© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

Economic Growth Models and Their Effects on Pension Security

Zsolt Szabó

Doctoral School on Safety and Security Sciences, Óbuda University, Budapest, Hungary

szabo.zsoltmihaly@uni-obuda.hu

Abstract: The system of correlations and laws determining growth can be called the mechanism of economic growth, in short the growth mechanism. Accelerating economic growth is one of the European Union's most important challenges. One of the most significant social changes threatening the Member States of the European Union is the severe aging of the population and its current and expected impact on economies and citizens' pension security. Numerous studies show that the state pension will not be sufficient to fully cover the expenses of retirement age. In order to maintain the level of pensions, it is expected that in addition to the state pension, it will be necessary to provide some savings for pension purposes. The lecture and the related study consist of three parts. The first part presents the current and future development of the population of the European Union on the basis of demographic and statistical data and its economic effects on the development of public pensions. It also briefly summarizes the possibility of modeling the state pension system, which provides information for economic policy. The second part describes the forms and possibilities of financial savings, with special regard to the possibilities of pension savings. The third part presents the theoretical foundations of the research project "The Role of Self-Care in Our Lives" and the results of related economic research on questionnaire behavior.

Keywords: pension modeling, pension security, financial investments, pension savings, behavioral economics

1 Introduction

The current economic environment requires greater attention from decision-makers in organizations, as their decisions can have a major impact not only on the short-term but also on the long-term future of their organization. A bad move can cause significant damage, but a good, well-informed decision can even lead to long-term success. A long, disease-free and fertile life is the desire of all of us. Compared to our predecessors, we can live today for an unprecedented time. Today, one of the most significant social changes threatening the Member States of the European

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

Union is the severe aging of the population and its current and expected impact on economies and societies. We now live far longer than any time before in history (Iván, 2004, Thaler, 2019, Hans - Ole - Rosling, 2018). Globally, the world is shaken by three major explosions by the beginning of the 21st century: the population explosion, the longer-lived explosion, and the information explosion (Iván, 2004). The problem of population explosion, longerevity and the associated aging society will affect the whole world in some social, economic and other way. According to United Nations (UN) demographics, the Earth's population appears to be growing (developing countries, where many live in deep poverty), but the industrialized countries are declining (United Nations, 2015, World Economic Forum, 2019).

The population of Europe and Hungary has not been growing for a long time, but is decreasing and aging according to the calculations. Population aging is questioning the capacity of societies to adapt to ongoing demographic change. With improved living standards and better health care, life expectancy at birth is also steadily rising around the world. By 2050, the proportion of people aged 65 and over will double from the current 10% to 20%. By 2050, the older 80% of the world's population will live in low-income countries, which will mean about 1.3 billion people, and 70% of the world's population will live in cities. According to Figure 1, the main economic factors for the future will be cities: by 2050, 70% of the world's total population will live in cities (European Commission, 2018). The issues of global urbanization and environmental challenges and the problem of an aging (rapidly aging population) society raise the question of whether current pension systems will be sustainable and whether people will have an adequate level of pensions in the future (European Commission, 2020).

2 The effect of aging on economies and pension systems

On 11 July 1987, the world population passed the five billion mark - since then the figure has risen steadily to 7.7 billion in 2018. According to the International Monetary Fund (IMF, 2020), the largest share of the world population lives in China with 18.7 percent, followed by India with 17.88 percent. With a population of 83 million, Germany also ranks among the top 20 most populous countries in the world. Last year, people in Germany accounted for 1.11 percent of the world's population. The U.S. is actually the world's third most populous nation. 4.39 percent of the global population live here. Since 1989, World Population Day has taken place on 11 July to draw attention to problems caused by the increasing number of people on this Earth. The UN expects the world's population to grow to 10.9 billion by 2100. Asia is by far the most populous continent on Earth (IMF, 2020). The United Nations estimates that the Asian population will peak at 5.27 billion in 2070. Europe

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

and Latin America will reach their population peaks at 689 million and 765 million inhabitants, respectively, around the year 2060, according to the projection. African populations are expected to keep growing, albeit at a slower pace, beyond the current century, which is when their combined size could surpass that of Asian populations (World Economic Forum, 2019).

