Project Visegrad ID 22010034
Are countries of the Visegrad Group (V4) ready for the consequences of population aging?

Demographic (population) ageing – a comparative analysis of particular populations of the V4

Andrzej Skibiński PhD

Czestochowa University of Technology, Faculty of Management,
Department of Economics, Investment and Real Estate, Poland

Agenda

- introduction,
- research methodology,
- causes of population ageing – a review of selected theories,
- demographic aspects of population ageing in V4 countries,
- the dynamics of population ageing in the V4 countries,
- conclusions.

Introduction

- Population ageing is a process of unprecedented scale and intensity, involving the societies of Europe and other highly developed countries of the world, leading to a situation described as demographic ageing.
- Apart from studying the economic and social consequences of population ageing, it is understandable to look the sources of changes in demographic structures, in particular in age groups.
- Research on the phenomenon of population ageing can be both static, i.e. it can lead to the determination of the state of demographic ageing in a given area, and dynamic, leading to the determination of changes in this respect.

The objective of this publication is to present the degree of advancement of population ageing, showing the differences in the dynamics of this process on the example of the Visegrád Group countries.

Research methodology

- **The demographic ageing index (DAI), based on point differences between the shares of the young and older populations and the economic ageing index (EAI) based on point changes in economic age groups were used to present the dynamics of population ageing:**
- **DAI = [U(0-14)t – U(0-14)t+n] + [U(≥65)t+n – U(≥65)t]**

where:

U(0-14)t – share of the population aged 0-14 at the beginning of the analysed period,

U(0-14)t+n – share of the population aged 0-14 at the end of the analysed period,

U(≥65)t – share of the population aged 65 and over at the beginning of the analysed period,

U(≥65)t+n – share of the population aged 65 and over at the end of the analysed period.

- **EAI = [P(m)t – P(m)t+n] + [P(pm)t – P(pm)t+n] + [P(ps)t+n – P(ps)t] + [P(s)t+n – P(s)t]**

where:

P(m) – share of population at pre-working age at the beginning (t) and end (t+n) of the analysed period,

P(pm) – share of the mobile population at working age at the beginning (t) and at the end (t+n) of the analysed period,

P(ps) – share of the non-mobile population at working age at the beginning (t) and at the end (t+n) of the analysed period,

P(s) – share of the population at post-working age at the beginning (t) and at the end (t+n) of the analysed period.

Research methodology

Table 1. Rosset's demographic ageing scale

Group	Share of population aged 60 and over in the population	Characteristics of individual groups
I	Below 8%	Demographic youth
II	8-10%	Early ageing
III	**10-12%**	**Proper ageing**
IV	**12% and more**	**Demographic old age**
	Degree of demographic old age	
IVa	12-14%	Initial state
IVb	14-16%	Middle state
IVc	**16-18%**	**Advanced state**
IVd	**18% and more**	**Highly advanced state**

Table 2. Demographic ageing scale based on median age

Median age	Type of population
15-19	very young
20-24	young
25-29	ageing
30-34	**advanced in the ageing process (old)**
35 and more	**very old**

Causes of population ageing – a review of selected theories

- The intensification of the ageing of European societies, which was particularly observed in the second half of the 20th century and is expected to continue at an even faster rate in the next decades of the 21st century, has been influenced by many factors.
- Among the most important ones are the decrease in the number of births, the decrease in the number of deaths and the migration movement of the population.
- The reasons for changes in the natural movement of the population as a direct cause of population ageing should be sought in demographic theories:

The demographic transition theory

The concept of the second demographic transition

- Theories attempting to explain the causes of changes in fertility include:

Caldwell's fertility decline theory,

The theory and hypothesis of Easterlin,

Lebenstein's population growth theory concept,

G.S. Becker's economic approach to human behaviour and gender equality theory.

Demographic aspects of population ageing in V4 countries,

- **The mechanism of the population ageing process has been built into the age structure of the population.**
- This occurred at the same time as the transition to a modern way of population reproduction, where population growth is low due to low birth rates, but also low mortality rates. These changes take place under the influence of social and economic modernisation, including economic changes in family functions.
- **In turn, a demographic view of this process allows us to assess both the degree of advancement of this phenomenon and its dynamics over a given period of time in a given area, which may be an administrative unit, country or region.**

Table 3 Basic data on demographic development in V4 countries between 1970 and 2019

