

The challenges of an aging society - The topical issues of pension security

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Abstract: One of the most important social changes that threaten EU member states is the considerable aging of the population and its present and future impact on economies and pension security. Numerous studies prove that the state pension will not be enough to fully cover retirement spending. Maintaining a standard of living at the desired level requires some pension savings in addition to the state pension. This study consists of three parts. The first section presents the present and future trends of the population of the European Union on the basis of demographic and statistical data and their economic impact on state pensions. The second section presents the forms and possibilities of financial savings, with particular regard to pension savings. The third part presents the theoretical basis and the results of the research project "The role of self-care in our life".

Keywords: pension security, financial investments, retirement savings, behavioural economics

1 Introduction

The issue of aging has fascinated people throughout human history. Numerous famous philosophers, such as Plato³, Aristotle⁴, Cicero⁵, Seneca⁶, Petrarca⁷,

³ Plato on the first book of the republic: Cephalus talks about old age and money. According to Plato, harmonious old age is possible without material wealth.

⁴ Aristotle writes about the relationship between youth and old age, life, and death in the Soul philosophical studies. According to Aristotle, there is no harmonious old age without physical and material well-being.

⁵ In Cicero's Old Age, he writes that we must fight old age. you must fight against old age as against some disease. The most effective weapon against old age is exercising science and virtues.

⁶ Seneca's writes to Lucilius about beautiful old age and death in part XIV of Moral Letters. Seneca says you shouldn't be afraid of death and old age.

Cardano⁸, Simone de Beauvoir⁹ and others have studied and written about aging. We all desire a long and healthy life. We now live far longer than any time before in history. The EU is threatened by aging and aging has a considerable influence on economies and societies. Similarly, to other EU member states, Hungary's population is also aging, and as a result, Hungary faces various challenges, including the reform of the health system, the pension system, and the tax system. In the countries of Central and Eastern Europe, including in V4 countries (Hungary, Slovakia, Poland and the Czech Republic) the state pension system works on the Pay-As-You-Go (PAYG) principle (Fig. 1). In each country, preliminary calculations are done to ensure the sustainability of the pension system [12].

Country	First Tier				Second Tier						Third Tier					
	Mandatory, adequacy				Mandatory, savings						Voluntary, savings					
	Basic	Minimum assistance	Social	PAYG	Public pension schemes				Privat occupational schemes		Privat individual schemes					
					Financing		Type of pension		Status		Status					
					Pre-funded	Flat rate	DB	PS	NDC	Mandatory	Voluntary	Mandatory	Voluntary			
Hungary (HU)	x			x				x							x	
Slovak Republic (SK)	x			x					x						x	x
Poland (PL)	x			x	x						x			x		x
Czech Republik (CZ)	x	x		x	x			x								x

Figure 1

A comparison of V4 pension systems (European Commission, 2018 and my own compilation)

The essence of the PAYG system is that the pension contribution of active workers is collected and distributed among the pensioners as pension [6]. In this system, the active workers pay for the pension of the pensioners. A great problem is that pension contributions are not capitalized, not invested [13]. Also, future pensions are not ensured, so all active workers can get is a promise that the state will provide for them when they are old. PAYG systems are in a crisis all over the world. State pension systems have to be reformed [2]. At the macro level, an automatic system should be created between contributions and benefits that

⁷ Petrarca writes in his secret book that all births and deaths are a new start and a possibility of closure to learning and experience. The stage between birth and death is life itself.

⁸ Cardano was a practising doctor. In his book about his life, he deals with the issue of aging and describes the diseases of old age.

⁹ Simone de Beauvoir maintains that almost everyone feels guilty about old people, and therefore the conspiracy of silence surrounds this topic. The purpose of his book is to break this silence.

ensures the long-term sustainability of the system [21]. The PAYG system is convenient while the population is growing [18].

