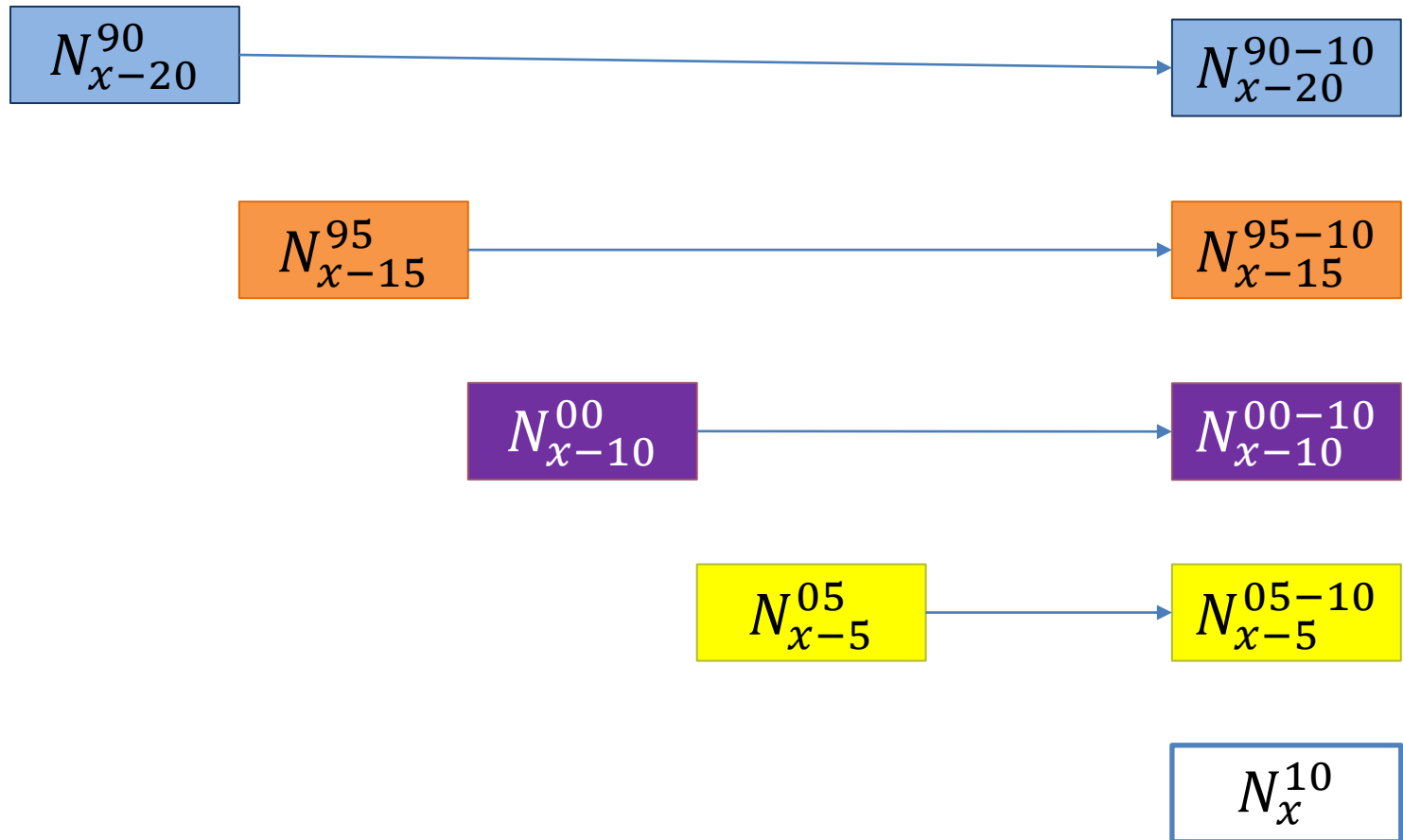
# Demographic conciliation. 1990-2010

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The five estimates have different characteristics.

