Pensions today
Economic, managerial, and social issues

Edited by
Filip Chybalski and Edyta Marcinkiewicz

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INTRODUCTION

The topic of pensions is very broad and multidimensional in nature so it is of great interest to many scholars representing various fields of science. Pension systems all over the world have been continuously undergoing some major or minor reforms, which refer to the general model or design of old-age social security, or which aim to change some of its parameters, especially the pensionable age. These reforms have a common ultimate goal, which is to ensure adequate benefits in old age funded by financially and economically sustainable pension systems. Changes to pension systems refer to various pension plans: those organized by the state through the public institutions, those organized by employers in cooperation with financial institutions, or those organized solely by financial institutions and dedicated directly to individuals. Thus, the spectrum of problems worth addressing by scholars is very wide. In this book, pensions and their background are investigated from the perspective of the social sciences, primarily management, economics, finance, and law. We address the very relevant and current problems of pension systems, retirement, the demographical determinants of pension systems' adequacy and sustainability, and the political and legal aspects of pension reform.

The monograph includes 23 chapters addressing the problems of contemporary pensions from both a general and a national view, studied from a theoretical or empirical perspective. The book is structured as follows. First, the managerial, administrative and business aspects of retirement and pension wealth are discussed. The next five sections are devoted to very important and current problems of family and gender issues in the context of old-age social security. The subsequent six chapters refer to other social and economic aspects of pensions with some references to social security reforms. In the next three sections, some financial and actuarial issues are discussed and investigated. Finally, in the last five chapters, the authors address selected problems of pension reform with special attention paid to their policy and legal aspects. In these 23 chapters, issues concerning various countries are presented. In some chapters, a single-country empirical approach is employed (with reference to Poland, Spain, Turkey, Slovakia, Latvia, or Czechia, for example), whereas some other sections present multinational studies.

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IMPACT OF A PENSION SYSTEM AND AN ENTERPRISE ON EMPLOYEES' RETIREMENT: AN INTERGENERATIONAL CONTEXT

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1. Introduction

The process of population ageing forces pension reforms which change intergenerational relations not only on the macro level but also on the micro one. In the case of a macro level, the issue of the relationship between pension reforms and the whole economy with special attention paid to the labour market (including the competition between different generations on the labour market) is a topic very often investigated by scholars (Barr and Diamond 2006; Chybalski and Marcinkiewicz 2015; Gruber et al. 2009; Hernaes 2013; Lefèbvre 2012). With regard to a micro level, ageing populations and changing pension systems are processes affecting intergenerational relations in both families/households as well as in enterprises. In case of a family/household, many research focus on consumption smoothing starting from a life cycle hypothesis (Ando and Modigliani 1963; Modigliani and Brumberg 1954), and continuing with its empirical tests (see for review: Bernheim et al. 2001; Campbell and Mankiw 1989; Campbell and Deaton 1989; Parker 2008; Parker 1999). Other studies address e.g. intergenerational transfers within a family in cash, time or in kind (Albertini et al. 2007; Daatland et al. 2012; Hagestad and Herlofson 2007), the coincidence of couples retirement (joint retirement) (Gustman and Steinmeier 2005), or the impact of roles played in a family/household (e.g. grandparenthood) on retirement (Hochman and Lewin-Epstein 2013; Kridahl 2017). With regard to an enterprise level, many studies tackle the problem of age management forced by ageing populations and decreasing labour supply (Brooke and Taylor 2005; Fuertes et al. 2013; Grima 2011; Muller-Camen et al. 2011; Schröder et al. 2009; Walker 2005). Other important issues are intergenerational relations and intergenerational conflicts in the workplace (Dencker et al. 2007; 2008; Lyons and Kuron 2014; Whitney Gibson et al. 2009) or intergenerational mentoring (Marcinkus Murphy 2012; Ropes 2013).

Ageing populations force many changes in the approach to the human resources management in companies. The reason behind this is mainly decreasing labour supply. Thus, the literature on age management and intergenerational workplaces

is very extensive. However, there is another important issue concerning companies facing the problem of shrinking human resources. This is the relationship between a pension system, an enterprise playing the role of an employer (workplace), and an employee making a retirement decision, in which an enterprise can modify the impact of pension system's regulations on employee's retirement decision. Thus, the goal of this paper is to identify and characterize main elements of this nexus in the context of retirement decisions taking intergenerational relations into account. We focus on the pension system's impact (with its main parameter, which is a pensionable age (statutory retirement age)) on the employers' behaviour, as well as the employers' (workplace) impact on employees' retirement decisions (reflected in effective retirement age). The paper is structured as follows. First, we present a pension system in an intergenerational context. Second, we attempt to discuss a pensionable age as a determinant of an enterprise activity in the role of an employer. The subsequent section tackles the issue of the possible impact of the employer on employees' retirement decisions. The paper ends with a brief summary of issues discussed.

2. Pensions in an intergenerational context

Pensions are usually investigated in the literature, both theoretically and empirically, from an individual or economy's perspective. The former refers to a microeconomic goal of a pension system which is consumption smoothing. This approach to pensions has its roots in theories of consumption, starting from the model of intertemporal choice (Fisher 1930), through permanent income hypothesis (Friedman 1957) to life cycle hypothesis (Ando and Modigliani 1963; Modigliani and Brumberg 1954). Further developments refer to behavioural economics in the context of individual pension decisions (Benartzi and Thaler 1999; Beshears et al. 2008; Blake 2006; Kahneman and Tversky 1979; Mitchell and Utkus 2003; Thaler 1985). From an economy's point of view, including labour market, macro aspects of pensions are investigated, which results from a macroeconomic definition of a pension system. In line with this, a pension system is a tool for dividing current GDP between generations (Barr and Diamond 2006; Góra 2008). This approach is deeply embedded in overlapping generations approach (Diamond 1965; Samuelson 1958).

In a micro approach, an individual is perceived as a "traveller" across different generations defined through the prism of age groups. First, an agent participates in education (the young generation), then is economically active and works (the working-age generation) and in the last phase of the life course is a pensioner (the elderly generation receiving pension benefits). This "intergenerational journey" forces some behaviour referring to the division of current incomes. Namely, income is divided between current consumption and saving. Saving is perceived as future consumption dedicated for the retirement period. Thus, in this context, a pension system allows for distribution of consumption to the future, from the period when an agent is economically active to the period after economic activity characterized by the lack of work income.

In a macroeconomic perspective a crucial thing is an intergenerational distribution of GDP as there is no alternative way to finance pensions. The working-age generation creates GDP which is divided between all generations. To simplify, today's workers finance the education of their children as well as pensions of their parents, regardless of a pension system's model (unfunded PAYG or funded). This intergenerational transfer is based, in principle, on the intergenerational reciprocity rule. Today's working-age generation financing pensions of their parents returns an earlier debt for education (incurred when today's working-age individuals were young and their parents were in the working age). Simultaneously, the same working-age generation finances education of their children whose generation in the future will finance pension benefits of their parents on the same reciprocity rule. This intergenerational character of pensions with regard to an individual (family/household) as well as to the whole economy is obvious and natural.

Although pensions in the intergenerational context are considered mainly from perspectives mentioned above, they reflect their intergenerational character in the scale of an enterprise as well, which is much less often addressed in the literature. First, a pension system constitutes an important macro determinant of enterprise activities. Second, pension schemes are organized not only outside the companies but also within them, and companies can affect their employees' decisions regarding retirement. In the former case, both the model of a pension system indirectly as well as a pensionable age (statutory retirement age) directly can affect employees' decisions about when to retire, which influences human resources in quantitative terms. In the latter case, employers responding to state regulations in terms of pensions may organize (on the voluntary or obligatory basis) occupational pension schemes in the company as well as may take actions impacting their employees' retirement decisions. Thus, individual decisions about when to retire can be affected not only by a state but also by employers. On the one side, a state creates general rules of retirement (mainly through the indication of a pensionable age). On the other side, a company can support (reinforce) or mitigate (counteract) the impact of state regulations on individual retirement decisions through encouraging or even forcing workers to accelerate or delay retirement. Pensions may affect intergenerational relationships in an enterprise (e.g. through occupational pension schemes, retirement regulations in a company), but similarly, intergenerational relations in an enterprise as a workplace may affect retirement decisions of employees. Below, in next two sections, we discuss these issues.