2 The effect of aging on pension systems

Demographic data show that the population of Central and Eastern Europe (Fig. 2), including Hungary (Fig. 3) has been decreasing for some time and calculations show that it will continue to do so. The aging of the population questions the ability of societies to adapt to demographic changes. They have reacted to these challenges correctly because the traditional methods of aging are misleading and do not take into account the temporal and spatial differences in the characteristics of the people.

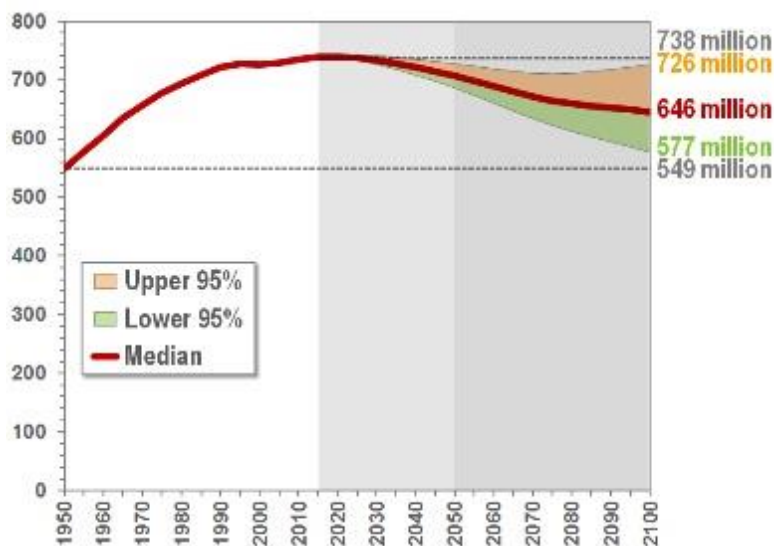


Figure 2

Population trends in Europe between 1950 and 2100 according to the baseline, low and high variation of population estimates (United Nations, 2015)

Today's people of 60 or 65 are very different from people of the same age half a century ago and are probably very different from people of the same age in half a century. People live longer and enjoy more knowledge.

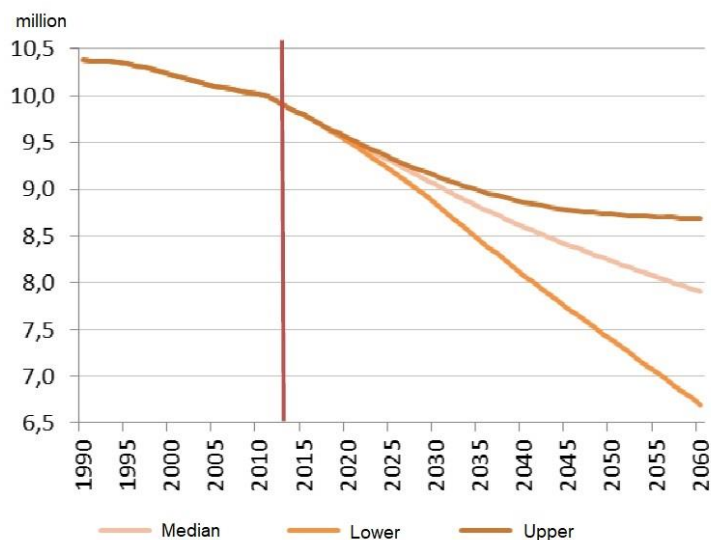


Figure 3

Population trends in Hungary between 1990 and 2060 according to the baseline, low and high variation of population estimates (Hungarian Central Statistical Office, 2015)

Not only “40 is the new 30” but also “70 is the new 60”. For this reason, aging in the 21st century can be better handled with tools of the 21st century.