- Figures that come from the 2010 Census nearly correspond to the census data.
- Other census data involves fertility, mortality and migration estimations (up to 20 years)



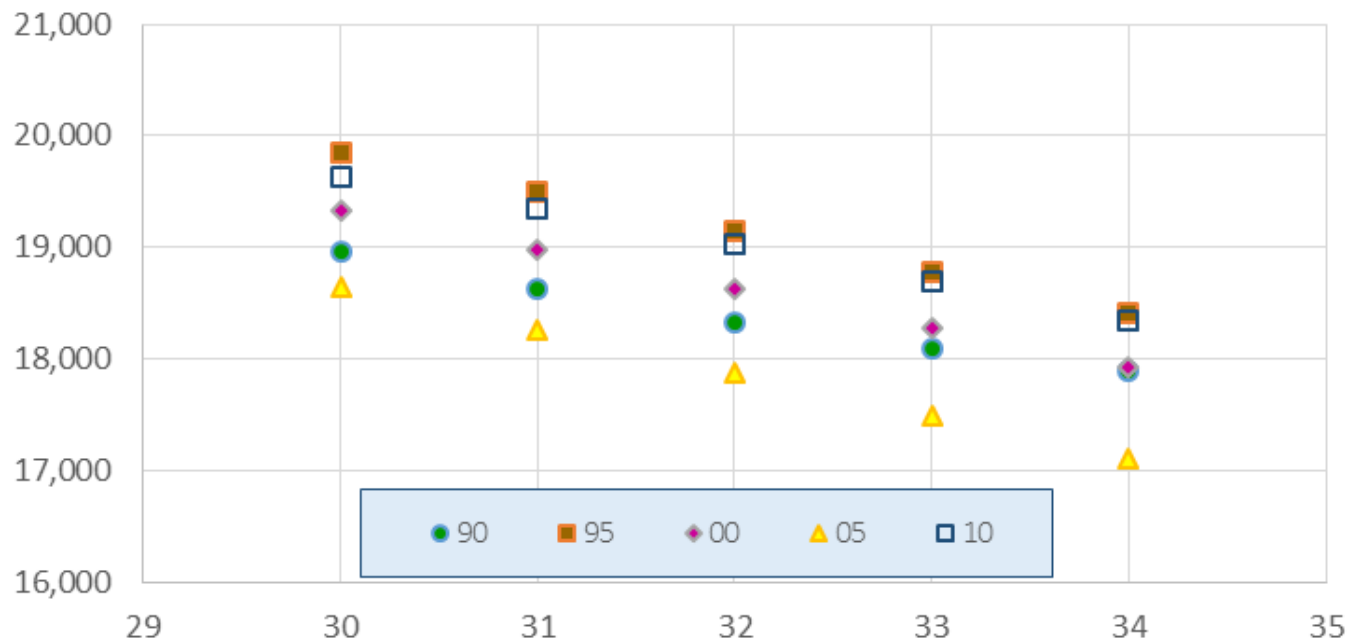


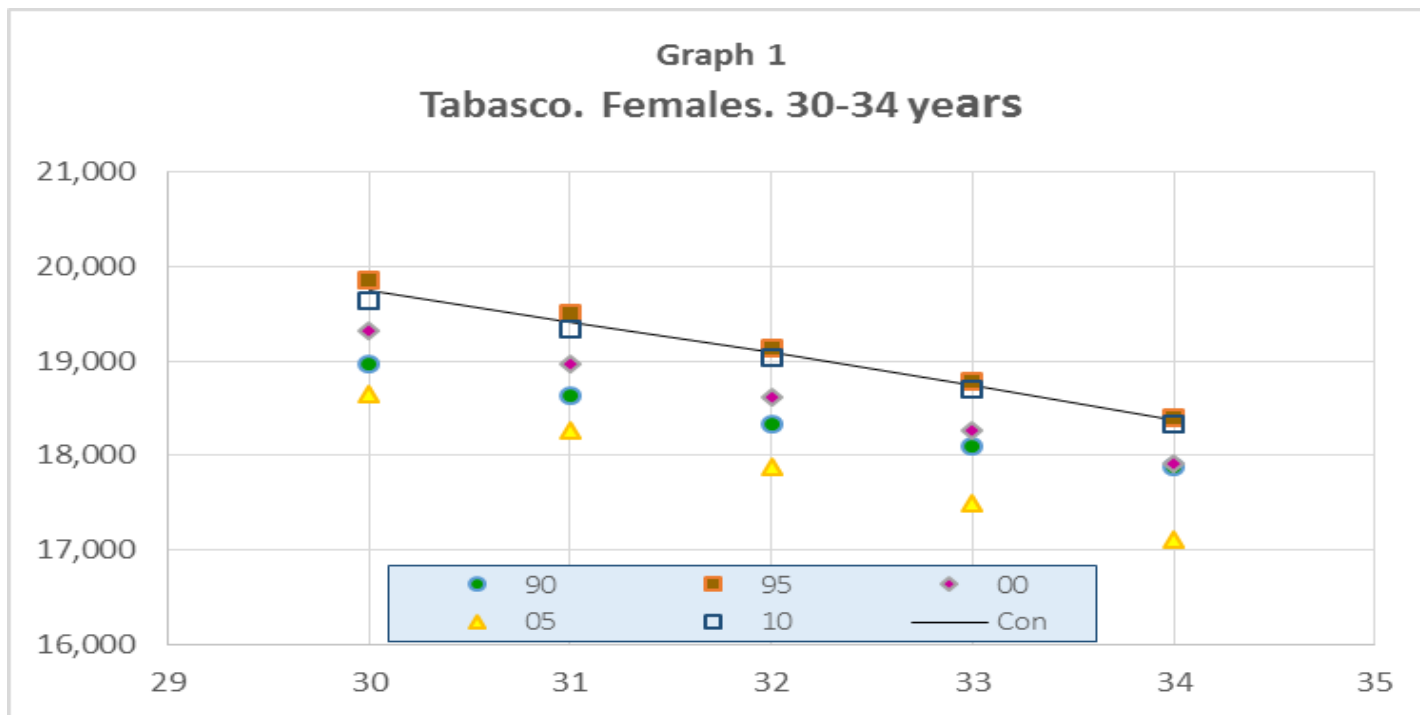
**Five figures  
for the same  
indicator**





