Research Article

The Mediterranean Islands: Demographic Convergences and Divergences, 1995–2021

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Once known as being at the earth's centre, the Mediterranean Sea includes many inhabited islands. Their populations are diverse on cultural, political, economic, and social grounds. People living there speak a variety of languages and have different national identities. Some of them form the body population of whole nations. That is the case in Cyprus and Malta. The others lie on the periphery of their broader national populations, keeping their specificities and characteristics simultaneously, at least to some degree. The research question in this paper relates to the most recent demographic transition occurring in these areas to identify the existing diversity and possible convergences and divergences occurring over time. Each population will be compared with its national one, except for Cyprus and Malta. Results indicate significant convergences between the populations studied. However, the observed heterogeneity remains high, and the insular populations remain distant from the national ones they belong to most of the time.

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Introduction

The Mediterranean Sea is home to many insular populations. A significant heterogeneity characterises their economic and social profile, modern history, and the population inhabiting them. The larger insular populations studied in this paper are seen in Table 1.

Of them, the larger ones are Sicilia and Sardegna, in Italy. The Spanish Illes Balears follow, along with the Greek Islands. Two nation-states, Malta and Cyprus, come next, followed by Corse in France. Besides the two nation-states, the analysis is at the NUTS 2 level for the other populations. Some small insular populations belonging to other countries, like Croatia and Turkiye, were not analysed. The same happened for the Islands in the Argosaronic Gulf next to Piraeus in Greece and Euboia due to their small sizes and the lack of relevant data. Finally, data for Cyprus refers only to the relevant EU Member.

Table 1 portrays the contribution of these populations to their national ones, along with their share in the Mediterranean population studied here. The insular people account for 5.8% of the overall national population. In relative numbers, Greece is the most significant insular state, as 13.3% of its population lives in the small Aegean and Ionian Islands along with Crete. However, the contribution of each NUTS2 area to the total population is small, except for Crete. Italy follows (10.8%), but in absolute numbers, its insular population is almost five times larger than the Greek one. Illes Balears also have a large population, constituting only 2.6% of the Spanish population. Cyprus, Malta, and Corse follow.

GEO	Population	% of National Populations	% of Mediterranean Populations
Greece (EL)	10,678,632		
Voreio Aigaio (EL41)	229,155	2.1	2.1
Notio Aigaio (EL42)	347,848	3.3	3.2
Kriti (EL43)	636,766	6.0	5.9
Ionia Nisia (EL62)	202,371	1.9	1.9
Greek Insular Populations	1,416,140	13.3	13.1
Spain ES	47,398,695		
Illes Balears (ES53)	1,219,775	2.6	11.3
France FR	67,656,682		
Corse (FRM)	346,610	0.5	3.2
Italy IT	59,236,213		
Sicilia (ITG1)	4,833,705	8.2	44.7
Sardegna (ITG2)	1,590,044	2.7	14.7
Italian Insular Populations	6,423,749	10.8	59.4
Cyprus (CY)	896,007		8.3
Malta (MT)	516,100		4.8
Sum of National Populations	186,382,329		
Sum Insular populations	10,818,381		5.8

Table 1. The insular populations in this article in 2021 (estimated population).

Data Source: EUROSTAT (https://ec.europa.eu/eurostat/databrowser/view/demo_r_d2jan__custom_9475329/default/table?lang=en)

This paper aims to analyse the recent demographic transition in the Mediterranean Sea's insular populations, record their demographic profile, and examine any convergences and divergences between them. The analysis will also include the national populations to which these islands belong, as well as the total population of the Mediterranean Sea, in order to facilitate comparisons. Each of the insular populations will be compared with the national one to which it belongs so that, on the one hand, convergences and divergences between them can be ascertained, and, on the other hand, to examine if the pattern of differentiation of an insular population is unique or if several analogies or similarities exist when compared with the other insular populations.

The published literature either refers to national populations or extends the analysis to a lower spatial level (see, for example, Léger and Parant[1]; Dumont et al.[2]; Doignon et al.[3]). This paper will compare distinct populations living in diverse geographic, cultural, political, economic, and social environments, emphasising insularity. That is why they will be compared not only among themselves but also with the national populations from which they originate and the total population that lives on the islands of the Mediterranean Sea in Table 1.

Data and Methods

Data come from the EUROSTAT database (https://ec.europa.eu/eurostat/data/database) in the form of year distributions by age and gender of births, deaths, and populations for each of the populations named in the introductory section of this paper. The Mediterranean Population in this paper is the sum of events and populations of all insular populations presented here.

Data cover the period 1995-2021. The following variables were calculated using the well-known conventional methods[4] and analysed:

1. Population Structure. Median population age, aged dependency (defined as the analogy of people under 20 and greater than 64 to the working population), and women per 100 men.
2. Crude rates (birth, death, natural increase rates). Note that the natural increase rate is the balance of vital event rates and is ultimately not an estimate of overall population growth rates, as immigration is not considered[5]. However, this paper does not consider the EUROSTAT relevant estimates due to the difficulties and inaccuracy in estimating actual migration flows to and from the insular populations.

3. Period Fertility, as recorded by the Total Fertility Rate. Also, the Mean Age at Childbearing, as a proxy for evaluating the developments of the fertility timetable.
4. Mortality, as estimated by the life expectancy at birth (e0). Additionally, all the populations (including the national ones) will be compared with that of the Mediterranean basin. However, as Zafeiris[6] notes, when comparing the average lifespan of different populations, it is necessary to consider all the differences in their mortality patterns, especially when dealing with multiple comparisons in longitudinal studies. Arriaga[7][8] has produced a specific procedure for carrying out such a task, which will be applied here, accompanied by the method developed by Zafeiris[6] for clustering the populations. Three-year moving averages will be used to stabilise the effects of differential mortality of the large groups (0, 1-14, 15-29, 30-44, 45-64, 65+ years) on e0 differences.

During the initial stages of the analysis, it became apparent that the heterogeneity in the 15 populations studied was significant. That situation significantly complicated the visualisation and interpretation of the data. At the same time, it did not allow for conclusions about the possible relationships between the populations in terms of the intensity of the phenomena and their change over time. Then, the question is how to analyse the data to arrive at safe conclusions. It was found that hierarchical cluster analysis, based on Euclidean distances and the unweighted pair-groups averages, gave the best results[6] (see also Peña and Tsay[9]) by considering both the variables' intensity and temporal trends. After applying this method, the cophenetic correlation coefficient was high, indicating the validity of the analysis. Of course, note that the data in question are in the form of time series, for which various analysis methods have been developed, such as Dynamic Time Warping (DTW; see Salvador and Chan[10]); however, these do not contribute significantly to the approach here, which refers to equidistant years and not to small units of time, for which it would be necessary to apply it.

Finally, for each of the four axes described previously, a discriminant analysis will take place to estimate divergences and convergences between the populations. Before applying the analysis, the calculated Variance Inflation Factors revealed that there was no problem of multicollinearity. Also, within-class covariance matrices are assumed to be different, and prior probabilities were not taken into account (for discriminant analysis, see Ayinla and Adekunle[11]).

Results

1. Population Structure

a. Median Age

Population ageing is a common and ongoing, ever-worsening problem (for Europe, see Council of Europe Development Bank[12]; see also the whole section Doignon et al.[3]; Doignon[13] about the population dynamics of the ethnic populations in the Mediterranean Basin) in all populations studied (Figure 1, A1-5), judging by their median age temporal trends.

After clustering the levels and trends of populations' median age, the observed heterogeneity creates 5 clusters (Figure 1, B1-2). Italy and the Ionian Islands are the most aged areas, forming Cluster 4. Greece, Sicilia, Spain, and the Mediterranean population are in a better position, forming Cluster 1. Cluster 3 comes after, consisting of Notio Aigaio, Kriti, Illes Balears, France, and Malta. Cyprus (Cluster 5) is very different, having, as said before, the youngest population. Finally, Voreio Aigaio (Cluster 2) has a unique course over time, having a much older population at the beginning of the study but finally a younger one than all the others, except Cyprus.

A mixed picture prevails after comparing the insular populations with their national ones (Figure 1, A1-5). The Illes Balears are always younger than the entire Spanish population despite the existing problem of population ageing. The opposite happens in Corse compared with France. In Italy, Sicilia is always younger. Sardegna also has a younger population than Italy at the beginning of the study; however, the population's median age is increasing rapidly, and it will eventually become significantly older. A similar situation occurs in Greece, where Kriti (Crete) and Notio Aigaio (Southern Aegean) are much younger than Ionia Nisia and Voreio Aigaio (Northern Aegean).

The clustering of the median age difference between the insular and their national populations (Figure 1, C1-2) gives a picture of the segmentation of populations according to this criterion. The most aged populations compared with their national ones are Ionia Nisia and Corse (Cluster 3), which deviate a lot but positively. Sicilia, Notio Aigaio, Kriti, and Illes Balears (Cluster 2) have more similarities as the mean ages of their populations are lower than the relevant national ones. Sardegna (Cluster 4) and Voreio Aigaio (Cluster 1) are unique populations. While it was initially younger, Sardegna ages fast and, in the end, has a much older population than Italy. The opposite happens with Voreio Aigaio.

This fragmented picture is due to the differential action of various demographic and socio-economic factors and how they are specialised on each island. In any case, the ageing population is a transformative social phenomenon, increasing the proportion of older people and, at the same time, denoting the need to create a friendly environment for the elderly and creating the necessary infrastructure for the well-being of these people[14].

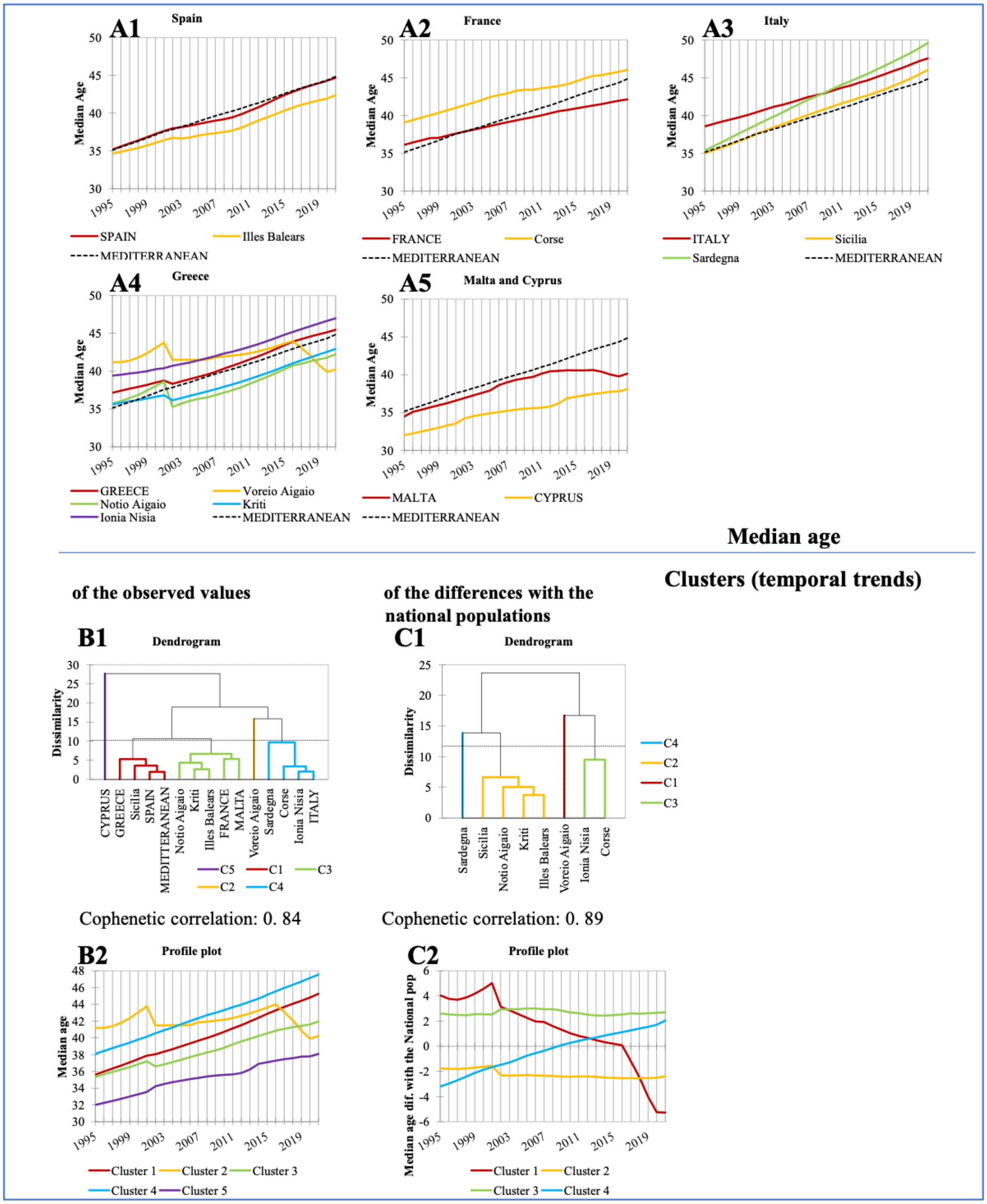

Figure 1. Median age of the populations. 1995-2021.

