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PRASC



**Project for the Regional
Advancement of Statistics
in the Caribbean**

**Projet régional pour
l'avancement de la statistique
dans les Caraïbes**

Funded by the
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Population Estimates
Component: Household Survey Infrastructure

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Module 3.0

Estimates of Total Population

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General Overview

- We already defined the concepts on which our population estimates will be based
- OECS NSOs are looking at producing mid-year population estimates (June 30) based on concepts aligned with their Census



General Overview (2)

- To produce our population estimates, we will use the Component Method.
 - Method used by most NSOs
 - An advantage: we can understand which component is responsible for the growth / decrease
 - It can be done for both estimates of total population and estimates by age & sex
 - It can be used for producing estimates of population for sub-national regions
 - With one additional component of population change which is the inter-regional migration.



The Component Method

- We know the population at time t , we need to estimate the population at time $t+x$
- To do so, we need to estimate the population change between t and $t+x$ (the reference year)
- By adding the population change to the population at time t , we will obtain an estimate of the population at time $t+x$

$$\text{Population}(t+x) = \text{Population}(t) + \text{pop. change}(t, t+x)$$



Components of population change

- To estimate the population change, we need to define which events generated that population change
- In our case, the population change is estimated by the following events
 - Births, Deaths, International Entries (in-migration) and Exits (out-migration)
- In order to produce a population estimate, we need an estimate for each of these components



The formula...

$$\begin{aligned} \text{Population}_{(t+x)} &= \text{Population}_{(t)} \\ &+ \text{Births}_{(t, t+x)} \\ &- \text{Deaths}_{(t, t+x)} \\ &+ \text{In-migrants}_{(t, t+x)} \\ &- \text{Out-migrants}_{(t, t+x)} \end{aligned}$$

where t is the beginning of the reference period
 $t+x$ is the end of the reference period
 $t, t+x$ is the reference period (usually a year)
 x is the duration of the reference period (usually a year)



Concepts

- We want to produce mid-year population estimates (MYPE)
- Reference Date: June 30 (midnight between June 30 and July 1)
- Reference year: from July 1 to June 30 (included)
- For each component of population change, we need the number of events between July 1 (included) to June 30 of the next year (included)



Exercice

- If an event (B, D, I, E) occurs on June 30, 2016, to which reference year should it be taken into account?
- 2015-2016 or 2016-2017?

- A question: in the Census, do the population counts include the events (births) during Census Day?
- Does the Census population counts reflect the population at the beginning or at the end of the Census Day?



Exercice

- MNI population was estimated at 5,000 people as of June 30, 2015.
- We know that between July 1, 2015 and June 30, 2016, there were in MNI, 50 births & 40 deaths.
- We also know that for the same period, there were 30 immigrants and 35 emigrants.
- What is the MNI population as of June 30, 2016?



Sources of information

- To produce population estimates, we need:
- A base population: the Census
 - In certain cases, other enumerations might be okay
 - Montserrat 2018 ICC
- Number of Births, Deaths, In-migrants and Out-migrants
- In the absence of such information, the component method might be difficult to use



The Base population

- Census
- With each Census starts a new cycle for population estimates
- For most OECS members, a census is held every 10 years (UN standard)
- The population estimates must align with the Census concepts
 - De jure / De facto, permanent residents, place of residence



An adjusted base population?

- Each Census has coverage issues: under- and over-coverage
- Undercoverage: people who should have been enumerated
- Overcoverage: people who should have not been enumerated (tourist) or was enumerated more than once (to his place and to his work)
- In some countries (Canada for example), Census is not used as is but is adjusted for coverage



Births

- Information usually comes from Vital Statistics
- In the absence of birth records, an estimation method could be used
 - Last known age-specific fertility rates applied to the female population at the beginning of reference year
- We should always privilege the use of direct data to the use of models.
- At the moment the direct data becomes available, the estimates should be revised.



Deaths

- Information usually comes from Vital Statistics
- In the absence of death records, an estimation method could be used
 - Last known age- and sex-specific mortality rates applied to the population at the beginning of reference year
- We should always privilege the use of direct data to the use of models.
- At the moment the direct data becomes available, the estimates should be revised.



International Exits & Entries

- Information usually comes from Tourism or Border Control Agency
- Because of the volume of the data, this is the most difficult component
- Data can be used in an aggregate way by subtracting entries from exits
- Similarly to what is done in Australia, OECS members could use a method using the micro-data information



Net international migration (NIM)

- While we will be estimating numbers of both in-migrants and out-migrants, these estimations should not be released publicly.
- Since the method is not relying on official numbers, it is preferable not to release such estimates in order not to create confusion amongst users.
- Same situation in Canada for the net change in the number of temporary residents.



Net International migration (NIM)

- NIM is the difference between in-migrants and out-migrants
- When NIM is positive, it means that there were more entries than departures and it will have an upward effect on population change.
- When NIM is negative, it means that there were more departures than arrivals and it will have an downward effect on population change.



The new formula...

$$\begin{aligned} \text{Population}_{(t+x)} &= \text{Population}_{(t)} \\ &+ \text{Births}_{(t, t+x)} \\ &- \text{Deaths}_{(t, t+x)} \\ &+ \text{NIM}_{(t, t+x)} \end{aligned}$$

where t is the beginning of the reference period
t+x is the end of the reference period
t,t+x is the reference period (usually a year)
x is the duration of the reference period
NIM represents the Net international migration which is the difference between international entries and exits



NIM or NOM?

- While working with Montserrat, we decided to use the expression Net overseas migration (NOM) to represent the difference between in-migrants and out-migrants
- This decision was made because the expression NOM is already used in Australia
 - In Australia, NIM is used for inter-state migration
 - However, other countries are also using NIM
- OECS will have to make a decision on this for consistency purposes amongst its members



The **Cohort**-Component Method

- So far, we only discussed estimates of the total population.
- The same method can be applied to produce population estimates by age and sex.
- In fact, the two estimates will be produced at the same time.
- Instead of doing it directly for the total population, we do it for each age cohorts (0, 1, 2, 3, etc...)
- We will look at it more closely later today or tomorrow.



Thank you!

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