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RESEARCH ARTICLE

The Spatial Dimension of Life Expectancy at Birth and at Age 65 in Attica, 2014-2020

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Abstract

Although the literature on the spatial dimension of social inequality in Attica and on mortality trends in Greece is extensive, studies investigating the spatial variation in life expectancy at birth and at age 65 within the Region of Attica are rare. The primary purpose of this paper is to examine whether there is spatial variation in life expectancy at birth and at age 65 across the Regional Units of Attica from 2014 to 2020, covering a significant period of the economic crisis of the 2010s and the first year of the COVID-19 pandemic. The novelty of this study lies in examining two basic indicators of quality of life in Attica, a Region of Greece that has been little studied and that presents significant socioeconomic differences. Based on previous literature, the main hypotheses are that variation in life expectancy at birth aligns with variation in socioeconomic status and that the COVID-19 pandemic mainly affected older men living in disadvantaged areas. Analysis of microdata from the Hellenic Statistical Authority and Eurostat data confirmed that inequality in life expectancy at birth aligns with socioeconomic inequality in Attica. More specifically, the findings showed that in the poor areas of Western Attica, life expectancy at birth was clearly lower than in the affluent areas of North and South Athens. Also, in the aforementioned poor areas, the gender gap in life expectancy at birth is significantly greater than in the affluent areas of Athens. Finally, findings from the first year of the COVID-19 pandemic show that losses in life expectancy are particularly high among people aged 65 and older.

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Introduction

The administrative Region of Attica in 2021 accounted for 35% of the country's population [1], making it the most populous region of Greece, including the country's capital, Athens. It consists of

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eight regional units, as shown in figure 1. These are Central Athens, including the homonymous city and North (Voreios Tomeas Athinon) and South Athens (Notios Tomeas Athinon), on either side of Central Athens. To the west lies the West Athens, and to the southeast, the South Athens (Notios Tomeas Athinon). Between them is the Piraeus regional unit. This urban complex is surrounded by the Western (Dytiki) and Eastern (Anatoliki) Attica, as well as by the Islands of Attica. Substantial differences exist among these areas regarding demographics [2] and socioeconomic development [3] (Figure 1).

It is characteristic that the natural growth rates of Central Athens and Piraeus were negative in the 2000s and 2010s. On the contrary, it was positive in North Athens, West and Eastern Attica [2]. The complex nature of the natural growth rate indicates demographic disparities in mortality and fertility, and it is indirectly influenced by the migration of young couples to peri-urban zones (As in Eastern Attica) [2].

In social terms, Maloutas [3] gives us a clear picture of the spatial dimension of social inequality in the Attica Region. More specifically, data from 2011 (Which hardly differ from those

Figure 1 Regional units of Attica.
Source: https://www.patt.gov.gr/, and own elaboration.

from 1991 and 2001; see also [4]) show that the "high socio-professional categories" are overrepresented in the Regional Units of North and South Athens. Also, the "working classes" are overrepresented in the Western Sector of Athens and West Attica, while "mixed social areas" are those of Central Athens and Piraeus, where there is "vertical social differentiation" with the highest socio-professional classes and the natives residing in the upper floors of apartment buildings and the working classes and immigrants to live in the apartments of the lower floors. To provide a more complete picture of Attica's social profile, special mention should be made of populations with a migrant background. After all, migration over the last thirty years (Mainly from the Balkans and the Middle East) played a key role in shaping Attica as a multicultural metropolis. More specifically, in 2021, 9% of Attica's population held non-Greek citizenship. However, the differences across Regional Units were very significant: in the Central Sector of Athens (With the most considerable population weight) and in Western Attica, in 2021, 16% and 9.2% of the population, respectively, had foreign citizenship. In contrast, in the Northern Sector of Athens, the percentage of foreigners in the total population was only 4.6% [5]. Additionally, focusing on the Central Sector of Athens, which has the largest concentration of immigrants, it should be noted that the percentage of immigrants with a tertiary education degree is only 12.3% [5]. In contrast, among residents of Greek citizenship in the same Regional Unit, it is 30.6% [5]. The literature shows that educational level is positively related to life expectancy at birth [6], while it should be noted that the academic level also determines the employment of both population groups: in 2011, 89.5% of Greek citizens of Attica worked either in the tertiary sector or as employers [3]. In contrast, among immigrants, this percentage was close to 63.4% [3].