- Aging is measured based on different characteristics, such as life expectancy, physical health, cognitive abilities etc. allowing a multidimensional description of aging. These new measures open new political perspectives in policy issues.
- How old do you have to be to be “old”? Commonly used old-age thresholds of 60 or 65-year-olds are different from the reality of people of longer life expectancy and better health. A better alternative is defining the shift of old age conforming to remaining life expectancy.
- More accurate measures of the aging of the population: The widely used indicators of aging, the ratio of old-age dependency and the median age of the population overestimate the rate of aging. We present this by comparing old measures with the “would be” counterparts, which adjust age groups to the differences of remaining life expectancy.
- A fair retirement age between the generations: fairness is a basic democratic value. A decent normal retirement age between generations can be calculated with the Characteristic approach, and it ensures that the balance of pension benefits and incomes is the same for each generation and that pension systems are flexible enough to adapt to demographic changes.

Then we present the measures of the aging of the population adapted to changes in life expectancy and compare them to the uncorrected measures. The uncorrected measurements of the aging of the population assume that old age starts at the age of 60 or 65. In this datasheet, we define the beginning of old age as the age when life expectancy drops to 15 years. This way a dynamic old-age threshold is obtained, which reflects the effects of demographic changes. The ratio of the population over the old-age threshold and the expected old-age dependency ratio is a measure based on two dynamic thresholds. In this datasheet, we measure aging with the new threshold value and compare it to the uncorrected values. With the help of the dynamic old-age threshold, new things can be seen. For example, here we show that the ratio of “old” 65-year-olds or older people is different in different countries and changes over time. According to the traditional approach, everybody over 65 is considered “old”. It can also be seen that the ratio of adult age spent in old age decreases over time. Without correcting the changes of remaining life expectancy, it seems that people spend an increasing proportion of their adult life in old age. It is predicted that in the EU in 2050 the average life expectancy of women will be 88.2 years and that of men will be 85.7 years (see Table 1).

Table 1 EPC calculations for EU 27 and Hungary
(European Commission, 2018 and my own compilation)

	2016	2020	2030	2040	2050
<i>EU 27 – Life expectancy for women {year}</i>	83,7	84,3	85,7	87,0	88,2
<i>HU – Life expectancy for women {year}</i>	79,6	80,4	82,3	84,0	85,7
<i>EU 27 - Life expectancy for men {year}</i>	78,2	78,9	80,6	82,1	83,5
<i>HU - Life expectancy for men {year}</i>	72,8	73,7	76,0	78,2	80,3

On the other hand, births will only slightly increase and the number of people in employment will decrease greatly. As a result, pension expenditures will likely increase in all 27 member states of the EU. An important question is whether there will be enough active workers to cover pensions with their pension contributions (see Table 2).

Table 2 EPC calculations for EU 27 and Hungary
(European Commission, 2018 and my own compilation)

<i>EU 27 – Number of births</i>	1,55	1,61	1,67	1,71	1,74
<i>HU - Number of births</i>	1,48	1,61	1,68	1,72	1,75
<i>EU 27 – Working-age population between 15-64 years {million}</i>	290,697	287,478	275,374	262,255	252,854
<i>HU - Working-age population between 15-64 years {million}</i>	6,588	6,364	6,081	5,711	5,325
<i>EU 27 – Potential growth of GDP</i>	1,3	1,4	1,2	1,2	1,4
<i>HU - Potential growth of GDP</i>	1,9	1,9	2,1	1,2	1,5
<i>EU 27 – pension expenditures {GDP %}</i>	10,4	10,7	10,5	11,4	12,5
<i>HU - pension expenditures {GDP %}</i>	10,6	10,9	10,7	12,8	13,8

Pension experts already recognised around 1990 that the PAYG system could not be maintained in its current form for a long time, as population growth will slow down. They predicted that the number of births would stabilize at a lower level and fewer people would enter working age [2].