b. Age Dependency

The age dependency ratio (ADR) in this paper represents the proportion of the non-working population (0-19 and 65+ years) to the working one (20-64 years; Figure 2). It represents the analogy of the economic dependents (not working) to non-dependents (working population); it indicates social and economic stability and progress. Its levels and temporal trends then depend on the temporal changes in the age structure of its population, as seen in Figure 3 in the form of large age groups.

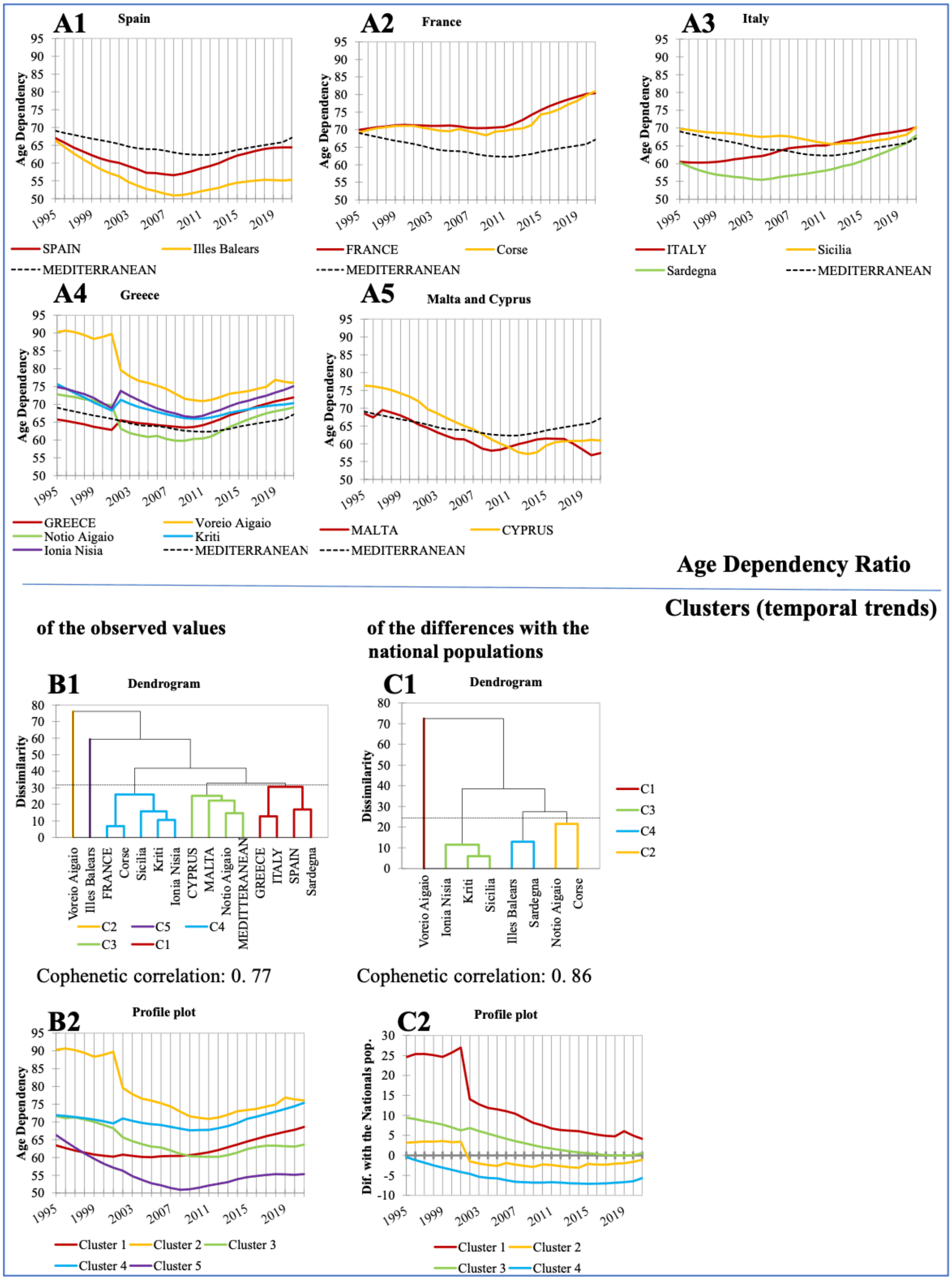

Figure 2. Age Dependency Ratio of the populations. 1995-2021.

The common element among all the populations studied is the decrease in the relative frequency of the younger population over time and its increase in the older population (Figure 3). The economically active population proportionally increases up to a time point and then decreases. Besides all of these, the populations differentiate in terms of intensity and timetable of the changes of the components of the age dependency ratio. The differential clustering of the populations of Figure 2 (A1, B1, C1) denotes the existing diversity, which “produces” the variable scheme of Figure 2.

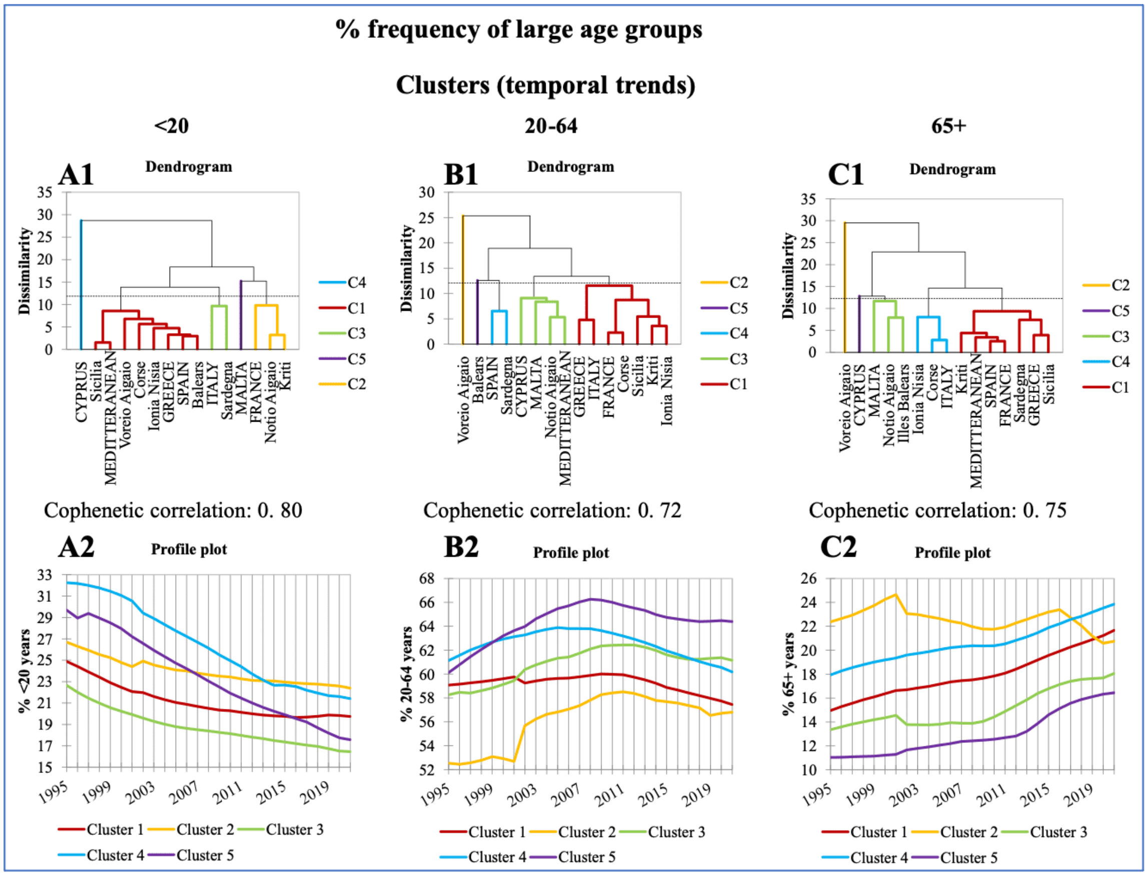

Figure 3. Relative frequency of the components of Age Dependency Ratio. 1995-2021.

In this environment, with few exceptions, the Age Dependency Ratio decreases up to a point in time and increases afterwards (Figure 2, A1-6, B1-2). After clustering the temporal trends of this Ratio, it seems that the most diverse population is Voreio Aigaio (Cluster 2), with the higher Dependency Ratio, and Illes Balears, with the lower one. Greece, Italy, Spain, and Sardegna have more similarities. A parallel course is followed by France, Corse, Sicilia, Kriti, and Ionia Nisia (Cluster 4), but the Age Dependency Ratio is higher in them. Cyprus, Malta, Notio Aigaio, and the population of the Mediterranean Sea (Cluster 3) have a distinct position, initially resembling Cluster 4 and then having smaller values than Cluster 1.

After comparing the temporal trends of the insular populations with the national ones, the smaller differences are in Illes Balears and Sardegna (Figure 2, C1-2), followed by Notio Aigaio and Corse (Cluster 2). There, the ADR is lower than that of their national populations. In Ionia Nisia, Kriti, and Sicilia (Cluster 3), the ADR is higher than that of the national populations, but it converges by the end of the study. The most diverse population is again Voreio Aigaio (Cluster 1).

Therefore, the observed diversity in levels and trends of the Age Dependency Ratio is not related to national populations or geographic location but mainly to the local conditions that prevail in each insular population and directly affect its population structure.

c. Women per 100 men

The next component of a population is the analogy of female to male population, expressed in this paper as “women per 100 men” (Figure 4). Despite slight variations, this ratio is around 105 women per 100 men in all the national populations. The most striking exception is Malta, where the male population predominates and has increased proportionally in recent years. The study's island populations are highly diverse (Figure 4). However, compared with their national populations, they experience a changing but continuous shortage of women. The only exception is Sicilia, which eagerly coincides with the Italian population.

