

ORIGINAL RESEARCH

Population aging from 1950 to 2010 in seventeen transitional countries in the wider region of South Eastern Europe

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Abstract

Aim: Population aging has profoundly reshaped demographic landscapes in all South Eastern European (SEE) countries. The aim of this study was to provide a thorough comparative inter-country assessment on the speed of population aging in the entire SEE region for the period 1950-2010.

Methods: Descriptive observational analysis of long-term trends on core primary and composite indicators of population aging across seventeen countries of the wider SEE region, with panel data sets at a national level.

Results: During the past six decades, the entire SEE region has experienced a rapid increase in the median age (from 25.2 years in 1950 to 37.9 years in 2010), with a simultaneous fall of fertility rates for two children per woman (from 3.55 children per each childbearing woman in 1950 to 1.49 in 2010), coupled with significant rise in the population of elderly citizens. The speed of population aging has vastly accelerated (with a 2.5 fold increase) over the past three decades. The percentage of individuals over 65 years has doubled from 7% in 1950 to 14% in 2010.

Conclusion: Complex national strategies are needed to cope with the shrinking labour force coupled with the growing proportion of the older population. With all likelihood, population aging will further accelerate in the near future. This profound long-term demographic transition will threaten financial sustainability of current health systems in all SEE countries.

Keywords: aging, demography, population; primary indicators; South Eastern Europe; syncretic indicators, trend.

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Introduction

According to the most realistic official forecasts scenario, global population aging will accelerate. The profound demographic transformation of contemporary societies started almost a century and a half ago in most of the developed nations (1). Surprisingly, this phenomenon is currently moving from rich industrial north to the most emerging markets of the southern hemisphere. The aging of developing nations occurs at a far greater speed. For increasing the proportion of people over 60 years from 7% to 14%, it will take China only 26 years, whereas the same process in France occurred over 115 years (2). To date, most of global aging in absolute terms, by far and large, has occurred in more developed regions with enormous social and economic consequences (3).

The wider South Eastern Europe (SEE) presents a myriad of societies in diverse ethno-religious traditions, prevailing lifestyle patterns and income levels (4). For the purpose of providing a comprehensive insight into the evolution of population aging in this region, a total of seventeen countries were examined in the region's broadly accepted geographical boundaries.

There is a significant gap in regional knowledge on population aging and its consequences in the broader Eastern European region including the Balkan peninsula (5).

The aim of this study was to describe the long-term aging trends and identify the serious aging-related public health challenges in the upcoming decades. The main hypothesis was that speed of population aging and stages of demographic transition differ substantially among the individual nations.

Methods

This was a descriptive retrospective trend analysis conducted on complex national level datasets within 1950-2010 time spans.

The data collection consisted of official release of medium range estimates on core population aging indicators provided by the United Nations (UN), Department of Economic and Social Affairs, Population Division issued within the report entitled: "*World Population Prospects: The 2012 Revision related to the period 1950-2010*" (6).

Countries selected were the ones whose territory lies within geographic boundaries of SEE partially or in its entirety and which are covered by the UN's Department of Economic and Social Affairs official demographic reports. The countries observed included: Albania; Bulgaria; Hungary; Republic of Moldova; Romania; Bosnia and Herzegovina; Croatia; Italy; FYR Macedonia; Montenegro; Serbia; Slovenia; Slovakia; Cyprus; Greece; Turkey; and Ukraine.

Transitional Balkan countries were observed as a subgroup of economies whose territories reside entirely or in large parts within the geographic boundaries of the Balkan peninsula, but were centrally planned economies during the Cold War era (1945-1989): Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, the Republic of Moldova, Romania, Serbia and the former Yugoslav Republic of Macedonia (excluding of Greece and Turkey which were free market economies prior to 1989).

The time period 1950-2010 was selected for two reasons: extensive data availability as well as the fact that most local nations actually entered severe population aging in the early post World War II decades, or at the end of the 20th century (7). For the purpose of this analysis there were no missing data, because UN referral bodies provided comprehensive assessments for each nation during the observation period.

