



## Sex Ratio, Age Structure and Population Ageing

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# Chapter 3

## Sex Ratio, Age Structure and Population Ageing



**Abstract** It is vital to examine the population composition, i.e. how the population being studied is structured. In demography, to understand the phenomena studied (firstly, births and deaths), it is common practice to examine the number of women in relation to the number of men and to distinguish the distribution of individuals by age. The most common representation of this gender and age composition is the “age pyramid”. It is important to know the age and gender composition, as this largely determines a population’s demographic dynamics. Elements relating to gender and age composition will enable better understanding of the dynamics outlined in the following chapters. In this chapter therefore, we will present the composition of the Mediterranean population from the perspective of sex ratios on the one hand, and the age distribution of populations on the other. We will also consider the implications of differences between countries at the sub-national level.

**Keywords** Age pyramid · Population ageing · Gender inequalities · Sex ratio · Mediterranean

### 3.1 Introduction

While studying the spatial distribution of a population is an important aspect to understanding it (see Chap. 2), it is also vital to examine its composition, i.e. how the population being studied is structured. There are several indicators to describe a population’s composition. In demography, to understand the phenomena studied (firstly, births and deaths), it is common practice to examine the number of women in relation to the number of men and to distinguish the distribution of individuals by age. The most common representation of this gender and age composition is the “age pyramid”.

It is important to know the age and gender composition, as this largely determines a population’s demographic dynamics. For example, the birth rate is firstly the result of the number of women of childbearing age (between puberty and menopause), and secondly the intensity of fertility by age group (Chap. 5 examines to aspects of

differentials fertility). Elements relating to gender and age composition will enable better understanding of the dynamics outlined in the following chapters. The birth rate, as we have said, but also mortality (Chap. 7), migration (Chap. 8) and population dynamics (Chap. 9).

In this chapter therefore, we will present the composition of the Mediterranean population from the perspective of sex ratios on the one hand, and the age distribution of populations on the other. We will also consider the implications of differences between countries at the sub-national level.

### 3.2 Gender Inequalities in the Mediterranean

The human species is characterised by an almost equal numerical balance between the sexes. On average, 105 boys are born for every 100 girls, but as the mortality rate for boys is slightly higher than for girls, the ratio between the two sexes reaches an equilibrium around the age of 20 and is maintained today until the age of 60. Secondly, the gap tends to widen between men who die earlier on average, and women (Chap. 7). Obviously, these orders of magnitude vary from one society to another, and have evolved over time. These inequalities in mortality can be explained by natural differences, but also by differences in personal behaviour and social constraints.

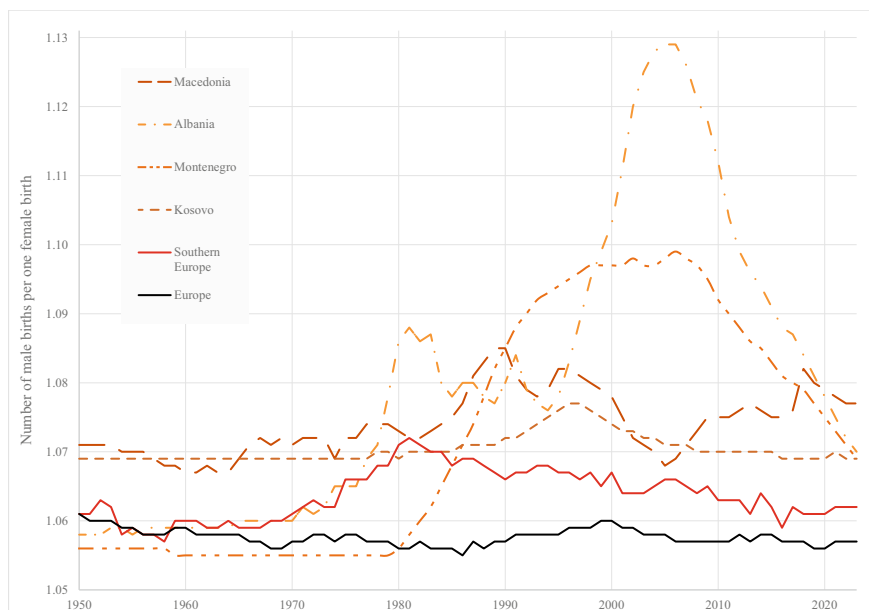
The male/female ratio, also known as the sex ratio, is the consequence of biological constants that cannot be explained, but also of differentiated cultural practices. Thus, in some countries there are imbalances in the sex ratio from birth. India and China are regularly cited in this regard, with a sex ratio that favours girls (Guilmoto & Oliveau, 2007). Around the Mediterranean, most countries have sex ratios at birth that follow the norm of 105 boys per 100 girls. In the 1970s and 1980s, excess female mortality was present in some countries on the Southern and Eastern shores (Locoh & Ouadah-Bedidi, 2014; Tabutin & Schoumaker, 2005), but this is no longer visible today (according to the *World Population Prospects 2022* data at least). However, other countries did show sex ratio imbalances at birth: Albania, Montenegro, and Macedonia. All three countries show an unbalanced sex ratio at birth, indicating strong discrimination against girls (Fig. 3.1).<sup>1</sup>