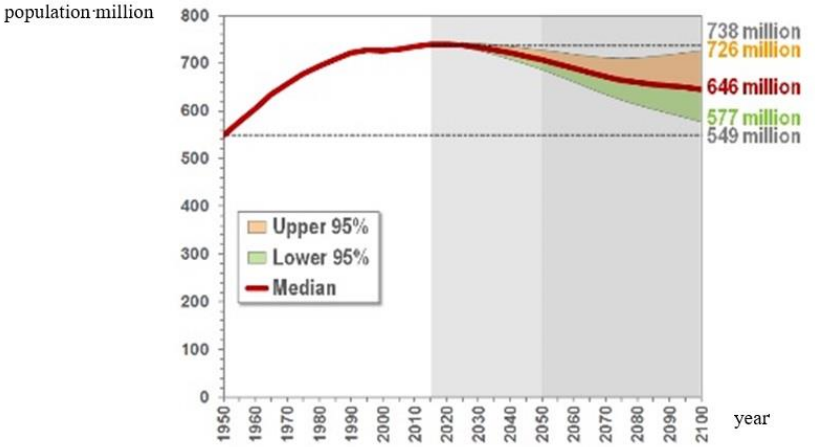

Figure 1

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

The EU is threatened by aging and aging has a considerable influence on economies and societies (Eurostat, 2015). 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. In each country, preliminary calculations are done to ensure the sustainability of the pension system (Mészáros, 2014). The essence of the PAYG system is that the pension contribution of active workers is collected and distributed among the pensioners as pension (Csontos, 1997). 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 (Novoszáth, 2014). Also, future pensions are not insured, 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 (Augusztinovics, 2014). At the macro level, an automatic system should be created between contributions and benefits that ensures the long-term sustainability of the system (Simonovits, 2002). The PAYG system is convenient while the population is growing

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

(Samuelson, 1958). We humans not only die, we grow old. Demographic data show that the population of Central and Eastern Europe (see Fig. 1), including Hungary (see Fig. 2) has been decreasing for some time and calculations show that it will continue to do so.

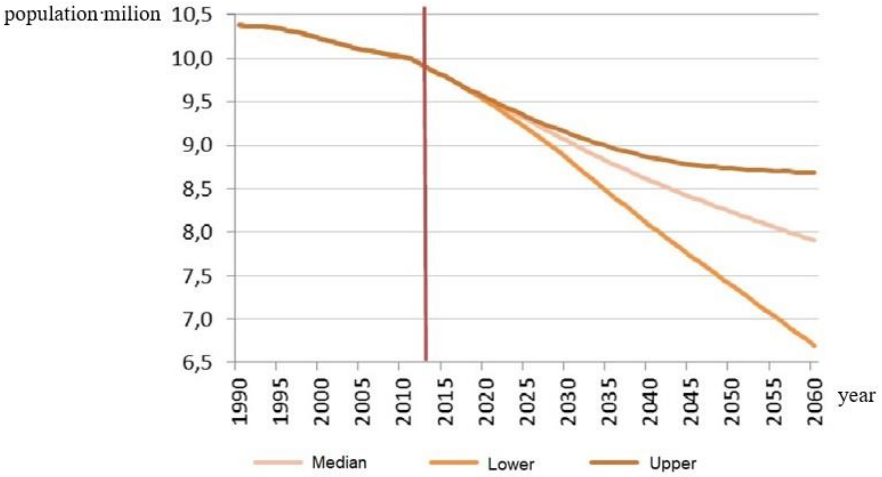

Figure 2

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

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. Today's people of 60 or 65 are very different from people of the same age half a century ago and will be probably very different from people of the same age half a century from now. People live longer and enjoy more knowledge (European Commission, 2018, 2020).

Due to unfavorable demographic trends, the current scenario is that Hungary's population will decline to 8.75 million over the next 20 years, said Zsolt Spéder, head of the CSO's Institute for Population Studies, in an interview to the Portfolio. According to the expert, if life expectancy increases, raising the retirement age by 2040 is likely to be inevitable. In addition, it would be a good idea to talk about a fairer Hungarian society in twenty years' time, even though major international trends are pointing towards increasing inequalities (Monostori - Őri - Spéder, 2015). The paper subsequently presents the measures of the aging of the population adapted to changes in life expectancy and compares them to the uncorrected

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

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, the beginning of old age has been defined 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. This paper, further measures aging with the new threshold value and compares it to the uncorrected values. With the help of the dynamic old-age threshold, new things can be seen. For example, here it is evident 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.

3 Modeling of pension systems

State pension systems are targeting long-term goals and have long-term impacts. (Augusztinovics, 2014). The Hungarian pension system is founded on two main pillars: the first pillar is the PAYG principle, the second is the capital provision principle (Novoszáth, 2014).

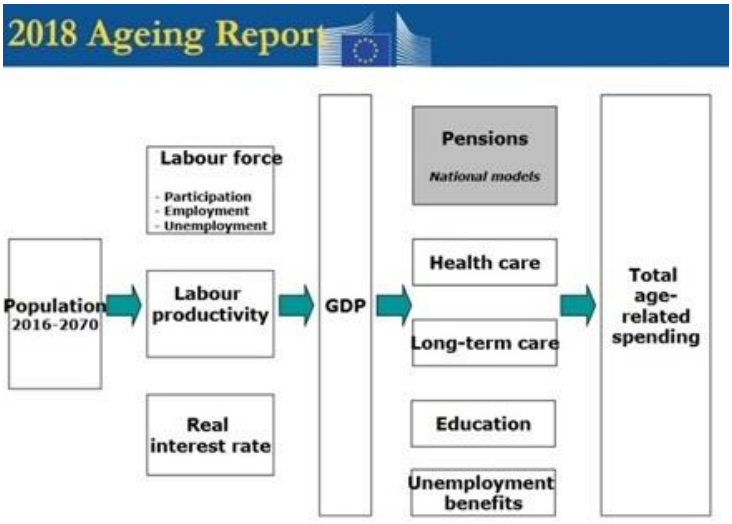

Figure 3

The microsimulation modelling process (European Commission, 2018)

