Original article

Ageing in European post-communist countries – is it a threat to the welfare system?

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ABSTRACT

The aim of the study was to diagnose the current and projected pace of ageing in the societies of European post-communist countries from the point of view of its being an increasing economic burden on the economically active population. The analysis covered the years 1990–2050. Ageing is already visible and, according to the forecast, the process will accelerate even more. The old-age dependency ratio (OADR) is expected to exceed 50 in half of the countries in the study by 2050. This will result in major threats to the further development of these countries and will lead to poverty and social exclusion of the elderly. In order to slow down the ageing process, the authorities of these countries should take a number of actions, the most important of which are the implementation of an effective and efficient pro-natal policy (so that the total fertility rate would increase above 2.1), and a well-thought-out migration policy.

KEY WORDS: ageing, old-age dependency ratio, second demographic transition, European post-communist countries

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1. Introduction

The collapse of the socialist system in European states in the early 1990s triggered, or modified, a number of political, social and economic processes taking place within them (HAVRYLYSHYN, 2007; JANUŠAUSKIENĖ, 2008; KOLLMORGEN, 2013). Among the processes modified by the fall of communism is ageing of the population. This is important because, according to PUTKARADZE ET AL. (2020), political and socio-economic factors have a fundamental impact on changes in the age structure of the population of post-communist countries.

Population ageing creates great socio-economic and health problems, creating for example slower economic growth, lack of a young labour force, limited innovation within the economy, higher tax charges on working-age population, greater threat of social exclusion, or a need to allocate more funds to healthcare and social welfare (ALEKSANDROVA & VELKOVA, 2003; ANGERMANN & EICHHORST, 2012).

On the other hand, there are also positive trends; e.g., extended life expectancy curbs inflation (BRONIATOWSKA, 2019).

Ageing of the population results from an interaction of three demographic processes: fertility, mortality and migration (KÁČEROVÁ & NOVÁKOVÁ, 2016). Fertility and mortality in the analysed countries fall within the second demographic transition (SDT) (LESTHAEGHE, 2010; VAN DE KAA, 2004; ZAIDI & MORGAN, 2017), while the migration processes only partially match the SDT.

According to SDT, there should be a transition of countries from greater emigration to greater immigration. Obtaining a clear picture of these changes is difficult because the system of registering foreign migrations is imperfect, which results in a high share of unregistered migrations (see HAZANS, 2019; JURČOVÁ & PILINSKÁ, 2014; MINISTERUL..., 2018).

The aim of this study was to diagnose the current and the projected pace of ageing of the societies in the region from the point of view of it being the

cause of an increase in the economic burden on the economically active population. The following hypotheses were formulated:

1. All countries of the region are experiencing a rapid pace of population ageing, which causes a rapid increase in the economic burden on the population of working-age.
2. The analysed group of countries differs little in terms of the pace of population ageing and, simultaneously, in the increase in the economic burden on the population of working-age.

The period of the study covers the years 1990–2050 broken down into 5-year periods. For 1990–2015, they represent the number of the population. For 2020–2050, they are a demographic forecast. The spatial scope of the study covers almost all European post-communist countries except: the former German Democratic Republic (since it is currently part of Germany) and two quasi-states: the Donetsk People's Republic and the Luhansk People's Republic. For Ukraine, the population of the Autonomous Republic of Crimea and the federal city Sevastopol was included in the analysis for all periods. The population of Serbia included the population of the Republic of Kosovo. The population of the Pridnestrovian Moldavian Republic was included in that of Moldova. This is due to the assumptions made in the database used.

There are two groups of measures for the population age. The first one involves measures based on fixed thresholds determined by calendar age. These include indicators based on the age structure and indicators defining the percentage of the population considered old (KLUFVÁ & POLÁKOVÁ, 2010; SKIRBEKK ET AL., 2019). The second group involves measures of old age which take into account changes in the economic activity, health of the population and increased life expectancy at age x (HUŽVÁR & KAŠČÁKOVÁ, 2017; MUSZYŃSKA & RAU, 2012).

The old-age dependency ratio (OADR), which belongs to the first group, was applied in this article. This is the ratio of the number of elderly people at an age when they are generally economically inactive, compared to the number of people of working age. In this case, people aged 65 and over were considered elderly, and people aged 20–64 years old as economically active people. This obtained indicator was multiplied by one hundred. As a result, an indicator was obtained which provides information about the number of economically inactive people due to old age per 100 people at working age. Naturally, this is only an indicative ratio, as there are different age thresholds for retirement in different countries or the education systems function differently.

