Basic Demographic Indicators

Methodology

INSTITUTO NACIONAL DE ESTADISTICA

Index

1 Introduction

Basic Demographic Indicators constitute a statistical operation formed by a set of indicators that allow analysing how basic demographic phenomena occur in Spain.

Its objective is to provide the intensity, the main characteristics, the dynamics and evolution of the demographic phenomena over the population residing in Spain.

The provided indicators summarise the historical evolution of the behaviour of the basic demographic phenomena in Spain (birth rate, fertility, mortality, marriage rate, divorce rate, migratory movements) and of the growth and structure of the population resident in the country.

They are calculated based on the results of the Births, Deaths and Marriages statistics of the Vital Statistics, the statistics of annulments, separations and divorces, the Migration Statistics, of the Migrations and Changes of Residence Statistics and the referent figures of the resident population in Spain (Intercensal Population Estimates, up to 2020, and annual Censuses since 2021, in addition to the Continuous Municipal Register Statistics, for the period 2014-2020, in the case of indicators at the municipal level).

2 Definitions and Concepts

All indicators refer to the **Resident Population** in a given geographical area, which is defined as those persons who, on the reference date have established their regular residence therein.

The **Regular Residence** is defined as the place where a person normally spends her/his daily rest periods, regardless of temporary absences for leisure purposes, holidays, visits to relatives and friends, business, medical treatment or religious pilgrimage. Nonetheless, it must be noted that only the following will be considered regular residents in a district:

– Those who, according to the previous definition, have regularly resided therein for a continuous period of at least twelve months.

– Those who, according to the previous definition, have established their regular residence therein less than twelve months prior, but who intend to remain there at least one year.

As per the calculation of the demographic indicators the **Average Resident Population during the reference year** is required. To this regard the average resident population of the group considered in the reference year is considered equal to the resident population stock belonging to said group in the middle of the period, that is, 1 July of that year.

– equal to the resident population stock belonging to said group half-way through the period, that is, on 1 July of that year, for the period 1975-2020.

– equal to the semi-sum of the resident population stock belonging to said group on 1 January of the years t and t+1, for the calculation of the indicators of the year t from 2021.

3 Scopes

3.1 Population scope

The target population of study of the Basic Demographic Indicators (BDI) is formed by:

– Persons residing in Spain

– Births to mothers resident in Spain

– Deaths of residents in Spain

– Married couples who establish their residence in Spain

– Divorces of married couples resident in Spain

– Migratory movements in which Spain is the origin or the destination.

3.2 Classification variables

The indicators related with the different demographic events are broken down depending on the following characteristics of the population:

– Sex

– Age

– Nationality (Spanish/foreign)

– Place of residence

In the case of births, there is also consideration of the variable:

– Order of birth

In the case of married couples, there is also consideration of the variable:

– Marital status prior to getting married

In the case of divorces, there is also consideration of the variable:

– Duration of the marriage

3.3 Geographical scope

National, Autonomous, provincial and municipal demographic indicators are provided.

3.4 Time frame

All demographic indicators obtained by the INE have an annual reference.

Most series of the basic demographic indicators started in 1975, except the following:

– Marriage rate indicators that are available as of 1976

– Divorce indicators which are available as of 2005.

– Migration indicators which are available as of 2008.

– Municipal level indicators which are available as of 2014.

Moreover, there is a series of specifications on the availability of certain data and aggregations in the indicator series that are detailed in the annex.

4 Calculation of Indicators

Indicators are classified into six groups depending on their topic:

– Birth and Fertility

– Mortality

– Marriage

– Divorce

– Migratory movement

– Growth and Structure of the Population

4.1 Birth and Fertility

Distinction is made between:

Birth Indicators: referring to births that occur in a population.

Fertility Indicators: referring to the births related with the population in which they take place, that is, women of fertile age.

4.1.1 BIRTH-RATE INDICATORS

4.1.1.1 Gross birth rate

Defined as the total number of births to mothers belonging to a specific scope in year t per 1,000 inhabitants That is:

$$TBN^t = \frac{N^t}{P^t}.1000$$

where:

N^t = Births registered during year t to mothers belonging to the scope of study

P^t = Average resident population in the scope of study, in year t

In general, the term "Gross Birth Rate" is used when the indicator refers to the total births that take place in a specific geographical scope (national total, Autonomous Community or province), whereas when the phenomenon restricted to a sub-group of the population is evaluated, within the geographical scope considered, the indicator is just called "Birth Rate".

This way, for example, the collection of Basic Demographic Indicators of the INE includes the "Birth Rate according to nationality (Spanish / foreign) of the mother".

4.1.1.2 Male rate at birth

It is defined as the total birth of boys for every 100 births of girls, registered among the births to mothers belonging to a specific scope, during year t:

$$RMN^t = \frac{N^t_{Males}}{N^t_{Females}} \cdot 100$$

where:

N^t_{Males} = Births of males registered during year t to mothers belonging to the scope of study

$N^t_{Females}$ = Births of females registered during year t to mothers belonging to the scope of study

4.1.2 FERTILITY INDICATORS

4.1.2.1 Global fertility rate

It is defined as the total number of births, to a mother of a specific scope occurring in year t, per 1,000 women of childbearing age (from 15 to 49 years of age) in said scope that is:

$$TGF^t = \frac{N^t}{M^t} \cdot 1000$$

where:

N^t = Births registered during year t to women from 15 to 49 years of age, belonging to the scope of study

M^t = Average resident population of women, from 15 to 49 years of age belonging to the scope of study

4.1.2.2 Fertility rates by five-year age group of the mother [1]

These are defined as the total number of births to mothers with age [2] between x and x+4 years old, belonging to the scope of study, throughout the year t for each 1,000 women of said population group. That is:

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[1] Fertility rates for adolescent girls (aged 10-14 and 15-19) per 1,000 women in that age group are included in Goal 3. Ensure healthy lives and promote well-being for all at all ages, of the United Nations 2030 Agenda for Sustainable Development. Specifically, it refers to indicator 3.7.2 of INE statistics "Indicators of the 2030 Agenda for Sustainable Development" (IOE 30800), included within target 3.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes of Objective 3 of the 2030 Agenda.

[2] For the age group of mothers from 10 to 14 years old, the numerator includes births to mothers aged 14 and under; the denominator considers exclusively the population of women between 10 and 14 years old, both ages included.

$$TEF_{x,x+4}^{t} = \frac{N_{x,x+4}^{t}}{M_{x,x+4}^{t}} \cdot 1000$$

where:

$N_{x,x+4}^{t}$ = Registered births during year t of mothers aged between x and x+4 years in the scope of study

$M_{x,x+4}^{t}$ = Average resident population of women aged between x and x+4 years, belonging to the scope of study in year t

x= Age. It takes values between 10 and 50 years

4.1.2.3 Fertility rates by age of the mother

Defined as the total births to mothers aged[3] x, belonging to the scope of study, throughout the year t per 1,000 women within said population group. That is:

$$TEF_{x}^{t} = \frac{N_{x}^{t}}{M_{x}^{t}} \cdot 1000$$

where:

N_{x}^{t} = Births registered during year t to mothers aged x in the scope of study

M_{x}^{t} = Average resident population of women aged x, belonging to the scope of study in year t

x= Age. It takes values between 15 and 49 years old (fertile age)

4.1.2.4 Short-term fertility indicator

It is defined as the average number of children a woman belonging to a specific scope would have throughout her fertile age in the case the fertile intensity by age remains the same as the one observed in year t, in that same scope. This is calculated as the sum of the fertility rates, by age[4] (expressed as so much per one), extended to the range of fertile ages (15 to 49 years old) [5].

For the age group of mothers aged 50 and over, the numerator includes births to mothers aged 50 and over; the denominator considers exclusively the population of women aged 50 years old.

[3] For the 15-year-old mother, the births to mothers 15 years old and under are included in the numerator, in the denominator the population of 15-year-old women are exclusively considered.

For the 49-year-old mother, the births to mother 49 years old and over are included in the numerator, in the denominator the population of 49-year-old women are exclusively considered.

[4] See note 3

[5] See note 3

$$ICF^t = \sum_{X=15}^{49} f_x^t$$

where:

$f_x^t = \frac{N_x^t}{M_x^t}$ = Fertility rate at age x in the scope of study, expressed as so much per one

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4.1.2.5 Average age at maternity

It is defined as the average age at which a woman of a specific scope would have children, in the case the fertile intensity by age remains the same as the one observed in year t, in that scope. It is calculated as the average of the ages[6] at which women have their children, weighted by the fertility rates by age expressed as so much per one, that is:

$$EMM^t = \sum_{x=15}^{49} (x+0,5) \cdot \frac{f_x^t}{ICF^t}$$

where:

$f_x^t = \frac{N_x^t}{M_x^t}$ = Fertility rate at age x in the scope of study and in year t, expressed as so much per one

ICF^t = Short-term Fertility Indicator during year t in the scope of study

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4.1.2.6 Percentage of born babies by order of birth

It is defined as the percentage of births of order r to mothers belonging to a specific scope over the total of births registered in that same scope during year t:

$$PN_r^t = \frac{N_r^t}{N^t} \cdot 100$$

where:

N_r^t = Births of order r, registered during year t, to mothers belonging to the scope of study

N^t = Births registered during year t to mothers belonging to the scope of study

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[6] See note 3

4.1.2.7 Percentage of births by nationality of the mother

It is defined as the percentage of births to mothers of nationality n belonging to a given scope over the total number of births registered in that scope during year t.

$$PN_n^t = \frac{N_n^t}{N^t} \cdot 100$$

where:

N_n^t = Births of mothers of nationality n belonging to the scope of study, registered during year t

N^t = Registered births during year t of mothers belonging to the scope of study

4.1.2.8 Proportion of births to unmarried mothers

It is defined as the total births to unmarried mothers (single, widow or divorced) belonging to a specific scope in relation with the total births to mothers in said scope. That is:

$$PN_{MNC}^t = \frac{N_{MNC}^t}{N^t} \cdot 100$$

where:

N_{MNC}^t = Births registered during year t, to unmarried mothers belonging to the scope of study

N^t = Births registered during year t to mothers belonging to the scope of study

4.2 Mortality

Distinction is made between:

Mortality Indicators: referring to deaths that occur in a population.