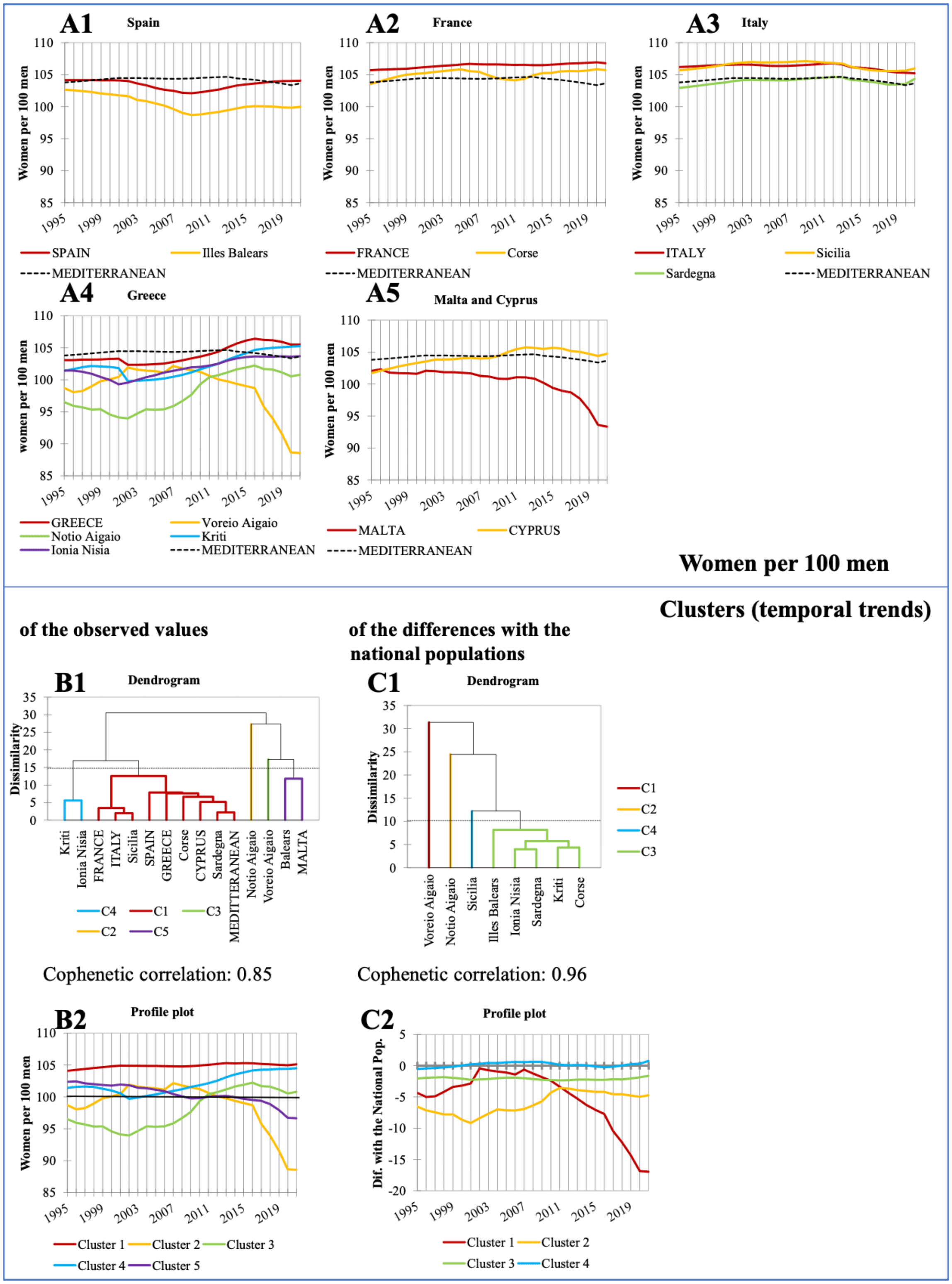

Figure 4. Women per 100 men. 1995-2021.

After clustering the temporal trends and levels of the analogy of women in a population, Malta and Illes Balears seem to be the more diversified populations (Cluster 5; Figure 4, B1-2). In them, this analogy decreases over time, i.e., the gender composition of their populations tends to favour males over time. The same happens in Notio Aigaio. On the contrary, in Voreio Aigaio, there is a constant shortage of women, but this is decreasing over time. The situation in Cluster 4 of Ionia Nisia and Kriti is somewhat better. All the other populations form a large and heterogeneous cluster (Cluster 1).

When the differences between each insular population and its national one are clustered (Figure 4, C1-2), the highest differences are found in the Aegean Sea, especially in Voreio Aigaio (Cluster 1), followed by Notio Aigaio (Cluster 2). The differences in the rest of the populations are more moderate (Cluster 3).

Differential emigration between the two genders could be a plausible explanation for these findings. It seems that women leave their insular homeland more easily than men. In some cases, like Voreio Aigaio, the increasing number of males depends on the gender composition of the population of refugees and immigrants arriving there. In other cases, the presence of a military population is essential.

d. putting all together

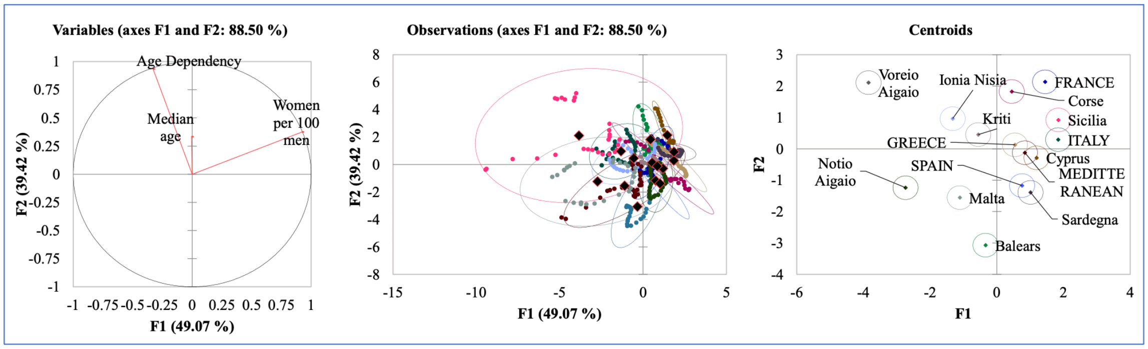

Figure 5. Discriminant analysis, 1995-2021.

Based on the three variables, the discriminant analysis results account for 88.5% of the overall variability (Figure 5). Besides the partial overlapping of the observations, the study of centroids reveals a significant differentiation of the insular populations of the Aegean Sea, Kriti, Malta, and Illes Balears. The other populations tie more closely together—France with Corse, Italy with Sicilia, and Greece and Malta with the overall Mediterranean population. Finally, Sardegna, despite being an Italian island, is very close to Spain. These findings show the high dynamics of the insular populations of the Mediterranean and the intense differences that exist at the local level under the influence of a series of distinct economic, technological, and historical factors.

2. Crude Rates

a. Crude Birth Rates

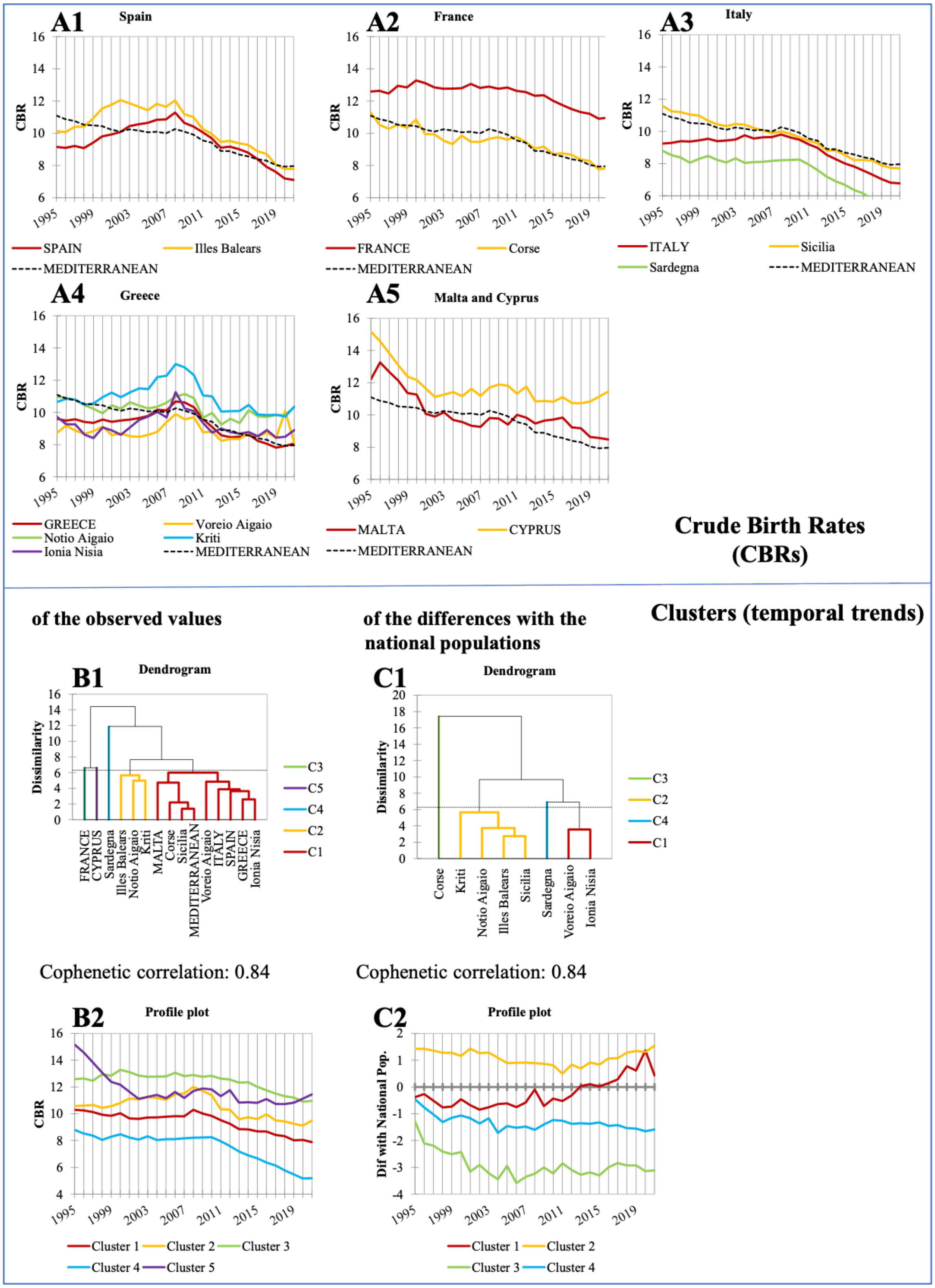

Figure 6. Crude Birth Rates (CBRs), 1995-2021.

doi.org/10.32388/BYVYTD

Three patterns prevail in the first component of population changes, i.e., the crude birth rates (CBRs, Figure 6, A1-5). In Spain, Italy, and Greece, CBRs increase until about the end of the first decade of the 21st century and decrease afterwards. In other words, population growth due to births in these countries accelerates to a certain point and then slows down. France constitutes a special case not only because of its high CBRs but also because of their temporal trends: they did not change much for long until they started to decline. The most significant deviation from these two patterns is Malta and Cyprus. In these countries, the CBRs, despite minor fluctuations, declined over time, a clear sign of their inherent dynamics regarding their population profile.

The insular populations, however, deviate a lot. After clustering the temporal trends and levels of the CBRs, it was found that the most striking deviation is Sardegna, which has the lowest CBRs that recently practically collapsed (Figure 6, A2 and B1-2). France and Cyprus are on the other edge, forming two distinct clusters (3 and 5) because of their high CBRs. Illes Balars, Notio Aigaio, and Kriti form a rather diverse cluster (2) resembling the first pattern of CBR developments (Spain, Italy, and Greece) located just beneath clusters 3 and 5). The final group of populations is also diverse, forming cluster 1 (see also C1-2). From the above, it is clear that among the populations of the Mediterranean and the nations to which they belong, completely distinct trends are taking shape regarding this component of population change and will largely determine their future course.