3. Pensionable age as a determinant of employers' behaviour

A pensionable age can influence enterprises and employers both directly and indirectly. The direct impact is an obvious one. The government sets following general categories of a retirement age:

- Pensionable age, which according to OECD terminology is "age from which an individual is eligible for pension benefits". Barr and Diamond (2010) name it "a normal retirement age" and it allows for "a full benefit" which means a benefit not reduced due to early retirement,

– Minimum retirement age, which is the lowest age entitling to be paid pension benefit, however, this benefit is usually reduced due to early retirement (i.e. before a pensionable age).

Additionally, a mandatory retirement age, i.e. age at which an individual is forced to retire (due to legal regulations or employment contracts) may also exist. However, today such practices are said to be age discrimination. Thus, mandatory age is usually applied only with regard to some specific professions, as e.g. judges.

State regulations concerning the pensionable age affect two parameters characterizing agent's decisions about retirement. These are:

– Effective retirement age, which is an age at which an individual starts to be paid a pension benefit, i.e. it is an actual retirement age. OECD calculates it for the population (separately for males and females) as an average effective age of retirement,
– Effective age of labour market exit, which is an age at which an individual stops finally working.

Obviously, the pensionable age does not determine solely the effective retirement age or effective age of labour market exit. The world does not work in such a way that people retire (even on average) exactly at pensionable age. In majority of OECD countries people usually retire earlier, before this age. Nevertheless, pensionable age (and minimum retirement age) is an important factor influencing individuals' decisions about retirement (Manoli and Weber 2016; Staubli and Zweimüller 2013) and, thus, affecting the labour supply significantly.

This direct impact of a pensionable age on human resources is not the only one. Pensionable age can affect human resources also in an indirect manner, interacting together with other elements of a pension system. This refers mainly to the linkage between an employee's salary in the working-age period and expected pension benefit, where a type of a pension scheme really matters. There are two models of calculating pensions: defined contribution (DC) and defined benefit (DB). These models characterize the linkage between the salary of an employee and his or her pension benefit.

In DC model pension benefit is directly determined by contributions paid to the pension scheme during the working period and the rate of return in this scheme (these both create pension wealth) as well as by the life expectancy after effective retirement age. Thus, since pension contribution is calculated as a percentage of a salary, a pension benefit is actually a derivative of salaries in the whole working life. Moreover, the pension wealth is transformed into annuity taking the life expectancy after retirement into account. This means that effective retirement age is crucial for the calculation of a pension benefit in DC model. Besides, as contributions paid earlier (in the younger age) are indexed over the longer period than those paid later (especially directly before retirement), a higher salary at the end of working period does not affect the amount of pension benefit significantly (a higher salary in the earlier phase of working life would affect a pension benefit stronger due to a greater number of indexation periods of the contribution paid from this salary). Therefore, DC model generally motivates to delay retirement

and, therefore, increases human resources in an enterprise, due to two reasons: longer accumulation period of pension wealth (however, earlier savings play more important role than later ones) and shorter decumulation period.

In case of DB model the impact of a pensionable age on retirement decisions is more complex as a design of defined benefit scheme plays an important role. Blake (2006) discusses three main ways of pensions' perception with regard to enterprises and human resources management: pensions as altruism, pensions as a deferred pay and pensions as a contingent claim. Altruism of pensions results from a care of employers about their employees as the former assume that the latter are not aware of possible financial shortages after retirement. With this in mind companies organize pension schemes. Pension as a deferred pay (i.e. pension benefit) is a tool of HRM aiming to motivate employees to stay loyal to the employer. Pension as a contingent claim can be perceived through the prism of a reward or insurance. The former refers to the distribution of benefits created in an enterprise between employers and employees, whereas the latter to the risk shared between them. The role played by pensions in HRM together with the design of a pension scheme affects employees' decisions about when to retire. Moreover, this role is very often determined by state regulations in terms of pensions (in some countries occupational pension schemes are obligatory, in other countries they are voluntary).

As Barr and Diamond (2006) indicate, DB schemes based on a final salary (final salary schemes), in case of which pension benefits are linked mainly to salaries in the final phase of working life, are especially problematic in the context of human resources supply. This motivates employees to stay with the same company instead of considering the change of workplace as they see advantages referring to a deferred pay. However, such schemes may determine significant differences in attitudes to the work across different generations in the workplace. Namely, final salary schemes encourage older workers to take activities aiming at increasing their salaries. They can achieve these goals working overtime. A quite different situation is in case of younger workers who do not see the linkage between present salaries and a deferred pay, i.e. future pension benefit. Therefore, a pension scheme does not motivate them to work extra hours, however, there are other factors which can do it, e.g. a prospect of increasing salary or a possible promotion (Blake 2006). Thus, regardless of a pensionable age, final salary schemes may motivate older employees to delay retirement, since salaries directly before retirement have the greatest impact on their pension benefit perceived as a deferred pay. Simultaneously, such schemes may stimulate intergenerational conflicts in the workplace as older workers are especially motivated to insist on a salary increase in the final stage of their working life. They can achieve this goal with the support of unions. As van Ours and Stoeldraijer (2011) indicate, salary can correlate with the age of employees instead of their productivity, which is caused by unions' activity aiming at supporting older workers and discriminating younger ones.

The last issue addressed in this section is the impact of a pensionable age on enterprises' decisions about the investment in human capital (of their employees). Both, individuals as well as companies take decisions on the basis of expectations. This refers to human resources management and spending on trainings, education or mentoring as well. State regulations in terms of pensions and retirement age affect these expectations as an employer develops a forecast concerning the further expected duration of working life of a given employee. This forecast is useful for the decision how much to invest in this employee. One can expect that investment in older workers, i.e. at age directly before pensionable age, can be perceived by employers as risky since the possible return period is short, whereas investment in human capital requires time to become profitable. The same refers to employees whose motivation to participate in trainings and education depends on the expected distance to retirement. People are not willing to learn directly before quitting the labour market. Thus, from both enterprises' as well as employees' perspectives, pensionable age affects their decisions about investment in human capital. Therefore, the factor of decreasing productivity of older workers is not their age (at least not directly) but low or even lack of investment in their knowledge and skills. Moreover, an increase in a pensionable age stimulates such investments (Bauer and Eichenberger 2016; Boeri and Ours 2008). A different pensionable age for males and females also matters in the context of HRM as it may cause a discrimination of females in terms of participation in trainings and education. In case of a male and female of the same age (e.g. 58 years), an employer will probably be more eager to finance the development of the former due to a longer expected return period on this investment in human capital as compared to the latter.

4. Enterprise and prevailing intergenerational relations as determinants of employees' retirement decisions

In this section we concentrate on how the workplace itself can determine employees' decisions about retirement. Thus, we disregard here a direct or indirect impact of macro-factors and focus on drivers existing in an enterprise, with a particular emphasis on intergenerational relations prevailing in the workplace and the role played by employers.