Selected indicators of population aging were defined according to the list provided in Anex I of the United Nation's Department of Economic and Social Affairs official projections entitled: "World Population Ageing: 1950-2050". Of the indicators listed, the vast majority were applied in this analysis with few minor exceptions of less relevant compound indicators. Authors had at their disposal complete availability of data for all the seventeen countries and all relevant years/five year periods within the 1950-2010 time span.

Results

Due to the rapid population growth rates in the initial decades of global demographic explosion, many nations of the wider SEE region exhibited bold gains in population size, most prominent in large countries such as Romania, Italy, Ukraine and Turkey. Top performers in terms of population growth were Turkey and Albania which even succeeded to triple their populations within these six decades (Table 1). However, the entire region has recorded profound population aging trends in terms of all the relevant indicators.

Table 1. Ground demographic indicators of population aging: Medium range estimates by the United Nations Department of Economic and Social Affairs - Population Division for 1950 and 2010

COUNTRY	Total population (both sexes, as of 1 July (millions))		Total fertility rate (children per woman)		Population growth rate (% of average annual rate of population change)		Median age of the total population (years)		Percentage of people aged 65+ years	
	1950	2010	1950-1955	2005-2010	1950-1955	2005-2010	1950	2010	1950	2010
Albania	1.2	3.2	6.1	1.8	2.7	-0.29	20.9	31.9	5.9	10.1
Bosnia	2.7	3.8	4.8	1.2	2.5	-0.2	20.0	38.6	4.0	15.1
Bulgaria	7.3	7.4	2.5	1.4	0.8	-0.8	27.3	42.4	6.7	18.3
Croatia	3.9	4.3	2.8	1.4	0.7	-0.2	27.9	41.9	7.9	17.5
Cyprus	0.5	1.1	3.7	1.5	1.4	1.3	23.7	34.2	6.0	11.6
Greece	7.6	11.1	2.3	1.5	1.0	0.1	26.0	41.8	6.8	19.0
Hungary	9.3	10.0	2.7	1.3	1.0	-0.2	30.1	39.9	7.8	16.7
Italy	46.4	60.6	2.4	1.4	0.7	0.6	28.6	43.3	8.1	20.3
Montenegro	0.4	0.6	4.0	1.7	2.2	0.1	21.6	36.3	7.4	12.5
Moldova	2.3	3.6	3.5	1.5	2.3	-1.1	26.6	35.2	7.7	11.2
Romania	16.2	21.9	2.9	1.3	1.4	-0.2	26.3	38.5	5.7	14.8
Serbia	6.7	9.6	3.2	1.4	1.5	-0.6	25.8	37.8	7.6	13.7
Slovakia	3.4	5.4	3.5	1.3	2.1	0.2	27.0	37.2	6.6	12.3
Slovenia	1.5	2.1	2.6	1.4	0.8	0.5	27.7	41.5	7.0	16.7
FYR Macedonia	1.3	2.1	4.0	1.5	1.8	0.1	21.8	36.1	7.1	11.7
Turkey	21.2	72.1	6.6	2.2	2.7	1.3	19.7	28.3	3.0	7.1
Ukraine	37.3	46.1	2.8	1.4	1.4	-0.5	27.6	39.4	7.6	15.8
Transitional*										
Mean ± SD	4.7±4.9	6.3±6.4	3.8± 1.1	1.5±0.2	1.8±0.7	-0.3±0.4	24.2±3.1	37.6±3.3	6.7±1.3	13.9±2.81
Range	0.4-16.2	0.6-21.9	2.5-6.1	1.2-1.8	0.7-2.7	-1.1-0.1	20.0-27.9	31.9-42.4	4.0-7.9	0.1-18.3
Wider SEE										
Mean ± SD	10.0±13.4	15.6±22.1	3.6± 1.3	1.5±0.2	1.6± 0.7	0.01±0.6	25.2±3.3	37.9±4.0	7.0±1.0	14.0±4.0
Range	0.4-46.4	0.6-72.1	2.3-6.6	1.2-2.2	0.7-2.7	-1.1-1.3	19.7-30.1	28.3-43.3	3.0-8.1	7.1-20.3

* Transitional Balkan countries were considered the following countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, the Republic of Moldova, Romania, Serbia and the Former Yugoslav Republic of Macedonia.