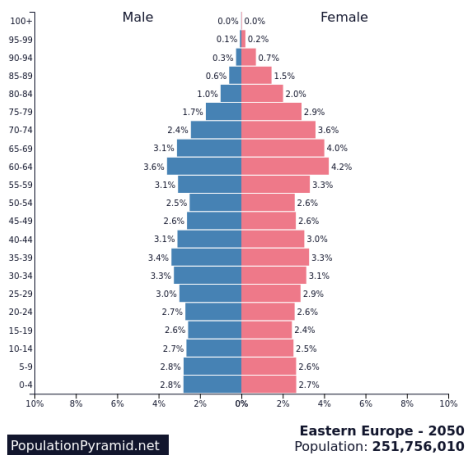


Figure 4 The population pyramid of Central and Eastern Europe and Hungary for 2050 (Population Pyramids, 2018)

The most important is to examine how the population changes, which makes accurate predictions for the future possible, for example what will the population and its composition of Hungary be in 2050. A closely connected issue is whether there will be enough active workers to provide for pensioners. The distribution of the population according to age can be seen in a population pyramid.

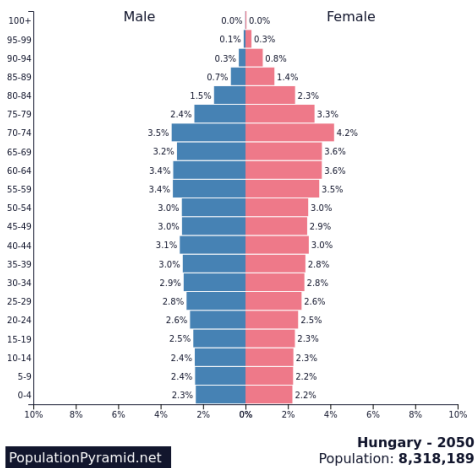


Figure 4 The population pyramid of Central and Eastern Europe and Hungary for 2050 (Population Pyramids, 2018)

The population pyramids in Fig. 4 and 5 show that by 2050 in Central and Eastern Europe and in Hungary, the number of young and middle-aged people will be

similar and the population pyramid only gets narrower at old age. It is predicted that not enough children and so there will not be enough workers so the ratio of workers and old people will not be satisfactory in Hungary in around 2040 (Fig. 7). Fig. 6 shows that the old-age dependency ratio grew to 29.9% in 2017. This shows the percentage of people over 64 related to the number of people aged 15-64. This means that there is one old person for every three active workers. Italy, Greece and Finland are in the worst situation. On the other hand, Luxembourg, Ireland and Slovakia has the best ratio. In Hungary the old-age dependency ratio has been growing steadily in the past years and last year it reached 27.9% according to Eurostat (at the beginning of 2018 it was near 29%). The ratio has grown in every EU member state in the past two decades, except in Luxembourg, where it decreased from 21.2% to 20.5%.



Figure 6 Old-age dependency ratio in the EU (2017, %) (Eurostat, 2017)

According to the prediction of KSH, the ratio of old and young people will change in the wrong direction because the number of old people will increase and the number of young people will decrease (see Fig. 7 and Table 3).

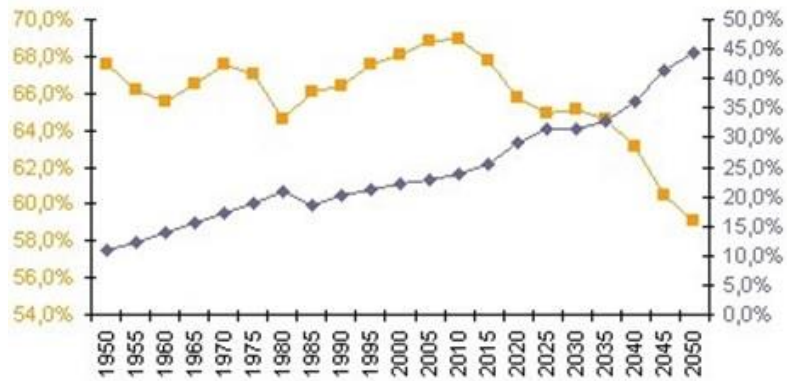


Figure 7 Old-age dependency rate in Hungary (KSH, 2017)

The basic principle of the PAYG system is that the working age population must be far larger than the pensioner population, otherwise the system collapses [11].