According to the existing literature, in areas with higher income [7] and educational levels, a

lower percentage of the immigrant population, and higher land coverage in green urban areas [8], the health-related quality of life was higher (e.g., Northern Sector of Athens) than in areas with the opposite situation (e.g., Western Sector of Athens). In summary, the populations of North and South Athens enjoy the best socio-economic conditions within Attica, while West Athens and West Attica have the most degraded areas.

Moreover, international literature has shown that the COVID-19 pandemic exacerbated pre-existing within-country inequalities [9-12] in terms of life expectancy, and that the social group most affected was older men living in disadvantaged areas [10,13].

Given this, the paper aims to investigate whether the spatial dimension of social inequality in Greece's capital [14] follows the spatial dimension of inequality in life expectancy at birth, and additionally, whether the COVID-10 pandemic impacted different age and social groups, and both genders equally [15-17]. More specifically, the main aim of this study is to identify the differences in life expectancy at birth and at age 65 between the Regional Units (NUTS 3) of Attica during the period 2014-2020, and especially to identify their spatial and temporal differences 1) during the period 2014-2019 and 2) during the first year of the COVID-19 pandemic (2020). Ideally, one could develop a statistical model to investigate the relationships between observed life expectancy and various socio-economic parameters. Unfortunately, the results of the survey on the economic and social situation of households conducted by the Hellenic Statistical Authority and available to us are not statistically significant at the NTHTS3 level. For this reason, in the following discussion, the results of the demographic analysis will be presented in the context of other already published studies, in the absence of alternative solutions.

This study constructs life tables using death and population microdata from the Hellenic Statistical Authority (ELSTAT) and Eurostat data.

The paper is structured as follows. As the Attica Region is an integral part of the Greek territory, section 2 will briefly discuss the mortality transition across the country. Section 3 presents the data and the method applied. Finally, section 4 presents the results, and in conclusion (Section 5), the results are interpreted, and the limitations of this study are noted.

A brief discussion of mortality transition in Greece

Trying to identify the causes of the different mortality trends in Greece by period, the mortality transition that took place up to 2010 is apparently due to what Zafeiris and his colleagues [17] call "enormous developments in the economic, political, and social characteristics of Greece". However, this developmental course was violently interrupted with the economic crisis of 2008 [18]. Phenomena such as austerity policies, cuts in the public health system, and social security, as well as the rapid increase in unemployment and poverty, led to the deterioration of the health of the population with several effects, for example, the exacerbation of depression and anxiety [18]. The period of the COVID-19 pandemic could be said to have added another factor to the deterioration of the health of the population, which contributed decisively to the further increase in mortality (“excess mortality”) [19].

Worldwide, the impact of the COVID-19 pandemic on life expectancy at birth (As this study includes 2020) was tremendous. The literature shows a decrease in life expectancy at birth. According to the studies by Aburto and his colleagues [20] and by Strozza and his colleagues [21], life expectancy at birth for women and men decreased in 27 of the 29 countries studied (the

only exceptions being Norway and Denmark). It should be noted, however, that the decrease in life expectancy was more significant among older men [13], particularly in deprived areas, e.g., poorer countries such as Bulgaria and Lithuania [20]. The losses were also significant in the United States compared to Western European countries, with vast effects on the poor social strata of Hispanic and Black Americans [22].

Data and Methods

For the purposes of this article, and in order to calculate life expectancy at birth (e_0) and at age 65 (e_{65}), we constructed life tables (Per five-year age group) separately for each year, for the two genders of the Greek and Attica populations, for each Regional Unit and for the whole of Greece. Subsequently, from the resulting life tables, we derived the corresponding values for life expectancy at birth and at age 65. They used the most recent available death microdata from the Hellenic Statistical Authority (ELSTAT) and population data from Eurostat. Regarding the choice of the period 2014-2020, this was also done for two reasons: first, the administrative division of Attica before 2014 was different, and matching deaths and age-group populations to the new administrative division was impossible. Second, the data on fatalities were available until 2020, when we received them from the Hellenic Statistical Authority, so we were limited to the analysis of only the first year of the COVID-19 pandemic.