All countries have experienced rapid increase in median age (from 25.2 in 1950 to 37.9 in 2010), with a simultaneous fall of fertility rates for two children per woman (from 3.55 children per each childbearing woman in 1950 to 1.49 in 2010). Population growth rate decreased steadily even among the youngest nations of the region from 1.6 in 1950 to 0.01 in 2010. Crude death rates followed the general pattern of improved mortality-based indicators in all countries with a decrease from 13 (per 1000 population) in 1950 to 11 in 2010. Old-age dependency ratio increased from 10.6 in 1950 to 20.9 in 2010. Furthermore, the potential support ratio decreased from 9.9 in 1950 to 5.1 in 2010.

Life expectancy increased substantially: at birth (about 15 years 1950-2010) and ages over 60 (four years increase during 1950-2010) and 80 (1.8 years increase during 1950-2010) (Table 2).

Table 2. Dependency and support indicators of population aging and life expectancies in key age groups: Medium range estimates by the United Nations Department of Economic and Social Affairs - Population Division for 1950 and 2010

COUNTRY	Old-age dependency ratio (individuals 65+ per 100 people aged 15-64 years)		Potential support ratio (individuals aged 15-64 per population 65+ years)		Life expectancy at birth [both sexes combined (years)]		Life expectancy at age 60 [both sexes combined (years)]	
	1950	2010	1950	2010	1950 -1955	2005 -2010	1950- 1955	2005- 2010
Albania	10.8	15.1	9.3	6.6	55.3	76.3	17.5	20.4
Bosnia	6.9	22.3	14.5	4.5	53.7	75.5	13.9	19.7
Bulgaria	10.1	26.8	9.9	3.7	62.1	72.9	17.4	18.5
Croatia	12.1	26.1	8.3	3.8	61.3	76.1	14.4	20.0
Cyprus	10.1	16.4	9.9	6.1	66.7	79.0	17.6	21.4
Greece	10.5	28.6	9.5	3.5	65.8	79.78	16.4	22.9
Hungary	11.6	24.4	8.6	4.1	64.0	73.8	16.0	19.4
Italy	12.4	30.9	8.1	3.2	66.3	81.5	17.2	24.1
Montenegro	13.2	18.3	7.6	5.5	59.8	74.2	15.5	18.9
Moldova	12.0	15.5	8.3	6.5	59.0	68.2	14.2	16.0
Romania	8.7	21.2	11.5	4.7	61.1	73.1	15.8	19.0
Serbia	11.9	19.8	8.4	5.1	59.1	73.3	15.4	18.3
Slovakia	10.3	17.0	9.8	5.9	64.5	74.7	16.7	19.4
Slovenia	10.7	24.0	9.3	4.2	65.6	78.6	15.4	22.2
FYR Macedonia	12.5	16.4	8.0	6.1	54.9	74.4	14.5	18.6
Turkey	5.2	10.6	19.3	9.4	41.0	73.4	13.3	20.0
Ukraine	11.7	22.4	8.6	4.5	61.8	67.9	16.9	17.2
Transitional*								
Mean ± SD	10.9±2.0	20.2±4.3	9.5±2.2	5.2±1.1	58.5±3.1	73.8± 2.4	15.4± 1.3	18.8±1.3
Range	6.9-13.2	15.1-26.8	7.6-14.5	3.7-6.6	53.7-62.1	68.3-76.3	13.9-17.5	16.0-20.4
Wider SEE								
Mean ± SD	10.6±2.1	20.9±5.5	9.9±2.9	5.1±1.5	60.1± 6.4	74.9±3.6	15.7±1.4	19.8±2.0
Range	5.2-13.2	10.6-30.9	7.6-19.3	3.2-9.4	41.0-66.7	67.9-81.5	13.3-17.6	16.0-24.1

* Transitional Balkan countries were considered the following countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Montenegro, the Republic of Moldova, Romania, Serbia and the Former Yugoslav Republic of Macedonia.

There was evidence of a significant rise in the elderly population, where the percentage of individuals aged over 60 years increased from 9.8% in 1950 to 19.6% in 2010, whereas the percentage of individuals aged over 80 years increased from 0.9% in 1950 to 3.1% in 2010.