Currently, employers have to deal with a diversity of employees being representatives of four different generations. Starting from the oldest one, these are: Baby boomers (born between 1946 and mid-1960s), Generation X (born between mid-1960s and late 1970s), Generation Y (born between late 1970s and mid-1990s) and Generation Z (born after mid-1990s). At the time when Baby boomers began to reach retirement age (or at least approach it), the number of older people in enterprises significantly increased and the issue of intergenerational relations has become even more important. Up to late 1990s, when the retirement age was approached by generation of Veterans (born before 1946), benefiting from pension privileges such as reduced retirement age (due to job characteristics) or early retirement, was very common. This affected negatively the mentality of

labour market participants, both employers and employees. The former did not have to focus on age management in their organizations nor on managing intergenerational relations as pushing older workers into early retirement was beneficial for them. The latter (mainly people from Baby Boom Generation) assumed that they would also be able to leave the labour market before reaching retirement age without major consequences (Mulders and Henkens 2019). Growing exactly in the same mentality as their predecessors but at the same time facing a completely different reality, promotes a sense of injustice and growing tension between generations. This often contributes to a growing desire among older workers to leave the labour market earlier.

Nevertheless, it is not the only problem related to intergenerational relations, which enterprises have to face nowadays and which influences employees' decision on retirement. Older workers have different skills and abilities than their younger colleagues. Technology development has never been so fast and it is progressing at a pace which is hard to accept by the elderly. Not keeping up with changes can be negatively perceived by younger generations (especially Y and Z Generations). This can lead to some intergenerational conflicts (the likelihood of potential conflict will be even greater in companies where seniority is particularly rewarded). Such conflicts can lead to an objection of younger employees and to an increasing sense of social exclusion (marginalization) among older people. This, in consequence, may contribute to the decision on early retirement. Intergenerational conflicts can also have their roots in stereotypes, which characterize each generation. They are perceived as the greatest barrier to successful intergenerational cooperation, as they focus mainly on negative beliefs or values about other age groups and consequently, deepen the gap between generations (Čič and Žižek 2017).

The age diversity of the workforce is a great challenge for an enterprise. The greater the number of generations on the labour market, the greater the challenge, as high diversity in employees' demography generally impedes the group performance (Phillips and O'Reilly 1998). Besides skills level, intergenerational differences can also refer to psychological traits, career patterns and paths, personality, motivational mechanisms, commitment, leadership styles, levels of creativity and retention (Urick et al. 2017). All of these differences affect intergenerational relations and the workplace atmosphere. Retirement decisions in multigenerational workplaces are also influenced by the attitude of younger employees towards older ones (Böckerman and Ilmakunnas 2019) and the workers' relationship with the employer (Morrell and Tennant 2010). Both factors determine the job attractiveness, the higher it is, the greater the desire to remain longer on the labour market.

Generational differentiation caused by age diversity can be on the one side risky as it may result in intergenerational conflicts, but on the other side, it can become a great opportunity for cross-generational mentoring (Knight 2014). It can take the form of both mentoring and reverse mentoring. In the former one, older workers sharing their experience with younger colleagues can feel needed, while in the latter one, they can acquire knowledge from younger generations, thus,

reducing their skill gaps. In that way, a cross-generational mentoring can contribute to the well-being of older workers in the workplace, and thus, to their longer (and still productive) stay on the labour market.

In addition to intergenerational relationships prevailing in the workplace, employers are the ones, who can affect directly employees' decision on retirement. Drucker (2001) believes that it is mainly human resources managers' task to develop policies enhancing older workers to stay longer on the labour market (even after reaching a pensionable age). Their involvement can have a proactive character, when they initiate a conversation with employees about the future and potential opportunities, or a reactive character, when they respond to some suggestions or requests of their employees (Davies et al. 2018).

Mulders and Henkens (2019) state that there are three main HR strategies that employers should apply to encourage older workers to stay longer on the labour market. These are: information strategies, health strategies, and person-job fit strategies. The first one is about making employees aware of various pension solutions and their consequences (mainly financial ones). A conscious individual is supposed to make more rational decisions, nevertheless, nowadays, pension awareness and knowledge is extremely low in society (Barrett et al. 2013; Holzmann et al. 2003). Individual advice within the workplace can also build the employee's loyalty towards the employer. The second HR strategy relates to occupational health. Obviously, with age, the health tends to deteriorate. Worse well-being caused by health problems and consequently sick leaves, contribute significantly to decreasing productivity. Nevertheless, employers can promote healthy lifestyle and provide employees with a medical care. Free (paid by the employer) and easily available medical assistance can be a great tool for building loyalty among employees, especially older ones. The last human resources practice refers to proper job adjustment. Especially in case of a physical work (but not only) it can be problematic or nearly impossible to do the same job until retirement. Thus, it is employers' task to reorganize jobs or retrain older employees in order to provide them with better suited positions in the workplace.

Another HR practice, which can influence employees' decision on retirement, is a flexibility of working arrangements (Shacklock and Brunetto 2005). The possibility of switching from full-time to part-time work, taking use of home-office or being covered by phased retirement programs encourages older workers to remain on the labour market longer. Another solution applied by employers which can greatly influence employees' decision on retirement (most often used in a public sector) is a seniority wage, which is a degree of linkage of worker's remuneration with his or her age. Nevertheless, the research shows that it acts as an incentive to stay longer in the particular workplace, but at the same time results in lower employment rates among elderly (Preter et al. 2013). Reduced employment opportunities for older workers being unemployed results in a discouragement to remain on the labour market, and consequently to its leaving (Duval 2003).

The employees' loyalty towards employers can be built with another HR tool, which is already mentioned, occupational pension scheme. It is a pension product, which shows employers' concern for the future of their employees. Despite the

fact that it is the state that defines the functioning of these plans in some extent, e.g. by defining the form of participation (they can be voluntary, quasi-mandatory or mandatory), employers are entities that can decide on the level of benefits arising from them, e.g. by defining the level of contributions or establishing some additional payments on their side.

It should be noted that employers can influence employees' decisions on retirement in both ways (encourage people to stay on or leave the labour market). Taking the issue of a decreasing workforce into account, caused by an aging population, it might seem that employers should do their best to keep their employees longer in the workplace. Nevertheless, one should not forget that organizations can focus more on own profits rather than their workers. Thus, they can act selectively when it comes to the application of HR practices, and try to keep employees, who are most profitable for them, and at the same time push out workers, whose maintenance would require special outlays from them.

5. Summary

A pension system's impact on the labour market seems obvious. Nevertheless, much less attention has been paid so far to analysing this impact from intergenerational relations' viewpoint. Especially, when it comes to the micro perspective, in which we focus on the impact of a pension system (with the main attention paid to a pensionable age) on enterprises operating within the labour market (as employers), and on the impact of enterprises (as employers/workplaces) on employees' decisions to retire before, just at, or after pensionable age.

In the case of the impact of a pension system on enterprises, the most significant parameter that directly and indirectly affects enterprises' behaviour is a pensionable age. The direct impact is obvious – the higher the pensionable age, the higher the effective retirement age and effective age of labour market exit. The indirect impact, on the other hand, results not only from a pensionable age but also from a pension scheme model. Defined contribution model generally motivates employees to stay longer on the labour market, as longer accumulation phase equals to higher benefits. In case of a defined benefit model, its impact on a labour market depends additionally on the way of determining a pension benefit. Defined benefit model based on a final salary motivates workers to stay longer in the workplace as well, but at the same time, it can lead to some intergenerational conflicts due to differentiated needs of each generation. The indirect impact of a pensionable age on enterprises concerns also the investment level in human capital. Higher pensionable age stimulates both financial expenditures of employers on trainings as well as the willingness of employees to participate in them.