Graph 1  
Tabasco. Females. 30-34 years





**There are three  
are not  
considered  
estimates which  
corresponds to  
values lower  
than 2010**



# Results

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Demographic conciliation estimated a census under coverage of 1.58%.

By State, this under coverage varies between 0.69% and 3.19%

Pos enumeration survey developed by INEGI estimated 1.30%

Two important limitations:

- There are five data and only two are considered (or one, when the maximum matches with 2010 datum),
- No consider data distribution



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The proposal is to explore the possibility of making a selection of initial values through some procedure, preferably statistic, to eliminate subjectivity and arbitrariness.

We did a first exercise with Box Plot and Bootstrap



## An alternative algorithm

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**Premise:** Use the five data for each age-sex group

1. Using Box Plot, “outliers” were identified. These points were eliminated.
2. Estimate a confidence interval for estimations in each sex/age group, assuming normal distribution and using Bootstrap
3. Choose maximum between confidence interval upper limit and 2010 census data.

This algorithm were applied in four states.



## Selected States

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- Chihuahua. Major under coverage estimated.
- Queretaro. Lowest under coverage estimated.
- Tabasco. The difference between post enumeration survey and conciliation was the lowest.
- Sinaloa. The difference between post enumeration survey and conciliation was the largest.



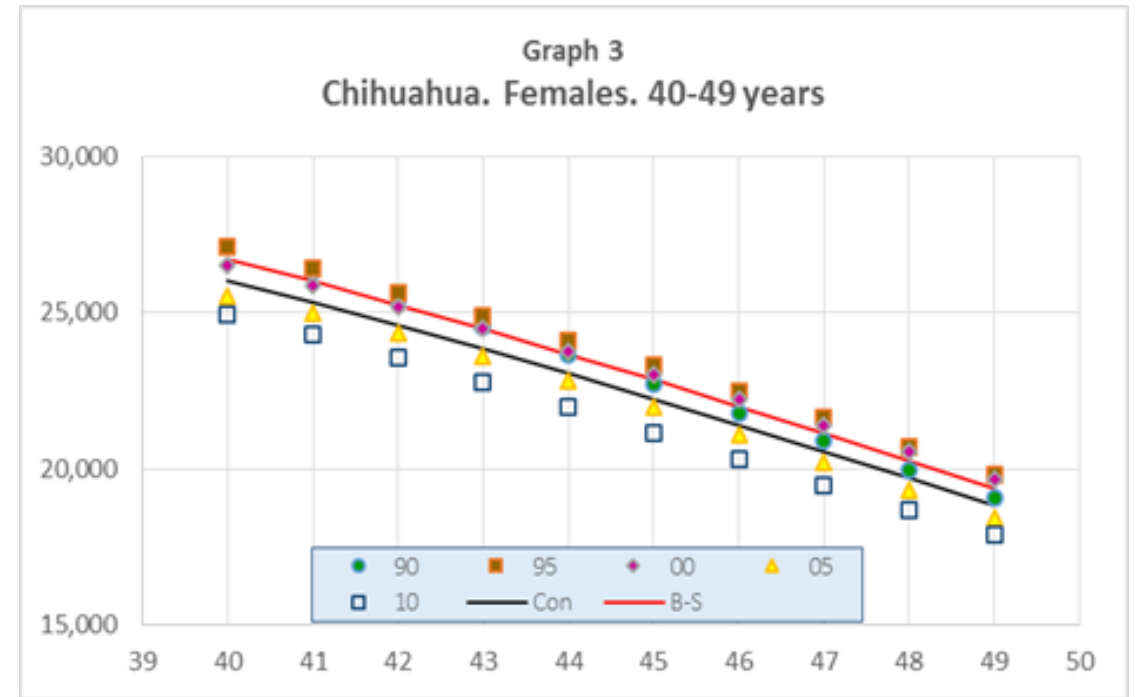
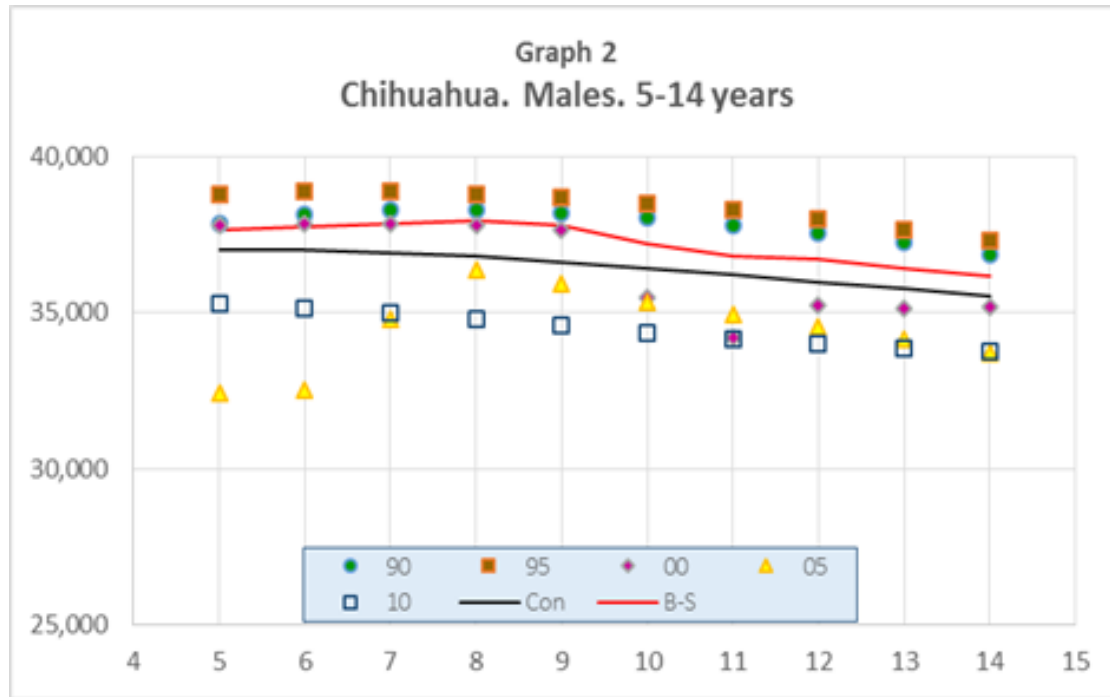
# Results

**TABLE 1**  
**ESTIMATED UNDER COVERAGE. SELECTED STATES**

State	Sex	Survey	Conciliation	Bootstrap
<b>Chihuahua</b>	Both	1.78	4.37	5.46
	Male		4.05	4.82
	Female		4.69	6.08
<b>Querétaro</b>	Both	1.01	0.34	0.17
	Male		0.47	0.25
	Female		0.22	0.10
<b>Tabasco</b>	Both	0.55	0.61	0.47
	Male		1.02	0.90
	Female		0.22	0.06
<b>Sinaloa</b>	Both	0.47	2.88	3.27
	Male		0.47	0.25
	Female		4.35	5.10