Years	Population					
	Total [in mln]	Dynamic index [1970-1.00]	Net migration	Crue birth rate	Crue death rate	TFR
			Czech Rep.			
1970	9.906	1.00	-121345	15.0	12.5	1.92
1980	10.315	1.04	-41216	14.9	13.2	2.08
1990	**10.362**	**1.05**	**-58893**	**12.6**	**12.5**	**1.90**
2000	10.278	1.04	-27980	8.9	10.6	1.15
2010	10.462	1.06	+14334	11.2	10.2	1.51
2019	**10.649**	**1.08**	**+44270**	**10.5**	**10.5**	**1.71**
			Hungary			
1970	10.322	1.00	0	14.7	11.6	1.98
1980	10.709	1.04	0	13.9	13.6	1.91
1990	**10.374**	**1.01**	**+18313**	**12.1**	**14.0**	**1.87**
2000	10.221	0.99	+16658	9.6	13.3	1.32
2010	10.014	0.97	+11519	9.0	13.0	1.25
2019	**9.772**	**0.95**	**+33562**	**9.5**	**13.3**	**1.55**
			Poland			
1970	32.670	1.00	-293620	16.8	8.2	2.21
1980	35.413	1.08	-24125	19.6	9.8	2.28
1990	**38.038**	**1.16**	**-12620**	**14.4**	**10.2**	**2.06**
2000	38.263	1.17	-19669	9.9	9.6	1.37
2010	38.022	1.16	+5027	10.9	9.9	1.41
2019	**37.972**	**1.16**	**+20081**	**9.9**	**10.8**	**1.46**
			Slovakia			
1970	4.536	1.00	-35091	17.8	9.3	2.41
1980	4.963	1.09	-11493	19.1	10.2	2.32
1990	**5.287**	**1.16**	**-2322**	**15.1**	**10.3**	**2.09**
2000	5.398	1.17	-22301	10.2	9.8	1.30
2010	5.390	1.17	-4929	11.2	9.9	1.43
2019	**5.450**	**1.19**	**+3632**	**10.5**	**9.8**	**1.54**

Source: own calculation based on: Eurostat data base https://ec.europa.eu/eurostat/data/database [access: 5.09.2020]

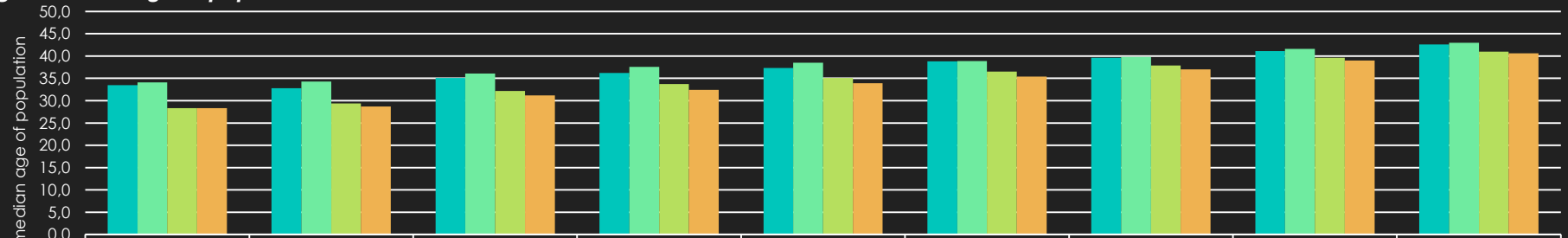
Assessment of the degree of population ageing in V4 countries

- The link between the past and present processes that make up the birth rate and the future age structure of the population is obvious and has a feedback loop character.
- It is also clear that both a low birth rate and a prolonged life expectancy contribute to the intensification of the ageing process from the bottom of the age pyramid (decreasing share of the youth) and from the top of the age pyramid (increasing share of the elderly).
- **The pace of this process is important for the demographic future, as well as the process of transformation of the population's age structure, understood as changes in the proportions of individual age groups.**

Table 4 Degree of demographic ageing based on the Rosset scale in the Visegrád Group countries

Country	Years					
	1970	1980	1990	2000	2010	2019
ageing - old age rate [in%]						
Czech Rep.	**11.9**	13.6	**12.5**	13.8	**15.3**	**19.6**
Hungary	**11.5**	13.5	**13.2**	15.0	**16.6**	**19.3**
Poland	8.2	10.2	10.0	12.1	13.6	17.7
Slovakia	9.1	10.6	10.3	11.4	12.4	16.0
Stages of population ageing - distribution of V4 countries (N)						
below 8	0	0	0	0	0	0
<8-10	2	0	0	0	0	0
<10-12	2	2	2	1	0	0
12 and more	0	2	2	3	4	4
Level of demographic old age - distribution of V4 countries (N)						
<12-14	0	2	2	2	2	0
<14-16	0	0	0	1	1	1
<16-18	0	0	0	0	1	1
above 18	0	0	0	0	0	2