	1970	1980	1990	2000	2010	2020	2030	2040	2050
<i>The proportion of pensioners and the working-age population</i>	22.4	26.9	27.2	23.6	24.6	30.2	33.7	38.6	47.7

Table 3

The proportion of pensioners and the working-age population (KSH, 2015 and my own compilation)

Table 3 shows that while in 1970 one pensioner's pension was paid by nearly five workers, in 2050 one pension will be paid by approximately two workers [21].

3 An analysis of the sustainability of the state pension system

The Hungarian pension system currently has two pillars. Pillar I is the state pension system that works on the PAYG principle and pillar II is the funded system [13]. The PAYG system is convenient while the economy is growing [18].

The EU published its report on the population of EU member states on Eurostat. Hungary's population was 2.1% of the population of the EU in 1995 and only 1.9% in 2015. Many other countries are also 2%, including Sweden, Austria, Bulgaria, Denmark, Finland and others. All the people in these countries under 2% amount to no more than 14% of the population of the EU. The report states that development was fuelled by migration.

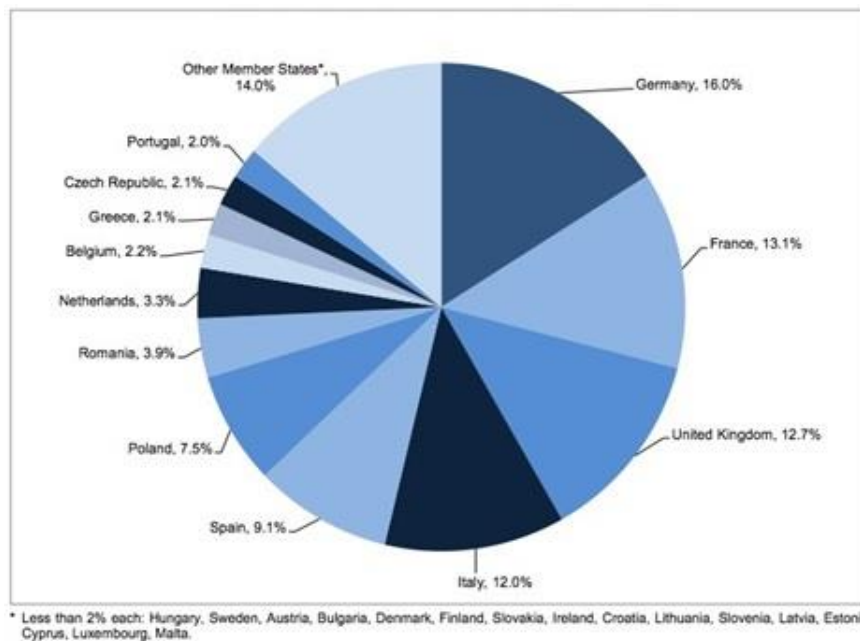


Figure 7 The population of EU member states as a proportion of the whole population of the EU (Eurostat, 2015)

For the sustainability of the state pension system, the simplified mathematical model of the PAYG system needs to be examined [21][3]:

$$A \times B \times C = D \times E$$

A: number of contribution payers

B: pension contribution rate

C: yearly average salary

D: number of pensioners

E: annual average pension

The number of pensioners is predicted to increase drastically—this cannot be changed. The right side will increase and the balance will be upset. How can it be reset?

- Increasing the number of people paying pension contributions: this number is not predicted to increase; it is likely to decrease. A solution could be to motivate young people to have more children.
- Increasing the pension contribution rate: it would be even more tax for employers and employees.
- Increasing the yearly salary: it cannot be increased much as productivity is low in Hungary.
- Decreasing pensions: pensions are low as they are, and further decreasing them would make the ruling party very unpopular, which no party would risk.
- Another possibility is raising the age of pension eligibility—it was suggested and introduced in many countries (Fig. 8). The Finnish Centre for Pensions collected current European retirement ages and also their planned increases. Except for Sweden and Norway, retirement age can be over 64 everywhere and in some countries, it may exceed 70 years. In Hungary, the retirement age is currently being raised gradually, over several years (the retirement age of 65 will be universal in Hungary by 2022). It may, however happen that in 5–10 years, retirement age will have to be raised again —first to 67 years, then in a relative way, connected to life expectancy at birth.