Infant Mortality Indicators: referring to deaths that occur during the first year of life.

4.2.1 MORTALITY INDICATORS

4.2.1.1 Gross mortality rate

It is defined as the total deaths throughout year t of persons belonging to a specific scope per 1,000 inhabitants of that scope. That is:

$$TBM^t = \frac{D^t}{P^t} \cdot 1000$$

where:

D^t = Deaths registered during year t of persons belonging to the scope of study

P^t = Average resident population in the scope of study in year t

In general, the term "Gross Mortality Rate" is used when the indicator refers to the total deaths that take place in a specific geographical scope (national total, Autonomous Community or province), whereas when the phenomenon restricted to a sub-group of the population is evaluated, within the geographical scope considered, the indicator is just called "Mortality Rate".

This way, for example, the collection of Basic Demographic Indicators of the INE includes the "Mortality Rate by sex for the total of ages".

4.2.1.2 Mortality rates by sex

It is defined as the total deaths of persons belonging to a specific scope, by sex s, registered during year t per 1,000 inhabitants of said population group. That is,

$$TM_s^t = \frac{D_s^t}{P_s^t} \cdot 1000$$

where:

D_s^t = Deaths registered during year t of persons belonging to the scope of study, of sex.

P_s^t = Average resident population in the scope of study of sex in year t.

4.2.1.3 Mortality rates by age

This is defined as the number of individuals, belonging to the study area, from the fictitious cohort that die at age x, divided by the time that the individuals of said generation are exposed to the risk of death. That is, it is the ratio of the number of deaths of individuals aged x and the total time lived (measured in years) by individuals from the fictitious generation aged x, this is:

$$m_x^t = \frac{d_x^t}{L_x^t} \cdot 1000$$

where:

d_x^t = Deaths Theoretical in the year t of individuals of the fictitious cohort belonging to the scope of study, of age x.

L_x^t = Stationary population at age x in the year t.

x= Age. In general, it takes values between "0" and "100 and more years" for the national total and between "0" and "95 and more years" for Autonomous Communities and provinces[7]. For communities and provinces the rates are calculated by five-year groups and for the national total by simple ages. In the case of educational level, the first age to be considered is 25 years for all territorial levels, with no changes in the last age group.

When referring to total deaths, its value is extracted from the results corresponding with said year of the Life Tables of the INE, whose calculation method may be found at:
http://www.ine.es/en/metodologia/t20/t2020319a_en.pdf

4.2.1.4 Life expectancy at birth

It is defined as the average number of years that the members of a generation of individuals would live, when they are subjected in each age to the mortality pattern observed over persons of a specific scope throughout year t.

Its value is extracted from the results corresponding with said year of the Life Tables of the INE, whose calculation method may be found on:
http://www.ine.es/en/metodologia/t20/t2020319a_en.pdf

4.2.1.5 Life expectancy according of age

It is defined as the average number of years that the members of a generation of individuals having turned x years of age would live, when they are subjected in each age to the mortality pattern observed over persons of a specific scope, throughout year t.

When referring to total deaths, its value is extracted from the results corresponding with said year of the Life Tables of the INE, whose calculation method may be found at:
http://www.ine.es/en/metodologia/t20/t2020319a_en.pdf

In the case of educational level, the first age in the mortality table is 25 years for all territorial levels and all educational levels.

4.2.1.6 Male rate at death

It is defined s the number of deaths of males belonging to a specific scope per 100 deaths of females in that same scope. That is:

$$RMD^t = \frac{D_{Hombres}^t}{D_{Mujeres}^t} \cdot 100$$

where:

$D_{Hombres}^t$ = Deaths registered during year t of males belonging to the scope of study

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[7] For reference period 1975-1990, the highest limit is "85 and over" in the case of Autonomous Communities and provinces.

$D_{Mujeres}^t$ = Deaths registered during year t of females belonging to the scope of study

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4.2.2 INFANT MORTALITY INDICATORS

4.2.2.1 Infant Mortality Indicators

It is defined as the total deaths of babies under one year old, belonging to a specific scope per 1,000 babies born alive in that scope. That is:

$$TMI^t = \frac{D_0^t}{NV^t} \cdot 1000$$

where:

D_0^t =Deaths registered during year t, of babies under one year old, belonging to the scope of study

NV^t=Total born babies registered during year t, to a mother belonging to the scope of study

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4.2.2.2 Post-neonatal infant mortality rate

It is defined as the relation between the deaths of babies under 28 days old and those born alive in a specific year. It is calculated as the total deaths of babies under 28 days old (from 0 to 27), belonging to a specific scope per 1,000 babies born alive in that scope. That is:

$$TMIN^t = \frac{D_{<28\ days}^t}{NV^t} \cdot 1000$$

where:

$D_{<28\ days}^t$ = Deaths registered during year t, of babies under 28 days old, belonging to the scope of study

NV^t=Total born babies registered during year t, to a mother belonging to the scope of study

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4.2.2.3 Early neonatal infant mortality rate

It is defined as the relation between the deaths of babies under 7 days old and those born alive in a specific year. It is calculated as the total deaths of babies under 7 days old (from 0 to 6), belonging to a specific scope per 1,000 babies born alive in that scope. That is:

$$TMINearly^t = \frac{D^t_{<7 \text{ days}}}{NV^t} \cdot 1000$$

where:

$D^t_{<7 \text{ days}}$ = Deaths registered during year t, of babies under 7 days old, belonging to the scope of study

NV^t = Total born babies registered during year t, to a mother belonging to the scope of study

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4.2.2.4 Late neonatal infant mortality rate

It is defined as the relation between the death of babies under 1 year old, being 7 or more days old but under 28 days old and those born alive in a specific year. It is calculated as the total deaths of babies under 1 year old being 7 or more days old but less than 28 days old, belonging to a specific scope per 1,000 babies born alive in that scope. That is:

$$TMINlate^t = \frac{D^t_{7\text{days-27 days}}}{NV^t} \cdot 1000$$

where:

$D^t_{7 \text{ days-27days}}$ = Deaths registered during year t, of babies under 1 year old, being 7 or more days old but under 28 days old, belonging to the scope of study

NV^t = Total born babies registered during year t, to a mother belonging to the scope of study

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4.2.2.5 Post-neonatal infant mortality rate

It is defined as the relation between the death of babies under 1 year old, being 28 days old and those born alive in a specific year. It is calculated as the total deaths of babies under 1 year old being more than 27 days old, belonging to a specific scope per 1,000 babies born alive in that scope. That is:

$$TMIPN^t = \frac{D^t_{28\text{days-364 days}}}{NV^t} \cdot 1000$$

where:

$D^t_{28 \text{ days-364 days}}$ = Deaths registered during year t, of babies under 1 year old, but over 27 days old, belonging to the scope of study

NV^t = Total born babies registered during year t, to a mother belonging to the scope of study

4.2.2.6 Late foetal mortality rate

It is defined as late foetal deaths[8] of mothers belonging to a specific scope per 1,000 births (born alive plus late foetal deaths) in said scope. That is:

$$TMFT^t = \frac{MFT^t}{NV^t + MFT^t} \cdot 1000$$

where:

MFT^t = Late Foetal Deaths registered during year t, to mothers belonging to the scope of study.

NV^t = Total born babies registered during year t, to a mother belonging to the scope of study

4.2.2.7 Perinatal mortality rate

It is defined as the total late foetal deaths plus the deaths of babies under 1 year old being under 7 days old, to mothers belonging to a specific scope per 1,000 babies born (born alive plus late foetal deaths) in that scope. That is:

$$TMP^t = \frac{MFT^t + D^t_{<7\ days}}{NV^t + MFT^t} \cdot 1000$$

where:

MFT^t = Late Foetal Deaths registered during year t, to mothers belonging to the scope of study.