Indeed, after comparing the insular populations with their national ones (Figure 6, C1-2), it is evident that the CBRs are higher in Kriti, Notio Aigaio, Illes Balears, and Sicilia (Cluster 2). Recently, these differences have enlarged. In Voreio Aigaio and Ionia Nisia, CBRs were lower than in Greece at the beginning of the study. Still, the populations recovered significantly after 2012, when they positively increased their differences with the national population. In Sardegna (Cluster 4), CBRs are becoming increasingly smaller than in Italy. Corse (Cluster 3) has more prominent but negative differences with the national population to which it belongs.

b. Crude death rates

The other vital events component of population change, the Crude Death Rates (CDRs), revealed that most populations are under intense and ultimately increasing pressure due to deaths, which naturally limit their size (Figure 7, A1-5). This problem is specified differently in terms of levels and intensity. However, it is not related to mortality levels, as seen later in the text, but is a result of the population ageing observed in each population.

In an environment of high diversity like the Mediterranean one, remote populations have more in common with each other than with their neighbours or even with the national ones to which they belong. Cluster analysis revealed that the most differentiated population is Voreio Aigaio, where CDRs tend to decrease over time (Cluster 2, Figure 7, B1-2), while at the beginning of the study, they had the maximum rates of population decrease because of the deaths. The next one is Ionia Nisia (Cluster 5), the most burdened population today and the second in order after the North Aegean in the past. Greece, Italy, and Sicilia (Cluster 1) form a distinct group with intermediate rate levels. Cluster 4 follows, and the lowest rates are in Notio Aigaio, Malta, Illes Balears, and Cyprus (Cluster 3).

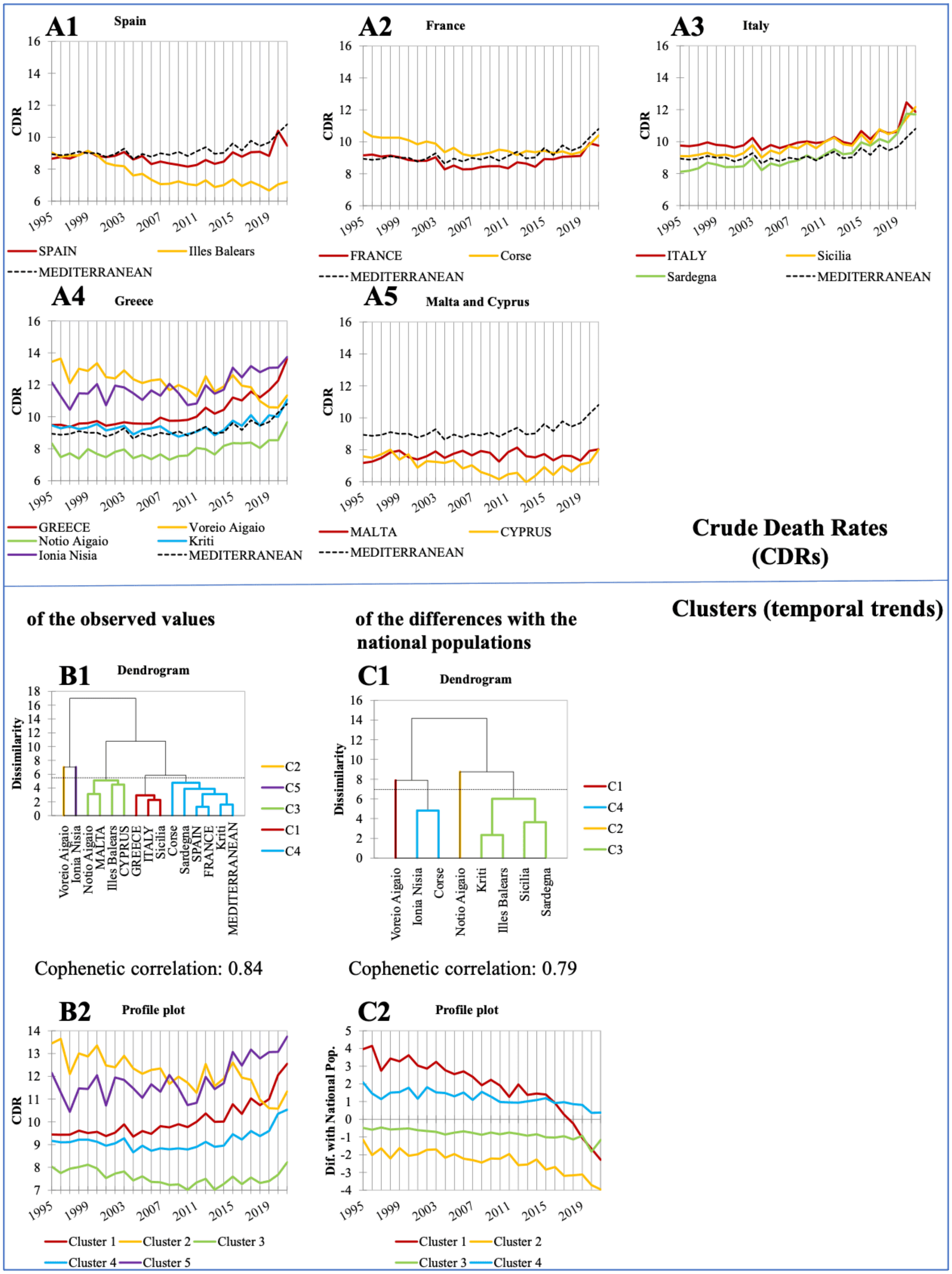

Figure 7. Crude Death Rates (CDRs), 1995-2021.

Two major and diverse groups emerge after comparing the insular populations with the national ones (Figure 7, C1-2). Voreio Aigaio (Cluster 1) and Ionian Nisia and Corse (Cluster 4) have constantly higher CDRs than the national populations they belong to, i.e., Greece and France, respectively. This trend has, however, reversed in recent years in Voreio Aigaio. The rest of the populations (Clusters 3 and 2) have constantly lower CDRs, increasing their differences from the national ones until the end of the study. Notio Aigaio also has the lowest CDRs compared with the entire population of Greece.

c. Natural increase rates

The opposing forces of births and deaths have differential effects on the populations; the balance of birth/death rates, i.e., the Natural Increase Rates, produces the variability portrayed in Figure 8 (A1-5). Mixed trends prevail among the national populations. These sometimes decrease, as in Greece and Italy, initially having almost zero rates of change. The same happened in Spain, but NIRs increased until 2008. France, Malta, and Cyprus continue to increase at a constantly decreasing rate.

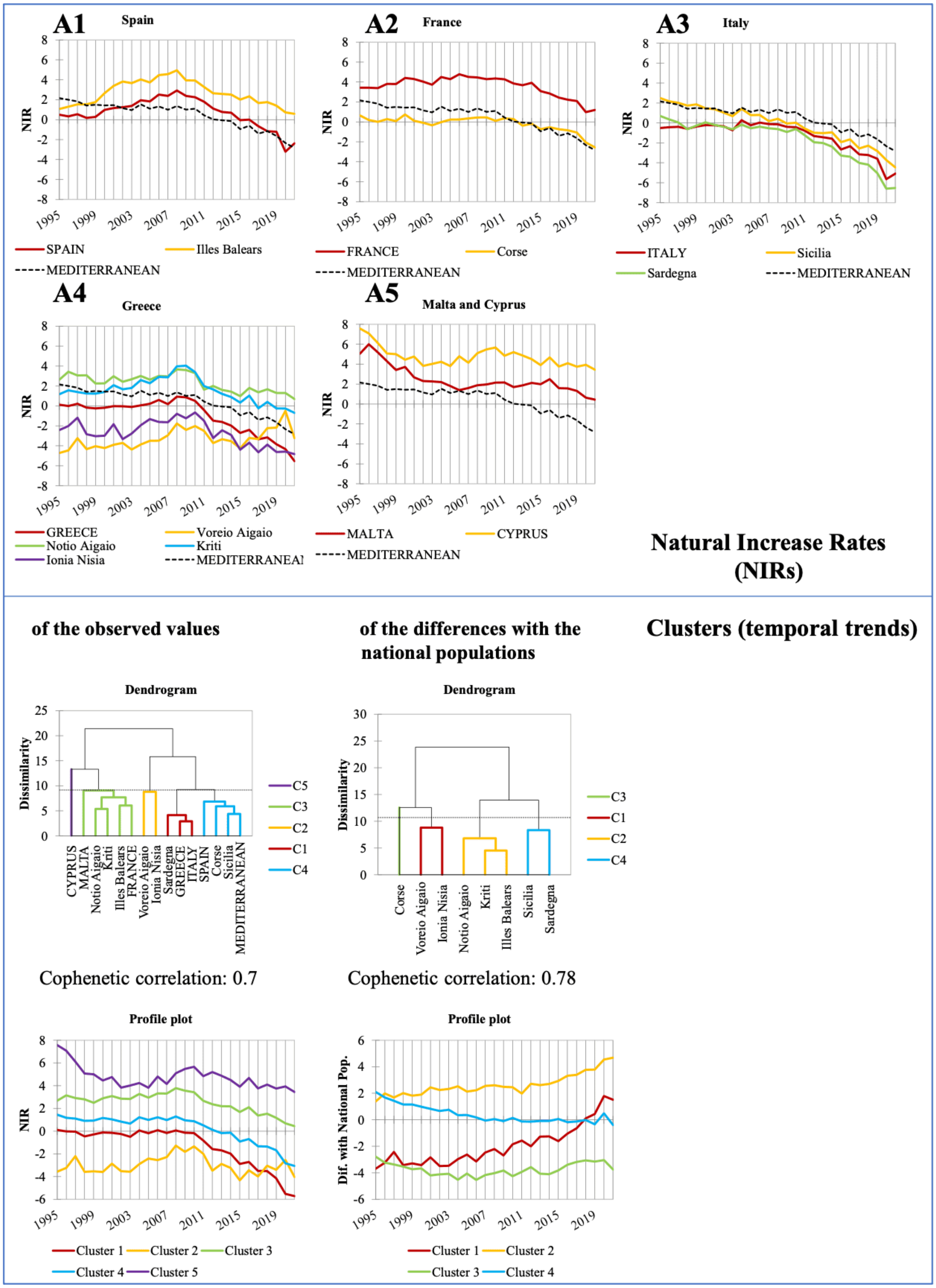

Figure 8. Natural Increase Rates (NIRs), 1995-2021.

After clustering these populations, Cyprus seems to be the most diverse population with the highest growth rates (Figure 8, B1-2). NIRs are lower than Cyprus in Cluster 2 (Malta, Notio Aigaio, Kriti, Illes Balears, and France), but they tend to converge to zero growth rates by the end of the study. Spain, Corse, Sicilia, and the Mediterranean population (Cluster 4) increase due to the births/deaths balance until the end of the 1st decade of the 21st century and decrease afterwards, i.e., deaths are more than births in them. The pressure due to the birth/death balance is more substantial in Greece, Italy, and Sardegna (Cluster 1), which moves in parallel with Cluster 4. The populations of Voreio Aigaio and Ionia Nisia (Cluster 2) also decrease, but the temporal trends of the NIRs are more variable all the time.

When comparing each insular population with the national one it belongs to, Notio Aigaio, Kriti, and Illes Baleares (Cluster 2) positively enlarge their differences over time (Figure 8, C1-2), i.e., their NIRs are higher than those of their national populations. Sicilia and Sardegna (Cluster 4) converge with the Italian population in the first decade of this century. Cluster 3 (Corse) has always had negative differences with France. In Voreio Aigaio and Ionia Nisia, NIRs were higher but in decreasing order in the beginning, and ultimately, they overcame Greece.

d. Putting it all together

Discriminant Analysis (Figure 9), applied to the variables described in this section, explained 100% of the existing variability. Despite the partial overlapping of the populations in the two axes, the centroids indicate the actual grouping of the populations. Voreio Aigaio and Ionia Nisia form a unique group of populations at a significant distance from Greece. In turn, Greece bears more similarities with Italy, Sicilia, and Corse. Spain and the Mediterranean population are close to them. Corse, in turn, lies far from France. Cyprus has a diverse place, as revealed in the paragraphs above. Illes Baleares, Malta, and Notio Aigaio form the next group. Finally, Sardegna is highly differentiated not only from Italy but also from all the populations studied. Based on these findings, the strong differentiation of the local insular populations is again established, both with the ethnic groups they belong to and their compatriots. On the contrary, distant populations may have more similarities among them.