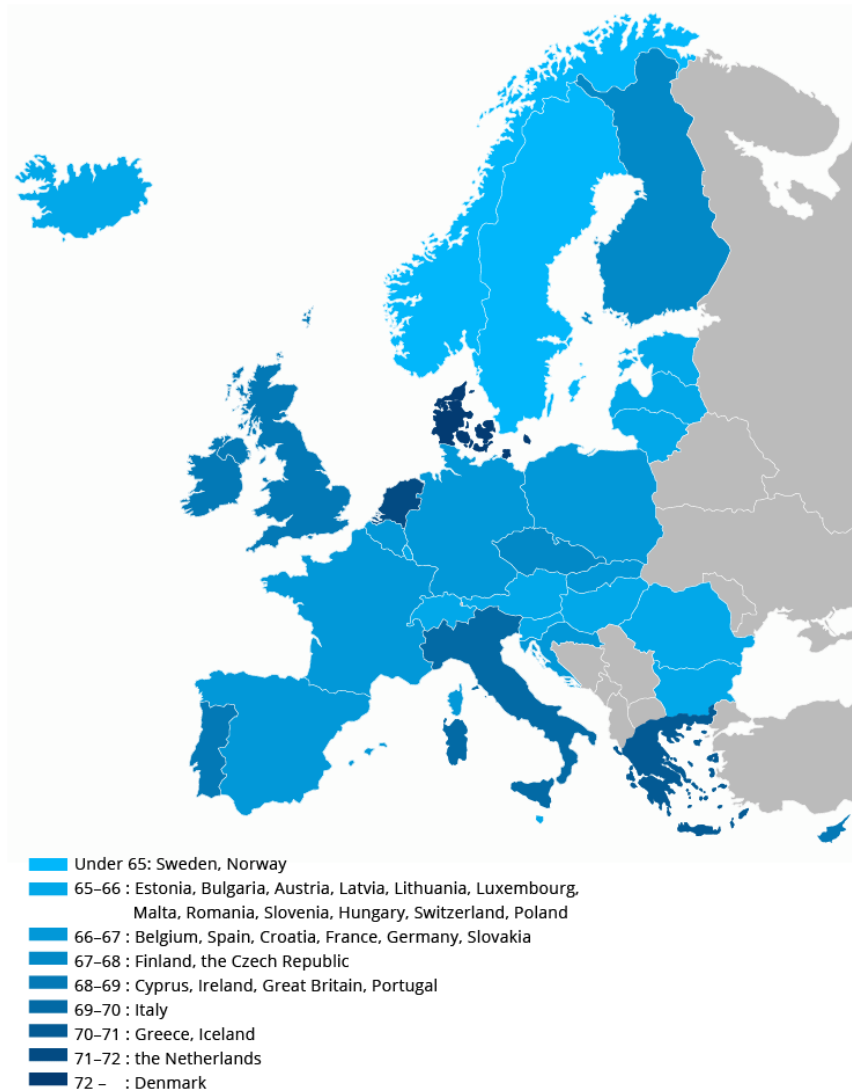


Figure 8 Retirement age in the EU in 2050 (Finnish Centre for Pensions, 2017)

Wherever the formula is modified, the system will become imbalanced. The two sides need to be balanced macroeconomically. Therefore, experts recommend a mixed system. In the current pension system, a supplementary element can be a voluntary pension fund. This can help sustain after retirement the standard of living one got used to in one's active years. Other pension saving systems include pension insurance.

4 Financial saving forms and possibilities

In addition to increasing pension contribution and tax, and retirement age, there is a more effective and sustainable solution: self-care. This means that people create their own private pension fund, which will enable them to live a full life in old age. This relieves the state too because they save money privately, albeit with state help, and they manage their own wealth. There are many forms of savings (e. g. voluntary pension fund, pension savings account and pension insurance). When choosing the right savings product, one must decide how important the term (time period) and liquidity are.