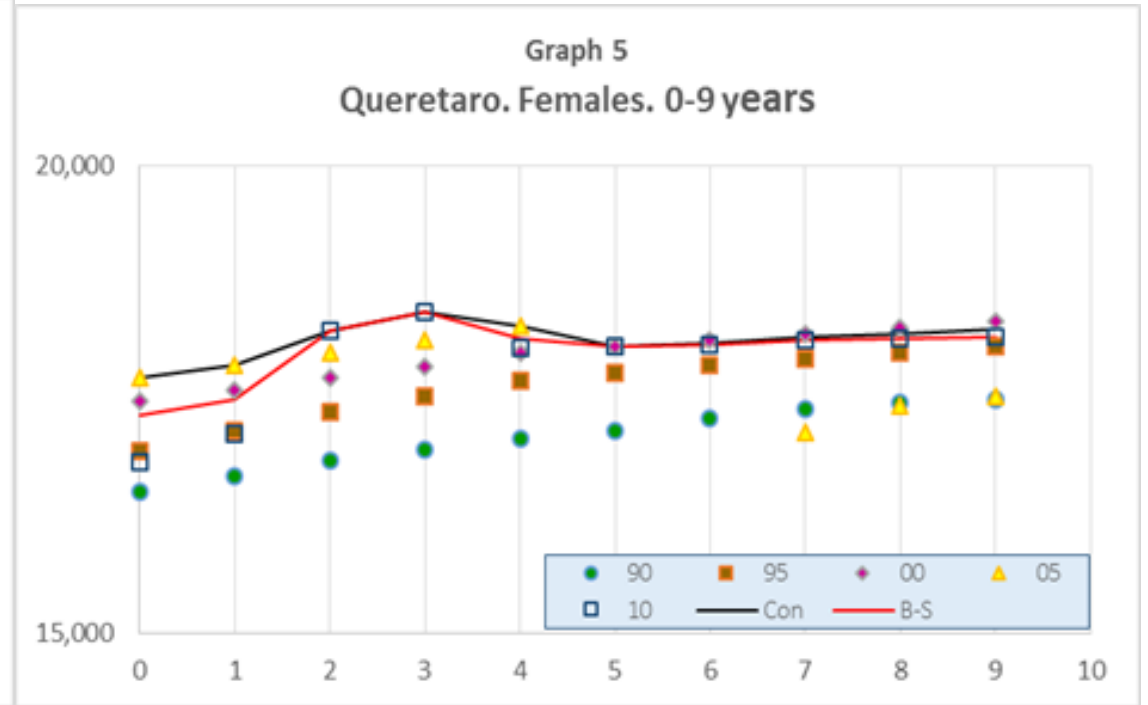
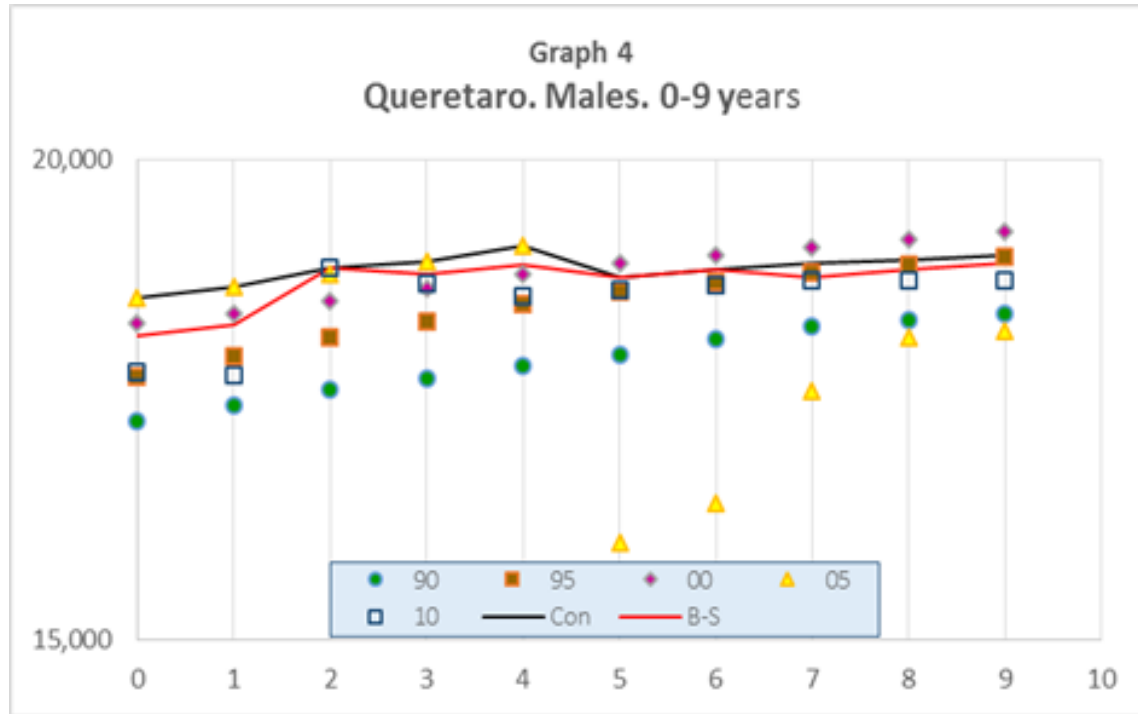