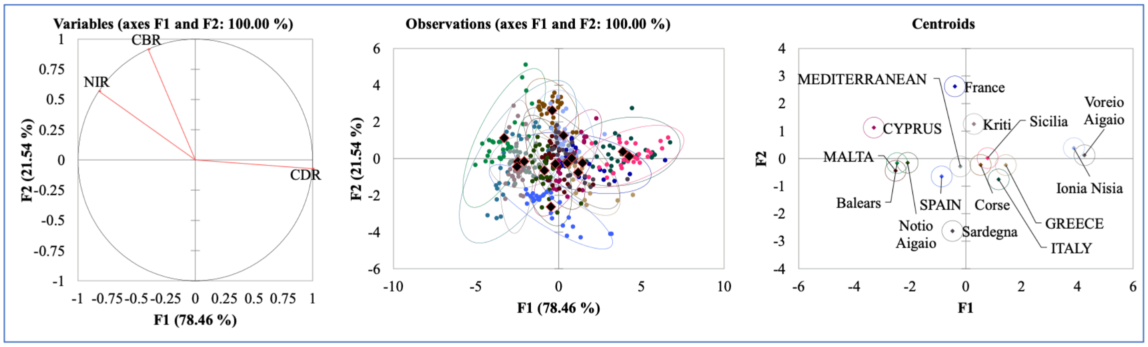

Figure 9. Discriminant analysis, 1995-2021.

3. Fertility

a. Period fertility rates (TFRs)

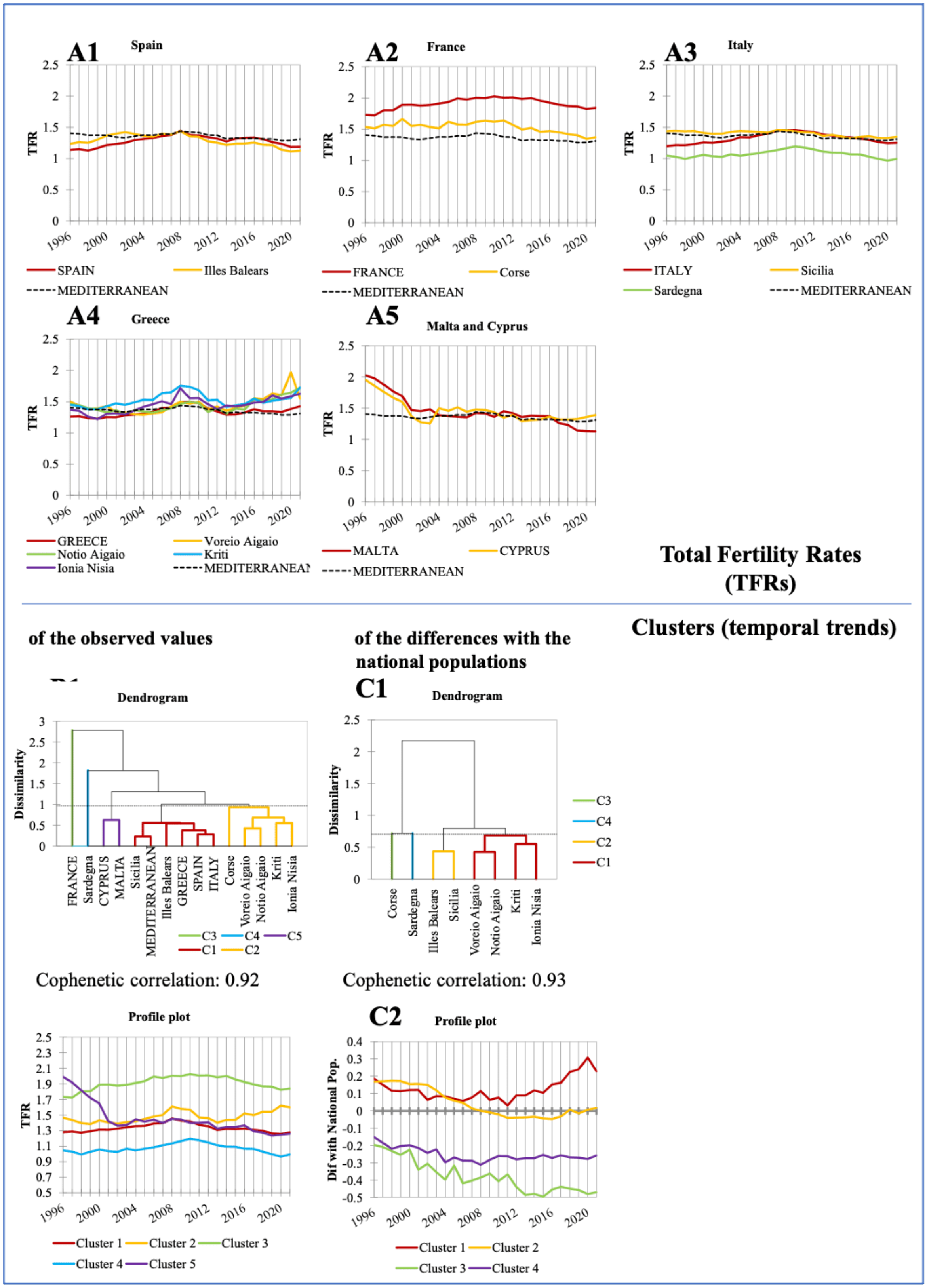

Figure 10. Total Fertility Rates (TFRs), 1996-2021.

Period fertility, as recorded by the Total Fertility Rates, varies significantly among the national populations of this study (Figure 10, A1-5). France retains a unique position, with its constantly high fertility, despite a slight decline in recent years[15][16][17] (for the low fertility countries[18]). Italy, Greece, and Spain have similar trends in terms of the TFR levels and their changes over time (for Italy, see[19]; for Spain[20]; for Greece[21]). Fertility, which is always very low, increases until 2010 and decreases afterwards. Besides France, in this lowest-low fertility environment (for the term, see[22]), Malta and Cyprus (see[23]) will intensively reduce their fertility levels in the first years of the 21st century, converging with the three countries above.

Sardegna has the lowest fertility of the insular populations of all the other populations studied (Cluster 4, Figure 10, B1-2). Cyprus and Malta formed Cluster 5 because fertility rapidly decreased until the end of the 20th century. Afterwards, they converged with the populations of Cluster 1 (Sicilia, Mediterranean population, Illes Balears, Greece, Spain, and Italy). Fertility was somewhat higher in Cluster 2, consisting of Corse and the Greek Islands.

The Greek Islands (Cluster 1) always retain better fertility than Greece (Figure 10, C1-2), enlarging their differences recently. Illes Balears and Sicilia (Cluster 2) practically converged to Spain and Italy after 2008. On the contrary, Corse (Cluster 3) has constantly lower fertility than France, enlarging its differences over time. The same happens in Sardegna (Cluster 4), but its differences from Italy are more moderate and do not change much after 2005.

The postponement of childbearing (see[24]) is an ongoing problem for all populations (Figure 11, A1-5), which differ from each other only in the levels and intensity of the phenomenon. The most significant issue is in Sardegna (Cluster 4; Figure 11, B1-2), where the maximum mean age values at childbearing are found. Illes Balears, Spain, and Italy (Cluster 3) follow. The problem is more moderate but remains extremely important in France, Corse, Cyprus, Greece, Sicilia, and the Mediterranean population (Cluster 1). The postponement of childbearing is less intense in the Greek Islands (Cluster 2) and Malta (C5).

After comparing the insular populations with their national ones, the differences between France and Corse (Figure 11, C1-2) seem minimal. On the contrary, the mean age at childbearing is much higher in Sardegna than in Italy (Cluster 4), while the other populations give birth to their children at lower ages (Cluster 1: Voreio Aigaio, Notio Aigaio, Sicilia; Cluster 2: Illes Balears, Kriti, Ionia Nisia).

It is worth noting that the postponement of childbearing, i.e., the changes in the timetable of births, deflates the observed period fertility rates (see[25]) in a differential way in each population concerning the variability described above. However, such a discussion is itself beyond the scope of this paper. The second point one should comment on is precisely this observed diversity discussed in the previous paragraphs.

The discriminant analysis carried out with both parameters of this section (i.e., TFR and MAC) explained 100% of the observed variability (Figure 12). However, a rather complex picture emerged, with much overlap between the populations and years included in the analysis. The centroids of the analysis are more informative. France and Corse bear distantly located positions. Sardegna is also highly differentiated. Italy, Spain, and Illes Balears form another group next to the remaining populations for which any discrimination is more difficult to describe. Malta, Notio Aigaio, and Voreio Aigaio are more distantly located. The pattern described above of distant populations having more similarities is confirmed again, so it will not be commented on further.

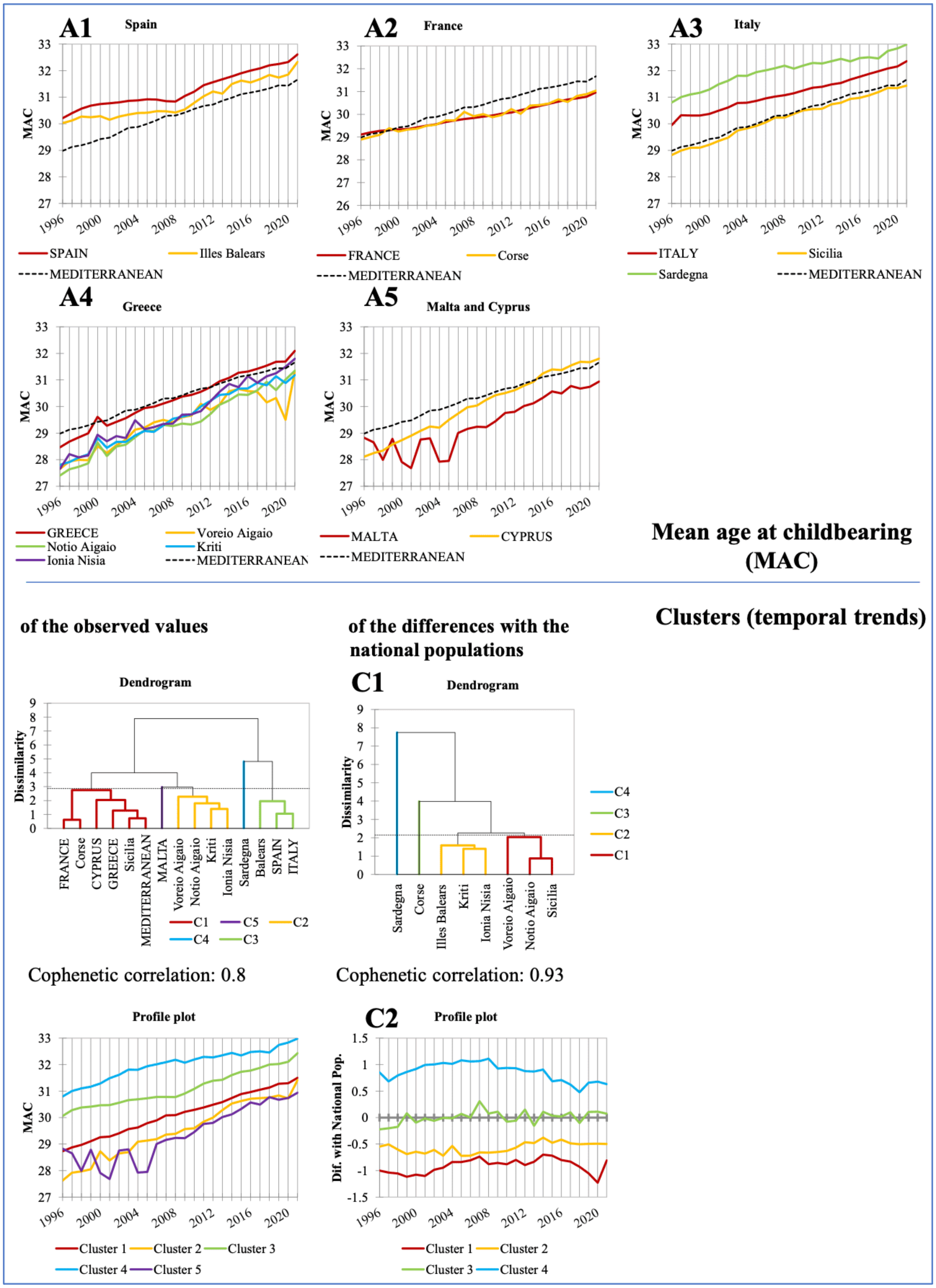

Figure 11. Mean Age at Childbearing (MAC), 1996-2021.