Although SANDERSON & SCHERBOV (2008) maintain that using chronological age to set the value of the old-age threshold is not a good solution, we decided to apply the OADR because it is this chronological criterion that is used when setting the retirement age threshold.

2. Data and methods

The statistical data used in the article were collected by the desk research method (CZARNIAWSKA, 2014). The basic data taken for analysis came from "World Population Prospects 2019" (UNITED NATIONS, 2019a). The medium-variant projection was adopted for the demographic forecast¹. Additionally, data contained in "Gender Statistics" (WORLD BANK, 2021) and in publications of national statistical and scientific institutions of each country of interest were used.

Commonly used indicators and statistical methods were applied in the study: range, coefficient of variation (CV), Pearson correlation coefficient (PCC). The autoregressive model (AR) was used to analyse changes in the OADR over time (REID, 2013). The model with the highest R^2 value was chosen from among the following functions: linear, logarithmic, exponentiation, exponential, polynomial (degree 2). If for all models the value of $R^2 < 0.70$, then no model was taken into account. Therefore, AR was used to show trends in the actual and predicted changes in the OADR value between 1990 and 2050, and not to construct an explanatory model. To analyse the similarity of value changes in the OADR, McQuitty's linkage analysis, the version without rotation (LANKFORD, 1974), was used. Breakdown into types was made at $PCC = 0.90$. In order to show synthetically spatial differentiation of the OADR, Moran's I in the version of adding up values in the rows of the matrix to 1 was used (MORAN, 1950).

3. Results

Before moving on to the temporal-spatial analysis of the old-age dependency ratio, it should be noted that the demographic projections were made before the COVID-19 pandemic. The emergence and the subsequent spread of this disease (DZÚROVÁ & JAROLÍMEK, 2020) may change these projections. This is because greater mortality from Covid-19 is noted among the elderly (KANG & SOOK, 2020; LEVIN ET AL., 2020; SOBOTKA ET AL., 2020).

¹The method is precisely described in "World Population Prospects 2019: Methodology of the United Nations Population Estimates and Projections" (United Nations 2019b).

Figure 1 presents the process of the estimated and the projected ageing of the population in the analysed area. Due to the large population of Russia (45.2% of the entire analysed population in 2020), this was done separately for Russia and

for other countries. It can be seen that in Russia and in other European post-communist countries the old-age dependency ratio has been growing since 1990 and will continue to grow increasingly faster.

Fig. 1. Estimated and forecasted old-age dependency ratio values (Source: United Nations, 2019a)

Using McQuitty's linkage analysis, the similarity of changes in the old-age dependency ratio between countries was examined. They all belonged to one type (with the PCC threshold of 0.90). This proves that in all the studied countries there is a similar trend in the population ageing, which results in the elderly increasing the economic burden onto people of working age.

Additional information is provided from spatial analysis of the estimated and forecasted old-age dependency ratio values at the beginning, middle and end of the period (Figs. 2–4). In 1990, the value of the OADR for Russia was 17.2, and for the other countries in total was 18.7. The diversity of the situation between countries, measured both by CV (19.4%) and the range (12.4) was average. Spatial

autocorrelation (Moran's $I=0.23$) was very small. In 2020, the projected value of the OADR for Russia was already 25.3, and for the other countries collectively was 29.8. The diversity of the situation between countries measured by CV (16.7%) decreased slightly and measured by the range it increased (17.4). Spatial autocorrelation (Moran's $I=0.08$) did not occur. According to the forecast, in 2050, the OADR for Russia will increase to 41.7, and for the other countries collectively will increase to 52.0. The diversity between countries measured by CV (13.5%) will decrease even further; on the other hand, when measured by the range, it will significantly increase (to 26.5). Spatial autocorrelation (Moran's $I=0.15$) will be very small.

Fig. 2. Old-age dependency ratio in 1990 (Source: United Nations, 2019a)

Fig. 3. Projected old-age dependency ratio in 2020 (Source: United Nations, 2019a)

Fig. 4. Projected old-age dependency ratio in 2050 (Source: United Nations, 2019a)

4. Discussion

Based on estimates and research, it can be concluded that a positive net migration rate prevails in the richer countries of the region (BOTRIĆ, 2016; DRBOHLAV & SEIDLOVÁ, 2016; JANSKÁ ET AL., 2014; VAN NIMWEGEN & VAN DER ERF, 2010; ŠPROCHA & MAJO 2016) and a negative one exists in those of average wealth and the poorer ones (CAREJA, 2013; DRBOHLAV ET AL., 2017; MARTIN ET AL., 2002; TABAC, 2018; THAUT, 2009; WHITE ET AL., 2018; PÍONTKÍVSKA ET AL., 2018). Although it is not a rich country, a positive net migration rate is also recorded in Russia – due to the immigration of ethnic Russians and economic migrants from the former USSR republics (AKTURK, 2016, LANG, 2017). Due to warfare, there

were unusual migrations in the 1990s in most of the countries of the former Yugoslavia (HARVEY, 2006, ŠANTIĆ, 2007).