# Chihuahua

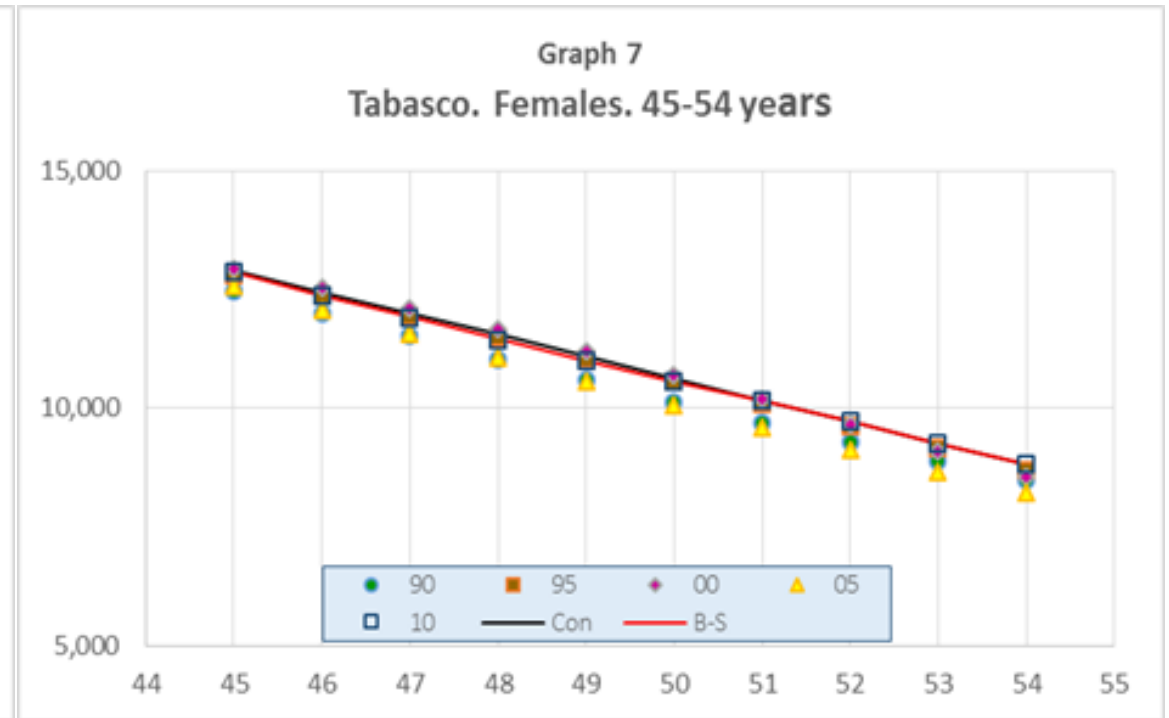
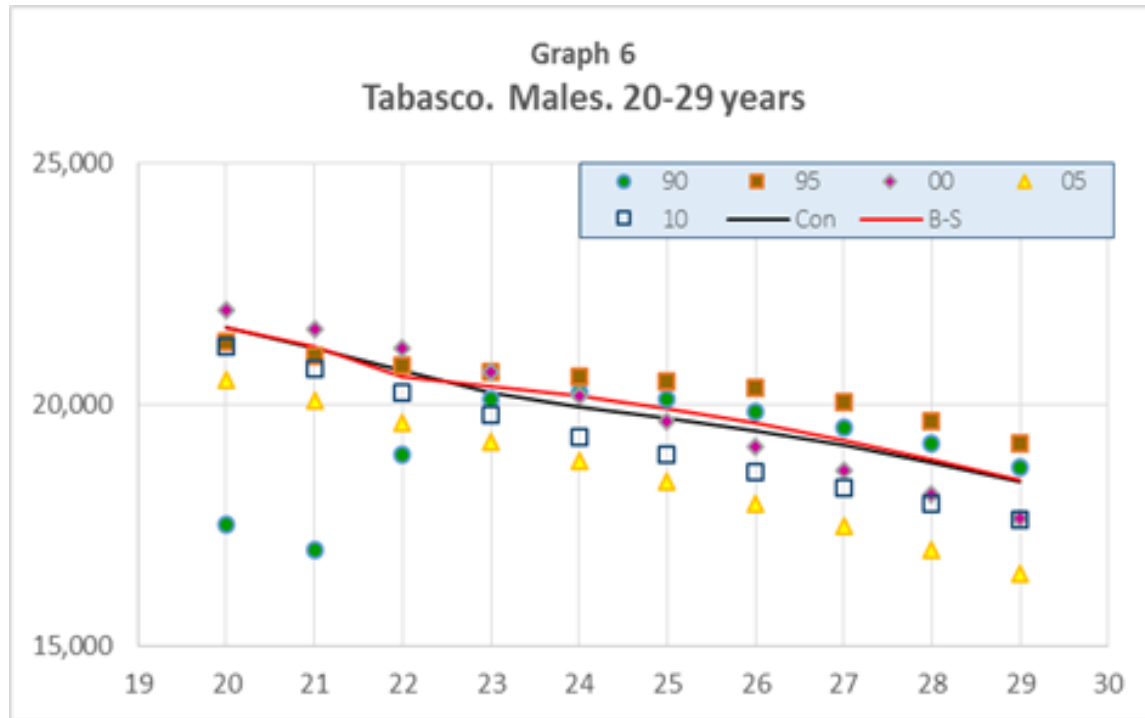