The Hungarian state supports three different pension savings schemes via income tax deduction, with support up to 130–150 thousand HUF annually (depending on yearly contribution). These are: voluntary pension fund, pension savings account (NYESZ) and pension insurance. Planning for at least 10–20 years ahead is recommended with these schemes. The accumulated private capital can be accessed when retirement age is reached (with special conditions they can be accessed earlier, too). The question is, however, which retirement age should be considered: the current or the future one? Of the three possibilities only pension insurance has a fixed retirement age, so if this is chosen, one does not have to worry about future changes. In the case of the other two, it is possible that the money can only be accessed at the age of 67–70 (if the retirement age is raised). The savings schemes in detail:

1. Voluntary pension fund (OPT): The members pay contributions to the fund regularly and at retirement age, they receive different services from the fund. Unlike state pension, pension payments are funded by the members' contributions and their interest. Membership and contributions are voluntary. The contributions can be different amounts must be at least 2000 Ft monthly. A voluntary pension fund can be used to accumulate wealth for other purposes than pension. Voluntary pension funds are excellent long-term investments because the state gives considerable tax relief after contributions.
2. Pension savings account (NYESZ): It is a supplementary element of the Hungarian pension system. People that have a pension savings account can choose the securities the money is invested in (shares, bonds, or investment fund shares). At the moment, this is the only form of pension savings where the individual gets state support, and can also decide the type of investment to be used.
3. Life insurance: In everyday use, life insurance is connected to events in the person's life: usually death but it can also be disability, operations, serious illnesses, permanent damage to health, incapacity or other event specified in the contract (reaching a certain age, wedding, having a child, retirement etc.)

5 The role of self-care in our decisions

5.1 Behavioural economics and decision-making typology

Self-care means pension savings (voluntary pension fund, insurance, other savings etc.). It is not easy to decide which we would like to provide for us in retirement. Decisions, for example “what investment form to choose” generally cannot be predicted based on reason or preferences because they are overwritten by other, non-rational factors [9]. Research shows that the processing of rational and irrational information is in connection with the hemispheres of the brain. The left hemisphere is conscious, dominant, logical, rational, analysing and thinks positively; the right hemisphere is associated with the subconscious—irrational, emotional and negative thinking. The positive or negative way of processing information is a stable personality trait but it can be influenced [9]. In most people, the dominant hemisphere is the left hemisphere, which is characterized by positive information processing [9]. It is positive because it hopes for a favourable outcome of situations, and so it does not tolerate crisis situations well as these threaten its positive expectations. The left hemisphere is characterized by analytical thinking, research and making lists. The right hemisphere is better suited to process negative information, that is, it plays with the expected outcomes in a given situation, imagines the outcomes therefore it is mostly activated in a given situation. From an economics point of view, it is important that research has shown that it is the right hemisphere that determines individual preferences. In problem solving, the right hemisphere collects experience about the individual outcomes. Decision making therefore is greatly influenced by which hemisphere the individual depends on more. Another determining factor of decision-making is the decisiveness of the decision maker. A decisive person makes decisions faster than an indecisive person. Based on decisiveness and use of the hemispheres four types of decision making style can be differentiated.

5.2 The role of financial awareness in decisions

The research focused on the present and future state of the respondents. We wish to know what motivated them to choose self-care, what customs and processes influenced them to choose the pension system they chose. We used a questionnaire and examined the respondents using behavioural economics and factor analysis to see what decisions we can make about the possible future pension. The research examines the role of self-care as a supplementary pillar to state pension in public awareness and in our decisions, what pension system the respondents think is desirable in the future, what will the pension of the future generations include, and the number of people who will work in the future and

how they will work. The research assumes that people think about pension with fear and uncertainty.