$D^t_{<7\ days,s}$ = Deaths registered during year t, of babies under 7 days old, belonging to the scope of study

NV^t = Total born babies registered during year t, to a mother belonging to the scope of study

4.2.2.8 Percentage of deaths of babies under 1 year old, as compared with total deaths

It is defined as the total deaths of babies under one year old, belonging to a specific scope per 100 deaths registered in that scope. That is:

$$PD^t_{<1\ year} = \frac{D^t_{<1\ year}}{D^t} \cdot 100$$

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[8] Death, prior to the complete expulsion or extraction from its mother, of a product of viable conception. The viability criteria currently applied to Late Foetal Death Statistics of Vital Statistics is: a foetus is considered viable when it weighs 500 grams or more. If there is no data regarding weight, the foetus is considered viable when there have been 22 or more weeks of pregnancy. If there is no information on the weeks of pregnancy, it is researched whether it has been incorporated to the abortion files of the Civil Register. If so, it is considered a late foetal death.

where:

$D^t_{<1\ year}$ = Deaths registered during year t, of babies under 1 year old, belonging to the scope of study

D^t = Total deaths registered during year t of persons belonging to the scope of study

4.2.2.9 Percentage of deaths of babies under 28 days old, as compared with total deaths

It is defined as the total deaths of babies under 28 days old, belonging to a specific scope per 100 deaths registered in that scope. That is:

$$PD^t_{<28\ days} = \frac{D^t_{<28\ days}}{D^t} \cdot 100$$

where:

$D^t_{<28\ days}$ = Deaths registered during year t, of babies under 28 days old, belonging to the scope of study

D^t = Total deaths registered during year t of persons belonging to the scope of study

4.2.2.10 Percentage of deaths of babies under 7 days old, as compared with total deaths

It is defined as the total deaths of babies under 7 days old, belonging to a specific scope per 100 deaths registered in that scope. That is:

$$PD^t_{<7\ days} = \frac{D^t_{<7\ days,\ s}}{D^t} \cdot 100$$

where:

$D^t_{<7\ days}$ = Deaths registered during year t, of babies under 7 days old, belonging to the scope of study

D^t = Total deaths registered during year t of persons belonging to the scope of study

4.2.2.11 Percentage of deaths of babies under 28 days old, as compared with deaths of babies under 1 year old

It is defined as the total deaths of babies under 28 days old, belonging to a specific scope per 100 deaths of babies under 1 year old registered in that scope. That is:

$$PDI^t_{<28\ days} = \frac{D^t_{<28\ days}}{D^t_{<1\ year}} \cdot 100$$

where:

$D_{<28 \text{ days}}^{t}$ = Deaths registered during year t, of babies under 28 days old, belonging to the scope of study

$D_{<1 \text{ year}}^{t}$ = Deaths registered during year t, of babies under 1 year old, belonging to the scope of study

4.2.2.12 Percentage of deaths of babies under 7 days old, as compared with deaths of babies under 1 year old

It is defined as the total deaths of babies under 7 days old, belonging to a specific scope per 100 deaths of babies under 1 year old registered in that scope. That is:

$$PDI_{<7 \text{ days}}^{t} = \frac{D_{<7 \text{ days, s}}^{t}}{D_{<1 \text{ year, s}}^{t}} \cdot 100$$

where:

$D_{<7 \text{ days}}^{t}$ = Deaths registered during year t, of babies under 7 days old, belonging to the scope of study

$D_{<1 \text{ year}}^{t}$ = Deaths registered during year t, of babies under 1 year old, belonging to the scope of study

4.2.2.13 Percentage of deaths of babies under 7 days old as compared with deaths of babies under 28 days old

It is defined as the total deaths of babies under 7 days old, belonging to a specific scope per 100 deaths of babies under 28 days old registered in that scope. That is:

$$PDIN_{<7 \text{ days}}^{t} = \frac{D_{<7 \text{ days}}^{t}}{D_{<28 \text{ days}}^{t}} \cdot 100$$

where:

$D_{<7 \text{ days}}^{t}$ = Deaths registered during year t, of babies under 7 days old, belonging to the scope of study

$D_{<28 \text{ days}}^{t}$ = Deaths registered during year t, of babies under 28 days old, belonging to the scope of study

4.2.2.14 Mortality rate of children under 5 years of age[9]

It is defined as the total number of deaths of children under five years of age, belonging to a specific scope, per 1,000 live births in that scope. That is:

$$TM_{0\text{-}4}^{t} = \frac{D_{0\text{-}4}^{t}}{NV^{t}} \cdot 1000$$

where:

$D_{0\text{-}4}^{t}$ =Deaths registered during year t, of children under five years of age, belonging to the scope of study

NV^{t} =Total live births registered during year t, of mother belonging to the scope of study

4.3 Marriage

Distinction is made between:

Marriage Indicators: referring to marriages that occur in a population.

First-Marriage Indicators: referring to the marriages of single persons that occur in a population.

4.3.1 MARRIAGE INDICATORS

4.3.1.1 Gross marriage rate

It is defined as the total marriages constituted throughout year t of persons belonging to a specific scope per 1,000 inhabitants of that scope. That is:

$$TBNup^{t} = \frac{M^{t}}{P^{t}} \cdot 1000$$

where:

$M^{t} =$ Marriages constituted during year t, belonging to a specific scope

$P^{t} =$ Average resident population in the scope of study, in year t

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[9] The mortality rate for children under 5 years of age is included in Goal 3. Ensure a healthy life and promote the well-being of all at all ages, of the United Nations 2030 Agenda for Sustainable Development. Specifically, this relates to indicator 3.2.1 of INE statistics "Indicators of the 2030 Agenda for Sustainable Development" (IOE 30800), included within target 3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births, of Goal 3 of Agenda 2030.

4.3.1.2 Marriage rate

It is defined as the total persons who get married throughout year t, belonging to a specific scope per 1,000 inhabitants of that same scope[10]. That is:

$$TNup^t = \frac{C^t}{P^t} \cdot 1000$$

where:

C^t = Persons who get married during year t, belonging to the scope of study

P^t = Average resident population in the scope of study, in year t

4.3.1.3 Marriage rates by age

They are defined as the total persons of age x who get married throughout year t, belonging to a specific scope of study per 1,000 inhabitants of said population group. That is:

$$TNup_x^t = \frac{C_x^t}{P_x^t} \cdot 1000$$

where:

C_x^t = Persons aged x, who get married during year t, belonging to the scope of study

P^t = Average resident population in the scope of study, in year t

x= Age. It takes values between 14 and 60 years old[11]

4.3.1.4 Short-term marriage indicator

It is defined as the average number of times an individual belonging to a specific scope would get married throughout their life, in case the same marriage intensity by age remains the same as the one observed in year t of said scope. This is calculated as the sum of the marriage rates of the studied population, expressed as so much per one, extended to the range of ages from 14 to 60 years old[12]. That is:

$$ICNup^t = \sum_{x=14}^{60} fNup_x^t \cdot$$

[10] The set of Basic Demographic Indicators of the INE include the "Marriage Rate" by sex and nationality (Spanish/foreign)".

[11] For the age of 14, the married parties of 14 years of age and under are included in the numerator, in the denominator the population of 14 years of age are exclusively considered.

For the age of 60, the married parties of 60 years of age and over are included in the numerator, in the denominator the population of 60 years of age are exclusively considered.

[12] See note 11

where:

$$fNup_x^t = \frac{C_x^t}{P_x^t} = \text{Marriage rate at age x in the scope of study and in year t, expressed as so much per one}$$

4.3.1.5 Average age at marriage

It is defined as the average age at which an individual belonging to a specific scope, would get married in case the marriage rates by age remain the same as the ones observed in year t of said population group.

It is calculated as the average ages (from 14 to 60 years of age) at which the individuals belonging to a specific scope get married, weighted by the marriage rates by age[13] of said population group, expressed as so much per one. That is:

$$EMN^t = \sum_{x=14}^{60} (x+0,5) \cdot \frac{fNup_x^t}{ICNup^t}$$

where:

$$fNup_x^t = \frac{C_x^t}{P_x^t} = \text{Marriage rate at age x in the scope of study, expressed as so much per one}$$

$ICNup^t = $ Short-term Marriage Indicator during year t in the scope of study

4.3.2 FIRST MARRIAGE INDICATORS

4.3.2.1 First marriage rate

It is defined as the total persons who get married for the first time throughout year t, belonging to a specific scope of study per 1,000 inhabitants of that same scope[14]. That is:

$$TPNup^t = \frac{C_{solteros}^t}{P^t} \cdot 1000$$

where:

$C_{solteros}^t = $ Persons who get married for the first time during year t, belonging to the scope of study

$P^t = $ Average resident population in the scope of study, in year t

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[13] See note 11

[14] The set of Basic Demographic Indicators of the INE include the "First Marriage Rate" by sex and nationality (Spanish/foreign)".

4.3.2.2 First marriage rates by age

They are defined as the total persons of age x who get married for the first time throughout year t, belonging to a specific scope per 1,000 inhabitants of said population group. That is:

$$TPNup_x^t = \frac{C_{solteros,x}^t}{P_x^t} \cdot 1000$$

where:

$C_{solteros,x}^t$ = Persons of age x, who get married for the first time during year t, belonging to the scope of study

P_x^t = Average resident population of age x, belonging to the scope of study, in year t

x= Age. It takes values between 14 and 60 years old[15]

4.3.2.3 Short-term first marriage indicator

It is defined as the average number of times an individual belonging to a specific scope would get married throughout their life, in case the same marriage intensity by age remains the same as the one observed in year t of said scope. It measures the proportion of single individuals that would get married in case the first marriage intensity by age in that moment remains the same. This is calculated as the sum of the first-marriage rates of the studied population, expressed as so much per one, extended to the range of ages from 14 to 60 years old[16]. That is:

$$ICPNup^t = \sum_{x=14}^{60} fPNup_x^t \cdot$$

where:

$fPNup_x^t = \frac{C_{solteros,x}^t}{P_x^t}$ = Marriage rate at age x in the scope of study and in year t, expressed as so much per one

By construction, said indicator can have a value greater than one, despite being treated as a non-renewable phenomenon.