In order to present the spatial variation of life expectancy at birth and at age 65 in the Region of Attica, analysis was done at the level of Regional Units. That is, at level NUTS 3. The Attica Region includes eight Regional Units (Figure 1): 1) "Kentrikos Tomeas Athinon" (Central Athens Regional Unit), 2) "Notios Tomeas Athinon" (South Athens Regional Unit), 3) "Voreios Tomeas Athinon" (North Athens Regional Unit), 4) "Dytikos Tomeas Athinon" (West Athens Regional Unit), 5) "Peiraias" (Piraeus Regional Unit), 6) "Nisoi Attikis" (Islands of Attica Regional Unit), 7) "Dytiki Attiki" (West Attica Regional Unit), 8) "Anatoliki Attiki" (East Attica Regional Unit). However, because in the Eurostat's database the data of Regional Units "Peiraias" and "Nisoi" are given grouped, analysis is based on seven Regional Units: 1) "Kentrikos Tomeas Athinon", 2) "Notios Tomeas Athinon", 3) "Voreios Tomeas Athinon", 4) "Dytikos Tomeas Athinon", 5) "Peiraias, Nisoi", 6) "Dytiki Attiki", 7) "Anatoliki Attiki". The reasons why we chose to analyse spatial variations in life expectancy at birth and at age 65 at the NUTS 3 level are, on the one hand, that this is the smallest administrative division available in the Eurostat databases, and on the other hand, because the socioeconomic and demographic differences between the Regional Units cover the aim of this research. Furthermore, we chose to examine socio-economic disparities within the Attica Region along spatial dimensions, following the example of bibliographic sources such as the article by Hang and colleagues on South Korea [10].

It should be noted that this is the first presentation of the research results, which will be expanded in the future by decomposing differences in life expectancy by cause of death.

Results- life expectancy at birth

The temporal changes in life expectancy at birth in Attica showed that the existing mortality regimes are dichotomic in both genders. Piraeus (Peiraias, Nisoi) and Western Attica mortality is always higher than the country's entire population. On the contrary, the lowest mortality is in Northern Athens (Voreios Tomeas Athinon), followed by Central Athens (Kentrikos Tomeas), Southern Athens (Notion Tomeas), and Eastern Attica (Anatoliki Attiki). Despite the significant fluctuations, Western Athens is close to Greece's population (Figure 2).

After comparing 2019 with 2014, it seems that life expectancy at birth increased (Table 1),