Using the Human Development Index (HDI) values for 2019 (UNITED NATIONS DEVELOPMENT PROGRAM, 2020), four groups of countries were distinguished according to the socio-economic situation of their citizens:

- very good ($HDI \geq 0.900$): Slovenia, Czechia;
- good (0.850–0.899): Estonia, Lithuania, Poland, Latvia, Slovakia, Hungary, Croatia;
- average (0.800–0.849): Montenegro, Romania, Russia, Belarus, Bulgaria, Serbia;
- bad (0.750–0.799): Albania, Bosnia and Herzegovina, Ukraine, North Macedonia, Moldova.

Thus, a better situation was recorded in the countries located in the central-western and north-western part of the study area.

In some moderately rich countries, net migration is slowly improving. Poland serves as an example of this (Fig. 5), where the growing trend in the number of emigrants has slowed down while the number of immigrants is still on the increase, which

can be illustrated, for example, by the number of work permits issued. Thus, the migration changes in Poland are slowly beginning to match those described by SDT. If there had not been any emigration from Poland after 1980, then by 2015 the percentage of elderly people would have been 1.1% lower than the actual one (FIEHEL ET AL., 2018).

Fig. 5. Estimated number of temporary migrants (over 3 months) [in millions] from Poland and the number of work permits issued to foreigners in Poland [in thousands] (Source: Główny..., 2020; Ministerstwo..., 2020)

A decrease in the number of live births is an important factor causing an increase in the economic burden of people of working age, as it results in a decrease in the number of people of working age in subsequent years. All analysed countries recorded a decrease in their total fertility rate (TFR)². While in 1990 four countries ensured replacement fertility, in 2000 there were only two such countries, and there were none in 2018 (Fig. 6). It should be noted that the highest values of TFR were in countries with a high percentage of Muslims, but there were exceptions. In 2011 96.1% of the population in Kosovo were Muslim, 70.2% in Albania (KETTANI, 2020) and in 2010, there were 36.6% (EURYDICE, 2020) in North Macedonia. On the other hand, there were few Muslims in Moldova, and yet the TFR was relatively high. In Bosnia and Herzegovina, there were 51.3% Muslims (KETTANI, 2020) in 2013, and the TFR remains very low.

The reasons for the low value of TFR in these countries fall within the framework described by SDT. Namely, there were both changes in reproductive behaviours and changes in marital

status. Of course, these processes vary in intensity in individual countries (BICI & THOMO, 2018; OSIEWALSKA, 2018; ŠPROCHA ET AL., 2018).

The second important factor increasing the economic burden on people of working age is the decrease in mortality, which results in extending life expectancy, and thus in an increase in the number of people aged 65+. In the analysed countries, this process is ambiguous (Table 1). In the analysed states of the region, there are wealthy countries. Based on research conducted in Czechia and Slovakia, ŠPROCHA ET AL. (2015) formulated the view that trends in changes in mortality were similar to those recorded in Western Europe, although they are delayed. Conversely, in the countries of the former USSR, an increase in mortality was initially recorded, which can be explained by a shock after the collapse of the USSR and by an increase in behaviours considered to be bad for health (especially alcohol consumption) (BRAINERD & BUTLER, 2004). Only later did mortality decline. Although factors influencing mortality, such as health-related behaviours, resources, medical care, social structures, stress and health, etc. (CUTLER ET AL., 2006) operate in the analysed countries with varying strength, when looking at data for the years 1992 and 2017, an extension of life expectancy at age 60 is noticeable. Slovenia,

² "Fertility rate, average number of children born to women during their reproductive years. For the population in a given area to remain stable, an overall total fertility rate of 2.1 is needed, assuming no immigration or emigration occurs" (Smoak, 2016).

Estonia, Czechia and Poland have the highest extension of life expectancy (by 4–5 years), while Montenegro, Moldova, Ukraine, Belarus, North Macedonia, Serbia have the lowest one (under 2 years). Therefore, the greatest extension of this life

expectancy was recorded in very or moderately rich countries. The smallest one was recorded in some of the poorer states of the former Yugoslavia or the former USSR.