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[15] For the age of 14, the married parties of 14 years of age and under are included in the numerator, in the denominator the population of 14 years of age are exclusively considered.

For the age of 60, the married parties of 60 years of age and over are included in the numerator, in the denominator the population of 60 years of age are exclusively considered.

[16] See note 15

4.3.2.4 Average age at first marriage

It is defined as the average age at which an individual belonging to a specific scope, would get married in case the first-marriage rates by age remain the same as the ones observed in year t of said population group.

It is calculated as the average ages (from 14 to 60 years of age) at which the individuals belonging to a specific scope get married, weighted by the first-marriage rates by age[17], expressed as so much per one. That is:

$$EMPN^t = \sum_{x=14}^{60} (x+0,5) \cdot \frac{fPNup_x^t}{ICPNup^t}$$

where:

$fPNup_x^t = \frac{C_x^t}{P_x^t}$ = First-marriage rate at age x in the scope of study and in year t, expressed as so much per one

$ICPNup^t$ = Short-term First Marriage Indicator during year t in the scope of study

4.4 Divorce

4.4.1 DIVORCE INDICATORS

4.4.1.1 Gross divorce rate

It is defined as the total divorces occurred throughout year t of persons belonging to a specific scope per 1,000 inhabitants of that scope. That is:

$$TBD^t = \frac{D^t}{P^t} \cdot 1000$$

where:

D^t = Divorces occurred during year t, belonging to a specific scope

P^t = Average resident population in the scope of study, in year t

4.4.1.2 Proportion of divorces according to the duration of marriage

It is defined as the percentage of divorces from marriages with a duration of x years belonging to a specific scope over the total of divorces registered in that same scope during year t:

[17] See note 15

$$PD_x^t = \frac{D_x^t}{D^t} \cdot 100$$

where:

D_x^t = Divorces from marriages with a duration of x years, registered during year t, belonging to the scope of study

D^t = Divorces registered during year t from marriages belonging to the scope of study

4.4.1.3 Divorce rate

It is defined as the total persons who get divorced throughout year t, belonging to a specific scope per 1,000 inhabitants of that same scope[18]. That is:

$$TDiv^t = \frac{Div^t}{P^t} \cdot 1000$$

where:

Div^t = Spouses who get divorced during year t, belonging to the scope of study

P^t = Average resident population in the scope of study, in year t

4.4.1.4 Divorce rates by age

They are defined as the total spouses of age x who get divorced throughout year t, belonging to a specific scope per 1,000 inhabitants of said population group. That is:

$$TDiv_x^t = \frac{Div_x^t}{P_x^t} \cdot 1$$

where:

Div_x^t = Spouses of age x, who get divorced during year t, belonging to the scope of study

P^t = Average resident population in the scope of study of age x, in year t

x= Age. It takes five-year values between 19 and 75 years old [19].

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[18] The set of Basic Demographic Indicators of the INE include the "Divorce Rate" by sex and nationality (Spanish/foreign)".

[19] For the age of 19, in the numerator divorcees aged 19 years of age and under are included, in the denominator the population of 19 years of age are exclusively considered.

For the age of 75, married parties of 75 years of age and over are included in the numerator, in the denominator the population of 75 years of age are exclusively considered.

4.4.1.5 Short-term divorce indicator

It is defined as the average number of times an individual belonging to a specific scope would get divorced throughout their life, in case the same divorce intensity by age remains the same as the one observed in year t of said scope. This is calculated as the sum of the divorce rates of the studied population, expressed as so much per one, extended to the range of ages from 19 to 75 years old[20]. That is:

$$ICD^t = \sum_{x=19}^{75} TDiv_x^t \cdot$$

where:

$TDiv_x^t = \dfrac{Div_x^t}{P_x^t}$ = Divorce rate at age x in the scope of study and in year t, expressed as so much per one

4.4.1.6 Average age at divorce

It is defined as the average age at which an individual belonging to a specific scope would get divorced, in case the divorce rates by age remain the same as the ones observed in year t of said population group.

It is calculated as the average ages (from 19 to 75 years of age) at which the individuals belonging to a specific scope get divorced, weighted by the divorce rates by age[21] of said population group, expressed as so much per one. That is:

$$EMD^t = \sum_{x=19}^{75} (x + {}^n/_2) \cdot \frac{TDiv_x^t}{ICD^t}$$

where:

$TDiv_x^t = \dfrac{Div_x^t}{P_x^t}$ = Divorce rate at age x in the scope of study, expressed as so much per one

ICD^t = Short-term Divorce Indicator during year t in the scope of study

4.5 Migratory movement

Depending on the origin and destination the following are distinguished:

Foreign Migration Indicators: referring to the migratory movements in which the regular residence of the migrants changed from one country to another.

Domestic Migration Indicators: referring to migratory movements within the same country.

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[20] See note 19

[21] See note 19

4.5.1 FOREIGN MIGRATION INDICATORS

4.5.1.1 Gross rate of immigration from abroad

It is defined as the total number of immigrations from abroad, that arrive to a specific scope throughout year t per 1,000 inhabitants in said scope. That is:

$$TBI^t = \frac{I^t}{P^t} \cdot 1000$$

where:

I^t =Immigration from abroad, registered during year t, of individuals that arrive to the scope of study

P^t = Average resident population in the scope of study, in year t

4.5.1.2 Immigration rate from abroad by age

It is defined as the total number of immigrations from abroad, of individuals aged x that arrive to a specific scope throughout year t, per 1,000 inhabitants in said scope. That is:

$$TI_x^t = \frac{I_x^t}{P_x^t} \cdot 1000$$

where:

I_x^t = Immigration from abroad, registered during year t, of individuals aged x, that arrive to the scope of study

P_x^t = Average resident population of age x, belonging to the scope of study, in year t

x= Age. It takes values between 0 and 75 years old[22]

In the case of the INE, the immigration rates from abroad by Autonomous Community and province are calculated by five-year age groups. These are defined as the total number of immigrations from abroad of individuals aged between x and x+4 years, belonging to the area of study, over the year "t" per 1,000 inhabitants of said area. In other words:

$$TI_{x,x+4}^t = \frac{I_{x,x+4}^t}{P_{x,x+4}^t} \cdot 1000$$

where:

$I_{x,x+4}^t$ = Inmigrations from abroad, recorded during year t of individuals aged x to x+4 years in the study area

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[22] For the age of 90 years, individuals 90 years or older are included.

$P^t_{x,x+4}$ = Average resident population aged x to x+4 years, belonging to the study area in year t

x= Age. It takes values between 0 and 75 years of age 23

4.5.1.2 Average age of immigrants from abroad

It is defined as the average ages of immigrants from abroad during year t who belong to a given scope. It is calculated using the following expression:

$$EMI^t = \frac{\sum_x \left(x + \frac{1}{2}\right) I^t_x}{\sum_x I^t_x}.$$

where:

x= Age. It takes values between 0 and 90 years old[24].

I^t_x = Immigration from abroad, recorded during year t, of individuals of age x arriving at the scope of study

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4.5.1.4 Gross rate of emigration with a foreign destination

It is defined as the total number of emigrations with a foreign destination, of individuals that leave a specific scope throughout year t , per 1,000 inhabitants in said scope. That is:

$$TBE^t = \frac{E^t}{P^t} \cdot 1000$$

where:

E^t=Emigration with a foreign destination, registered during year t, of individuals that leave the scope of study

P^t = Average resident population in the scope of study, in year t

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4.5.1.5 Emigration rates with a foreign destination by age

They are defined as the total number of emigrations with a foreign destination, of individuals aged x that leave a specific scope throughout year t , per 1,000 inhabitants in said scope. That is:

$$TE^t_x = \frac{E^t_x}{P^t_x} \cdot 1000$$

where:

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23 See note 22.