These imbalances were particularly high in the past, and are now decreasing. Albania, for example, saw the sex ratio imbalance worsen in the mid-1990s, peaking at 113 boys for every 100 girls in the mid-1980s, and declining steadily since. The trends are different for these three countries, but they have all at some point had a sex ratio at birth that has exceeded 108 in the last 30 years. In 2020, they reached a level of around 107, higher than that observed in Southern Europe or the European Union.

This preference for boys is complex to explain, as it is based on cultural practices and lineage structures that are not explicit and are generally unconscious. Discriminatory practice, while there is no doubt, is not being claimed here. Nevertheless, for

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<sup>1</sup> For at the sub-national level analysis of the sex ratio in former Yugoslavia, see Buisson (2016).



**Fig. 3.1** Evolution of the sex ratio at birth in select South European countries (Source World Population Prospects 2022)

the preference for boys to be expressed by the disappearance of girls, there would have to be legal and medical contexts that allow for it. Thus, the development of ultrasound scans and abortion facilitated the use of prenatal selection. The development of these practices from the 1990s onwards is, for instance, visible in regions with a large Albanian population (Guilmoto & Duthé, 2013).

Nevertheless, traces of discrimination at birth may be erased over time in the composition of the general population, through a higher mortality of boys and then men, or through sex-differentiated migration, which can ultimately change the overall sex ratio. From this perspective, international migration can severely impact the overall sex ratio. This is the case for Albanian men who leave their country in greater numbers than women, thus rebalancing the overall sex ratio.

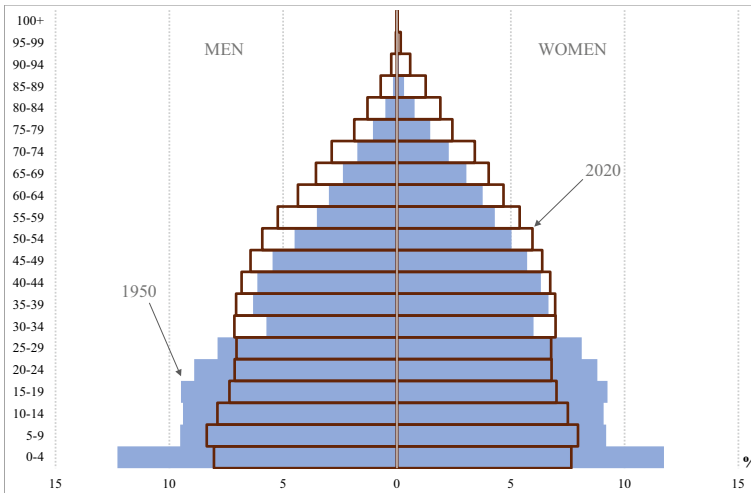
Finally, in general, men's mortality is higher than women's, and even more so at older ages (Chap. 7). As a result, countries with ageing populations generally have a sex ratio in favour of women. Delbès et al. (2006) summed it up well about Europe when they wrote that "women grow old alone, but men grow old with a partner".

### 3.3 An Ageing Population

Looking at a population in terms of its age structure enables understanding of the demographic potential in terms of replacement level, ageing, development opportunities, etc. The determinants of age structure are both the births and deaths rates (which are themselves the result of a cross between the fertility/age-specific mortality rates and the structure of the population by age and sex), and the effect of inward and outward migration. In 1950, the Mediterranean's age pyramid had a broad base and a rather thin top, which is a sign of a high average birth rate and an even higher mortality rate at advanced ages (Fig. 3.2).