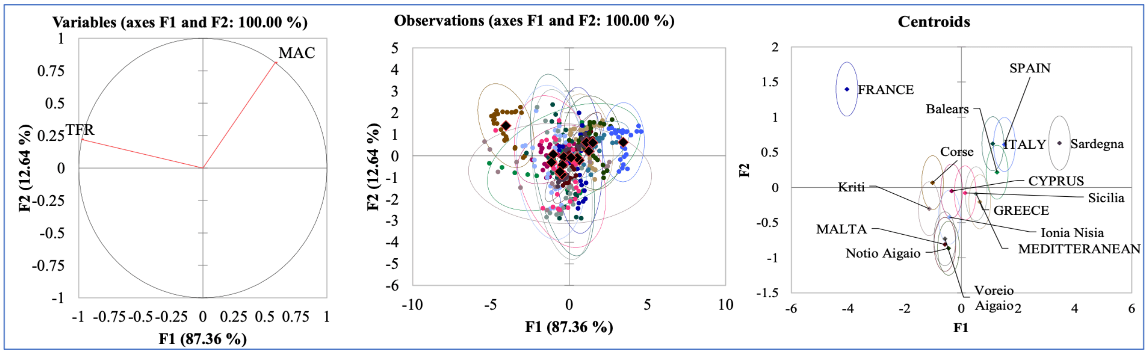

Figure 12. Discriminant analysis, 1995-2021.

4. *Mortality*

5. *Life expectancy at birth (e0)*

Mortality decreased in all the populations studied until the emergence of the COVID-19 pandemic in 2020 (Figure 13, males: A1-5, females: B1-5) and the reversal of the developments. Judging by the temporal trends of e0 in Figure 13, the mortality transition occurred with different rhythms and timetables (For more details, see the following papers. For France[26][27]. For Spain[28][29]. For Italy[30][31]. For Greece[32][33]. For Malta[34]. For Cyprus[35]). Once again, the studied populations, beyond their similarities, are characterised by significant diversity.

In males, the clustering of the e0 levels and temporal trends (Figure 14, A1-2) revealed that the more differentiated populations are Notio Aigaio (Cluster 3) and the rest of the Greek islands (Cluster 2). In these populations, mortality was lower at the beginning of the study, but they soon converged with the others, especially Cluster 1, which France and Greece formed. The latter populations have a lower life expectancy at birth than all the other populations for most of the time. Illes Balears and Corse (Cluster 5) have a unique position. While they initially started with lower levels of e0, their fast mortality transition led to lower mortality in recent years. Somewhat lower is e0 in the populations forming Cluster 4.

After comparing these populations with their national ones (Figure 14, B1-B2), it is certified that most of the insular populations have lower mortality. The only exception is Cluster 3 (Illes Balears, Sicilia, Sardegna). Thus, the general rule that the longevity of the insular populations is always higher is not universal. Illes Balears have the most negligible differences compared with the Italian Islands named before.

In females (Figure 15, A1–2), Corse, Illes Balears, France, Spain, and Sardegna have the lower mortality (Cluster 4). Cluster 2 comprises the Greek Islands (except Ionia Nisia) and Italy, where mortality is somewhat higher but still lower than in the other populations. Sicilia has more affinities with Greece (Cluster 1). The Ionia Islands (Cluster 3) have a unique position, mainly because of the higher mortality in recent years. Finally, Cyprus and Malta (Cluster 5) had much higher mortality in the early years, but the mortality transition was intense in these populations and eventually converged with Cluster 1.

Females of Sicily (Cluster 4) have the most remarkable and negative differences with the entire Italian population (Figure 15 B1–2), i.e., mortality is much higher there. The same happens most often with Illes Balearas (Cluster 3). Ionia Nisia (Cluster 2) mostly has higher longevity than Greece, except for the most recent years. All the other populations steadily have lower mortality than the national populations they belong to. Thus, the lower mortality of the insular populations compared to their national ones is partly confirmed, though a more complex picture emerges in females compared with males.

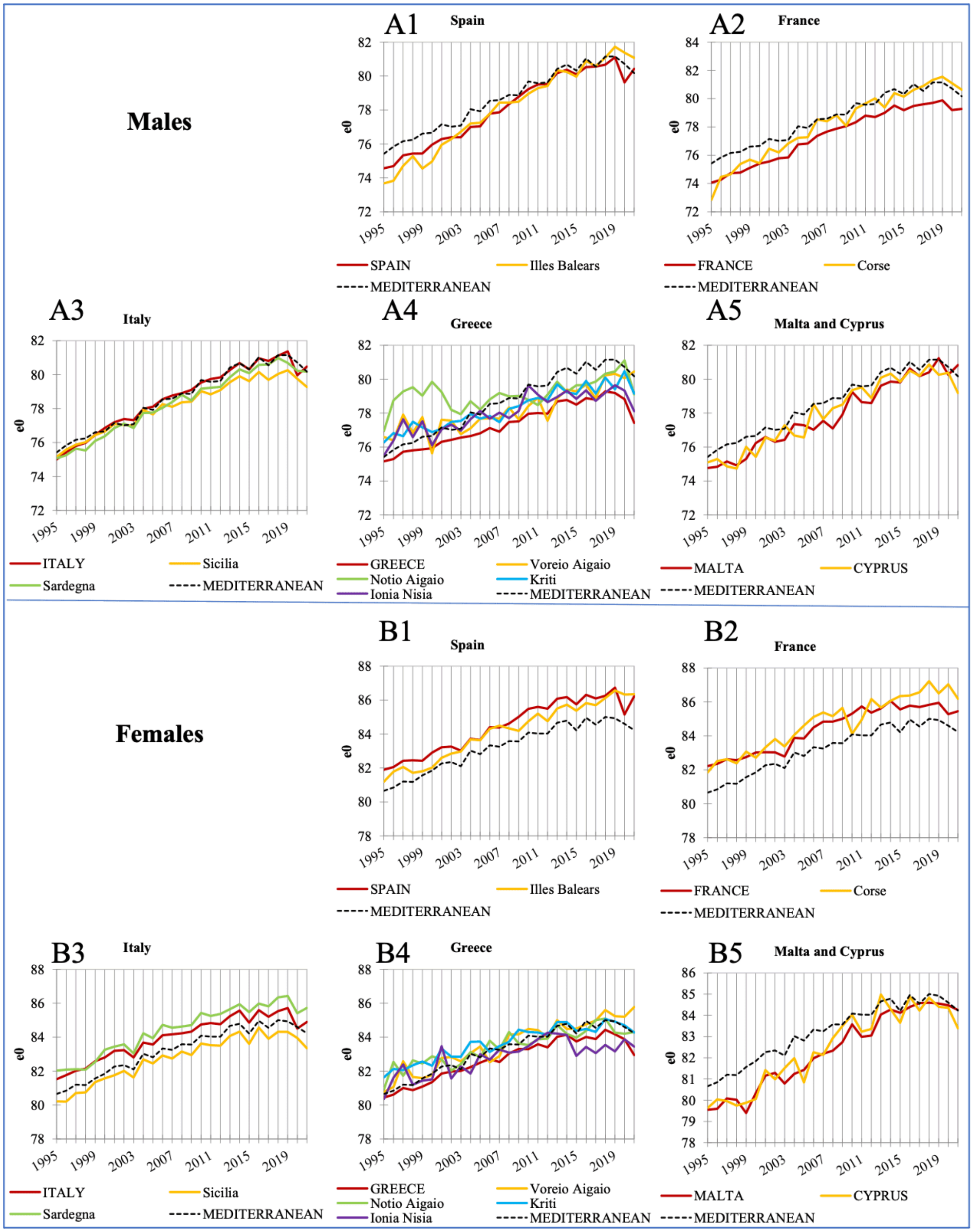

Figure 13. Life expectancy at birth (e0). 1995-2021.