Speed of aging was assessed independently in two thirty-year periods (1950-1980 and 1980-2010) using the percentage of individuals aged over 60 years in line with the methodology employed by the UN Population division in the World Population Ageing report issued in 2013.

According to the official UN estimates based on national data, the speed of population aging has vastly accelerated over the past three decades (with a percentage point increase of people over 60 years of 2.8% during 1980-2010) compared to the previous three decades (7.0% during 1950-1980). During the same period, transitional Balkan countries aged considerably faster, from 1.4% increase in the early three decades to 8.1 % increase in the past three decades.

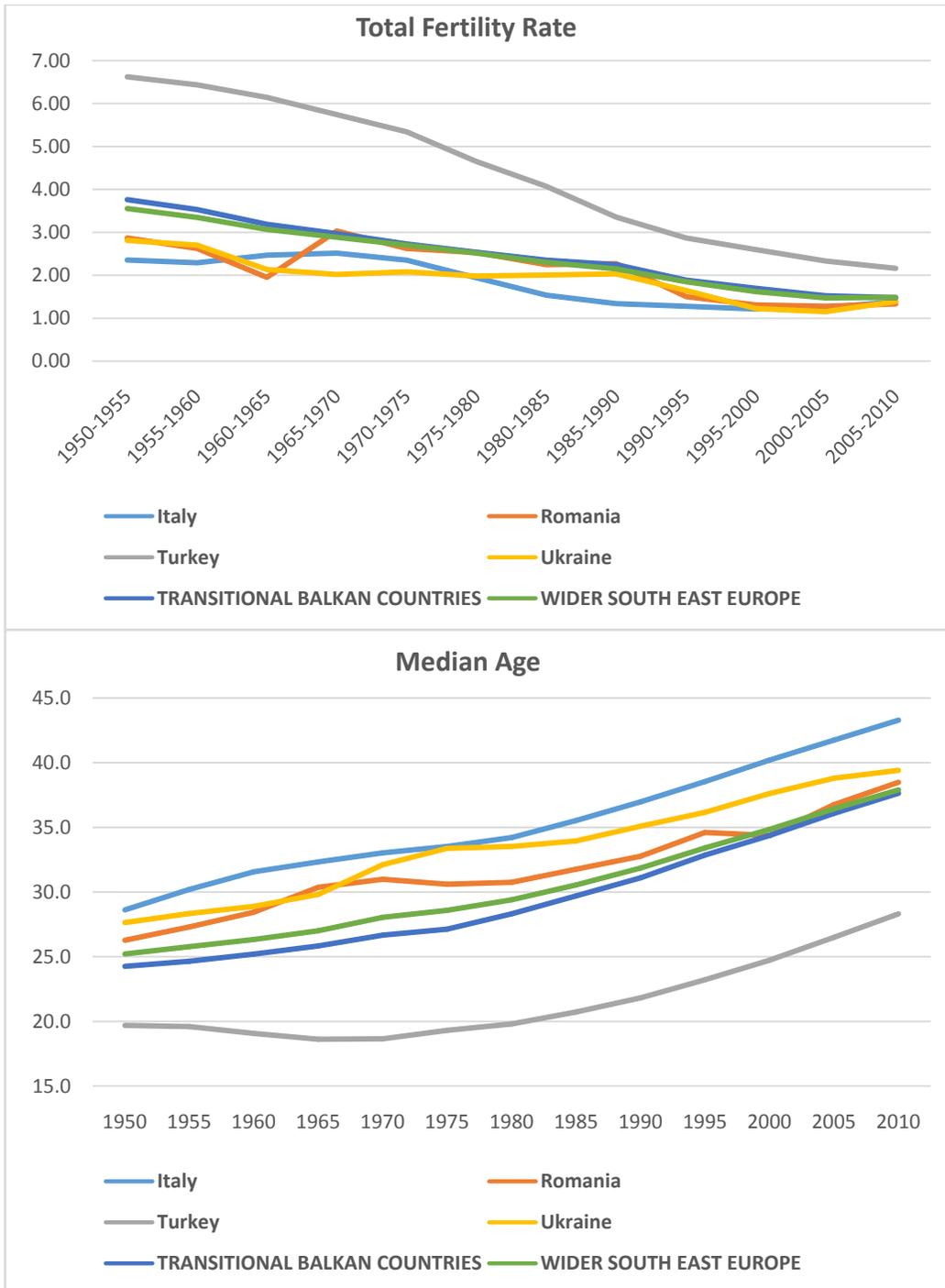
Extensive details on national estimates in five-year periods or single years during 1950-2010 time span, depending on the variable considered, are listed in Tables 1-2.