Fig. 1. Median age of population in the V4 countries 1970-2019



	1970	1980	1990	1995	2000	2005	2010	2015	2019
Czech Rep.	33,5	32,8	35,1	36,2	37,3	38,8	39,6	41,1	42,6
Hungary	34,1	34,3	36,1	37,6	38,5	38,9	39,8	41,6	43,0
Poland	28,3	29,4	32,2	33,7	35,1	36,5	37,9	39,6	41,0
Slovakia	28,3	28,7	31,2	32,4	33,9	35,4	37,0	39,0	40,6

Source: as in table 3

The dynamics of population ageing in the V4 countries

- The dynamics of the population ageing process can be considered as changes in the age structure of the population between the two selected time profiles or as continuous changes, e.g. annual changes in the age structure determining their trend.
- In general, the greater the dynamics of this process, the greater the increase in the proportion of older people and the decrease in the share of the youth.
- The process of population ageing, which should be considered as a kind of deformation of the population's age structure, has certain demographic and socio-economic consequences.

Table 5. Change in the population by economic age groups, in V4 in the 1970 - 2019 period

Year	population by economic age groups					Demographic and economic ageing index	
	0-14	15-44	45-64	15-64	65+	DAI	EAI
Czech Rep.							
1970	21,4	43,2	23,5	66,7	11,9	-	-
1980	23,3	42,0	21,1	63,1	13,6	**-0,2**	**-1,4**
1990	21,7	44,1	21,7	65,8	12,5	**+0,5**	**-1,0**
2000	16,6	43,7	26,0	69,7	13,8	**+6,4**	**+11,1**
2010	14,3	43,0	27,4	70,4	15,3	**+3,8**	**+5,9**
2019	15,9	38,4	26,2	64,6	19,6	**+2,7**	**+6,1**
Hungary							
1970	21,1	44,1	23,3	67,4	11,5	-	-
1980	21,9	41,9	22,7	64,6	13,5	**+1,2**	**+2,8**
1990	20,5	42,4	23,8	66,2	13,3	**+1,2**	**+1,8**
2000	16,9	42,4	25,7	68,1	15,0	**+5,3**	**+7,2**
2010	14,7	42,3	26,4	68,7	16,6	**+3,8**	**+4,6**
2019	14,5	39,1	26,9	66,0	19,3	**+2,9**	**+6,6**
Poland							
1970	27,2	45,8	18,8	64,6	8,2	-	-
1980	24,1	45,6	20,0	65,6	10,2	**+5,1**	**+6,5**
1990	25,3	44,8	19,9	64,7	10,0	**-1,4**	**-0,7**
2000	19,8	45,2	22,9	68,1	12,1	**+7,6**	**+10,2**
2010	15,3	43,5	27,6	71,1	13,6	**+6,0**	**+12,4**
2019	15,4	40,7	26,2	66,9	17,7	**+4,0**	**+5,4**
Slovakia							
1970	27,5	43,6	19,8	63,4	9,1	-	-
1980	26,1	44,0	19,3	63,3	10,6	**+2,9**	**+2,0**
1990	25,5	45,1	19,2	64,3	10,3	**+0,3**	**-0,9**
2000	19,8	46,7	22,1	68,8	11,4	**+6,8**	**+8,1**
2010	15,5	45,5	26,6	72,1	12,4	**+5,3**	**+11,0**
2019	15,7	41,6	26,7	68,3	16,0	**+3,4**	**+7,4**

Source: as in table 3

Fig. 2 Increase in the share of the population aged 65 yeas or over between 2000 and 2019 (in %)