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

In the case of a pension system based on the PAYG principle, the incoming contributions are not capitalized nor invested, but pensions are payed directly from them. The PAYG system is comfortable and might seem attractive while the population and the economy are growing. The recent obligatory social insurance system faces the following three problems that endanger the financial balance of the Hungarian pension system: an ageing population, a low level of employment and the partial payment of contributions. According to demographical data, the population stopped growing a long time ago. Meanwhile, pension payments are continuously growing as statistics show (Dekkers - Rézmovits - Sundberg - Tóth, 2015).

Country	*Financing*	*Public pension schemes*	*Model*	*Institution*
Belgium	PAYG	DB	MIDAS-BE	Belgian Federal Planning Bureau (FPB)
Germany	PAYG	PS	AVID	Ministry of Labour and Social Affaires and the German Pension Insurance (MLSAGPI)
Sweden	PAYG	NDC	SESIM2	Ministry of Health and Social Affairs (MHSA)
Hungary	PAYG	DB	MIDAS-HU	Central Administration of the National Pension Insurance (CANPI)
Slovak Republic	PAYG	PS	IER	Institute for Economic Research (IER)
Poland	PAYG	NDC	ZUS	Polish Social Insurance Institution (PSII)
Czech Republic	PAYG	DB	NEMO	Ministry of Labour and Social Affairs (MLSA)

Table 1

Tools of modelling pension systems in EU and V4 (European Commission, 2018, 2020 and author's compilation)

The PAYG system is undergoing a serious crisis in the European Union and the reforms of pension systems are inescapable. On a macro level an automatic system should be designed for contributions and pension payments that would ensure the long-term balance of the system (Dekkers, 2013). A method to simulate the above-listed problems and pension models with computers is microsimulation. This way

there is no need for authoritative decisions – the effects of decisions can be simulated and calculated before the decision is made. The term "micro-simulation" is short for the expression "micro-analytical simulation" (Gilbert - Troitzsch, 1999, Molnár, 2004, European Commission, 2018). Micro-simulation models applied in the impact analysis of the pension system may be classified according to many aspects, from absolutely static to fully dynamic (Dekkers - Rézmovits - Sundberg - Tóth, 2015).

Micro-simulation modelling takes place at the level of individuals and households, i.e. in those locations where the direct impacts of the changes of the pension system are registered (see Fig. 3). This way the changes in the distribution of various incomes (wages, pensions) in time can be modelled Pension systems are for the long term and therefore they have long-term impacts. According to demographic figures, the population has not grown for a long time, and preliminary calculations show that the growth of the economy has stalled and pension expenditures keep increasing (European Commission, 2018). Recently, PAYG systems are in a deep crisis everywhere in the world, therefore the reform of the state-operated pension system has become inevitable. It is essential to assess the impacts of actions, and micro-simulation is an excellent method for this.

Year	2016	2020	2030	2040	2050
EU 27 – Life expectancy for women {year}	83,7	84,3	85,7	87,0	88,2
HU – Life expectancy for women {year}	79,6	80,4	82,3	84,0	85,7
EU 27 - Life expectancy for men {year}	78,2	78,9	80,6	82,1	83.5
HU - Life expectancy for men {year}	72,8	73,7	76,0	78,2	80,3

Table 2

EPC calculations for EU 27 and Hungary (European Commission, 2018, 2020 and author's compilation)

The task of pension calculation requires the long-term forecast of data and that can be done through modelling (in the U.S. calculations are performed for 75 years, in the EU and in V4 for 50 to 60 years ahead) (European Commission, 2018). In general, we use the following micro-simulation models in the impact analysis of pension systems (see Fig. 3) (European Commission, 2018).

Year	2016	2020	2030	2040	2050
EU 27 – Number of births	1,55	1,61	1,67	1,71	1,74
HU - Number of births	1,48	1,61	1,68	1,72	1,75
EU 27 – Working-age population between 15-64 years {million}	290,697	287,478	275,374	262,255	252,854
HU - Working-age population between 15-64 years {million}	6,588	6,364	6,081	5,711	5,325
EU 27 – Potential growth of GDP	1,3	1,4	1,2	1,2	1,4
HU - Potential growth of GDP	1,9	1,9	2,1	1,2	1,5
EU 27 – pension expenditures {GDP %}	10,4	10,7	10,5	11,4	12,5
HU - pension expenditures {GDP % }	10,6	10,9	10,7	12,8	13,8

Table 3

EPC calculations for EU 27 and Hungary (European Commission, 2018, 2020 and author's compilation)

Dynamic simulation is generally used, where the demographic modules also have to be created. In Hungary the predicted number of births, deaths, marriages and divorces necessary for the modules can be obtained from the statistical service of the state (KSH). Table 2 and 3 shows that countries of the EU use different tools for modelling their pension systems. Nowadays dynamic microsimulation models are used in public or semi-public research agencies or ministries in EU member states for policy assessment. Many models form the basis of international scientific publications and are therefore better known. Models developed in public institutions

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

are less extensively documented (in English) and appear less often in international publications.