Fig. 6. Total fertility rate (Source: World Bank, 2021)

Table 1. Life expectancy at age 60 (years) (Source: World Bank, 2021)

Country	Female			Male		
	1992	2017	1992–2017	1992	2017	1992–2017
Albania	20.4	22.9	+2.5	16.8	20.9	+4.1
Belarus	19.8	22.3	+2.5	14.3	15.8	+1.5
Bosnia and Herzegovina	19.2	22.0	+2.8	16.4	18.7	+2.3
Bulgaria	19.3	21.8	+2.5	15.9	17.2	+1.3
Croatia	20.1	23.5	+3.4	15.9	18.9	+3.0
Czechia	19.8	23.8	+4.0	15.4	20.0	+4.6
Estonia	19.6	24.8	+5.2	14.4	19.0	+4.6
Hungary	19.4	22.9	+3.5	14.7	17.9	+3.2
Latvia	19.7	23.5	+3.8	14.3	17.2	+2.9
Lithuania	20.7	24.5	+3.8	15.7	17.5	+1.8
Moldova	17.7	19.9	+2.2	14.6	14.8	+0.2
Montenegro	22.3	21.6	-0.1	17.9	18.0	+0.1
North Macedonia	18.9	20.6	+1.7	16.4	18.0	+1.6
Poland	20.1	24.8	+4.7	15.4	19.6	+4.2
Romania	19.0	22.4	+3.4	15.9	18.0	+2.1
Russia	19.1	22.1	+3.0	13.8	16.1	+2.3
Serbia	19.3	21.2	+1.9	15.9	17.7	+1.8
Slovakia	19.8	23.3	+3.5	15.2	18.5	+3.3
Slovenia	21.1	25.7	+4.6	16.4	21.4	+5.0
Ukraine	19.1	20.7	+1.6	14.6	15.4	+0.8

5. Summary

The process of population ageing in post-communist European countries has long been well advanced and will continue to accelerate in the near future (see: DARÓCZI, 2007; KÁČERKOVÁ & ONDAČKOVÁ, 2015; ŠÍDLO ET AL., 2020a). It is clearly related to the level of socio-economic development – countries with a better situation have higher OADR values. For example, the PCC between HDI (2019) and OADR (2020) was 0.71.

This will result in a rapid increase in the economic burden on the population of working age. According to demographic forecasts, in half of the analysed countries, by 2050, the old-age dependency ratio will exceed 50 – this means that two people of working age will have to maintain one person of post-working age. The worst situation is forecast for Slovenia (65.0) and Poland (60.3). If we include people in the pre-working age, unemployed persons, pensioners, etc. – in an extreme situation, one economically active person will maintain one inactive person. The level of diversification of the OADR by the CV by 2050 will not significantly change. Yet, when measured by the range, it will dramatically increase from 12.4 in 1990 through 17.4 in 2020 to as much as 26.5 by 2050. Thus, it can be concluded that the first hypothesis has been fully confirmed, and the second one only partially.

Such a large increase in the OADR over 30 years may inhibit economic growth and reduce the quality of life, especially of the elderly. In order to counteract this, a number of actions must be taken. The first is of a political and demographic nature. An effective pro-natalist policy should be launched so that the TFR would increase to over 2.1. However, it should also be borne in mind that due to a decline in the number of women in the 15–49 year cohort, only a TFR clearly above 2.1 can reduce depopulation and slow down the ageing of the population. Of course, such a policy is already being implemented in countries of the region (e.g. FREJKA & ZAKHAROV, 2013; KOTOWSKA, 2019; KRIMER, 2017), but in view of the TFR constantly remaining below the level of 2.1 – it is absolutely necessary to increase its effectiveness and efficiency. It is also necessary to start a pro-migratory policy so that the loss of people of working age is at least partially replaced by immigrants (preferably of pre-working or mobile age). Of course, one should be aware that immigration would not eliminate the problem of an ageing population. However, it may alleviate it (HARPER, 2016). The second group is economic in nature and should focus on economic resilience, productivity growth and changes in the retirement age threshold (ŠÍDLO ET AL., 2020b).

Of course, a number of other measures also need to be taken, e.g. adapting the health and welfare system to the growing percentage of elderly people (BLAŽIENĖ & ŽALIMIENĖ, 2020; NOVÁ, 2018) or intensifying actions to counteract poverty and social exclusion of the elderly (RAŠEVIĆ, 2006).

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