Discussion

In the early post World War II decades, many of populations in the wider SEE region were young, with high fertility rates and a rather modest longevity (8). The latter was determined by a modest literacy level and unhealthy lifestyle/behavioural factors attributable to the low socioeconomic levels of most of the countries. Higher income levels and standards of living were initially observed in Italy followed by Greece and former Yugoslavia (9) in the course of 1960s and 1970s. These countries had higher capabilities and capacities in terms of national health systems and better coverage of rural areas regarding the provision of health care services. We should revoke the fact the urbanization of Balkan societies was still developing rapidly during the second half of the 20th century. Most of the inhabitants were still living in rural communities and therefore reach of extended network of medical facilities increased the percentage of births attended by skilled personnel. In addition, the increase of youth vaccination rates and improved hygiene and availability of antibiotics significantly improved survival in the early childhood. Such changes are clearly visible in the official data provided by regional governments to the various WHO offices including the European Health for All Database. These positive developments were initially visible among the Semashko-type (10) health systems and much later in Turkey (11).

After the “baby boom” of post World War II generations, a few health policymakers anticipated the scale of the population aging that was about to come. Complex socio-cultural changes, as well as economic limitations gradually led to decreasing fertility rates among all of the nations of the region (Figure 1). An essential event giving impetus to the changes was the massive absorption of female labour force into most of the world economies. Women were getting easier access to education and consecutively had higher chances to build up a professional career path. This, in turn, led to governmental financial incentives to women for giving birth to fewer children and, instead, contribute to the community as employed citizens (12).

Figure1. Total fertility rate evolution 1950-2010 (above) and median age evolution 1950-2010 (beneath) in the wider South Eastern Europe, transitional Balkan countries and four largest countries of the region (Italy, Romania, Turkey and Ukraine)