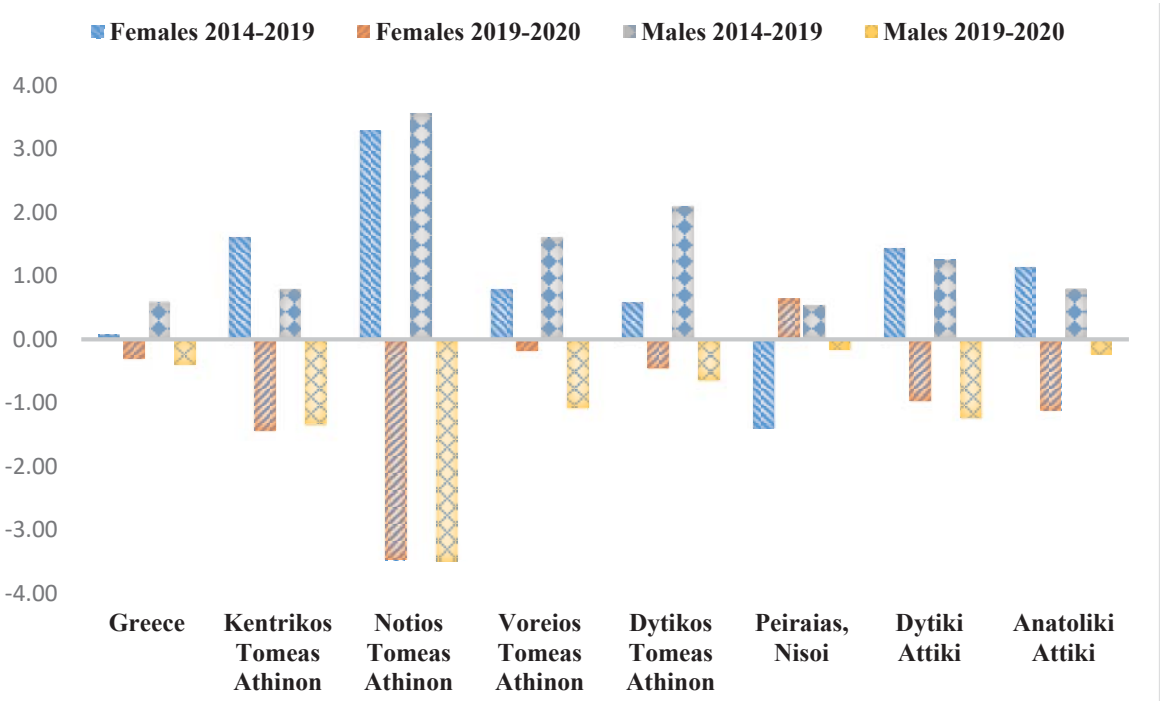

Figure 2 Changes in life expectancy at birth (in percentage, %) between 2014-2020, and between 2019-2020. Men and women, Greece and regional units of Attica.
Source: Own elaboration from Hellenic Statistical Authority (ELSTAT) and eurostat database.

and in fact, in the Regional Unit of the Southern Sector of Athens by 2.89 years for women and 2.85 years for men. The only exception is women in the Regional Unit of Piraeus-Islands, where life expectancy at birth decreased by 1.16 years. However, the diversity in average longevity gains is high. However, a spatial distribution of e0 gains between these years is unclear, especially in males. In females, besides Notios Tomeas Athinon, Voreios Tomeas but also Dytikos Tomeas benefit more (Table 1).

2020 is associated with the onset of the COVID-19 pandemic, and the impact on life expectancy at birth is clear. Initially, men and women observed decreased life expectancy at birth (Figure 2), except for the Piraeus-Islands Regional Unit (Figure 2, table 1). Among women, the Regional Units with the most significant decrease in life expectancy at birth were those of the South (-3.06 years) and the Central Sector of Athens (-1.17 years), while among men, the results were similar, with a decrease of 2.9 and 1.07 years, respectively (Figure 2, table 1). Once again, any spatial pattern is not clear.

Despite that, the gender differences in life expectancy at birth bear a more spatial character (Table 2). They are lowest in Anatoliki Attiki and clearly higher in the Dytikos Tomeas Athinon and in Piraeus-Islands. Viewed in a diachronic perspective, the gender differences decreased between 2014 and 2020 both for Greece as a whole and in four of the seven Regional Units of Attica (Table 2).

Results- life expectancy at age 65

Turning to life expectancy at age 65-that is, among older age groups-we observe equally significant findings. First, women consistently have a clearly higher life expectancy than men in older age groups as well (Table 3). In addition, as with life expectancy at birth discussed earlier, life expectancy at age 65 increased during the 2014-2019 period, although with clear spatial-i.e., socio-economic-disparities: affluent areas

Table 1: Life expectancy at birth. Greece and regional units of Attica 2014-2020.