In the case of the impact of enterprises on employees' retirement decisions, the most significant factors relate to prevailing intergenerational relations in the workplace and applied human resources strategies. In the former case, the ability to manage multigenerational relationships favours longer stay on the labour market. Nevertheless, the greater the number of generations on the labour market, the more difficult it is to develop an intergenerational cooperation instead

of conflicts. In the latter case, employers and human resources managers, in particular, can use different practices to enhance employees to stay longer in the workplace. Nevertheless, one should not forget that enterprises can put their own interests above interests of their employees. In the age of decreasing workforce, organizations can search for different solutions to retain employees longer in the enterprise, but it can concern only workers with high productivity or specialization in a given field. For less productive employees or ones with lower qualifications, the employer's approach can be quite the opposite. It can be beneficial for them to pursue their earlier leave and exchange a staff for a younger one.

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MANAGEMENT APPROACH TO SOCIAL HOUSING TO SUPPORT THE WELFARE OF THE ELDERLY

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1. Introduction

The deteriorating demographics in the majority of developed countries, which is reflected in the aging of societies, obviously entail some economic and social problems. This impact is associated with the welfare position of the elderly. A shrinking labor force and a growing elderly population are major threats to the sustainability and adequacy of pension systems. According to Eurostat statistics, between 2005 and 2018, in many European countries the increase in at-risk-of-poverty rates in the age cohort of 60+ was considerably greater than the increase in the below-60 age group. It mostly affected Central and Eastern European (CEE) countries (such as Bulgaria, Czechia, Estonia, Latvia, Lithuania, Hungary, Poland, and Slovakia), but not solely (e.g., Germany, the Netherlands, and Luxembourg). The prospects for future retirees are not optimistic, as in face of major demographic, economic, and social changes governments are forced to reduce their welfare systems, predominantly by cutting pension benefits. According to the projections of net theoretical replacement rates (TRR) for EU Member States, in the vast majority of EU countries the estimated change in TRR between 2016 and 2056 is negative; for some countries, such as Poland and Romania, the drop exceeds 40% (European Commission 2018), which is a tremendous deterioration.

Among different ideas intended to improve the position of the elderly in the future, one can distinguish the role of housing. The connection between housing and welfare is widely acknowledged in the current literature. For example, Torgensern (1987) points out the role of housing in the welfare package by naming it a "wobbly pillar under the welfare state", the least decommodified area of welfare among pensions, health care, education, and other social services. Decommodification can be described as the individual's economic well-being independent of the paid labor market (see Esping-Andersen 1990). Housing is less a social right, and more an individual responsibility, than the abovementioned areas of social policy. That is why housing is predominantly seen as the part of a life-cycle wealth accumulation strategy which can bring in-kind income or cash income to an individual during retirement. Such a concept can be referenced to theoretical developments such as the asset-based welfare theory (Sherraden 1991), which later evolved into the housing asset-based theory (Toussaint and Elsinga 2009; Ronald et al. 2015). Nonetheless, housing is still a considerable area of

social policy and a social service, which — along with various other vulnerable social groups — is intended for the elderly.

This paper deals with the topic of social housing which supports seniors. Its aim is to identify the key aspects of social housing management with the older population as a target group. The link between effective functioning of the public sector and citizens' welfare is evident. Therefore, in this paper special emphasis is placed on the managerial approach to social housing as a way of maximizing performance in delivering public services, with a special focus on satisfying the housing needs of the elderly. As the role of the public sector mainly applies to social housing, this area is of particular interest in this paper. However, other public governance interventions which are not directly connected with the delivery of public services are acknowledged (such as setting legal frameworks for the private sector in terms of housing regulations). As summarized by Hwang et al. (2019) previous research on housing from a customer's perspective can be categorized into four broad areas: housing behavior, housing satisfaction, policy, and design. The authors also indicate fairly unexplored areas, such as adjustments in local policy to meet the growing demand for social housing for seniors, current housing stock assessment, housing modifications, including those involving technology. These aspects also refer to the challenges for institutions and entities which govern or manage housing stock.

First, this paper discusses various management aspects at different governance levels (state, municipality, and housing organization) which are applicable to social housing in general, as well as with reference to older people. Second, it provides some statistics concerning the housing and the economic situation of the elderly population in European countries.

2. Governance issues in social housing – an overview

The three most common ways of satisfying an individual's housing needs include acquiring one's own home, renting privately, or public renting. A whole range of policy measures can be taken to facilitate the achievement of this goal with reference to vulnerable social groups (the elderly, among others). Table 1 presents the detailed classifications of the policy instruments which can be divided into three broad categories: schemes for homebuyers to foster homeownership, schemes for homeowners and tenants that involve some sort of financial subsidy, and schemes strictly dedicated to tenants consisting of arrangements that guarantee tenants' rights and provide social housing. It reports the number of countries that adopted each policy (out of a total of 46 countries surveyed by the OECD in the Questionnaire on Affordable and Social Housing [QuASH]). It seems justified to state that among the measures listed, the most helpful for elderly welfare are housing allowances and social rental housing.

Table 1. Overview of housing policy instruments (2018 or latest year available)

Housing policy instruments	Number of reporting countries adopting each policy type
Schemes for homeowners/buyers	
Financial support for housing regeneration	41
Tax relief for access to homeownership	34
Subsidized mortgages and guarantees to homebuyers	29
Subsidies to facilitate homeownership	24
Mortgage relief for over-indebted homeowners	18
Schemes for homeowners and tenants	
Housing allowances	37
Subsidies to develop affordable housing (other than social housing)	24
Schemes for renters	
Social rental housing	34
Some form of rent control (on initial levels and/or increases)	24
Minimum quality regulations for rental dwellings	21
Measures to regulate short-term holiday rentals	19
Tax relief measures for rental costs	14
Rent guarantees and deposits	11

Source: OECD, QuASH 2016, 2019.

There is no unified definition of social housing (see Hansson and Lundgren 2019 for a review); however, its most emphasized features are 1) target groups comprised of people with low incomes and/or with a particular socioeconomic status and 2) providers which are public-sector entities (state or municipal government), non-profit organizations, or for-profit private organizations. With reference to the provider, one can consider different levels of governance being associated with social housing policies. The state is responsible mostly for policy design and specific social housing regulations. However, at this level the state can also act as a social housing provider via public agencies. The lower level of governance is the municipality (local government). Typically, it is involved in the provision of social housing and maintenance as owner of the social housing stock, but it may also be responsible for local social housing regulations. The third level of governance, which is a housing association/community or non-profit organization, is directly engaged in everyday maintenance and day-to-day management. Figure 1 presents different solutions for providers of social housing used in various countries. As shown, in many countries a mix of different kinds of providers offer social housing services. However, local authorities (municipality level) most frequently act as social housing providers, as do non-profit organizations.

Although the core service of social housing providers is social rental housing and its maintenance, the scope of their operations can be broader. Scanlon et al. (2017), in their report concerning the activity of housing associations in the UK,

identify several kinds of services provided in addition to pure social renting. These include social care targeted towards particular vulnerable groups (e.g., people with certain disabilities, dementia, etc.) or pursuing educational programs in their communities (such as personal finance advice or professional skills training). In the case of older people, such initiatives can cover the prevention of loneliness as well. Housing associations in the UK also offer commercial services independently from social housing, which also includes market renting services.

In order to assess the range of social housing and the importance of this solution as a housing policy instrument, Table 2 presents the share of social rental dwellings in the total housing stock. According to OECD data (QuASH), the greatest proportion of dwellings as social rentals is reported for the Netherlands, Denmark, and Austria, where it exceeds 20%. At the other end of the scale, there are countries such as Latvia, Czechia, and Lithuania, where the proportion is less than 1%.