The higher the birth rate, the greater the number of young people and the wider the base of the pyramid. This initially creates needs (in terms of educational infrastructure in particular), but also rapidly opportunities (through the influx of workers into the labour market). In 2020, the Mediterranean pyramid evolved. Its base was narrower, with a lower weight of young people in the population. In addition, there are more age groups above 30 than in 1950, and the top of the pyramid is much fuller. The weight of older people has increased, and the population has aged, generating many socio-demographic challenges (Blöss, 2018). This change in the age pyramid between 1950 and 2020 is the result of the demographic transition (Chap. 4), with a sharp drop in fertility, which fell below the generation replacement level in several countries (Chap. 5), a significant drop in mortality and improved survival to old age (Chap. 7).

In societies in transition from a demographic regime of high births and high deaths to a demographic regime of low births and low deaths (Chap. 4), there comes a time when there are still few old people and few young people. This leaves plenty of room



**Fig. 3.2** Age pyramid of the Mediterranean in 1950 and 2020 (Source World Population Prospects 2022)

for people of working age, creating what is known as a demographic window of opportunity for the economy: the number of working people is greater than the number of people who depend on them (children and the elderly). A summary measure of this situation is the “dependency ratio”, which relates the population aged under 20 and those aged 65 or over to the population aged 20–64. If the ratio is above 100, then there are more inactive than active people, and if it is below 100, then the number of active people is higher than the number of inactive people, suggesting a greater possibility of productivity in society.

This dependency ratio in the Mediterranean decreases significantly between 1950 and 2020, from 105 to less than 75 (Fig. 3.3). This decrease indicates a lower amount of young and old people in the population. This trend is primarily related to the falling birth rate (Chap. 4), which narrows the base of the pyramid. As the number of young people decreases, the dependency ratio decreases. However, there has been a recent increase in the dependency ratio in Balkan countries, Southern European countries and also in Israel. This is due to the ageing of the population, where more people are surviving into old age, increasing the amount of the elderly in the population. Countries on the Southern and Eastern shores retain higher dependency ratios than countries on the Northern Shore (Ambrosetti, 2020), particularly in the Near East, which is mainly due to a higher birth rate and thus a higher presence of children in the population. Two countries stand out due to their ratio trajectories. First of all, Israel has maintained a high ratio (>80%) since 1950, combining an improvement in the longevity of its elderly with a relatively high fertility rate. The second country is France, whose ratio is currently the highest on the Northern shore, due to a combination of a birth rate that has not fallen to the same extent as elsewhere in Europe, immigration that provides a steady supply of workers, and an ageing population.

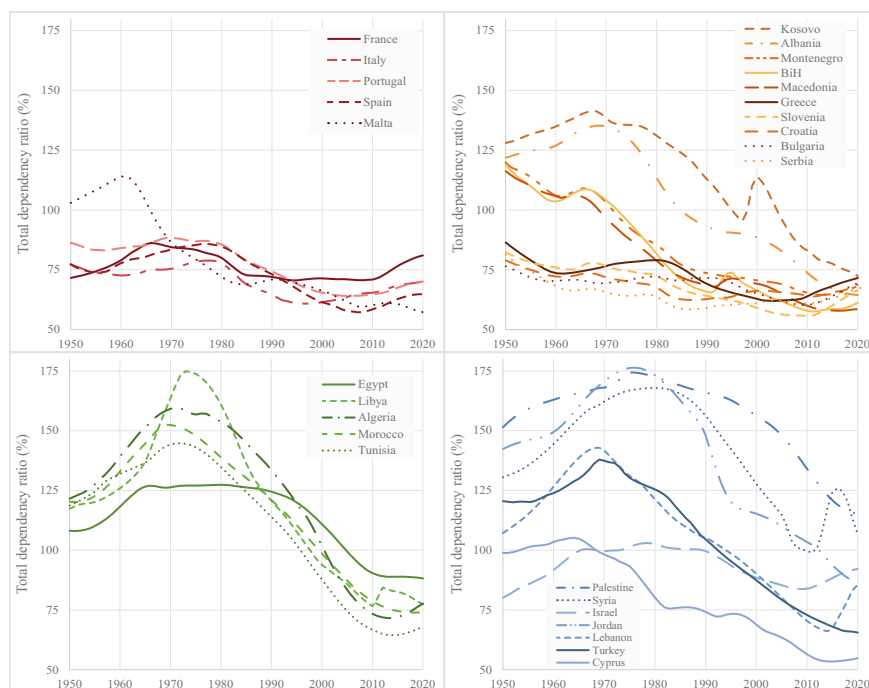
### 3.4 Ongoing Significant Differences in Age Structure Between Regions