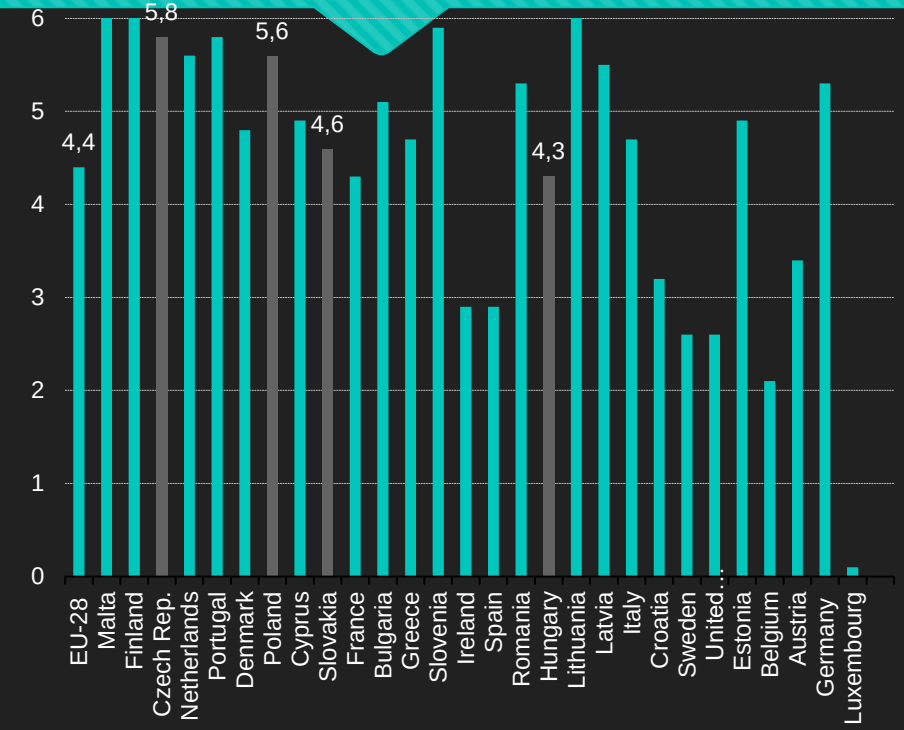
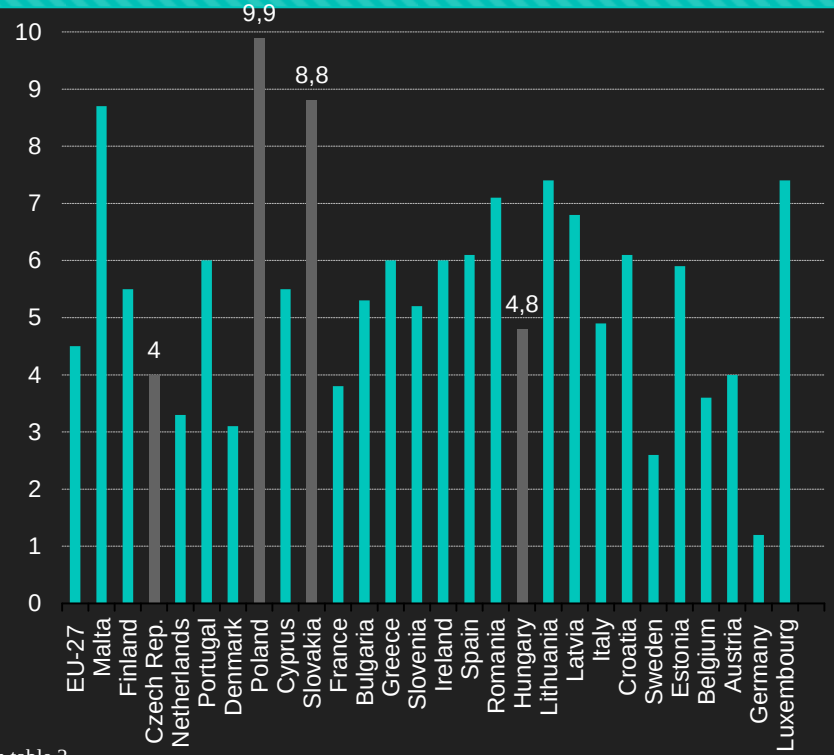


Fig. 3 Increase in the share of the population aged 65 yeas or over between 2019 and 2050 (in %)



Source: as in table 3

Conclusion

- The situation in European countries, including the V4 countries, varies in terms of the degree of risk of deformation of age structures and therefore the intensity of the ageing process of their populations, however this does not preclude consideration of the general demographic trend towards which the entire continent is heading.
- Focusing on the issue of shrinking labour resources, it seems that the solution is the participation of the elderly in the labour force, which not only supports income and reduces state budget expenditure, but also provides an opportunity to secure current household income and increase the amount of future pensions. Increasing the labour force participation of the population is therefore one of the main challenges facing the former Eastern Bloc countries and their labour markets in the medium term.
- Furthermore, analyses have shown that V4 countries are characterised by a relatively low population growth rate and a very intensive ageing process, which is particularly noticeable in Poland and Slovakia.
- Based on the latest population forecasts for the Visegrád Group countries by Eurostat, there appears to be an ominous vision of the spread of the low fertility syndrome, which will no longer ensure the continuity of generations.

Conclusion

- If this vision of demographic development becomes a reality, the demographic consequences could prove to be very serious, and their far-reaching effects are difficult to predict at the moment.
- Future processes will cause permanent changes in the demographic structure, in particular in the age structure of many European societies – especially in the group of Central and Eastern European countries.
- The demographic trends presented herein should represent an important development challenge and should therefore be taken into account in future social and economic development strategies not only at EU level but also at regional level.
- **Therefore, it seems that the process of population ageing should not be treated only in the negative context of the so-called demographic catastrophe, because the perception of the growing number of the elderly in society as a threat is being abandoned in favour of treating this phenomenon as a challenge.**

Thank you for your attention