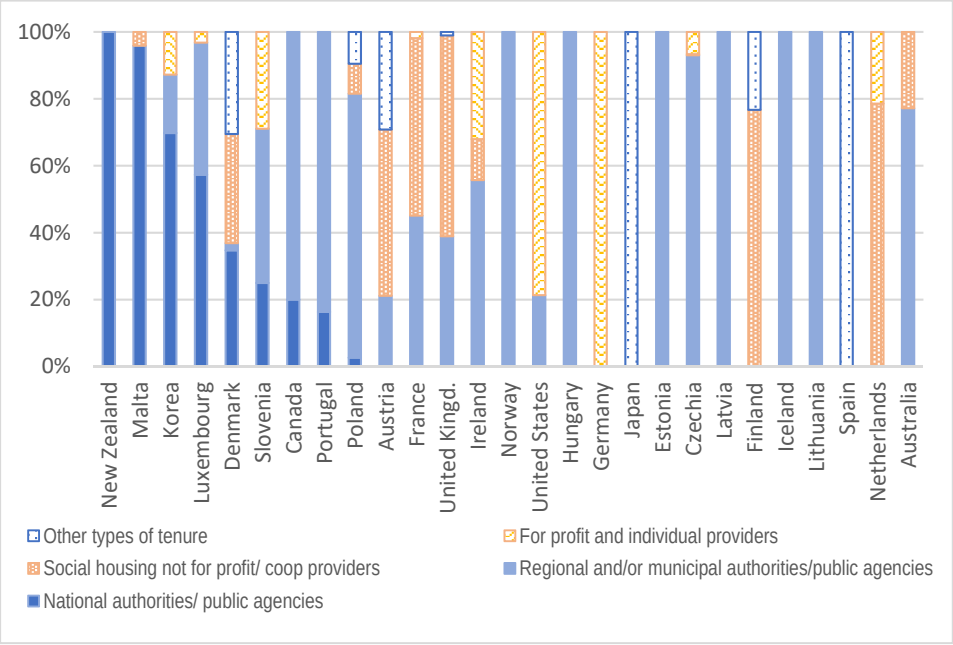

Fig. 1. Percentage of total social rental housing stock by type of provider (2018 or latest year available)
Source: OECD, QuASH 2016, 2019.

Table 2. Number of social rental dwellings as a percent of the total number of dwellings (2018 or latest year available)

Country	Percent of total housing stock	Tear	Country	Percent of total housing stock	Year
Netherlands	37.7	2018	Canada	4.1	2011
Denmark	21.2	2018	Hungary	4.0	2013
Austria	20.0	2018	Spain	4.0	2017
United Kingdom	16.9	2018	New Zealand	3.7	2018
France	14.0	2018	United States	3.3	2017
Ireland	12.7	2016	Japan	3.1	2018
Iceland	11.1	2018	Germany	2.9	2017
Finland	10.5	2017	Portugal	2.0	2011
Poland	7.6	2017	Luxembourg	1.6	2013
Slovenia	6.4	2015	Estonia	1.1	2017
Korea	6.4	2015	Lithuania	0.8	2017
Malta	5.5	2013	Czechia	0.4	2011
Australia	4.4	2017	Latvia	0.2	2013
Norway	4.3	2018			

Source: OECD, QuASH 2016, 2019.

The approach to social housing that includes managerial aspects requires a proper definition of social housing management. One can distinguish two areas that management may reference, which correspond to the aforementioned levels of governance. The first area refers to direct social housing maintenance, while the second is broader and concerns public authorities and their efficiency in delivering social housing as a public service, similarly to education, health care, public security, etc. As indicated by Pearl (1997), the common (narrow) understanding of social housing management refers to property management and activities such as rent collection, repairs, etc. Similarly, as defined by Power (2017) basic housing governance includes all of the activities that "operate within a given housing community, and that include the rules that govern the housing community as well as day-to-day management through processes such as maintenance". This "first line" management — involving direct contact with a tenant — obviously has a great impact on the tenant's perception of social housing. For example, specifically referring to older residents living in subsidized housing, Johnson et al. (1993) prove that the manager's leadership style has a direct effect on residents' satisfaction.

A broader view of social housing management is presented by Priemus et al. (1999). They define it as "the set of all activities to produce and allocate housing services from the existing social housing stock". Additionally, among several different areas of interest of social housing managers, they specify four main categories: 1) technical management (maintenance), 2) social management

(housing allocation), 3) financial management, and 4) tenure management (buying, selling, and modifying properties). It can be argued that tenure management in particular is crucial with reference to seniors, as their physical condition very often requires special facilities. Fox et al. (2017), on the basis of a survey conducted among older tenants living in Irish social housing, highlight several aspects of housing arrangements that are especially important for older people, such as physical adaptation of a dwelling for disabled persons (e.g., bathroom adaptation, no stairs, nonslip floor surfaces), outdoor space (e.g., patio, balcony, or small garden, especially important for less mobile people), accessibility of technology for safety, security, and health monitoring, a safe and quiet neighborhood, which enables social contact as well as health and support services. All of these aspects are associated with the poorer and deteriorating general health of the elderly as compared to younger age groups. As noted by Fox et al. (2017), if such accommodations for disabilities are not directly provided in social housing, older people should be at least assisted in applying them.

Priemus et al. (1999) distinguish between day-to-day housing management and strategic housing management. The latter also includes all interactions with different stakeholders, such as municipality authorities, government authorities (regulators), financiers, current and future tenants, etc. If such strategic management refers to public-sector providers, it can be considered through the lens of three major theories of public service provision: traditional public administration, new public management, and new public governance (see Osborne 2010). Supromin and Choonhakhlai (2019) present different models of providing social services (at the municipality level) for the elderly, corresponding to the three aforementioned paradigms. The traditional public administration approach focuses on planning and policy implementation, with very limited cooperation with third parties. In a new public management model, municipalities cooperate with private-sector organizations and transfer some tasks to them. They pay more attention to efficient management. The new public governance model, which is the most complex one, assumes the co-production of public services entailing close cooperation — at both the planning and implementation stages — with various entities, including private-sector organizations, non-profit organizations, social partners, etc. The co-production concept seems to be a means to mitigating the undesirable effects which are likely to appear when the new public management approach is implemented. As argued by Sprigings (2002), the new management practices in social housing entail the discrepancy between social justice purposes and expected performance indicators. As a result, such objectives as the prevention of social exclusion or inequality are lost sight of.

3. Housing in Europe – the elderly perspective

In order to assess the need for social housing in the elderly population, at present and in the near future in European countries, it can be useful to take a closer look at the statistics. The findings from such an analysis can identify some present and

new challenges that policymakers and other parties involved in the management of social housing now face and will face in the future.

Figure 2 presents the most recent data on the distribution of the population in European countries by tenure status. In almost all of the countries studied, apart from Germany and Austria, the percentage of homeowners is greater than 60%. Especially in Central and Eastern European countries, it reaches very high levels — above 80%. This arises mainly from the fact that many CEE countries privatized a large amount of the public housing stock in the 1990s, after the political and market transition resulting from the collapse of communism (see, e.g., Pichler-Milanović 1999; Clapham 1995). Sitting tenants seized the opportunity to become owners of the dwellings they occupied at discounted prices. For this reason, in CEE countries there is a relatively low proportion of owners with mortgages or loans. With reference to tenants in the countries studied, their average proportion among the population is slightly higher than 25.3%. The majority of households in this group — 16.2% of the population in each country on average — pay rent at market prices, and 9.2% on average benefit from reduced prices or pay no rent. Social housing is mainly included in the latter category. Some of the countries where renting at reduced prices or for free is most popular are the United Kingdom, Ireland, France, and Slovenia.