Looking at ratios at the country level is interesting and already shows remarkable differences. It is nevertheless more pertinent to approach the subject at a finer level in order to offer a more precise understanding of the age composition of the Mediterranean area. We have therefore constructed age pyramids at a sub-national level for each country that is as comparable as possible from one country to another in terms of average area (Doignon, 2020; Doignon & Oliveau, 2015). In order to allow for cartographic analyses, we have established a typology for age pyramids, which consists of 7 profiles (from the youngest to the oldest) and uses a hierarchical ascending classification (Fig. 3.4).<sup>2</sup>

The first profile type is an age pyramid with a very broad base and a narrow top. It represents a very young population, with a high birth rate (characteristic of a fairly

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<sup>2</sup> The period represented is 2010–2015 due to data availability.



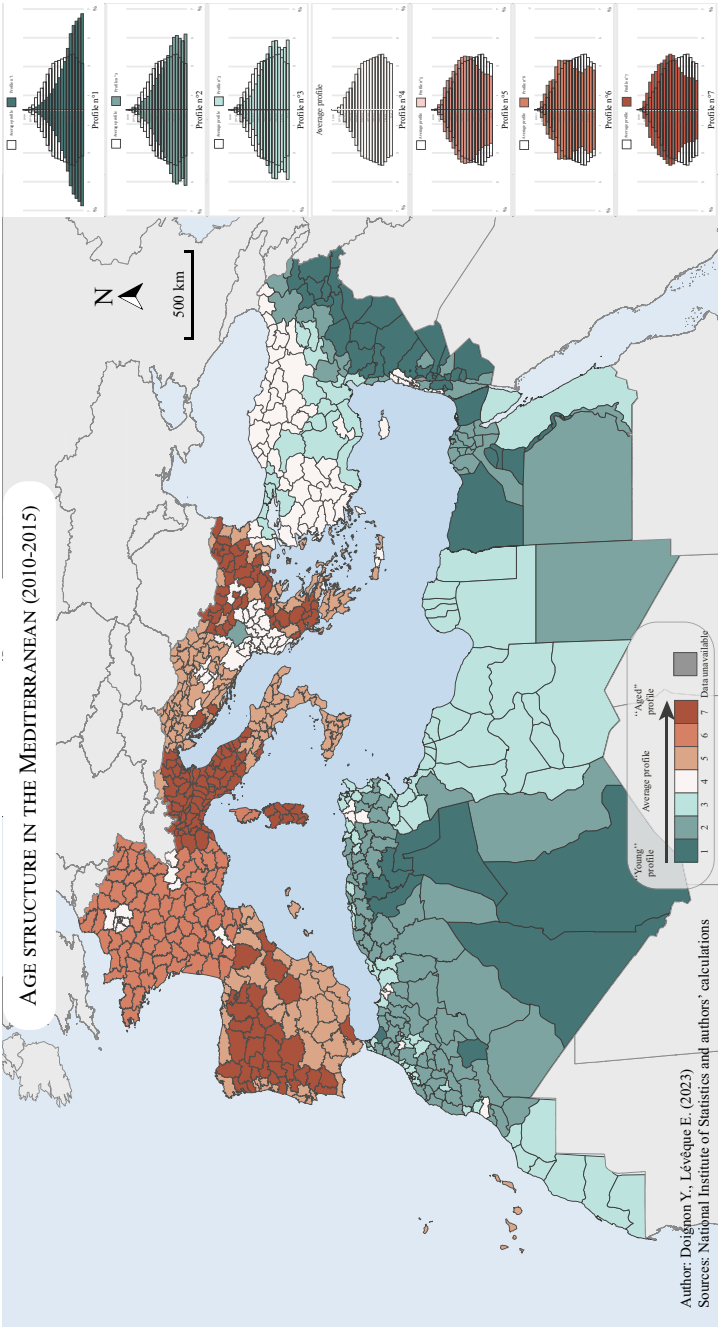
**Fig. 3.3** Total dependency ratio in the Mediterranean (1950–2021). (Source World Population Prospects 2022. Note The total dependency ratio is the ratio of population aged 0–19 and 65 + per 100 population aged 20–64)

high fertility rate), and a low proportion of elderly people (on average less than 3% of the population is aged 65 or over). It includes part of the Nile Valley in Egypt, Palestine, Jordan, Syria, and also Turkish Kurdistan (with a higher fertility than the rest of the country) and some Saharan regions of Algeria.