Microsimulation can predict the effects of planned measures therefore it can effectively help decision-making. Information is important for an economic entity, be it a state or private organization. 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 2). 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 (Eurostat newsrelease 2015). An important question is whether there will be enough active workers to cover pensions with their pension contributions (see Table 3.). 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 (Augusztinovics, 2014). The most important task is to examine how the population changes, and thereby make it possible to accurately predict the future , 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. In 2018, employment rates for men and women aged 55 to 64 years were higher, at 65% for men and 52% for women, than the average rates for all adult men and women (60% and 48%) in the European Union (EU). The most striking aspect is the rapid pace at which employment rates for people aged 55 to 64 years increased between 2003 and 2018 (with little or no impact from the global financial and economic crisis). This was particularly notable in relation to the growing proportion of women in work (European Commission, Eurostat, 2019).

4 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 (Novoszáth, 2014). The PAYG system is convenient while the economy is growing (Samuelson, 1958). As it has been seen before, life expectancy in the world has doubled in 100 years, with fewer and fewer children being born. 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. Demographic pressures are on the rise both in Central Europe and Hungary, and by 2060 demographic dependence may double (NYIKA, 2010, Mészáros, 2014, Banyár, 2016).

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

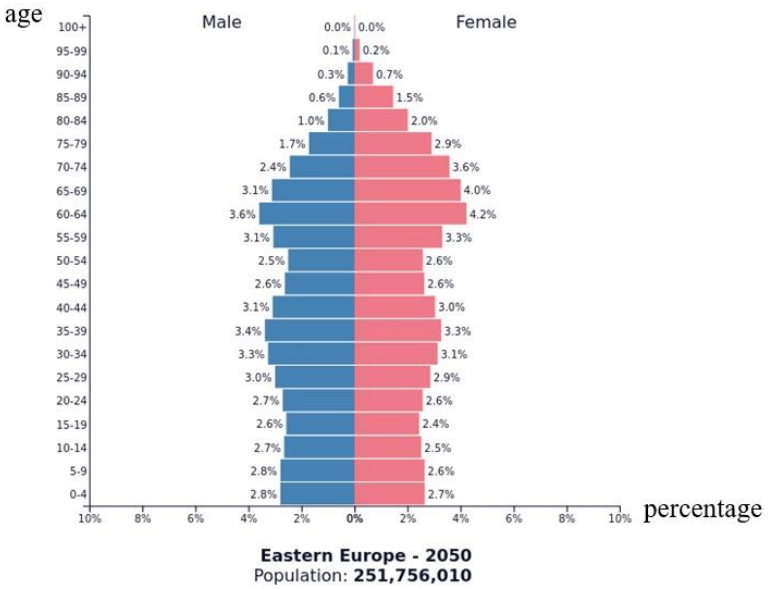

Figure 4

The population pyramid of Central and Eastern Europe and Hungary for 2050 (Population Pyramids, 2020)

The latter may change slightly due to family protection action plans. Among the V4 countries, the financial wealth of Hungarian households stands out, including real estate, which would be 200% of GDP. However, it is less good that the share of life insurance and retirement savings as a percentage of GDP is only 9%, well below the EU average of 46.5%. In retirement savings, reserves and portfolios are increasing, with NYESZ alone declining compared to the end of 2014. When looking at active contributors and active members, the effective pension supplement coverage in Hungary is about 29%. This also means that 70% will not have any pension savings. According to the MNB, welfare funds would provide mass access because they would provide subject membership and actively finance the economy through stock exchanges and government securities. Not to mention that one can reach out to young people with an expanded range of services (first home purchase, childbirth). In practice, this could look like a retirement and health pocket for an individual welfare account, which could be used in a family-friendly way. It is envisioned that every employee could be a member of the welfare fund resulting from the merger of health funds and pension funds. It would be up to everyone to decide the rate of individual contribution. This would be supplemented by employers' preferential tax subsidies. The current tax credit may be replaced by a state normative grant (Thaler – Sunstein, 2011).