Females									
	Year							Changes (in years)	
	2014	2015	2016	2017	2018	2019	2020	2014-2019	2019-2020
Greece	83.96	83.61	83.86	83.74	84.27	84.02	83.77	0.06	-0.25
Kentrikos Tomeas Athinon	84.81	84.19	84.94	84.69	85.13	86.19	84.95	1.38	-1.24
Notios Tomeas Athinon	85.13	84.29	84.35	85.52	84.88	88.02	84.96	2.89	-3.06
Voreios Tomeas Athinon	85.43	85.24	85.58	85.58	85.41	86.11	85.96	0.68	-0.15
Dytikos Tomeas Athinon	84.07	86.17	84.17	83.55	84.37	84.56	84.18	0.49	-0.38
Peiraias. Nisoi	83.5	82.46	82.68	82.76	83.19	82.34	82.87	-1.16	0.53
Dytiki Attiki	82.25	82.95	82.47	82.58	83.14	83.44	82.64	1.19	-0.8
Anatoliki Attiki	84.32	84.46	84.51	84.36	85.15	85.29	84.34	0.97	-0.95
Males									
	2014	2015	2016	2017	2018	2019	2020	2014-2019	2019-2020
Greece	78.6	78.37	78.73	78.67	79.12	79.06	78.75	0.46	-0.31
Kentrikos Tomeas Athinon	79.73	78.61	79.18	79.48	79.68	80.36	79.29	0.63	-1.07
Notios Tomeas Athinon	80.03	79.01	79.41	80.85	80.37	82.88	79.98	2.85	-2.9
Voreios Tomeas Athinon	80.8	80.98	81.39	81.39	81.56	82.09	81.21	1.29	-0.88
Dytikos Tomeas Athinon	78.07	78.41	78.35	78.67	78.96	79.7	79.19	1.63	-0.51
Peiraias. Nisoi	77.31	76.79	78.06	77.64	77.39	77.72	77.6	0.41	-0.12
Dytiki Attiki	76.71	76.69	77.53	76.99	78.14	77.67	76.72	0.96	-0.95
Anatoliki Attiki	80.84	79.66	80.7	80.5	81.59	81.48	81.29	0.64	-0.19

Source: Own elaboration from Hellenic Statistical Authority (ELSTAT) and eurostat database.

Table 2: Gender differences in life expectancy at birth. Greece and regional units of Attica 2014-2020.

	2014	2015	2016	2017	2018	2019	2020
Greece	5.36	5.24	5.13	5.07	5.15	4.96	5.02
Kentrikos Tomeas Athinon	5.08	5.58	5.76	5.21	5.45	5.83	5.66
Notios Tomeas Athinon	5.1	5.28	4.94	4.67	4.51	5.14	4.98
Voreios Tomeas Athinon	4.63	4.26	4.19	4.19	3.85	4.02	4.75
Dytikos Tomeas Athinon	6	7.76	5.82	4.88	5.41	4.86	4.99
Peiraias. Nisoi	6.19	5.67	4.62	5.12	5.8	4.62	5.27
Dytiki Attiki	5.54	6.26	4.94	5.59	5	5.77	5.92
Anatoliki Attiki	3.48	4.8	3.81	3.86	3.56	3.81	3.05

Source: Own elaboration from Hellenic Statistical Authority (ELSTAT) and eurostat database.

in the Southern Sector of Athens experienced an increase of approximately 2.7 years, while disadvantaged areas in the Western Sector of Athens saw a much smaller increase of just 0.38 years (Table 3).

Moving to the year of the COVID-19 pandemic, 2020, the first point to highlight is that it was associated with a decline in life expectancy at age 65 in nearly all Regional Units of Attica (Table 3). This decline was clearly more pronounced among men, but not necessarily in the most disadvantaged areas: The Regional Unit with the greatest drop in life expectancy was, in fact, the affluent Southern Sector of Athens (Table 3).

Furthermore, table 4 shows that gender disparities widened during the COVID-19 period in four out of the seven Regional Units of Attica, including the poorest ones (West Attica and the Western Sector of Athens). This finding supports the aforementioned international literature, which suggests that the pandemic disproportionately affected older men living

Table 3: Life expectancy at age 65. Greece and regional units of Attica 2014-2020.