24 For the age of 90 years, individuals of 90 years and older are included.

E_x^t = Emigration with a foreign destination, registered during year t, of individuals aged x that leave the scope of study

P_x^t = Average resident population of age x, belonging to the scope of study, in year t

x= Age. It takes values between 0 and 90 years old[25]

In the case of the INE, the rates of emigration abroad by Autonomous Community and province are calculated by five-year age groups. These are defined as the total number of emigrations abroad of individuals aged between x and x+4 years, belonging to the scope of study, over the year t per 1,000 inhabitants of said scope. In other words:

$$TE_{x,x+4}^t = \frac{E_{x,x+4}^t}{P_{x,x+4}^t} \cdot 1000$$

where:

$I_{x,x+4}^t$ = Emigrations abroad, recorded during year t of individuals aged x to x+4 years in the study area

$P_{x,x+4}^t$ = Average resident population aged x to x+4 years belonging to the study area in year t

x= Age. It takes values between 0 and 75 years of age [26]

4.5.1.6 Short-term indicator on emigration with a foreign destination

It is defined as the average number of times an individual belonging to a specific scope would emigrate to a foreign destination throughout their life, in case the same emigration intensity by age remains the same as the one observed in year t in said population group. It is calculated as the sum of the rates of emigration with a foreign destination by age, expressed as so much per one, and extended to all ages from 0 to 75[27] That is:

$$ICE^t = \sum_{x=0}^{75 \text{ and more}} fe_x^t \cdot$$

where:

$fe_x^t = \frac{E_x^t}{P_x^t}$ = Emigration rate at age x in the scope of study and in year t, expressed as so much per one

In the case of the INE, since the rates of emigration abroad by communities and provinces are calculated by five-year age groups, then the short-term indicator of emigration abroad at these territorial levels is calculated using these rates weighted by the size of the age interval, which in this case is 5 because they are five-year groups. In other words:

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[25] See note 22

[26] See note 22

[27] See note 22

$$ICE^t = \sum_{x=0}^{75 \text{ y más}} fe_{x,x+4}^t \cdot 5$$

where:

$fe_{x,x+4}^t = \dfrac{E_{x,x+4}^t}{P_{x,x+4}^t}$ = Emigration rate for age group x to x+4 in the study area y in year t, expressed as a percentage of one

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4.5.1.7 Average age at emigration to a foreign country

It is defined as the average age at which an individual would leave a certain scope and go abroad, in the event of maintaining the same intensity of emigration by age as that observed in year t in that scope. It is calculated as the average ages[28] at which individuals migrate abroad weighted by the emigration rates by age expressed on a per-unit basis, that is:

$$EME^t = \sum_{x=0}^{75 \text{ y más}} (x + \tfrac{1}{2}) \cdot \frac{fe_x^t}{ICE^t}$$

where:

$fe_x^t = \dfrac{E_x^t}{P_x^t}$ = Emigration rate at age x in the scope of study and in year t, expressed on a per-unit basis

ICE^t = Short-term indicator of emigration to a foreign country during year t in the scope of study

In the case of the INE, this indicator at the level of communities and provinces is calculated on the basis of the emigration rates by five-year age groups and the short-term indicator of emigration abroad calculated using these five-year rates. In other words:

$fe_{x,x+4}^t = \dfrac{E_{x,x+4}^t}{P_{x,x+4}^t}$ = Emigration rate for age group x to x+4 in the study area y in year t, expressed as a percentage of one

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4.5.1.8 Rate of gross migration abroad

It is defined as the total migration (immigrations and emigrations) abroad, carried out in year t by individuals of a specific scope, per 1,000 inhabitants of that scope. That is:

$$TMB^t = \frac{I^t + E^t}{P^t} \cdot 1000$$

where:

[28] See note 22

I^t=Immigration from abroad, registered during year t, of individuals that arrive to the scope of study

E^t=Emigration with a foreign destination, registered during year t, of individuals that leave the scope of study

P^t = Average resident population in the scope of study, in year t

Take note that the Gross Migration Rate is the sum of the Gross Immigration Rate plus the Gross Emigration Rate (see sections 4.4.1.1 y 4.4.1.3)

$$TMB^t=TBI^t+TBE^t$$

4.5.1.9 Net migration rate abroad

It is defined as the total net migration (immigrations less emigrations) abroad, carried out in year t by individuals of a specific scope, per 1,000 inhabitants of that scope. That is:

$$TMN^t= \frac{I^t-E^t}{P^t} \cdot 1000$$

where:

I^t=Immigration from abroad, registered during year t, of individuals that arrive to the scope of study

E^t=Emigration with a foreign destination, registered during year t, of individuals that leave the scope of study

P^t = Average resident population in the scope of study, in year t

Please take note that the Net Migration Rate is the difference between the Gross Immigration Rate plus the Gross Emigration Rate (see sections 4.4.1.1 and 4.4.1.3).

$$TMN^t=TBI^t - TBE^t$$

4.5.2 DOMESTIC MIGRATION INDICATORS

The domestic migration indicators obtained by the INE may be structured into different blocks:

Indicators for the national total: they allow evaluating the effect of domestic migration on the entire territory.

Indicators for Autonomous Communities and provinces: to evaluate the effect of domestic migration by Autonomous Communities or by provinces.

Note the different interpretation of domestic migration from the point of view of the national total and domestic geographical areas. For the national total, each migration has its origin and destination within the territory of reference, therefore to account for the volume of domestic migratory movements, it is sufficient to choose one of two

approaches: the emigration (depending on origin) or immigration (depending on destination); both will be equivalent. For this, at the national level, we discuss domestic migration generically. However, when we go down to lower geographic levels, emigrations and immigrations differ from one another in each region, therefore they need treatments and consequently indicators, differentials.

Indicators for the national total

4.5.2.1 Inter-regional/inter-provincial migration rates by age

It is defined as the total number of emigrations to other Autonomous Communities/provinces of individuals belonging to a specific scope, from a specific Autonomous Community/province throughout year t, per 1,000 inhabitants of said population group. That is:

$$TMInt_x^t= \frac{MInt_x^t}{P_x^t}\cdot 1000$$

where:

$MInt_x^t$= Domestic emigration of individuals of the scope of study, who change regions of residence (Autonomous Community or province) throughout year t. At the national level, the following identity is achieved:

$$MInt_x^t=IInt_x^t=EInt_x^t$$

$IInt_x^t$= Domestic immigration that occurred in the entire territory, of individuals aged x, belonging to the scope of study and throughout year t

$EInt_x^t$= Domestic emigration that occurred in the entire territory, of individuals aged x, belonging to the scope of study i, throughout year t

P_x^t =Average resident population of individuals aged x, belonging to the scope of study, in the entire territory in year t

x= Age. It takes values between 0 and 75 years old[29].

4.5.2.2 Short-term indicator of inter-regional/inter-provincial migration

It is defined as the average number of times an individual belonging to a specific scope would change their Autonomous Community/province of residence throughout their life, in case the same migration intensity by age remains the same as the one observed in year t. It is calculated as the sum of the migration rates (inter-regional/inter-provincial)

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[29] See note 22

by age of individuals belonging to the scope of study, expressed as so much per one, and extended to all ages from 0 to 75[30]. That is:

$$ICMInt^t = \sum_{x=0}^{75+} fm_{int_x}^t$$

where:

$fm_{int_x}^t$ = Inter-regional/inter-provincial migration rates at age x, in the scope of study, expressed as so much per one

Indicators for Autonomous Communities and provinces

4.5.2.3 Gross rate of inter-regional/inter-provincial immigration

It is defined as the total number of immigrations from other Autonomous Communities/provinces of individuals belonging to a specific scope, that arrive to a specific Autonomous Community/province throughout year t, per 1,000 inhabitants of said population group. That is:

$$TIInt^t = \frac{IInt^t}{P^t} \cdot 1000$$

where:

$IInt^t$ = Domestic immigration of individuals of the scope of study, from the given region (Autonomous Community or province) throughout year t

P^t = Average resident population, belonging to the scope of study, in the given region (Autonomous Community or province) in year t

4.5.2.4 Inter-regional/inter-provincial immigration rates by age

They are defined as the total number of immigrations from other Autonomous Communities/provinces of individuals aged x, belonging to a specific scope, that arrive to a specific Autonomous Community/province throughout year t, per 1,000 inhabitants of said population group.

$$TIInt_x^t = \frac{IInt_x^t}{P_x^t} \cdot 1000$$

where:

$IInt_x^t$ = Domestic immigration of individuals aged x, belonging to the scope of study, from the given region (Autonomous Community or province) throughout year t.

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[30] See note 22

P_x^t = Average resident population aged x, belonging to the scope of study, in the given region (Autonomous Community or province) in year t

x= Age. It takes values between 0 and 90 years old[31]

4.5.2.5 Gross rate of inter-regional/inter-provincial emigration

It is defined as the total number of emigrations to other Autonomous Communities/provinces of individuals belonging to a specific scope, from a specific Autonomous Community/province throughout year t, per 1,000 inhabitants of said population group. That is:

$$TEInt^t = \frac{EInt^t}{P^t} \cdot 1000$$

where:

$EInt^t$=Domestic emigration of individuals of the scope of study, to the given region (Autonomous Community or province) throughout year t

P^t = Average resident population, belonging to the scope of study, in the given region (Autonomous Community or province) in year t

4.5.2.6 Inter-regional/inter-provincial emigration rates by age

They are defined as the total number of emigrations to other Autonomous Communities/provinces of individuals aged x, belonging to a specific scope, from a specific Autonomous Community/province throughout year t, per 1,000 inhabitants of said population group. That is:

$$TEInt_x^t = \frac{EInt_x^t}{P_x^t} \cdot 1000$$

where:

$EInt_x^t$ = Domestic emigration of individuals aged x, belonging to the scope of study, to the given region (Autonomous Community or province) throughout year t

P_x^t = Average resident population aged x, belonging to the scope of study, in the given region (Autonomous Community or province) in year t

x= Age. It takes values between 0 and 90 years old[32].