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

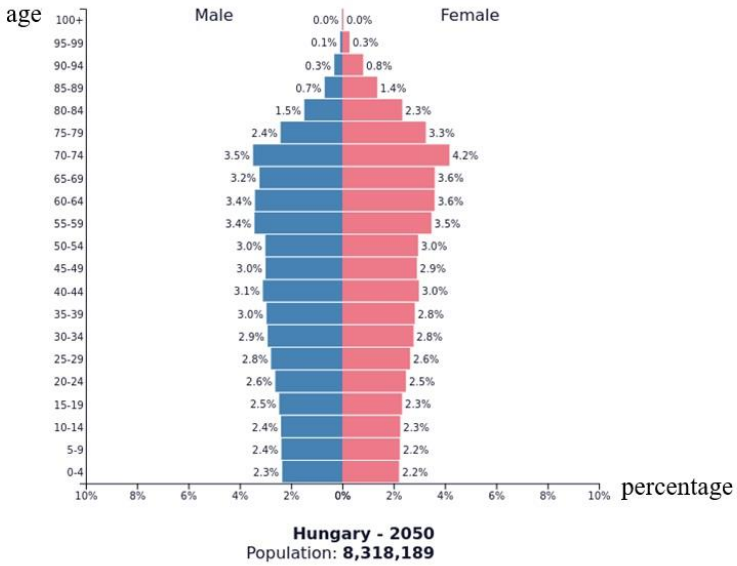

Figure 5

The population pyramid of Central and Eastern Europe and Hungary for 2050 (Population Pyramids, 2020)

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.

5 Financial saving forms and possibilities

Although the contribution to the pension system is one of the highest in the OECD countries in Hungary, one receives only 60 percent of one's earnings as a pensioner. In terms of the value of pensions, there are several countries where contributions are largely made to mandatory private pension schemes. The mandatory contribution to the state pension fund is the second highest in Hungary among the OECD countries. An average worker pays roughly 30 percent of his income into the pension system, which is higher only in Italy. Nevertheless, the replacement rate of pensioners (i.e. the proportion of retirees receiving their previous salary as a pension) is only 60 percent in Hungary, thus Hungary is in the middle of the OECD (between Japan and New Zealand - of course, the average income in these two countries is much higher) . In Hungary, the pensions currently paid out entirely

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

come from the mandatory state pension contribution. Currently, the proportion of VRS in the OECD countries is low, especially in the Anglo-Saxon countries (Canada, the United Kingdom, the USA), which make up a significant part of old-age benefits. In other states, such as the Netherlands and Denmark, a large proportion of payments come from mandatory private pension funds.

Product types	*Timeframes*	*Liquidity*
Cash, Bank Deposit	1 month to 2 years	liquid
Permanent Investment Account	2-5 years	relatively liquid
Investment Certificates, Investment Funds, Housing Savings Bank	6-10 years	less liquid
Voluntary Pension Fund (VPF), the Retirement Savings Account (RSA) and Pension Insurance	from 10 years until reaching retirement age	least liquid

Table 4

Liquidity of financial savings (Rombuszbroker, 2020 and author's compilation)

These countries occupy the first two positions in terms of the replacement rate of pensions: in Denmark, pensions are equivalent to more than 85 percent of average salary and in the Netherlands more than 95 percent. However, in general, it cannot be said that the higher the proportion of mandatory private pension, the greater the salary one receives as a pensioner. For example, Italy and Austria are in the third and fourth place, where, like Hungary, only the state pension fund has to pay pension contributions, while in Estonia and Lithuania, for example, there is a compulsory private pension scheme, although the replacement rate is lower than in Hungary. In fact, the value of pensions relative to salaries depends on a number of other factors, from the dependency ratio to the overall performance of the economy. 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 (see Table 4.).

Nobel Prize-winning British economist Angus Deaton confirms the findings of his research on consumption, well-being and poverty that money makes people happy

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

from poverty to subsistence and then to security. Above one level, however, more money no longer causes a significant improvement in quality of life (Steptoe - Deaton - Stone, 2015). Mention should also be made of research into the technique of surveying the world's extreme poverty, people living on less than one or two dollars a day, and the reliability of data, especially household surveys conducted by the National Sample Survey (NSS) in India. His research also covers the interrelationship between the social situation, health, income and education, and its effects on the national economy. The Almost Ideal Demand System (AIDS), created by Angus Deaton, is the first globally applicable method for measuring poverty. The concept of the so-called Deaton paradox is also derived from it, i.e. that the level of consumption does not usually change even in times of rapid rise and fall in income (Deaton, 2017). The levels of the Maslow Hierarchy of Needs, if one looks at income at the first two levels, money is needed to buy food, provide a place to sleep, to live almost exclusively with the contribution of money. Of course, these needs must be met in the long run, too, so it is clear that the second pillar is the money as the key to our long-term sustainability. As one moves up the pyramid, one becomes happy and content with his own life. After this level, money as a value cannot do more for one's happiness, because love and acceptance cannot be bought, of course. The hierarchy envisioned by Maslow does not always hold true, as has been confirmed by numerous studies (Wahba - Bridwell, 1976).

According to forecasts, the number of pensioners will increase dramatically, and this cannot be changed in the short term. In the current pension system, one of the complementary elements of securing old age livelihoods may be the choice of a voluntary pension fund. A voluntary pension fund can enable the citizens to maintain their standard of living during their active years when they retire. These institutions supplement other retirement savings such as pension insurance. Pension is, in general terms, "the benefit that senior citizens of a country are entitled to, and therefore not on a means-tested basis. Its amount depends on the length of service, that is, the number of years of work (earning) and previous earnings "(Matits, 2016). This definition is a good reflection of the public perception that the concept of pension relates exclusively to social security benefits. However, any regular old-age income to which one is entitled in one's active age is considered a pension. Thus, our retirement income may or may not be our retirement income. It should be made clear that there is no form of public benefit that can, and cannot, be a good pension for everyone. So if a person wants to be really safe in his old age, then he will really have to do a lot. In addition to raising taxes and contributions and pushing the retirement age, there is a more effective and sustainable solution called self-care.