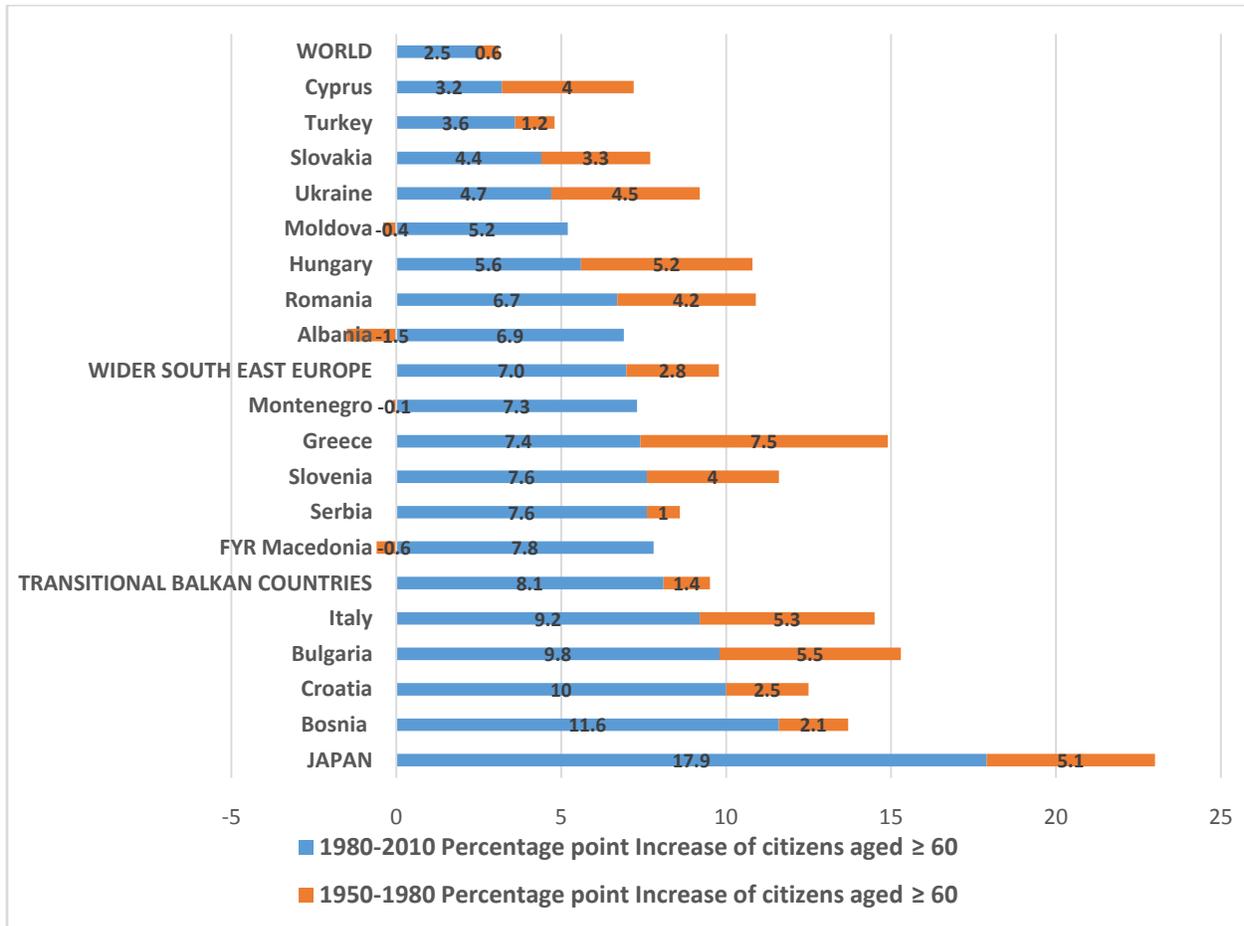
In historical terms, nations were at different stages of this demographic transition at the starting point of our observation (in 1950). Albanian and Turkish populations were quite young at the time with fertility rates above six (per woman), in Bosnia almost five, while Macedonia and Montenegro over four. All the other nations were significantly above the simple population replacement level of 2.1. Currently, after six decades, we have quite an opposite landscape across Europe. Turkey and Ireland remain among the few nations with 2.1 fertility levels. Legalized abortion procedures performed by gynaecologists had a profound impact on vulnerable fertility of Eastern European nations (13). These changes coupled with a significant rise in longevity of almost fifteen years on average in the wider SEE region have ultimately led to dramatic changes of population pyramids in all nations (14). Median age, broadly regarded as one of the most reliable indicators of population aging, has also increased as much as fifteen years (the four largest nations in the region are illustrated in Figure 1).

Speed of population aging is another core issue in this research work. Long-term perspective of six decades has allowed us to split it into two periods to observe the pace of the process across the local nations. During the initial three decades in the so called “take off” stage, there was a very slow pace and, in some countries, it has not even begun before 1980s. But, in the latter stage, the scale of the process became much more intensive providing insight into evident acceleration in most countries of the region (15) (Figure 2).

Population aging is about to remain a landmark change of our time in almost all regions of the world, with the exception of sub-Saharan Africa and a few MENA countries – including a total of eighteen countries so-called “demographic outliers” (16). This global fact is constantly increasing the workload and economic burden to the national health systems. Grounds are demanding medical needs of the elderly population (17) joined with significantly longer life expectancies among citizens aged over 60 and 80 years. The worsening of demographic balance of working age population and the elderly throughout the entire region is clearly present. Old age dependency ratio has substantially increased, whereas the potential support ratio has heavily decreased in all countries within the 1950-2010 time span. This means that dwindling tax-base of employees is about to sustain even a heavier layer of retired citizens whose pension contributions to the national social insurance funds has to be supported by the current budget revenues. The most obvious and extreme example of this phenomenon is observed in the world’s oldest large nation of Japan (18). Universal health coverage that effectively functions in the second largest global health care market has contributed to the highest attainable longevity.