As mentioned earlier, the PAYG system is in a crisis, therefore the second pillar of the pension system, self-care receives more and more attention. To understand the motivations behind the decisions of the respondents more deeply [10], I used factor analysis, which is widely used nowadays to map personality (Otto, 2003). I used the SPSS software to process the questionnaire data with help from the department [17]. The online survey was carried out in 2017. The respondents gave their answers online on [kerdoivem.hu](http://www.kerdoivem.hu) (link: <http://www.kerdoivem.hu/kerdoiv/927511662/>). There were a total of 500 respondents (n=500). My basic questions were connected to the planning of pension systems, forms of pension savings and self-care, pension security because these elements determine the financial background of our future existence, that is, the degree of self-care. The answers were divided into three groups: 1. Knowledge of pension systems (mandatory, voluntary); 2. Financial planning (characteristics of various kinds of savings); 3. The role of self-care (mapping the personality). The qualitative research analyses the above three groups separately. We calculated several statistical characteristics, for example average and frequency, and also carried out cross tabulation analysis. This paper only focuses on state pension and the role of self-care.

			PENSION SAVINGS		Total
			Male	Female	
<i>OPTIMIST</i>	<i>Yes</i>	<i>Number</i>	324	12	336
		<i>% OPTIMIST</i>	96,4%	3,6%	100,0%
		<i>% PENSION SAVINGS</i>	67,4%	63,2%	67,2%
		<i>% Total</i>	64,8%	2,4%	67,2%
	<i>No</i>	<i>Number</i>	157	7	164
		<i>% OPTIMIST</i>	95,7%	4,3%	100,0%
		<i>% PENSION SAVINGS</i>	32,6%	36,8%	32,8%
		<i>% Total</i>	31,4%	1,4%	32,8%
<i>Total</i>	<i>Number</i>	481	19	500	
	<i>% OPTIMIST</i>	96,2%	3,8%	100,0%	
	<i>% PENSION SAVINGS</i>	100,0%	100,0%	100,0%	
	<i>% Total</i>	96,2%	3,8%	100,0%	

Table 4 The role of optimism in pension savings (my own compilation)

The answers show that the respondents are basically informed about the pension system. 92.2% of respondents do not think the current state pension system is stable. They trust pension savings more - 65.2% of the respondents answered yes

to this question. Only 15.6% have pension insurance. The results show that savings are important to the respondents. Pension savings according to age - People of 29-48 years of age consider pension savings important [22]. Table 4 shows further relationships between pension savings and optimism. Relationships between pension savings and optimism. Optimist men regard pension savings more important than optimist women do (shown by the higher number of 324 yes responses). Generally speaking, respondents are most encouraged by the general economic situation and security at work, and the pension and health insurance systems in the future country.

Conclusion

The population of a country changes only slowly from year to year, and the characteristics of demographic processes are drawn up over a longer period. However, the factors influencing population change are well predictable as a result of the laws of each sub-process. According to forecasts, current pension systems are likely to cause severe social and economic problems globally because of the rapid ageing of our societies. Based on forecasts, the current pension regime, and the drastic change in the ratio between active wage earners and pensioners will, with a high degree of probability, cause social, economic and other problems in the future both globally and in our country. The Hungarian mandatory pension system is a pure pay-as-you-go state pension system. It covers all persons who are engaged in any kind of employment as well as recipients of unemployment and certain child care benefits. This is a defined-benefit PAYG system with an earnings related public pension. The old-age pension is the most important source of income for the elderly. However, in order for the amount of the pension to be of an adequate standard, it is usually not enough to meet the requirements for the minimum period of insurance required by national legislation. The longer the insurance period, the higher the amount of benefit the person can expect. Experts recommend a mixed system but currently there is no universally accepted concept. Despite the small number of answers, there are many possibilities. The respondents consider many possibilities to ensure their future living. State pension is mandatory so there is no choice about it. Concerning supplementary possibilities, like voluntary pension funds and private investments, income and emotional decisions determine which form or forms are chosen. Of course, research can not solve all the problems of the pension system but researchers can clearly define and examine possibilities and effective methods for prediction and problem-solving.

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