This means that people create for themselves a private pension fund that allows them to live a full life as they grow older. This will also relieve the state of the burden because, with the help of the state, they are putting money aside. They manage their own assets and do not pay more for the community. There are many

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

pension savings options available. Before choosing the right savings product, one needs to decide in advance how much time and liquidity will be involved in choosing the savings form. The state supports three types of retirement savings solutions: the Voluntary Pension Fund (VPF), the Retirement Savings Account (RSA) and Pension Insurance. These are worth thinking about for a minimum of 10-20 years. Accumulated private pension funds can be taken up when one reaches retirement age, with some restrictions being made available earlier.

6 The role of self-care in one's decisions

6.1 Behavioural economics and decision-making typology

Self-care, i.e. savings for retirement (voluntary pension fund, insurance, other savings, etc.). Of these, it is easy to choose which one or more people want to provide for their future expected pension level (Havran, 2011). Decisions in general, such as what type of "financial investment" to choose, cannot be supported by human reasonableness or preference, and this is also supported by economic psychological research because it is overridden by other non-rational considerations (Fodor, 2013). Research has shown that the processing of rational and non-rational information is related to the cerebral hemispheres. The left hemisphere is the conscious, the dominant, the logical, the rational, the analyst, the positive thinker, and the right hemisphere is the equivalent of the unconscious, irrational, emotional, negative thinking. Positive or negative information processing is a solid, though influential personality trait (Hámori, 1998). For most people, left hemispheric function is a hallmark of positive information processing (Fodor, 2013).

Its positivity lies in its confidence that it is difficult to bear crisis situations that jeopardize its positive outlook and expectations in the good course of events. The left hemisphere is characterized by a systematic, analytical problem approach, research and listing. The right hemisphere is more capable of processing negative information, that is, it plays with the expected outcomes in a given situation, imagines the outcomes, and is therefore more likely to be activated when a given situation occurs. From an economical point of view, research has shown that the right hemisphere is also decisive in shaping individual preference systems. From the point of view of problem solving, the right hemisphere gathers experience on each outcome. Thus, decision-making is heavily influenced by which cerebral hemisphere the individual relies on. Another decisive factor in decision making is the determination of the decision maker. A determined person makes a decision faster than a less determined partner.

© Szabó, Zs. (2020): Economic growth models and their effects on pension security. In Kelemen-Erdos, A., Feher-Polgar, P., & Popovics A. (eds.): Proceedings of FIKUSZ 2020, Obuda University, Keleti Faculty of Business and Management, pp 262-281 http://kgk.uni-obuda.hu/fikusz

6.2 The role of financial awareness in decision making

This paper also focuses on the present and future status of direct persons. It's important to understand what respondents are directing themselves to the decision about self-care, what habits and processes influenced their decision, and more precisely what motivated them to choose the form of savings under consideration. With the help of questionnaire research, the author examined respondents' behavioral fundamentals and factor analysis methodology to determine what choices one has in relation to the expected pension level in the future. The research examines the importance of self-care as a pillar of retirement supplementation in the public consciousness and one's decisions today. It also examines the possible future pension systems, the future generations of retirement, how many people will work and how they will work in the future.

The research is based on the basic assumption that people think about retirement with fear and uncertainty. Based on the previous chapters it can be seen that the Pay-As-You-Go (PAYG) system is in crisis, so the II pillar, self-care is receiving increasing attention today. In order to gain a deeper understanding of the motivations behind one's decisions, parts of the factor analysis statistical procedure was used, which is nowadays a widespread computerized method of personality mapping (Sajtos - Mitev, 2007). The data of the questionnaire and the statistical calculations were done with the help of the SPSS software. The online survey was conducted in 2020. The total number of respondents was 1410 (n = 1410). The basic questions for which answers were sought were related to the planning of pension systems, retirement savings and self-care, retirement security, as these are the elements that determine the financial background of one's future existence, that is, the extent of one's self-care. Within the research, the answers were divided into 3 groups: 1. Knowledge of pension systems (compulsory, voluntary); 2. Financial planning (different characteristics of savings); 3. Role of self-care (personality mapping). The above three groups were analyzed separately by qualitative research. The three groups were subjected to a number of statistical evaluations, such as means, frequency, cross-tabulation. In this study, only the role of state pensions and self-care has been looked into. Based on the answers to the questionnaire, respondents are generally well informed about the pension system, but 86.2% of respondents do not consider the current state pension system to be stable. In contrast, they tend to rely on retirement savings, with 52% of respondents saying yes. Only 11.4% of respondents have pension insurance, while 29.1% have some form of retirement savings (Fig. 6).