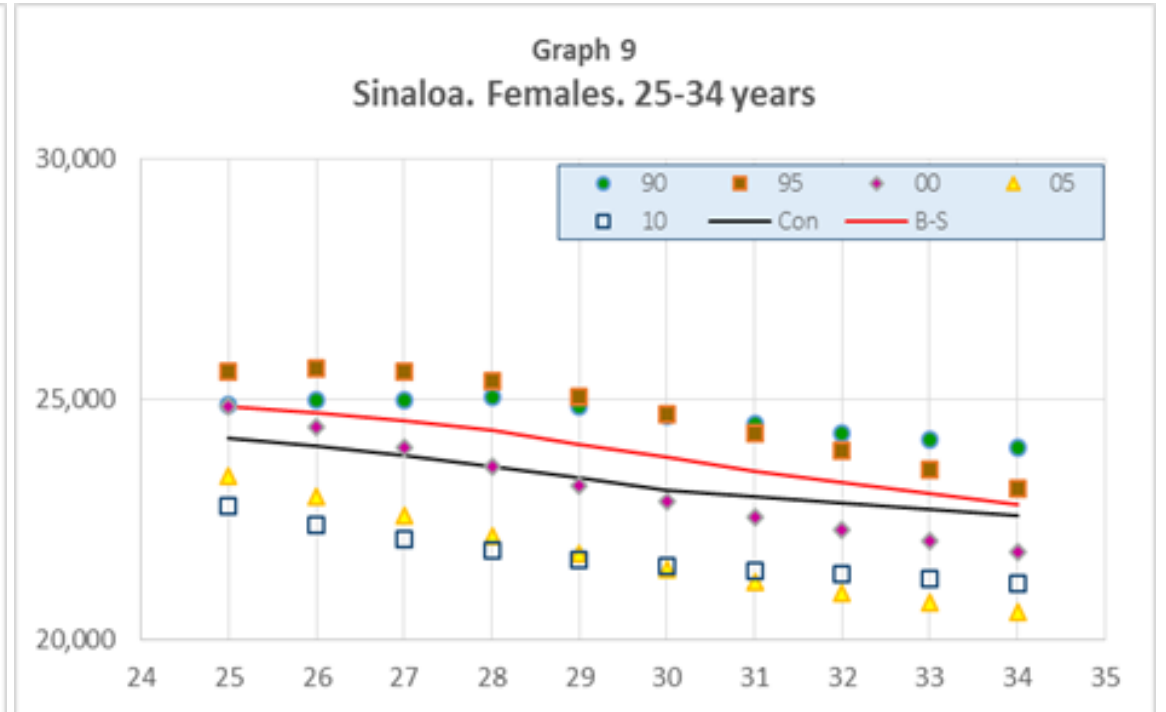
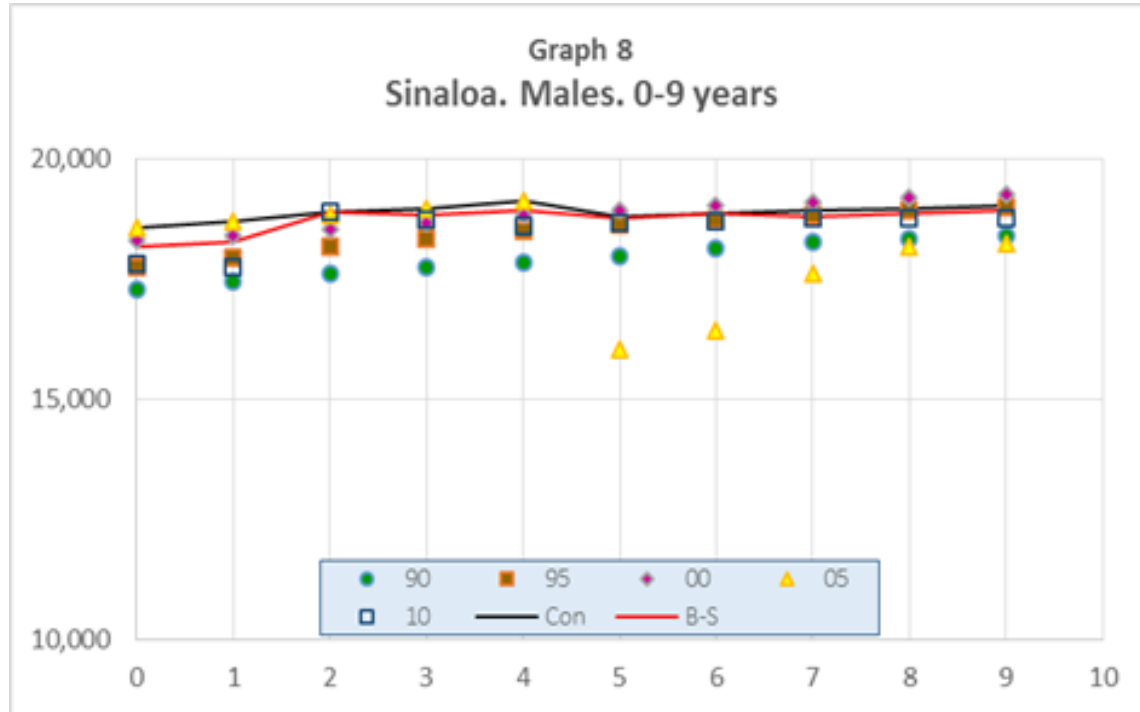
# Queretaro



# Tabasco



# Sinaloa



# Conclusions

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1. Demographic conciliation has proved to be very useful in determination of base population for the preparation of population projections in Latin America.

In this approach, should be removed the **arbitrary and subjective character in the selection of initial values**

2. Its usefulness in the reconstruction of demographic dynamics, is generally limited, without affecting the estimates of mortality, fertility and migration.

In last exercise in México, Total Fertility Rates were adjusted with selected initial population, but migration and mortality not



## Pending tasks

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To search another alternatives for the selection of initial values, based on statistical procedures.

Some elements to be considered:

- Incorporate not only the distribution of the data, but also their time sequence.
- Consider the values of various ages simultaneously.
- Consider simultaneously values of both sexes.



## Pending tasks

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Search for statistical methods to evaluate the initial hypothesis of demographic variables

In exercise for Mexico, was applied a procedure to re-estimate fertility rates.

- A backward projection was made, including births per year.
- TFR was recalculated with these births and initial fertility age structure

Is required to think about possibilities for evaluating the initial estimates of the migration



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# Thanks!

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