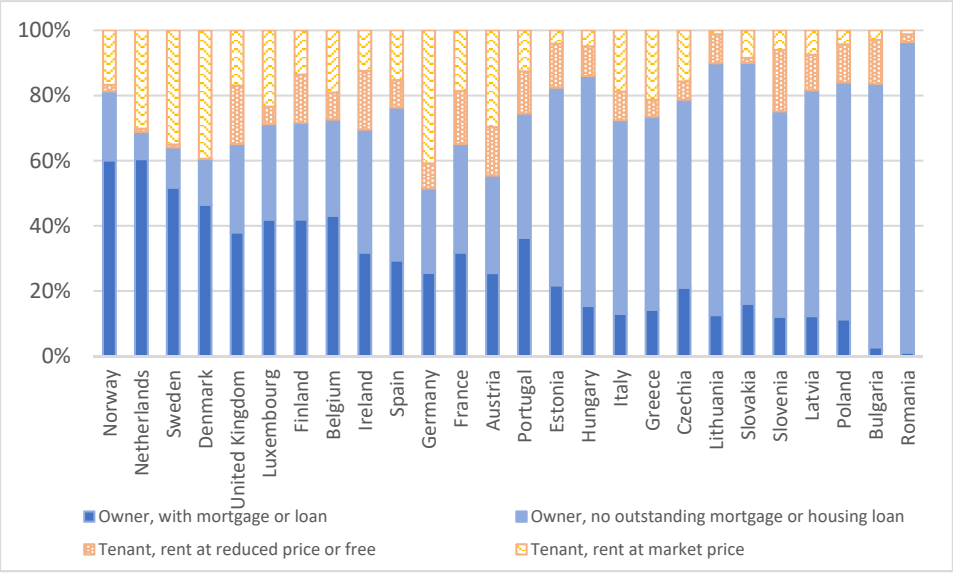

Fig. 2. Distribution of population by tenure status (2018)
Source: Eurostat (EU-SILC).

Some useful information about the trends in housing statistics can be observed when comparing the current state (the most recent data available are for 2018) with that of more than a decade ago. Figure 3 presents the data for 2007, just at the very beginning of the financial crisis, which had a severe impact on the real estate market in many countries. However, the picture is quite similar to 2018, and

no significant changes which would be common for all countries can be observed. This means that the effects of the financial crisis on the distribution of tenure status among the populations were not very relevant — or if they had a visible impact, it was only short-term. Nonetheless, there are countries where the difference between 2007 and 2018 is noticeable. For example, whereas in the majority of the countries there was a slight decline or a slight increase (lower than 3%) in the share of households benefitting from reduced or free rent, in Poland this figure in 2018 was 23.3% lower than in 2007, and in Czechia it was 15.1% lower. However, whereas in Poland this change was associated with an increase in the homeownership rate (by 21.4%), in Czechia it was accompanied mostly by a growth in the percentage of households renting their dwellings at market price (by 10.9%).

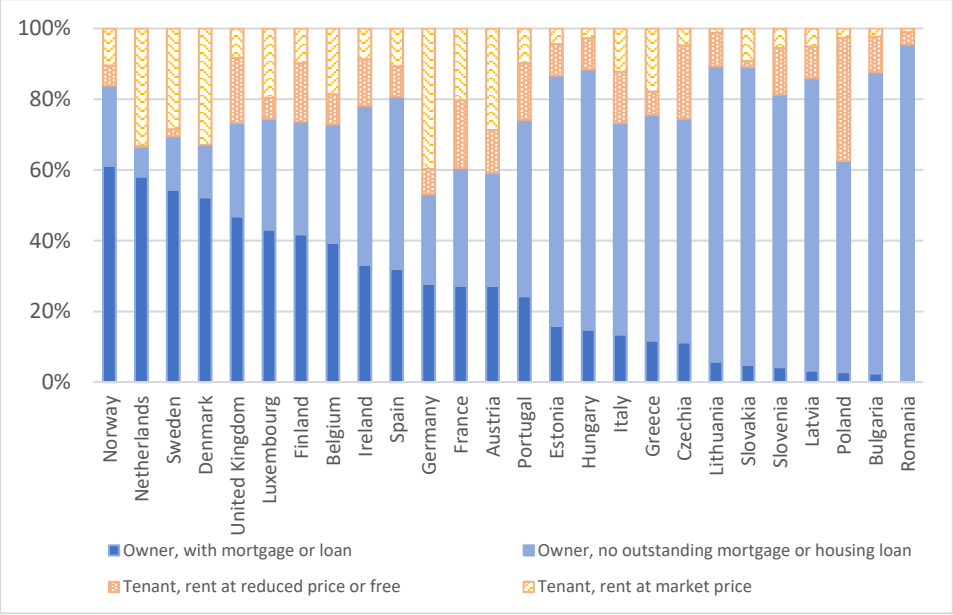

Fig. 3. Distribution of population by tenure status (2007)
Source: Eurostat (EU-SILC).

Figure 4 refers to the tenure status of the population aged 65 and above, which enables to consider specifically the elderly perspective. It presents the share of tenants (non-homeowners) in this group. As shown, there are significant differences among the countries in this respect. This diversity is even greater when compared to the whole population (see Figure 2). However, in average terms, among the elderly population the rates of homeownership are slightly lower than in the whole population. A very small percentage of older tenants is reported for some CEE countries: Croatia, Lithuania, Hungary, Romania, and Slovakia. Similarly, in Ireland, Spain, and Norway this share is below 10%. The countries where older tenants are a larger social group include Denmark, Germany, Cyprus, the Netherlands, Austria, and Sweden; the percentage of non-homeowners among people aged 65 and above exceeds 30% in these countries.

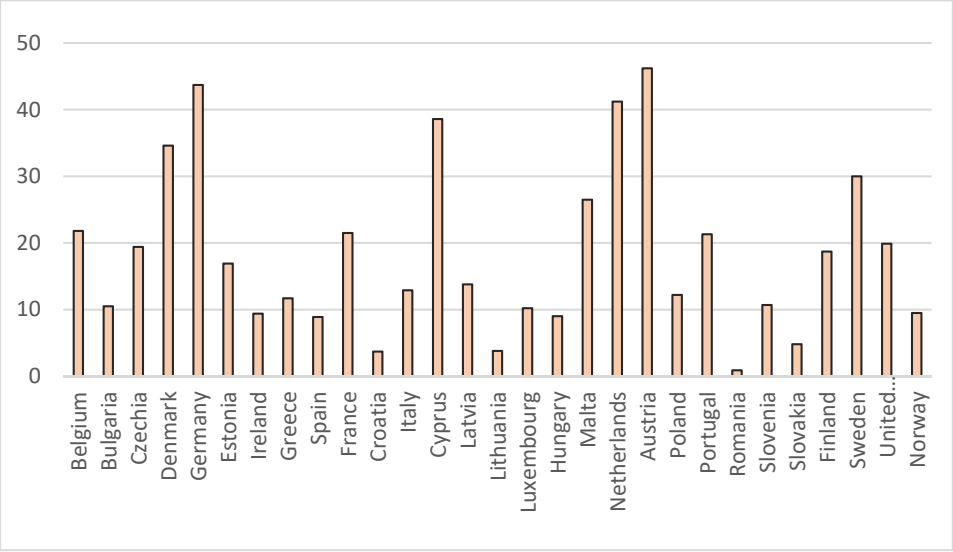

Fig. 4. Percentage of the population aged ≥65 years with the tenure status of non-homeowner (2018)
Source: Eurostat (EU-SILC).

Some previous studies have suggested that elderly women are especially at risk of housing problems, i.e., homelessness and inadequate housing, which is a consequence of their career paths (or lack thereof) which in turn arises from their traditional roles in society (Darab and Hartman 2013). To illustrate this problem, Figure 5 presents the gender differences in terms of severe material deprivation rate among people over the age of 75. This EU-SILC indicator expresses the proportion of the population unable (not unwilling) to pay for at least four of the following: 1) rent, mortgage, or utility bills; 2) keeping their home adequately warm; 3) unexpected expenses; 4) food to eat meat or protein regularly; 5) vacations; 6) a television set; 7) a washing machine; 8) a car; or 9) a telephone. It is a measure of absolute poverty related not to one's income, but to one's living conditions, also comprising housing in a general sense. The observed patterns in the countries studied reveal that the level of severe deprivation varies significantly. A particularly high severe material deprivation rate for women is reported for some CEE countries: Bulgaria, Croatia, Latvia, Lithuania, Romania, Slovenia, and Slovakia. This problem also concerns three Mediterranean countries: Portugal, Italy, and Greece. In almost all cases (Denmark being the sole exception), the rates for older women are higher than those for older men, and in

some countries they are even two or three times higher, so the differences between severe material deprivation rates for men and women are significant. The higher poverty levels among older women may be attributed first of all to the gender pension gap (see Bettio et al. 2013; Frericks et al. 2009), which results from the different working patterns of men and women.