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[31] For the age of 90, individuals of 90 years and over are included

[32] See note 19

4.5.2.7 Short-term indicator of inter-regional/inter-provincial emigration

It is defined as the average number of times an individual belonging to a specific scope and in a specific Autonomous Community/province, would emigrate to any other Autonomous Community/province throughout their life, in case the same emigration intensity by age remains the same as the one observed in year t in said population group. This is calculated as the sum of the inter-regional/inter-provincial emigration rates, by age, expressed as so much per one, extended to the range of ages from 0 to 90 years old[33]. That is:

$$ICEInt^t = \sum_{x=0}^{90 \text{ y más}} feint_x^t \cdot$$

where:

$$feint_x^t = \frac{E_x^t}{P_x^t} = \text{Inter-regional/Inter-provincial migration rates at age x in the scope of study}$$

and in year t, expressed as so much per one

4.5.2.8 Gross inter-regional/inter-provincial migration rates

They are defined as the total number of migrations of individual to or from a specific Autonomous Community (for the analysis of inter-regional migration), or province (for the analysis of inter-provincial migration), belonging to a specific scope, throughout year t, per 1,000 inhabitants belonging to said scope. That is:

$$TMBInt^t = \frac{IInt^t + EInt^t}{P^t} \cdot 1000$$

where:

$IInt^t$=Domestic immigration of individuals of the scope of study, in the given region (Autonomous Community or province) throughout year t

$EInt^t$=Domestic emigration of individuals of the scope of study, in the given region (Autonomous Community or province) throughout year t

P^t = Average resident population in the scope of study, in the given region (Autonomous Community or province) in year t

Take note that the Gross Inter-Regional/Inter-Provincial Migration Rate is the sum of the Gross Inter-Regional/Inter-Provincial Immigration Rate plus the Gross Inter-Regional/Inter-Provincial Emigration Rate (see sections 4.4.2.3 and 4.4.2.5).

$$TMBInt^t = TBIInt^t + TBEInt^t$$

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[33] See note 19

Net inter-regional/inter-provincial migration rate

It is defined as the net migratory balance of a specific Autonomous community/province, that is, the difference between the entries and exits of individuals of the Autonomous Community/province, belonging to a specific scope, throughout year t per 1,000 inhabitants of said population group. That is:

$$TMNInt^t = \frac{IInt^t - EInt^t}{P^t} \cdot 1000$$

where:

$IInt^t$=Domestic immigration of individuals of the scope of study, from the given region (Autonomous Community or province) throughout year t

$EInt^t$=Domestic emigration of individuals of the scope of study, to the given region (Autonomous Community or province) throughout year t

P^t = Average resident population in the scope of study, in the given region (Autonomous Community or province) in year t

Please take note that the Gross Inter-Regional/Inter-Provincial Migration Rate is the difference between the Gross Inter-Regional/Inter-Provincial Immigration Rate plus the Gross Inter-Regional/Inter-Provincial Emigration Rate (see sections 4.4.2.3 and 4.4.2.5)

$$TMNInt^t = TBIInt^t - TBEInt^t$$

4.6 Growth and Structure of the Population

Distinction is made between:

Population Growth Indicators: referring to the variations in the size of the population.

Population Structure Indicators: referring to the characteristics and composition of the population.

4.6.1 POPULATION GROWTH INDICATORS

4.6.1.1   Population growth per thousand inhabitants

Defined as the increase in the number of individuals belonging to a specific scope in year t per 1,000 inhabitants. That is:

$$CT^t = \frac{P^{01\text{-}01\text{-}(t+1)} - P^{01\text{-}01\text{-}t}}{P^{01\text{-}07\text{-}t}} \cdot 1000$$

where:

$P^{01-01-t}$ = Resident population in the scope of study at 1 January of year t

$P^{01-07-t}$ = Resident population in the scope of study at 1 July of year t

$P^{01-01-(t+1)}$ = Resident population in the scope of study at 1 January of year t+1

4.6.1.2 Natural increase per thousand inhabitants

Defined as the difference between the number of births and deaths of individuals belonging to a specific scope in year t, per 1,000 inhabitants. That is:

$$SV^t = \frac{N^t - D^t}{P^t} \cdot 1000$$

where:

N^t = Births registered during year t to mothers belonging to the scope of study

D^t = Deaths registered during year t of individuals belonging to the scope of study

P^t = Average resident population in the scope of study, in year t

4.6.1.3 Migratory balance per thousand inhabitants

It is defined as the difference between the number of immigrations coming from abroad and the number of emigrations of a specific scope per 1,000 inhabitants throughout year t. That is:

$$SM^t = \frac{I^t - E^t}{P^t} \cdot 1000$$

where:

I^t = Immigration from abroad, registered during year t, of individuals that arrive to the scope of study

E^t = Emigration with a foreign destination, registered during year t, of individuals that leave the scope of study

P^t = Average resident population in the scope of study, in year t

Take note that said indicator is the same as the difference between the gross rate of immigration from abroad and the gross rate of emigration with a foreign destination of a specific scope for the year t (see sections 4.4.1.1 and 4.4.1.3)

$$TMB^t = TBI^t - TBE^t$$

where:

TBI^t = Gross Rate of Immigration from abroad for the scope of study in year t.

TBE^t = Gross Rate of Emigration with a foreign destination from the scope of study in year t.

4.6.1.4 Births per thousand deaths

Defined as the number of births to mothers belonging to a specific scope per 1,000 deaths of individuals belonging to said scope throughout year t. That is:

$$RND^t = \frac{N^t}{D^t} \cdot 1000$$

where:

N^t = Births registered during year t to mothers belonging to the scope of study

D^t = Deaths registered during year t of individuals belonging to the scope of study

4.6.2 POPULATION STRUCTURE INDICATORS

4.6.2.1 Male rate of the population

Defined as the number of males per 100 females belonging to a specific scope at 1 January of year t. That is:

$$RM^t = \frac{P_{Hombres}^{01\text{-}01\text{-}t}}{P_{Mujeres}^{01\text{-}01\text{-}t}} \cdot 100$$

where:

$P_{Hombres}^{01\text{-}01\text{-}t}$ = Male resident population in the scope of study at 1 January of year t.

$P_{Mujeres}^{01\text{-}01\text{-}t}$ = Female resident population in the scope of study at 1 January of year t.

4.6.2.2 Average age of the population

Defined as the average age of individuals belonging to a specific scope at 1 January of year t. It is calculated using the following expression:

$$EMedia^t = \frac{\Sigma_x \left(x + \tfrac{1}{2}\right) P_x^{01\text{-}01\text{-}t}}{\Sigma_x P_x^{01\text{-}01\text{-}t}}$$

where:

x = Age reached at 1 January of year t.

$P_x^{01\text{-}01\text{-}t}$ = Resident population in the scope of study aged x, at 1 January of year t

4.6.2.3 Median age of the population

Defined as the exact age that divides the distribution by age of the population belonging to a specific scope at 1 January of year t in two numerically equal groups, that is, half of the population is under or equal to the median and the other half is over or equal to the median. It is calculated using the following expression:

$$\text{EMediana}^t = \text{AGE}_{med} + \left(\frac{\left(P_{\square}^{01\text{-}01\text{-}t} \big/ 2 \right) - P_{[0,med\text{-}1]}^{01\text{-}01\text{-}t}}{P_{med}^{01\text{-}01\text{-}t}} \right)$$

where:

AGE_{med} = Age in full years reached, in such a way that half or more of the population, belonging to the scope of study at 1 January of year t, is EDAD_{med} or more years old and half or more of the population is AGE_{med} or less years old.

$P^{01\text{-}01\text{-}t}$ = Resident population in the scope of study at 1 January of year t.

$P_{[0,med\text{-}1]}^{01\text{-}01\text{-}t}$ = Number of individuals belonging to the scope of study at 1 January of year t, being less than EDAD_{med} years old.

$P_{med}^{01\text{-}01\text{-}t}$ = Number of individuals belonging to the scope of study at 1 January of year t, being EDAD_{med} years old.

4.6.2.4 Proportion of the population born abroad

Defined as the percentage of the population belonging to a specific scope born abroad, over the total population of said scope at 1 January of year t. That is:

$$\text{PROP}_{\text{nacido ext}}^{t} = \frac{P_{\text{nacido ext}}^{01\text{-}01\text{-}t}}{P^{01\text{-}01\text{-}t}} \cdot 100$$

where:

$P_{\text{nacido ext}}^{01\text{-}01\text{-}t}$ = Population born abroad belonging to the scope of study at 1 January of year t.

$P^{01\text{-}01\text{-}t}$ = Resident population in the scope of study at 1 January of year t

4.6.2.5 Proportion of foreign population

It is defined as the percentage represented by the population of foreign nationality belonging to a certain scope, over the total population of said scope as at 1 January of year t. That is:

$$PROP_{ext}^{t} = \frac{P_{ext}^{01\text{-}01\text{-}t}}{P^{01\text{-}01\text{-}t}} \cdot 100$$

where:

$P_{ext}^{01\text{-}01\text{-}t}$ = Population of foreign nationality belonging to the scope of study as at 1 January of year t.

$P^{01\text{-}01\text{-}t}$ = Population resident in the scope of study as at 1 January of year t

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4.6.2.6 Proportion of people over a certain age

It is defined as the percentage represented by the population over x years of age over the total population as at 1 January of year t. That is:

$$PROP_{x+}^{t} = \frac{P_{x+}^{01\text{-}01\text{-}t}}{P^{01\text{-}01\text{-}t}} \cdot 100$$

where:

$P_{x+}^{01\text{-}01\text{-}t}$ =Population over x years of age, belonging to the scope of study as at 1 January of year t

$P^{01\text{-}01\text{-}t}$ = Population resident in the scope of study as at 1 January of year t

x= Age. It takes values between 65 and 100 years old.