Females									
	Year							Changes (in years)	
	2014	2015	2016	2017	2018	2019	2020	2014-2019	2019-2020
Greece	21.52	21.13	21.15	21.24	21.74	21.53	21.25	0.01	-0.28
Kentrikos Tomeas Athinon	22.79	22.15	22.8	22.61	22.98	24.01	23	1.22	-1.01
Notios Tomeas Athinon	22.28	21.85	22.02	22.44	22.63	24.98	22.31	2.7	-2.67
Voreios Tomeas Athinon	22.63	22.41	22.87	22.93	22.24	23.08	23.05	0.45	-0.03
Dytikos Tomeas Athinon	21.69	23.98	21.76	21.3	21.8	22.07	22	0.38	-0.07
Peiraias. Nisoi	21.22	20.39	20.77	20.88	20.87	20.89	20.89	-0.33	0
Dytiki Attiki	20.57	20.17	20.78	20.27	21.02	20.98	20.71	0.41	-0.27
Anatoliki Attiki	21.89	21.52	21.78	21.69	22.49	22.5	21.9	0.61	-0.6
Males									
	2014	2015	2016	2017	2018	2019	2020	2014-2019	2019-2020
Greece	18.58	18.32	18.74	18.51	18.95	18.86	18.45	0.28	-0.41
Kentrikos Tomeas Athinon	19.71	19.07	19.78	19.86	19.85	20.66	19.76	0.95	-0.9
Notios Tomeas Athinon	19.53	18.75	19.12	19.81	19.36	21.68	19.37	2.15	-2.31
Voreios Tomeas Athinon	19.89	20.25	20.4	20.46	20.83	20.92	20.2	1.03	-0.72
Dytikos Tomeas Athinon	18.06	18.13	18.59	19.02	18.93	18.93	18.63	0.87	-0.3
Peiraias. Nisoi	17.9	17.12	18.44	17.76	17.95	18.25	18.05	0.35	-0.2
Dytiki Attiki	17.62	17.96	18.35	17.21	19.16	17.59	16.97	-0.03	-0.62
Anatoliki Attiki	20.14	19.38	20.03	19.87	20.95	20.49	20.5	0.35	0.01

Source: Own elaboration from Hellenic Statistical Authority (ELSTAT) and eurostat database.

in disadvantaged areas. From a diachronic perspective, the picture is mixed: Between 2014 and 2020, gender differences in life expectancy at age 65 decreased for Greece as a whole and in three Regional Units of Attica, yet increased in four others (Table 4).

Finally, figures 2,3 clearly illustrate that both the increase in life expectancy between 2014 and 2019 and the decrease between 2019 and 2020 were proportionally much greater among the elderly. This indicates that older age groups are significantly more affected than younger ones by changes-whether socio-economic developments or public health crises-with either a positive or negative impact.

Discussion and Conclusion

This study explores the spatial dimension of life expectancy at birth and at the age 65 in the Attica Region from 2014 to 2020. The literature shows that there is a strong positive relationship between socioeconomic status and health-related quality of life [8]. The results supported this finding: although the North and South Sectors of Athens have historically had the highest life expectancies at birth for both women and men, the East Sector has an equally high life expectancy at birth in some years. This finding should be related to the fact that since the early 2000s, a movement of affluent population groups towards the suburban areas of Attica has been observed [14]. Suffice it to mention that the population of the Regional Unit of East Attica increased from 403,918 inhabitants in 2001 to 516,549 in 2021, that is, it experienced an increase of 28% [5]. Accordingly, the population of the Municipality of Athens decreased from 789,166 residents in 2001 to 643,449 in 2021, i.e. it experienced a decrease of 28.5% [5]. Finally, it should be noted that for both men and women, the Regional Unit with the lowest life expectancy at birth was West Attica, confirming once again the literature [8]. At the same time, life expectancy at birth and at the age 65 during the COVID-19 pandemic (2020) are

Table 4: Gender differences in life expectancy at age 65. Greece and regional units of Attica 2014-2020.