Retirement Savings Account (RSA)	64	7.7%
Pension Insurance	95	11.4%
Voluntary Pension Fund (VPF)	178	21.4%
Life Insurance	107	12.9%
Permanent Deposit / Investment Account	28	3.4%
Bank Deposit	76	9.1%
Cash	42	5%
Government Securities	66	7.9%
Share	38	4.6%
Bond	19	2.3%
Investment Certificate	16	1.9%
Treasury Bills	14	1.7%
Building Society	68	8.2%
Other	21	2.5%
All answers	832	

Figure 6

The respondent has financial savings for retirement purposes (author's my own compilation)

The results also show that financial savings are important for respondents. Based on the average age of those who completed the questionnaire (average age: 30.6 years), savings are important. Further analyzes show additional internal relationships, such as the role of optimism in pension savings. Old-age savings are much more important for optimistic women because yes responses are greater than for men with similar characteristics.

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 Hungary. The Hungarian mandatory pension system is a pure Pay-As-You-Go (PAYG) 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.

References

[1] Angus, S. D. (2017): A nagy szökés - Egészség, gazdagság, és az egyenlőtlenségek eredete, Corvina Kiadó, pp. 1-414.

[2] Andrew, S. – Angus, D. – Arthur, A. S. (2015): Subjective Wellbeing, Health, and ageing. The Lancet, 385 (9968). pp. 640–648.

[3] Augusztinovics, M. (2014): Egy értelmes nyugdíjrendszer. Közgazdasági Szemle LXI. évf., 2014. október. Válogatás az elmúlt évtizedek írásaiból. pp. 1219-1239.

[4] Banyár, J. (2016): Model Options for Mandatory Old-Age Annuities. ISBN: 9789636937034. Gondolat Kiadó. pp. 1-236.

[5] Dekkers, G.: *An introduction to MIDAS_BE, the dynamic microsimulation model for Belgium (working paper).* Centre for Sociological Research, Brussels, 2013. 1-29.

[6] Dekkers, G.; Desmet, R.; Rézmovits, Á.; Sundberg, O.; Tóth, K.: On using dynamic microsimulation models to assess the consequences hypotheses on pension adequacy: Simulation results for Belgium, Sweden and Hungary. 2015-03. 1-58, Downloaded: 02/11/2020., https://lirias.kuleuven.be/bitstream/123456789/493177/5/REP_SIMUBESEHU0515_11026.pdf

[7] European Commission (2020): The 2021 Ageing Report ISSN 2443-8014 (online) Underlying Assumptions & Projection Methodologies INSTITUTIONAL PAPER 142 | NOVEMBER 2020 pp. 1-238.

[8] European Commission, Eurostat (2019): People work more years before retirement Downloaded: 02/11/2020. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/WDN-20191111-1?inheritRedirect=true&redirect=%2Feurostat%2Fnews%2Fwhats-new&fbclid=IwAR0l9ijxjS1QiAiynyJ10nqc8U0ZUoGJMYwD5xliXfzwglfrCK0WGdGZaQs

[9] European Commission: The 2018 Ageing Report: Underlying Assumptions and Projection Methodologies. Underlying Assumptions & Projection Methodologies INSTITUTIONAL PAPER 065 | NOVEMBER 2017. ISBN 978-92-79-64713-0 (print). DOI:10.2765/40638 (print). pp. 1-240.

[10] Eurostat newsrelease (2015): First population estimates EU population up to 508.2 million at 1 January 2015 Over 1 million more people living in the EU than in 2014. Product Code: 3-10072015-AP, Theme: Population and social conditions, Collection: News releases 124/2015 - 10 July 2015. pp.1-5. Downloaded: 06/11/2020. http://ec.europa.eu/eurostat/web/products-press-releases/-/3-10072015-AP

[11] European Commission: *PENMICRO Monitoring pension developments through micro socioeconomic instruments based on individual data sources: feasibility study*. Final Report for The European Commission Employment, Social Affairs and Equal Opportunities DG EMPL E4 Unit. Unit Submitted by: TARKI Social Research Institute (Hungary) Prepared by: Róbert I. Gál, András Horváth, Gábor Orbán in collaboration with Gijs Dekkers (FPB, Belgium) (Jan-Dec 2008), 1-66. Downloaded: 06/11/2020. http://ec.europa.eu/social/BlobServlet?docId=4300&langId=en

[12] International Monetary Fund (2020): World Economic Outlook: A Long and Difficult Ascent. Washington, DC, October. pp. 1-204.

[13] Iván, L. (2004): Az öregedés élettani és társadalmi jelenségei. Az öregedés aktuális kérdései. Budapest: Magyar Tudomány, A Magyar Tudományos Akadémia lapja 2002/4.

[14] Fodor, L. (2013): Gazdaságpszichológia. Noran Libro Kiadó. Budapest. pp.1-494.

[15] Gilbert, N.; Troitzsch, K.: *Simulation for the Social Scientist.* Buckingham: Open University Press, 1999. 1-308.