4.6.2.7 Aging index

Defined as the percentage represented by the population over 64 years of age, over the population under 16 years of age, at 1 January of year t. That is:

$$Aging\ Index^{t} = \frac{P_{65+}^{01\text{-}01\text{-}t}}{P_{0\text{-}15}^{01\text{-}01\text{-}t}} \cdot 100$$

where:

$P_{65+}^{01\text{-}01\text{-}t}$ =Population over 64 years of age, belonging to the scope of study at 1 January of year t

$P_{0\text{-}15}^{01\text{-}01\text{-}t}$ =Population under 16 years of age belonging to the scope of study at 1 January of year t

4.6.2.8 Dependency rate

Defined as the quotient between the population belonging to a specific scope at 1 January of year t under 16 years of age or over 64 years of age, divided by the population from 16 to 64 years of age, expressed as a percentage. This indicator has a clear economic meaning, as it represents the relative measurement of the potentially (economically) inactive population over the (economically) active population. That is:

$$\text{Dependency rate}^t = \frac{P_{0\text{-}15}^{01\text{-}01\text{-}t} + P_{65+}^{01\text{-}01\text{-}t}}{P_{16\text{-}64}^{01\text{-}01\text{-}t}} \cdot 100$$

where:

$P_{65+}^{01\text{-}01\text{-}t}$ =Population over 64 years of age, belonging to the scope of study at 1 January of year t

$P_{16\text{-}64}^{01\text{-}01\text{-}t}$ =Population over 15 and under 65 years of age, belonging to the scope of study at 1 January of year t

$P_{0\text{-}15}^{01\text{-}01\text{-}t}$ =Population under 16 years of age belonging to the scope of study at 1 January of year t

4.6.2.9 Dependency rate of the population under 16 years of age

Defined as the quotient between the population belonging to a specific scope at 1 January of year t under16 years of age, divided by the population from 16 to 64 years of age, expressed as a percentage. That is:

$$\text{Dependency rate of the population under 16 years of age}^t = \frac{P_{0\text{-}15}^{01\text{-}01\text{-}t}}{P_{16\text{-}64}^{01\text{-}01\text{-}t}} \cdot 100$$

where:

$P_{0\text{-}15}^{t}$ =Population under 16 years of age belonging to the scope of study at 1 January of year ^{t}.

$P_{16\text{-}64}^{t}$ =Population belonging to the scope of study at 1 January of year ^{t} over 15 and under 65 years of age.

4.6.2.10 Dependency rate of the population over 64 years of age

Defined as the quotient between the population belonging to a specific scope at 1 January of year t over 64 years of age, divided by the population from 16 to 64 years of age, expressed as a percentage. That is:

$$\text{Dependency rate of the population under 64 years of age}^t = \frac{P_{65+}^{01\text{-}01\text{-}t}}{P_{16\text{-}64}^{01\text{-}01\text{-}t}} \cdot 100$$

where:

$P_{16\text{-}64}^{t}$ =Population belonging to the scope of study at 1 January of year ^{t}over 15 and under 65 years of age.

$P_{65+}^{01\text{-}01\text{-}t}$ =Population over 64 years of age, belonging to the scope of study at 1 January of year t

5 Indicators at municipal level

The Basic Demographic Indicators at the municipal level follow exactly the same definitions as those published at the national, regional and provincial level that have been detailed in the previous sections. The differences lie in their calculation methodology inherent to the problems that small populations raise.

The sources of information on which these indicators are based are the births, deaths and marriages statistics of the Vital statistics, as well as for the indicators of higher level of territorial disaggregation, and the results of the Statistics of the Continuous Register that provides the resident population in each municipality of Spain on January 1 of each year, for the period 2014-2020, and the results of the annual Population Censuses, from 2021.

For the 2014-2020 period, indicators related to the demographic phenomena of birth, fertility, mortality, nupciality and Population Growth are published for those municipalities for which half of the considered period have more than 50,000 inhabitants or it is a provincial capital.

In the case of the Population Structure indicators, the criterion for calculating one-year indicators will be that on January 1 of that year the municipality has more than 50,000 inhabitants or it is a provincial capital

The methodology for calculating the Growth and Population Structure Indicators at the municipal level is exactly the same as that detailed in section 4.6 of this document.

However, in the case of the demographic phenomena of birth, fertility, mortality and nuptiality triennial indicators are calculated in order to minimize the possible annual variability or randomness of some indicators of small populations.

In order to avoid undesirable distortions on the results that may hinder its interpretation and as a consequence of the randomness of the demographic conjuncture typical of small populations, for the basic demographic phenomena (birth, fertility, mortality and nuptiality) indicators will be calculated at the triennial municipal level, that will be mobile to generate a time series.

The methodology for calculating the birth, fertility, mortality and nuptiality indicators developed by the INE at the municipal level follow the following general characteristics:

1. All the indicators correspond to periods of three consecutive years and are considered referred to the central year of the period.

2. To calculate any rate, quotient between a flow and a stock, we will use in the numerator the average flow of the considered demographic phenomena corresponding to each of the three years and in the denominator the stock of population in the middle of the period of three years considered. That is, for example, the crude birth rate of year t of municipality m (where t is the central year of the three-year period considered) is calculated as:

$$TBN_m^t = \frac{(N_m^{t-1} + N_m^t + N_m^{t+1})/3}{(P_m^{1-1-(t-1)} + P_m^{1-1-(t+2)})/2} \cdot 1000$$

Where:

N_m^{t-1} = Births registered during the year t -1 of mothers residing in the municipality m

$P_m^{1-1-(t-1)}$ = Population resident in the municipality m on January 1 of year t-1

$P_m^{1-1-(t+2)}$ = Population resident in the municipality on 1 January of the year t+2

3. The specific mortality rates by sex and age group and the life expectancy are extracted from the three-year abridged mortality tables constructed only for individuals of Spanish nationality residing in municipalities of more than 50,000 inhabitants in the middle of the period or being capital of province. These mortality tables are prepared by accumulating the flows of deaths occurring in the three years of the period considered and the population stocks at the beginning and end of the period. The calculation methodology used to obtain the biometric functions is exactly the same as that detailed in the methodology of the operation Mortality Tables published by the INE annually.

4. Migration and divorce indicators are not published at this level of disaggregation because there are no data on migration or divorce for territorial levels lower than the province.

Following various analyses, from 2021 the basic demographic indicators for all phenomena except mortality will cease to be triennial and will be calculated taking into account only the year of study, exactly as we do for indicators at provincial, autonomous community and national level.

Another new feature is that from 2021 the list of municipalities for which basic demographic indicators are offered is a fixed list of 155 municipalities.

The set of demographic indicators that is drawn up by the INE at the municipal level are as follows:

1. Birth indicators at the municipal level

    1.1. Gross Birth Rate

2. Fertility Indicators at the municipal levelOverall Fertility Rate

    2.2. Fertility Rates by age group of the mother

    2.3. Short-term Fertility Indicator

    2.4. Average Age at giving birth

    2.5. Fertility Rates at the first child by age group of the mother

    2.6. Average Age on giving birth to the first child

    2.7. Percentage of births by birth sequence

    2.8. Proportion of births to unmarried mothers

3. Mortality Indicators at the municipal level Gross Mortality Rate Mortality Rates by sex and age group

    3.3. Life Expectancy at birth by sex

    3.4. Life Expectancy at 65 by sex

4. Marriage Indicators at the municipal level

    4.1. Gross Marriage Rate

    4.2. Marriage Rate by sex

    4.3. Marriage Rates by sex and age group

    4.4. Average age at Marriage by sex

5. First Marriage Indicators at the municipal level First Marriage Rates by sex and age group Average Age at First Marriage by sex

6. Population Growth Indicators at the municipaPopulation Growth per thousand inhabitants

   6.2. Natural Increase per thousand inhabitants

   6.3. Births per thousand deaths

7. Population Structure Indicators at the municipal level

   7.1. Male Rate of the population

   7.2. Average Age of the Population by sex

   7.3. Median Age of the Population by sex

   7.4. Proportion of elderly people at a certain age (>65;>75;>85)

   7.5. Ageing Index

   7.6. Dependency Rate

   7.7. Dependency Rate of the population under the age of 16

   7.8. Dependency Rate of the population over the age of 64

   7.9. Proportion of the population according to place of birth

      7.9.1. Proportion of people born in the same municipality as the one in which they reside (autochthonous)

      7.9.2. Proportion of people born in a different municipality from the one in which they reside but in the same province

      7.9.3. Proportion of people born in a different province from the one in which they reside but in the same autonomous community.

      7.9.4. Proportion of people born in a different autonomous community from the one in which they reside but in Spain

      7.9.5. Proportion of people resident in Spain and born outside Spain

6 Publication of results

The final results of Basic Demographic Indicators at national, autonomic and provincial level are published 11 months after the finalisation of the reference year.

The results are disseminated annually, in November each year:

– November of year t+1: publication of final results for year t

The definitive results of the Basic Demographic Indicators at the municipal level are published several months after or before the end of the reference year depending on the demographic phenomenon in question.