	2014	2015	2016	2017	2018	2019	2020
Greece	2.94	2.81	2.41	2.73	2.79	2.67	2.8
Kentrikos Tomeas Athinon	3.08	3.08	3.02	2.75	3.13	3.35	3.24
Notios Tomeas Athinon	2.75	3.1	2.9	2.63	3.27	3.3	2.94
Voreios Tomeas Athinon	2.74	2.16	2.47	2.47	1.41	2.16	2.85
Dytikos Tomeas Athinon	3.63	5.85	3.17	2.28	2.87	3.14	3.37
Peiraias. Nisoi	3.32	3.27	2.33	3.12	2.92	2.64	2.84
Dytiki Attiki	2.95	2.21	2.43	3.06	1.86	3.39	3.74
Anatoliki Attiki	1.75	2.14	1.75	1.82	1.54	2.01	1.4

Source: Own elaboration from Hellenic Statistical Authority (ELSTAT) and eurostat database.

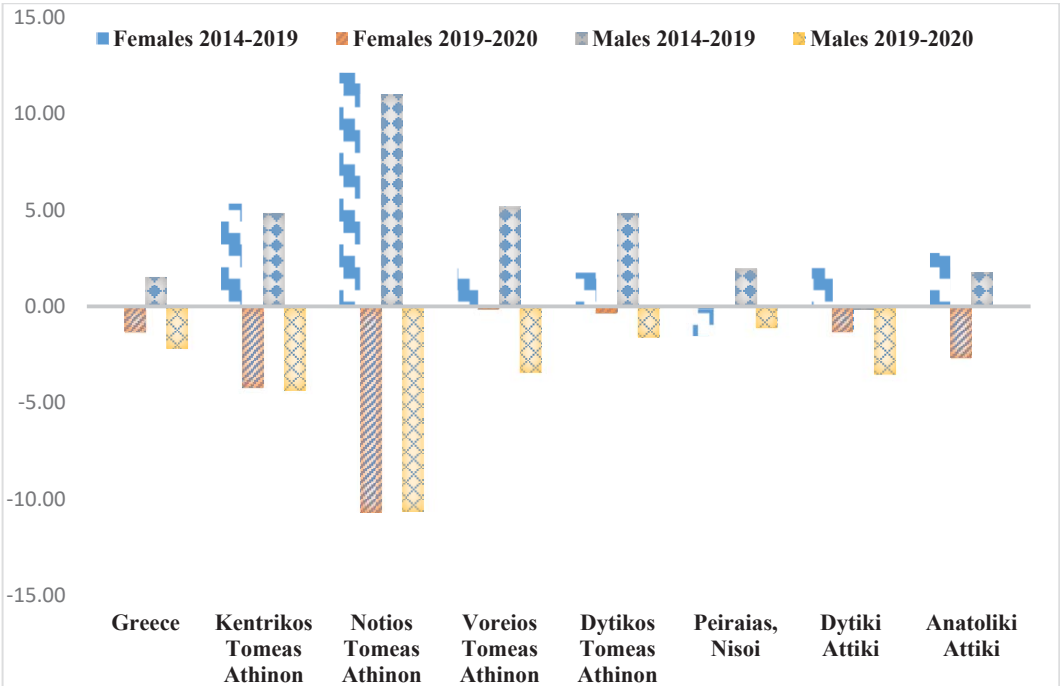

Figure 3 Changes in life expectancy at age 65 (in percentage, %) between 2014-2020, and between 2019-2020. Men and women, Greece and regional units of Attica.
Source: Own elaboration from Hellenic Statistical Authority (ELSTAT) and eurostat database.

lower than that of the previous period (2019) in almost all Regional Units of Attica for both men and women. This confirms the international literature showing that life expectancy has decreased in wealthy and poor contexts [20]. However, it should be noted that the decline in life expectancy at age 65 was greater among men, further confirming previous findings [13].

Additionally, was there any spatial pattern according to the socio-economic background of the populations studied for the e0 and e65 losses in the first year of the pandemic? One could suspect that the poorer areas could suffer the heavier effects. However, this did not happen. A possible explanation for this finding is that the determining factors in the spread of the coronavirus and mortality internationally were population density [23,24] and mobility [25], which last concerns more affluent social strata.