The second type corresponds to a situation where the birth rate has started to decline, but is still high. People aged 65 and over still represent only 4.2% of the population. This type of age pyramid is essentially found in much of the Maghreb, and in the Nile delta in Egypt.

The third type is very similar to the second, but with the base of the pyramid showing the beginning of a recovery, indicating that a decline in fertility is taking place over time. It represents the situation in Libya, southern Morocco, the urban regions of the Maghreb (Casablanca, Rabat, Agadir, Oran, Algiers, Tunis, etc.), a large part of Tunisia, and Turkey, in the regions of Istanbul and Ankara, and on its southern border.

The fourth type represents the average characteristics of the Mediterranean area. The base of the pyramid is slightly sunken, indicating rather low fertility, and the top is fuller than the previous types. The share of elderly people in the population is about 9%. This type is found on all shores of the Mediterranean. It is characteristic



**Fig. 3.4** Age structure in the Mediterranean (2010–15) (*Source* National Institutes of Statistics and authors' calculations)



of Albania, Montenegro, Macedonia, Lebanon and Cyprus, along with a large part of Turkey and certain localised rural areas of the Maghreb. Finally, some large urban centres have this profile, such as Paris, Lyon and Toulouse in France (as well as the departments bordering Switzerland, which attract many young workers), and Tel Aviv and Haifa in Israel.

The fifth type embodies European ageing, with a rather low birth rate. People aged 65 or over represent almost 15% of the population. This pattern is found in the Iberian Peninsula, southern Italy, and much of the Balkans, almost equal to the seventh type. The only exception is France on the Northern shore.

The French regions are represented by the sixth type which is specific to them. Despite the ageing population (15% of the population is 65 years or older), the birth rate remains high compared to other European countries (see Chap. 4), which gives the age pyramid a typical shape, still somewhat narrow at its base, but with a full top.

The seventh and last type is an even older age pyramid than the fifth type. The base of the pyramid is very narrow and the top is very wide. The proportion of people aged 65 or over in the population reaches 19% (1 in 5 people). This seventh type is found in the same regions as the fifth type, i.e. the Iberian Peninsula, Northern Italy and the eastern Balkans.

As evidenced, the model of contrasting shores between north, south and east needs to be rethought. The Mediterranean is a highly heterogeneous area. While profiles 1, 2 and 3 are not present in the north, they are differentially distributed in the south and east and are clustered locally. Type 4 is thus present everywhere, although it is over-represented in the east. Types 5 and 7 correspond only to certain countries on the Northern Shore (Bulgaria, Greece, countries of the former Yugoslavia, Italy, Spain, Portugal) and therefore do not constitute a particular model. Moreover, type 4 regions are interspersed. Finally, type 6 is a reminder of France's demographic uniqueness, even if the country is not perfectly uniform.

### 3.5 Implications and Consequences of Age Structure Differences

This heterogeneity in age composition of Mediterranean populations is above all the consequence of demographic transitions whose pace and intensity have differed and still differ between countries (Chap. 4). What interests us here are the implications of these observed differences.

Throughout Mediterranean societies, the relationship between men and women will change. The situation remains difficult to summarise. On a global scale, the sex ratio is unlikely to change between now (98.9 males per 100 females in 2020) and the next 30 to 50 years (99.5 males per 100 females in 2050 and 2070). However, this stability hides a strong convergence of sex ratios between countries. In fact, countries where women have been in the minority (general sex ratio of the population greater than 100) are trending towards a better balance between the sexes. In fact, while in

1950 there were only 6 countries with a sex ratio greater than 105, in 2020 there was only 3 and in 50 years-time there will likely only be 2. At the same time, countries where women were in the majority (overall sex ratio of the population below 100) are also trending have been towards 100. 11 countries had a sex ratio below 95 in 1950 and 6 countries in 2020. However, in 50 years, only France is predicted to have a sex ratio below this value. The French case is once again different from the Mediterranean model, as its sex ratio will be even lower than 90! With this exception, the projections show a strong convergence of sex ratios towards a better numerical gender balance in all societies.

The reduction in the labour force could also lead to a greater demand for female labour, which, together with better education, could lead women to renegotiate their place, even within societies that some believe are still stuck in fairly traditional patriarchal forms of organisation.

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