The results are disseminated annually, in November each year. Thus, in November of the year t+1:

– Publication of the definitive results of the year t-1 of the indicators of Birth, Fertility, Mortality, Marriage and Population Growth, 23 months after the end of the reference year.

– Publication of the definitive results of the year t+1 of the Population Structure indicators, 1 month before the end of the reference year.

Availability of results

Besides the aforementioned exceptions, there are a series of specifications on the availability of specific data and aggregates in the BDI series that are detailed as follows:

– Fertility indicators from the provinces of Canarias in 1978, País Vasco in 1986 and Andalucía in 2007 are not available, due to registry errors in the "order of birth" variable in the Vital Statistics.

– Late Foetal Death indicators are not available for 1976.

– The results for the 1980-1985 period may be affected by a subregister of marriages in the Vital Statistics, of the population located in the provinces of Murcia, Salamanca, Valladolid, Girona, Alicante/Alacant and Guadalajara.

– Divorce indicators are not available for the Autonomous City of Ceuta in 2015, because for that year the courts of this province have not provided data.

– Since 2002:

  There are indicators broken down by nationality for all demographic phenomena except for the case of divorces.

– Since 2005:

  Legal regulation relating divorce are contained in the Civil Code as well as in the Civil Procedural Act. Current legislation is basically governed by Law 15/2005, of 8 July. This law amended the previous Law 30/1981 of 7 July, which was the one that introduced the figure of divorce in the Spanish legislation. This law, compared with that of 1981, extends the scope of freedom of spouses with reference to exercising the right to request the dissolution of the marriage relationship. This, unlike the previous law, allows the divorce without the previous factual or legal separation. Therefore, the set of indicators on divorces begin in 2005 with the new law.

- Since 2008:

There is data on migrations coming from the Migration Statistics. As a consequence, the Migratory Balance indicator is calculated since that year per 1000 inhabitants and all Migratory Movement Indicators.

- Since 2011:

There are indicators on divorces broken down by nationality.

There are indicators on divorces relating to all types of marriages, since previous years (2005-2010) they were only available for divorces of opposite-sex marriages.

- Since 2014:

The indicators regarding infant mortality are adapted to COMISSION REGULATION (EU) No. 328/2011 of 5 April 2011 by which European Parliament and Council Regulation (EC) no. 1338/2008 on community statistics regarding public health and occupational health and safety, for which statistics on the cause of death are referred to. The changes have been applied to the total of the series, specifically the following adjustments have been made:

- Neonatal deaths are considered as those which occur to those born alive during the first 28 days of life (days 0 to 27). Before 2014 those occurring within the first 30 days of life, as representative of the first month of life were considered.

- Early neonatal deaths are considered as those which occur to those born alive during the first 7 days of life (days 0 to 6). Before 2014 those occurring within the first 8 days of life, as representative of a full week of life (days 0 to 7) were considered.

- Post-neonatal deaths are considered as those which occur to those born alive of over 27 days of life but less than 1 year old (days 28 to 364). Before 2014 those occurring within 30 days but less than 1 year were considered.

- The calculation of Late Foetal Mortality as well as the Perinatal Mortality Rate has been modified in order to adapt to the definitions of Eurostat, including the denominator of all babies born, that is, those born alive plus late foetal deaths.

- Since 2016:

Between 2014-2015, the intercensal population series for the period of 1971-2001 were recalculated in order to achieve a unified and continuous series of population figures that begin on 1 January 1971 and link to the most recently published Population Figures statistics. Given that the series of Intercensal Population estimates published up to 2015 were prepared according to different softened processes by age, they did not constitute a homogeneous series. This means that in 2016 all of the series of Basic Demographic Indicators were updated on the new intercensal population base.

- Since 2019:

In June 2019 the series of fertility indicators are recalculated according to the order of birth for the years 1996-2006 to take into account the modification of the calculation method of this variable in the Birth Statistics of the Vital statistics of said period. Thus, for the years before 1996, all live births in a multiple birth had the same order (number of children born alive in previous births + number of children born alive in the current birth).

As of 1996, the method for calculating the order of birth variable is modified so that each child born alive in a multiple birth has the correlative order that corresponds to it.

On the other hand, in June 2019 the level of disaggregation of the age variable for the Migratory Indicators at the autonomous and provincial levels is also modified in such a way that it is matched to the level of detail published in the Migration Statistics on this date. As a result, all migration indicators that use age-specific rates for their elaboration have been recalculated.

Basic Demographic Indicators are published for the first time at the municipal level, beginning the series in 2014.

– Since 2020:

In June 2020, the proportion of people according to place of birth is included in the Population Structure Indicators at the municipal level, consisting of five indicators or proportions of "autochthony" at different territorial levels in which the place of birth is compared with the place of residence.

In October 2020, Mortality Rates by sex, age and educational level for all territorial levels and Life Expectations by sex, age and educational level were included in the Mortality Indicators. In both cases, four educational levels are considered by aggregation of the Classification of Programmes, Qualifications and Certificates by Educational Levels Achieved, CNED-A.

– Since 2023:

With the new 2021 Population Census, published in December 2022, the intercensal population series for the period 2012-2020 were calculated throughout 2023, in order to obtain a continuous and unified series of population figures that begins on 1 January 1970 and links to the first published period of the annual Population Censuses on 1 January 2021 and subsequent years.

In the case of migration indicators, the results for 2021 are also recalculated on the basis of the new Statistics on Migration and Residence Changes, which becomes the new source of information for these indicators.

In November 2023, the Basic Demographic Indicators for the period 2012-2020 will be published, calculated on the population basis of the new intercensal and annual censuses, as well as the new Statistics on Migration and Residence Change, were published.

Annex: Concept Dictionary

Autochthonous: Individual who was born in the same place in which he resides.

Married: Individual who had a civil marriage with another individual of the same or different sex and is registered in the Civil Register.

Death: The statistical concept death used traditionally in Spain comprised the deaths of all persons that had lived for more than 24 hours. As of 1975, this concept has been broadened to include live born infants that die in the first 24 hours. This change is fundamental, as it implies the adoption of the death criterion recommended by the International Organisations.

Divorcee: Individual who dissolves its marriage bond with another individual of the same sex or different sex, by means of a judgment, judicial decree, or notarial deed, registered in the civil register.

Duration of marriage: Number of full years since the date of marriage until the date of the judgement of notarial deed which dissolves the marriage bond.

Age: Number of complete years elapsed since birth.

Emigration: Action by which a person who, having previously been a regular resident in one territory, ceases to have regular residence therein for a period that is, or is expected to be, at least twelve months in duration.

Immigration: Action by which a person establishes her/his regular residence in a territory for a period that is, or is expected to be, at least twelve months in duration, having previously been a regular resident of another territory.

Marriage: As per the calculation of the basic demographic indicators, marriage is considered the stable union between two persons of the same or different sex, as the product of the agreement of will of both parties, externally manifested with the formalities legally established and registered in the Civil Register.

The Marriage Statistics experienced an important variation in the year 2005, for the purpose of the entry into force of *Law 13/2005, of 1 July (B.O.E. of 2 July 2005)*, modifying the Civil Code in terms of the right to marry. Said law allows marriages between persons of the same or different sexes, with complete and equal rights and responsibilities, regardless of the composition of said marriages. The sex variable of each of the spouses was introduced in the statistical register. These statistics include all marriages registered in the Civil Register.

Migrant: Person who takes part in a migration (immigration or emigration).

Late foetal death: A late foetal death is death prior to the complete expulsion or extraction from its mother or a product of viable conception.

The viability criteria currently applied to Late Foetal Death Statistics of Vital Statistics is: a foetus is considered viable when it weighs 500 grams or more. If there is no data regarding weight, the foetus is considered viable when there have been 22 or more weeks of pregnancy. Lastly, if there is no information on the weight nor on the weeks of pregnancy, it is researched whether it has been incorporated to the abortion files of the Civil Register. If so, it is considered a late foetal death.

Birth: The concept of birth in Vital statistics is identified with the biological one of "born alive".

Nationality: The particular legal link between an individual and their State, acquired by birth, naturalisation, declaration, choice, marriage and other methods in accordance with the national legislation.

Birth order: Number of babies born alive that the mother has had throughout her life including this birth.

Resident population: the resident population in a given geographical area are the persons that on the reference date have their regular residence established therein.

According to the definition of regular residence established in *European Parliament and Council Regulation 763/2008 regarding Population and Housing Censuses,* understanding the regular residence to be that place where a person normally spends her/his daily rest periods, not including temporary absences due to travel for leisure, holidays, visits to relatives and friends, business, medical treatment or religious pilgrimage. Nonetheless, it must be noted that only the following will be considered regular residents in a district:

– Those persons who, according to the previous definition, have regularly resided therein for a continuous period of at least twelve months.

– Those persons that, according to the above definition, would have established their regular residence in it less than twelve months before, but intended to stay in it for at least one year.

Sex: This refers to the biological sex of the person. According to the WHO, "sex" refers to the biological y physiological characteristics that define men and women, whereas "gender" refers to the socially constructed roles, conducts, activities and attributes that a specific culture considers appropriate for males and females. According to this description, the WHO considers "men" and "women" are categories of sex, whereas "male" and "female" are categories of gender.