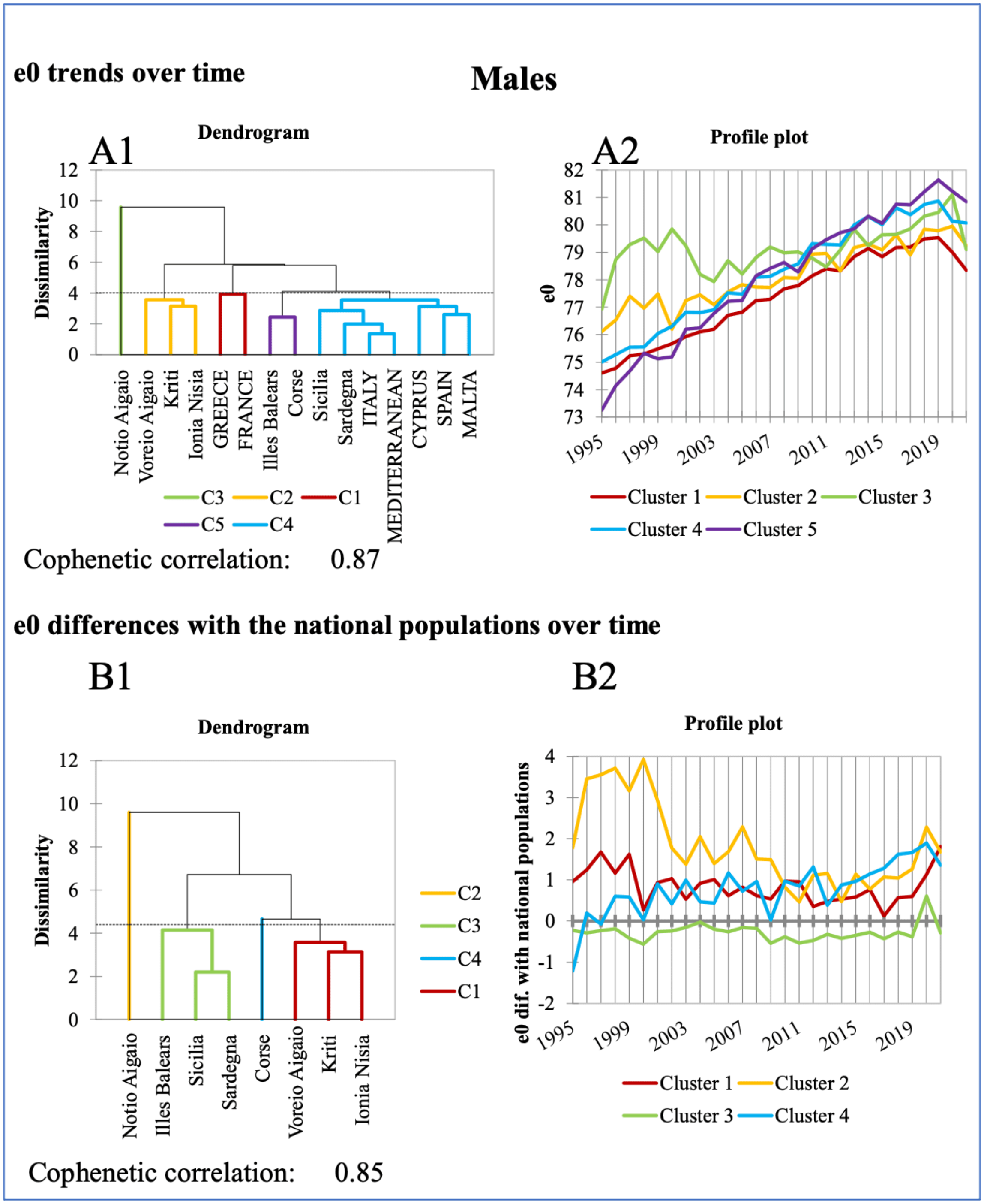

Figure 14. e0 temporal trends. 1995-2021. Males

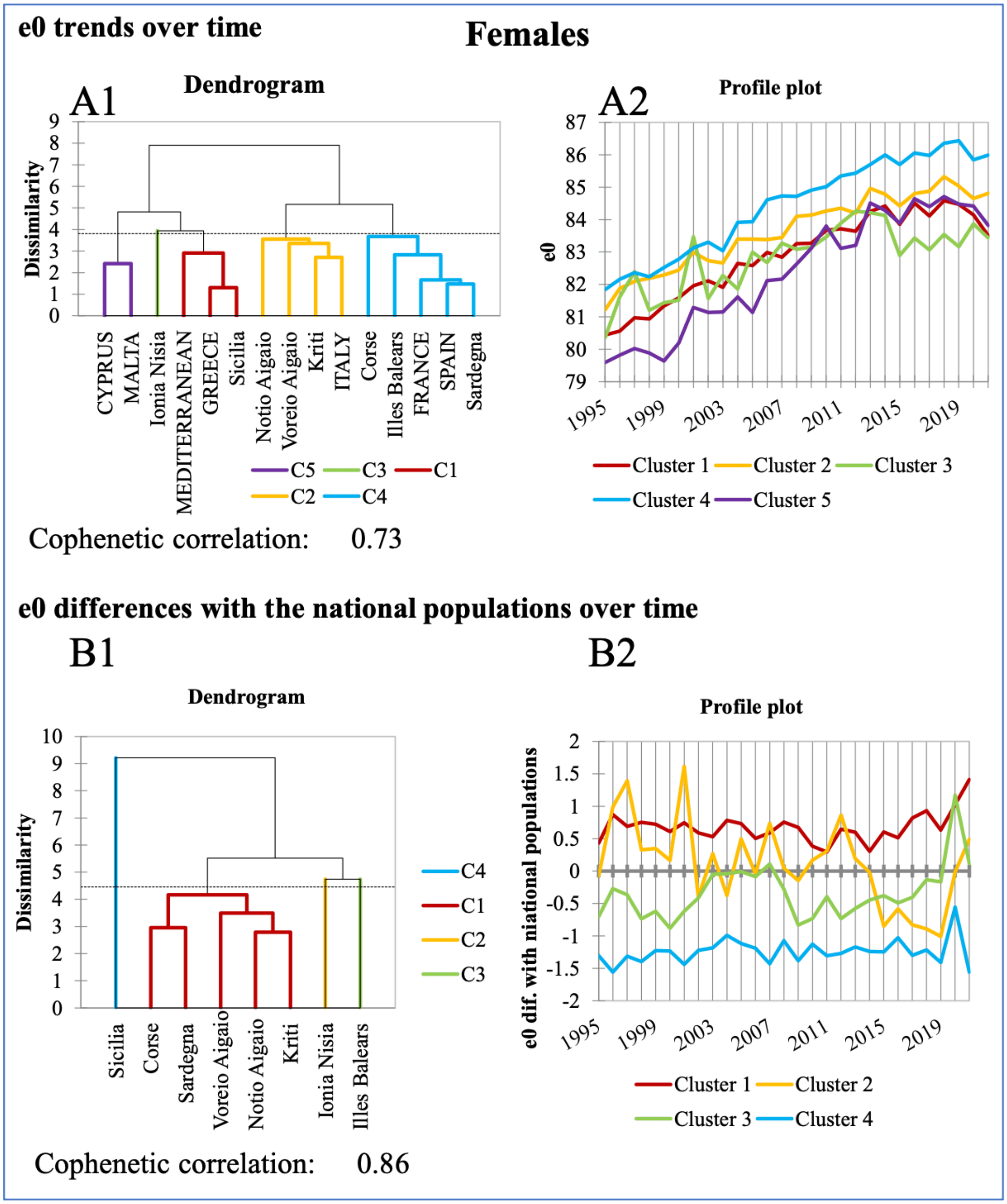

Figure 15. e0 temporal trends. 1995-2021. Females

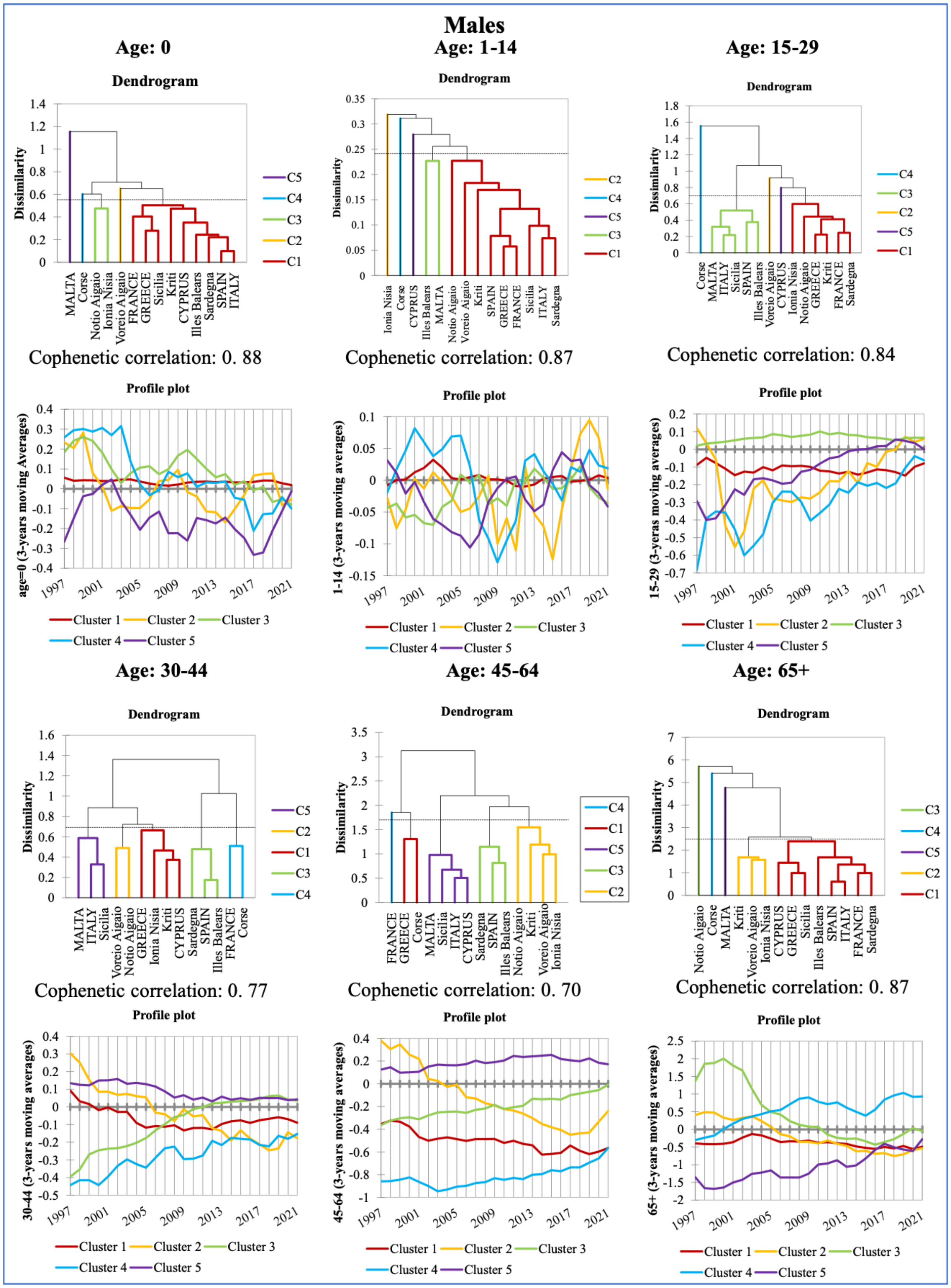

Figure 16. Decomposition of e0 differences with the entire insular population (Mediterranean). 1997-2021.

Males

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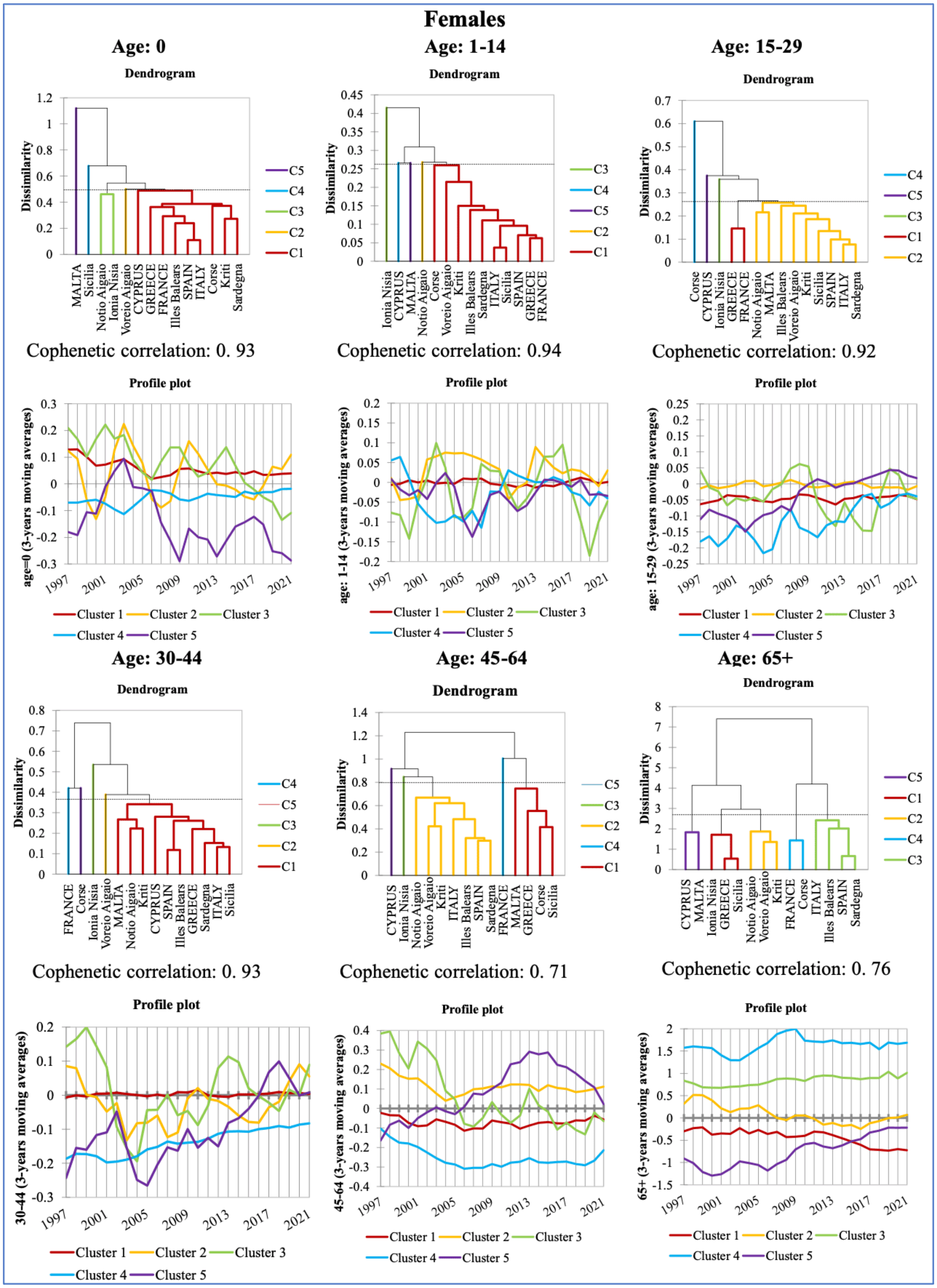

Figure 18. Decomposition of e0 differences with the entire insular population (Mediterranean). 1997-2021.