Moreover, according to the literature [10,26,27] during the pandemic COVID-19 (2020), men had a greater loss of life expectancy

at birth and at age 65 than women. These findings are confirmed by our results, given that in Greece as a whole, the decrease in life expectancy at birth between 2019 and 2020 was more significant for men. Looking at the literature, the explanations given relate either to the, in any case, higher mortality rates of men, or social aspects of gender (e.g., greater likelihood of smoking under the conditions of social isolation and less handwashing among men compared to women) [27], or even for biological reasons (Women's immune systems are superior to those of men) [26].

Furthermore, it is necessary to make a reference to the gender gaps in life expectancy at birth and at age 65, because there is spatial differentiation. In Regional Units of East Attica, South and North Athens the gender gaps are significantly smaller than in Regional Units of West Attica and Piraeus and Islands. We could relate this trend to the literature which shows that the gender gap in life expectancy is greater in degraded environments because in these environments the probability of men being smokers, obese or alcoholics is significantly higher [28].

Finally, as previously mentioned, the fact that, proportionally, both the increase in e65 between 2014 and 2019 was more pronounced than that at e0, as well as the sharper decline between 2019 and 2020, can be attributed to the fact that older age groups are significantly more affected than younger ones by changes-whether socio-economic developments or public health crises-with either a positive [29] or negative [30] impact.

This study has some limitations. The most important of these is that we were unable to extend the study period from 2000 to 2020, as was originally planned. The reason we limited ourselves to the period 2014-2020 was that before 2014, the administrative division in Attica was different, and therefore the distribution of population and deaths in the various administrative units of the capital. This deprived us of the opportunity to investigate the spatial dimension of life expectancy in Attica before the onset of the economic crisis of the 2010s. Furthermore, the available data was up to the year 2020 when we received it from the Hellenic Statistical Authority and this did not allow us to study either the second year of the pandemic (2021) or the post-pandemic period. Nevertheless, this study is one of the few that have studied mortality in Attica, and especially during the pandemic COVID-19 and in relation to socioeconomic factors. The issue of the relationship between mortality and socioeconomic factors becomes even more interesting when we refer to Attica after the onset of the 2008 Economic Recession. It is noteworthy that in 2019 the Attica Region was second to last in terms of life expectancy at birth among the thirteen Regions of Greece, for both men and women [1]. This is a result of the social and environmental degradation that has occurred across the country and, especially, in the capital of Greece over the last fifteen years [31]. This degradation is also reflected in the health sector: for example, across the country, the number of surgical day care services decreased from 2.61 per hundred thousand inhabitants in 2017 to 1.72 in 2021 [1]. Moreover, the number of hospital beds in Attica decreased from 2009 to 2019 by 21.5% [1]. Of course, the health sector also has socioeconomic dimensions if we take into account the fact, for example, that in 2020 in Greece the chances of a workplace accident were 60% greater for immigrants [1]. In summary, we would say that the spatial dimension of e0 and e65 in a Region with acute socioeconomic differentiations [32] is a key issue, and indicates targeted social policies to improve living conditions and reduce the socio-economic gap between the Regional Units of Attica, which has widened since the onset of the Economic Recession of 2008 [32]. Indicatively, health policies are required that reverse the precedent of the period of the economic crisis

from 2008 onwards, namely policies to increase spending in the health sector, policies to strengthen sports infrastructure and promote better nutrition at young ages, continuation of interventions to reduce pollution emissions and upgrading the aging road network in a country with a high number of road accidents.

In closing, we should point out that the findings of this research are not only of local interest, such as the social differentiation in the field of mortality in Attica, but of broader interest: the fact that during the pandemic COVID-19 e0 and e65 decreased more in areas with high population density and affluent populations constituted a crack in key aspects of globalization such as rapid urbanization and increased human mobility. Therefore, the results of the pandemic could be an occasion for a discussion around a new spatial planning of cities and a different organization of economic activity. With regard to regional policy in Attica, we hope that the findings of this article will serve as a catalyst for meaningful interventions in health infrastructure, particularly in the direction of alleviating acute socioeconomic disparities. After all, it is widely recognized that the primary instrument available to institutions for curbing socioeconomic inequalities is social policy.

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