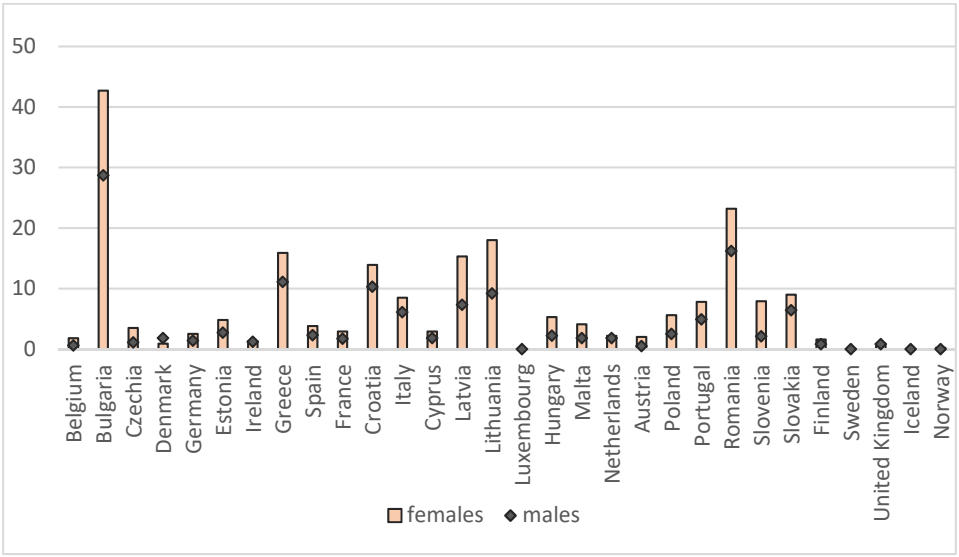

Fig. 5. Severe material deprivation rates among men and women in the >75 age cohort (2018)
Source: Eurostat (EU-SILC).

An indicator that specifically relates to housing affordability is the housing cost overburden rate. It is defined by Eurostat as the proportion of people living in households where the total housing costs are more than 40% of disposable income (the "net" of housing allowances). Figure 6 presents the housing cost overburden rate in the population of less affluent (below 60% of the median equivalized income) older men and women. Across the countries studied, the average percentage is 30.3% for women and 26.7% for men. However, there are some countries (Bulgaria, Denmark, Germany, and Greece) where more than half of the population faces very high housing costs relative to their incomes. Again, in each country there are differences between the rates for women and men, but contrary to the severe material deprivation rate, women are not so clearly more vulnerable to such problems. In nine countries, more men than women have problems with housing affordability, though the differences are quite minor (except for Norway). At the same time, there are countries where these gender differences exceed 10% (Bulgaria, Romania, Slovakia, and Sweden).

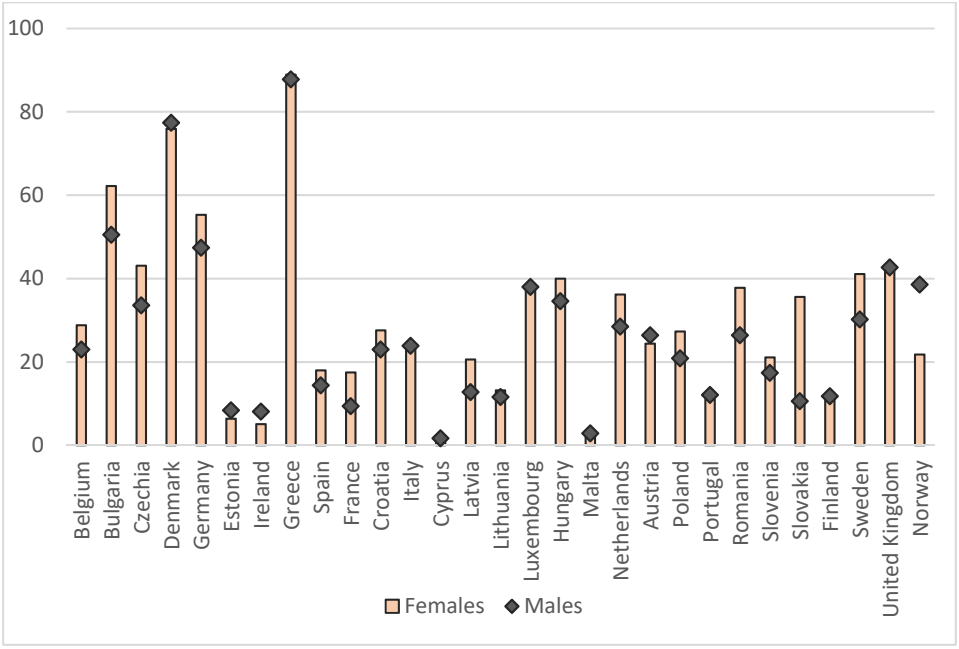

Fig. 6. Housing cost overburden rate of men and women (with incomes of less than 60% of the median equivalized income) in the >65 age cohort (2018)
Source: Eurostat (EU-SILC).

4. Conclusions

The development of social housing for seniors is consistent with the concept of "aging in place," which denotes "remaining living in the community, with some level of independence, rather than in residential care" (Davey et al. 2004, p. 133). It is believed to have positive impact on the emotional, social, and functional wellbeing of older people, and this issue has been widely discussed in the current literature from many perspectives (see Vasunilashorn et al. 2012 and Hwang et al. 2019 for a summary). This implies that social housing for elderly people who are not homeowners and cannot afford private rent at market prices is particularly important. However, in order for social housing to meet the particular needs of older people, it requires both proper policy design and adequate governance.

As shown in this paper, the management issues can be related to different levels of governance. They cover various tasks associated with all aspects of accomplishing the objective of providing social housing. However, when considering social housing as a public service, the managerial performance criteria (such as, e.g., cost efficiency) cannot displace or overshadow the social objectives. In the case of housing for the elderly, it is important to take into account the special needs of this group resulting from their poor physical health.

This paper presents some statistical data corresponding to the current, but also future, demand of older people for social housing as a public service. According to the findings by van Vliet et al. (2020), who analyzed Luxemburg Income Study

data for the time span of 1985-2013, despite the fact that the poverty rates for people aged 65 and above declined during the period studied, in many countries they are still higher than those of the working-age population. Moreover, the tendency seems to be quite different in the latter group, as the poverty rate among people under the age of 65 increased between 1985 and 2013. The data presented in this study also confirm that seniors are vulnerable to poverty and social exclusion. This affects the Central and Eastern European countries to a greater extent. Although in CEE countries homeownership rates are much higher than in, e.g., Western European countries, older people there are in a worse economic situation. Thus, to improve the welfare of the elderly in these countries, some other means should be taken, as social housing development applies to a relatively small proportion of the elderly population.

The data presented also reveal that female seniors are more exposed to poverty risk. Unless the situation of women on the labor market is improved, in terms of greater participation, equal pay, and more sustainable careers, the process of pension privatization and individualization (see Frericks et al. 2007) may further put more women at risk of poverty and inadequate housing while retired. One fairly unexplored area of research and a challenge in practice is the aspect of gender in social housing and the adjustment of these public services to women's needs.