Females

doi.org/10.32388/BYVYTD

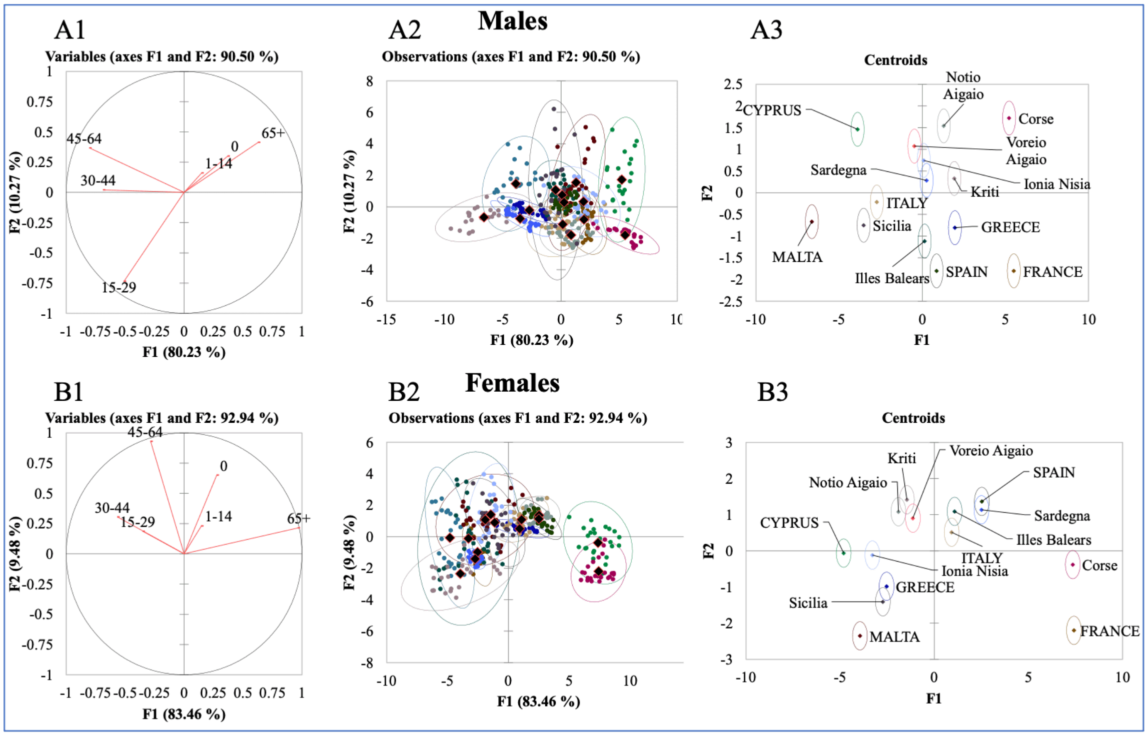

Figure 19. Discriminant analysis based on the e0 differences decomposition results. 1997-2021.

The results of Arriaga's decomposition method of the e0 differences each population has with the Mediterranean one (Figures 17 for males and 18 for females) indicate the complexity of the recent mortality transition in the Mediterranean basin. Before discussing any findings, note that the estimates refer to the differences between the e0 of a population and the entire Mediterranean population. This was the only solution for considering the national populations for the analysis.

This complex situation refers to all ages and genders. Since mortality is higher in a population than in the Mediterranean one, the contribution of each age group to the overall e0 differences becomes negative. The opposite is true when mortality is lower. According to the findings, the most important regulator of e0 differences in mortality at older ages, especially that of the non-working population of 65+ years. The other age groups play a less significant but essential role, like the mortality differences in the infants (age: 0) or the age group of 45-64. However, the situation is not uniform between populations, and significant variations occur between them.

This heterogeneity is portrayed in Figure 19, which contains the discriminant analysis results after applying the Arriaga decomposition procedure. In males, more than 90% of the existing variability is explained (Figure 19, A1). Figure 19 (A1) shows a considerable overlap between populations and years, but the centroids (A3) indicate the heterogeneity mentioned earlier. Malta, Cyprus, Corse, Spain, and Notio Aigaio are the most differentiated populations. All the others lie somewhere in between. Italy has more similarities with Sicilia but not with Sardegna. The latter has more affinities with Ionia Nisia and Voreio Aigaio. Kriti is somewhat distantly located, as are the Illes Balears from Spain.

The female results are more straightforward (92% of the variability is explained; Figure 19, B1). All the Greek Islands, except the Ionia Nisia, lie tightly together but distantly from the entire population of Greece (Figure 19, B3). The latter has more affinities with Sicilia. Cyprus, Malta, France, and Corse are differentiated. Spain is very close to Sardegna and Italy, with the Illes Balears.

Therefore, in the emerging picture – with few minor exceptions - the insular populations are significantly differentiated from their national ones and have more affinities with others. However, this differentiation is gender-specific because males and females have significant dissimilarities.

Discussion and Conclusions

The insular populations studied in this paper spread from the westernmost to the easternmost point of the Mediterranean basin. They are parts of larger national populations, retaining essential features of their economic, social, and cultural peculiarities.

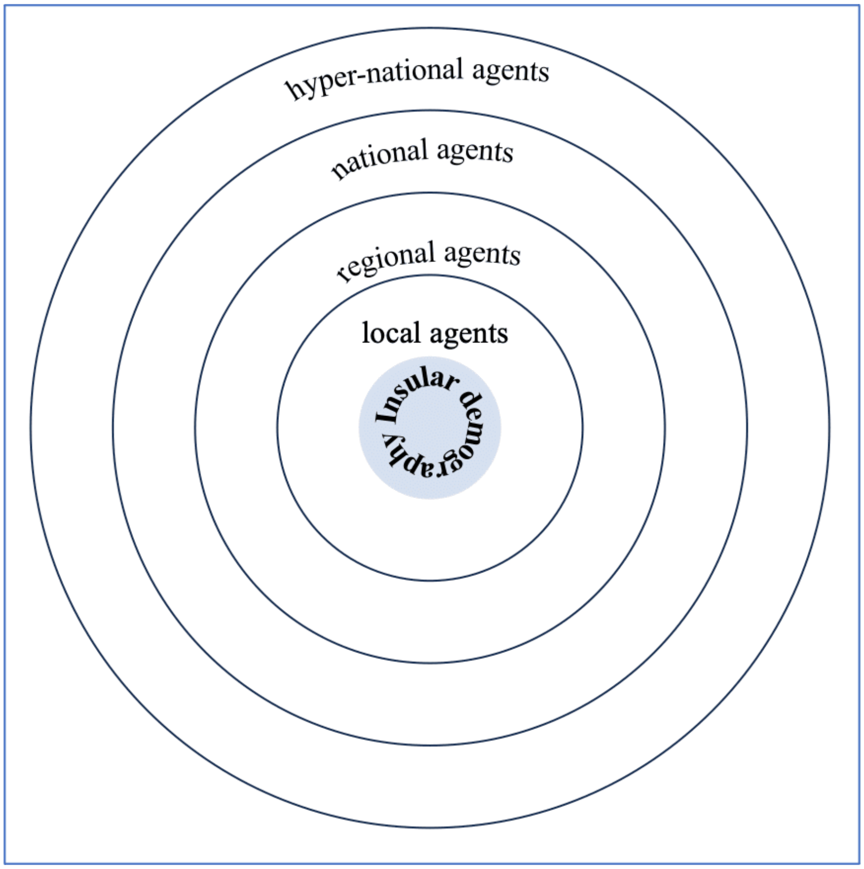

Figure 20. An interpretative scheme of the factors affecting insular demography.

An interpretation scheme of the observed demographic trends in the Mediterranean Sea is seen in Figure 20. The demographic situation on an island, including the demographic interaction of the demographic phenomena, is determined by a complex system of local, regional, national, and hyper-national factors. These factors are structured into interacting and concentric circles, ultimately shaping the social, economic, and physical environments in which these populations live.

All the insular populations are European; they are parts of broader national populations that lie at the core of the European Union, being members of the EUROZONE, as they have a common currency, the Euro. Thus, to a significant extent, they share common values and live in socioeconomic environments of substantial analogies. Over time, significant changes in the values and attitudes related to family life, childbearing, and sexuality occurred in Europe[36]. In all populations, France included, fertility was mainly below the threshold of 2.1 children per woman and, in most populations, below the lowest-low fertility levels. The insular populations had different starting points in the fertility transition in the modern era. Still, they soon began to converge with the national ones, but this convergence has not been fulfilled yet. The same happened with the other element of fertility, i.e., the Mean Age at Childbearing. In all the populations, the postponement of childbearing is evident. However, the variability remained significant.

It seems then that the local and regional agents, in relationship with the national ones, are responsible for manipulating the determining factors of fertility and their specialisation in a population, always having a hyper-national dimension. In this way, while the populations appear to have a common fate, they retain their particularities to a considerable extent for the time being. Still, these are much smaller than they were in the early years of the analysis.

That is apparent in the analysis of mortality. Mortality declines in all populations, but despite the general convergence trend, this occurs with different intensities and timetables. At the end of the study, the observed variability remains significant among the populations of both genders. However, mortality tends to be lower in the insular populations of the Mediterranean basin. This fact probably refers to environmental issues, like air pollution, lifestyle agents (perhaps a stressless life and other agents), dietary reasons, etc.

At the same time, in a regime of declining mortality, the crude death rates tend to rise due to population ageing. Here, too, the system’s heterogeneity is significant and concerns the starting points and the most recent trends. The same happens in the crude birth rates, which are related to fertility levels and the number of women of reproductive age. The latter is related to the phenomena of ageing populations, to refer once again to the interference phenomena between demographic factors, the discussion of which is not within the scope of this paper. As a result of these developments, the Natural Increase Rates are very diverse in all populations; most tend to decrease by the end of the study while keeping their unique characteristics.

The aforementioned population ageing is accompanying all these developments. This problem is intense in all populations; however, the variability is again high. The same happens with the age dependency ratio and the analogy of women per 100 men.

Generally speaking, most of the time, the insular populations significantly differ from the national ones they come from. One of the most common findings is that these populations cluster closely with geographically remote ones. That is one of the specificities of the demographic regimes in the Mediterranean Basin. However, such a finding does not indicate that the same factors acted on different populations in precisely the same way and produced similar demographic results. In other words, this article does not claim that similar factors caused similar effects in different populations. It is evident that complex human societies, especially those in such an extended geographical space, will retain many peculiarities, and that is why the various local, regional, national, and supranational factors affect their demographic characteristics. This issue needs further study to elucidate the analogies, similarities, and differences between populations and their effect on demographic behaviour and population dynamics. That is, therefore, an open issue for further research.

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