Most national health systems of the region ranked substantially lower in terms of patient satisfaction, quality and accessibility of medical care in the last WHO ranking of 2000. Severe financial constraints throughout the region are worsened by macroeconomic crisis such as the case of Italy (19), Greece and Serbia (20). Such developments hampered national capacities to expand medical spending (21) and reimbursement of medicines for the retired to cover the needs of aging societies (22). Among the few truly successful options to contain the sky rocketing costs of health care without severe trade-off for quality consists of the generic replacement of brand name drugs. Governmental strategies targeted to give financial incentives to prescribers, dispensers and patients to use “copy cat” pharmaceuticals were already successfully implemented in major global markets such as the Japanese one (23). Innovative industrial manufacturers were at the same time protected from their revenue losses in order to compensate for their research and development expenses across the globe (24).

Figure 2. Speed of population aging expressed as proportion of people aged over 60 years in the entire population (percentage point increase) in two three-decade periods (1950-1980 and 1980-2010) providing clear evidence of a several-fold acceleration in most of the wider SEE countries



Another highly visible trend in regional pharmaceutical market transformation includes the prevailing domination of medicines used to treat non-communicable diseases which are very prevalent in the older age. This is the case with COPD (chronic obstructive pulmonary disease) cancer, diabetes and cardiovascular disorders whose growing share of the market size both in terms of unit dose prescription as well as value-based was recently evidenced in a regional example (25). Interestingly, the most expensive medical care is actually attributable to the patient's last year of life which is most obvious in the case of malignant disorders (26). Only a minor part of these costs might be partially contained by diverse screening and prevention strategies. National authorities have adopted different policies to cope with growing budget impacts of aging with various success stories. Regardless of an almost unbearable burden imposed by this demographic transition, some promising developments in the emerging rapidly evolving economies such as Turkey, might pose an excellent example on promising perspectives for the improved medical care for the elderly (27).

Study limitations

The far reaching process of aging of human populations in Europe dates back much earlier than 1950. Actually, earliest roots of falling fertility levels might be tracked back almost two centuries ago (28). The process itself in some Balkan nations such as Serbia began much earlier, even a century ago (29). Therefore, a minor study weakness could be considered the very time span of this study when taking into account long-term historical processes. Nevertheless, in most of the nations, population aging becomes visible in demographic statistics only during 1980s. Official data worldwide are lacking for most of the countries before 1950. Thus, authors consider the selected time horizon to be the broadest attainable within this methodological framework.

One political entity was omitted from the analysis because of lack of availability of official data although its territory resides within geographic boundaries of the wider SEE. Kosovo (UNSC 1244/99) was exempted from the analysis due to the fact that it is absent from the UN registries during the period under observation. UN estimates bear the minor risks of under- or overestimating the real life population data. Nevertheless, such assessments rely on a sound methodological framework and are most likely to reflect properly hidden demographic trends even in cases of missing data for some countries and some periods (30).

Of the overall UN Department of Economic and Social Affairs list of core indicators of population ageing, a few of them were omitted based on partial or complete lack of such data or grounds for their calculation in the UN's public demographic registries. These indicators include: the illiteracy rate, labour force participation rate, the parent support ratio and the survival rate to a specific age. Although they present a minor setback of the study design, the authors considered that these indicators would not change the demographic landscape of the aging process in any significant manner.

Inclusion of large countries such as Italy, Ukraine and Turkey whose territories rely mostly outside strict geographical boundaries bears the risk of bias. National level extrapolations refer to the entire populations of these countries living in Apennine peninsula, Eastern Europe and Asia Minor. Regardless of this fact, the aim of the paper was to depict a comprehensive image of regional population fluctuations and describe the long-term demographic transition of the respective nations.

Conclusion

Accelerated pace of population aging across the globe will have a profound echo among the rapidly developing SEE markets. Some of these nations have entered this demographic transition only in recent decades such as e.g. Albania. Other countries stand at the borderline of simple replacement fertility rates such as Turkey, which is the region's largest nation. Italian, Greek, Romanian, Hungarian and all the remaining Slavic populations have undergone these changes many decades earlier. These trends will put an additional pressure to the national health systems and the entire regional economy. The balance between working age population and the retired citizens is worsening, thus, leading to a shrinking base of tax payers. At the same time, increased longevity will increase demands for medical care and the burden to families still supporting their elderly people. Complex socioeconomic and health policy strategies will have to be adopted by regional governments to cope with probably the largest single long-term public health challenge of the 21st century.

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