[16] KSH: *Magyarország 2015*. Központi Statisztikai Hivatal, Budapest, 2016. pp. 1-185.

[17] Hans, R. - Ole, R. – Rosling, R. (2018): Tények. Budapest: Libri Könyvkiadó, 2018. pp. 1-300.

[18] Havran, D. (2011): Nyugdíjrendszerek: magán vagy állami? Nyugdíjparadigma-irányzatok a finanszírozás szemszögéből. Hitelintézeti Szemle 1. pp. 48-60.

[19] Hámori, B. (1998): Érzelemgazdaságtan. Kossuth Kiadó. Budapest. pp. 16-20.

[20] Holtzer, P. (szerk.) (2010): Jelentés. A nyugdíj és időskor kerekasztal tevékenységéről. MEH. NYIKA. pp. 1-452.

[21] Mahmoud A. Wahba - Lawrence G. Bridwell (1976): Maslow reconsidered: A review of research on the need hierarchy theory. Organizational Behavior and Human Performance, 15(2). pp. 212–240.

[22] Matits, Á. (2016): Az állam és az egyén felelőssége az időskori jövedelem biztosításában. Simonovits 70, Társadalom- és természettudományi írások Arkhimédésztől az időskori jövedelmekig. Budapest: MTA KRTK Közgazdaság-tudományi Intézet. pp. 195-199.

[23] Mészáros, J. (2014): European Pension System: Fantasy or Reality. Report of the conference of the Central Administration of Ntional Pension Insurance organised in cooperation with the International Social Security Association Eurpean Network held in Budapest, Hungary on 19th September 2014. pp. 1-94.

[24] Molnár, I.: *Microsimulation model development environments.* Statisztikai Szemle, 2004., 82. évf., 5. sz. 462-477.

[25] Monostori, J. - Őri, P. - Spéder, Zs. (2015) (szerk.): Demográfiai portré 2015. Budapest: KSH NKI. pp. 1-241.

[26] MNB (2018): A nyugdíjpénztárak 2018. évi, a 2004-2018. és a 2009-2018. évek közötti befektetési teljesítményének. Downloaded: 11/11/2020. https://www.mnb.hu/letoltes/hozamratak-2018.pdf

[27] Novoszáth, Péter (2014): A társadalombiztosítás pénzügyei. Nemzeti Közszolgálati és Tankönyv Kiadó. pp. 1-244.

[28] Novoszáth, Péter (2017): A társadalombiztosítás pénzügyeivel kapcsolatos rendszerek átalakítása Magyarországon. Budapest: Új magyar közigazgatás, 10. évf. Klnsz. / 2017. pp. 8-18.

[29] NYIKA (2010): Jelentés a Nyugdíj és Időskor Kerekasztal tevékenységéről. Budapest, 2010. pp. 1-400.

[30] OECD Pensions at a Glance (2019): OECD and G20 Indicators. Downloaded: 08/11/2020. https://www.oecd-ilibrary.org/social-issues-migration-health/pensions-at-a-glance-2019_b6d3dcfc-en

[31] Ottó, I. (2003): Hierarchikus faktoranalízis SPSS szoftverrel. Magyar Pedagógia 103. évf. 4. szám pp. 447–458.

[32] Sajtos, L., Mitev, A. (2007): SPSS kutatási és adatelemzési kézikönyv. Budapest. Alinea Kiadó. pp. 1-404.

[33] Samuelson, P. A. (1958): An Exact Consumption-Loan Model of Interest with or without the Social Contrivance of Money. Journal of Political Economy, Vol. 66., pp. 467–482.

[34] Simonovits, A. (2013): Modeling pension systems. Houndmills: Palgrave Macmillan, 2013. pp. 1-192.

[35] Szabó, Zs. (2017): Retirement security – The role of self-care. Reicher Regina Zsuzsánna, Kozma Tímea, Varga Erika (szerk.). Thinking Together: The economy in practice. 151 p. ISBN:978-963-449-033-3; 978-963-449-034-0. Budapest: Óbudai Egyetem, 2017. pp. 67-79. (1.) 1.

[36] Thaler, H. R. (2016): Rendbontók. A viselkedési közgazdaságtan térnyerése. Budapest: HVG könyvek. pp. 1-500.

[37] Thaler, H. R. – Sunstein, C. R. (2011): Nudge- Jobb döntések egészségről, pénzről és boldogságról - A pénzügyi válság után. Manager Könyvkiadó. pp. 1-263.

[38] United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population. Prospects: The 2015 Revision, Volume I: Comprehensive Tables (ST/ESA/SER.A/379). pp. 1-372.

[39] World Economic Forum (2019): These are the most populous nations on Earth. Downloaded: 05/11/2020. https://www.weforum.org/agenda/2019/07/these-are-the-most-populous-nations-on-earth-according-to-study?fbclid=IwAR25MS4OzJ4zxgsbyUu_jdQFdJW0gzC1HIYTh9IglYOV7yoYbOVi7xbmpXY