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THE ROLE OF FAMILY BUSINESSES IN OLD AGE SECURITY

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1. Introduction

The situation in which possessed retirement savings would guarantee the achievement of financial independence in the period of retirement would be ideal in old age security. This means that a pensioner's income from retirement benefits and (or) private savings would enable meeting their needs not only on a satisfactory level, but also maintaining a minimum of the standard of living similar to the period of their professional activity.

Unfortunately, achieving financial independence through state pension systems is not possible in Poland, as well as in most developed countries of the world, because they usually ensure only the level of the so-called social security. The level of retirement benefits received from such systems usually constitutes around 50-60% of the average remuneration received before retirement, while the replacement rate considered as optimal should represent 65-80% (OECD 2015; Mercer 2019).

Therefore, especially in the context of demographic changes, the future pensioners are more and more often facing the need to seek other possibilities ensuring their old age security.

Due to the low level of interest in voluntary forms of saving that are offered under the pension system (in Poland they include individual pension accounts, individual pension security accounts, employee pension funds' and employee capital plans), there is a question concerning alternative ways of providing security in old age. It is emphasised in the literature (Olejnik 2016; Redmond et al. 2017, pp. 362-375; Haurin and Moulton 2017, pp. 245-276) that old age security can be provided not only by savings accumulated in the pension system, but also by consciously and intentionally raised and clearly separated private assets intended to secure this period of life, expected support from children, and even the plan to continue working indefinitely. Therefore they can, for example, include the following:

- physical assets (e.g. property, real estate, works of art, gold, wine),
- assets accumulated in financial institutions, investment or long-term care insurance, stock market investments, money kept at home,
- intangible assets generated within the natural system, e.g. "investing" in children, with the hope of being supported by them in the period of old age. This approach is considered a type of deposit set up by parents to secure their needs in old age.

Therefore, people who have children, invest considerable financial resources in the upbringing of their children, in the hope that the children will fulfil their obligation towards their parents (Coall and Hertwig 2010, pp. 2-4).

The primary purpose of the private accumulation of pension assets is obviously for individuals to make their old age (financially) secure. However, such assets are also often a very important element of intergenerational transfers (Olejnik 2015, pp. 31-42; Chybalski et al. 2018, pp. 5-18). The issue of the succession[1] of family businesses definitely stands out in this area (Blackburn 2003; Piketty 2015). Thus, it seems important to know whether having your own, preferably prosperous company generating profits also after official termination of work and retirement, can be perceived as one of the unconventional methods of ensuring financial security in old age.

It is worth stating that statistical data concerning family businesses in Poland are quite ambiguous, although according to the Institute of Family Business (2016), 36% of companies in 2016 are family enterprises generating 18% of GDP (for comparison, family businesses make up more than 60% of all companies in Europe, European Commission 2020). Such companies developed in Poland especially after 1989, and now generational change will be more and more often observed. They will be passed on to the next generation – either in the form of succession to the children or through their sale. In the latter case, the income obtained from the sale may certainly constitute financial security in the retirement life of the previous owner. However, in the case of succession to the children, there is a question whether it can also be a form of old age security.

Therefore, the purpose of the paper is to identify the role of family companies in relation to both parties – parent founders and successors – in the context of security in future old age. Therefore, the paper firstly shows a review of the literature related to the perception of family businesses through the prism of old age security. The second part of the article presents the results of qualitative research conducted in this area.

2. Theoretical background

2.1. Own company as a retirement security

Meeting consumer needs in the period of old age requires households to make a distribution of income in time – that is to accumulate savings. Therefore, income obtained after finishing working life comes from the savings accumulated before

[1] In the literature on the subject, the term "succession" is not clearly defined. According to Słownik Języka Polskiego [Polish dictionary] succession means: 1. "inheritance from somebody; works of art or cultural goods left after ancestors". 2. "inheriting the rights to the throne" 3. "taking over a senior position" (sjp/pwn.pl, accessed December 27, 2019). Analysing the definitions of succession, it should be noticed that they enclose not only the transfer of ownership or assets, but also the allocation of the labour force and gentle donation of management along with decision-making.

– either in the pension system organised by the state or in any individual form outside this system.

Consumer behaviours related to individual retirement benefit may be influenced by owning a business.[2] Running such a company gives the opportunity of the longest working life (Potts et al. 2001), which is very important for many people, and a lot of people over 50 definitely want to work. This is of great importance especially in the situation of ageism – discrimination on the labour market and in the workplace based on age. Owning their own company also gives senior citizens the opportunity to turn a decent profit in their retirement.

Running a business is also one of the factors that affect saving motivated by old age security. For example, research conducted by Loretto, White and Duncan (2001, p. 397) shows that people running a business choose individual pension schemes explicitly more often than others and that they think in this way they can save more. However, this is not always the case, because the study by Redmond, Walker and Hutchinson (2017, pp. 362-375) shows that the lack of long-term financial security can be a potential outcome of self-employment.

The literature focuses relatively little attention on the perception of an own company run in the form of family enterprises as one of the ways of attaining old age security.

It should be stated that the very possession of own business does not mean that it is automatically a family business. A family company is defined as "one that will be passed on to the family's next generation to manage and control" (Ward 2011, p. 273). To clarify this concept a little, it should be noted that the definition of a family company comprises several criteria, both objective (e.g. ownership, management method) and subjective (e.g. family involvement in management and work in the enterprise, orientation on transferring the company to the next generation). Therefore, the research issue regarding the perception of the role of family businesses and the related succession process in retirement security seems to be interesting and significant.

2.2. Succession of family businesses as a multigenerational transfer

Succession is a multidimensional process. Firstly, this is because transferring the "achievement", which a private enterprise is, is not only the transfer of ownership, the accumulated assets or capital (including patents, copyrights, knowledge, etc.), but often also a very important human need and motivator to improve the quality of life for the successors (children) or other person.

[2] It should be mentioned that as L. Cook (2017) states, in the United Kingdom: "With the sheer number of baby-boomers now approaching retirement age, the era of the "olderpreneur" is upon us". The author also indicates that "the number of self-employed people aged 65 and over has more than doubled in the past five years. By the age of 70, almost 60 per cent of those still in work are self-employed".

Secondly, the transfer of a family business to the next generation is rather a specific intergenerational transfer. This is because in this case we are dealing with transfers not only in the "vertical" arrangement (i.e. a family business received as a classic inheritance after the death of the owner[3]), but also horizontal, i.e. the transfer associated with the desire or necessity to transfer knowledge, competences, etc. to the successor by the parent founders even in their lifetime.
The literature on family businesses mostly studies fear of retirement and death of the main founder of such a company among others (Cabrera-Suarez et al. 2001; Filser et al. 2013, pp. 256-277). Therefore, thirdly, due to a rising life expectancy of parent founders, their decisions at the stage of "pre-succession" are relatively extended (which, however, can lead to unexpected drops). The owners often believe that their company success depends on their involvement, so they wish to stay in the company even after retirement (Bruce and Picard 2006, pp. 306-309). This phenomenon is caused, among others, by the fact that business owners invested a lot of time and effort to build and develop their firm, thus devoting their whole lives to it. The fear of retirement associated with the company's succession may also be the result of perceived loss of status and fears of not knowing what to do after retirement. What's more, seniors postpone the process of succession, because it makes them aware of the approaching retirement age, and thus raises negative emotions associated with old age and death. And this, in turn, may give rise to conflicts between the business owners and their potential successors, especially because of diverse perceptions of how to run the company, as well as due to different visions of the directions of the company development[4] (Filser et al. 2013, pp. 256-277).

As a consequence, it happens that due to family conflicts related to succession, the companies often fail (Tkaczyk 2017, pp. 29-30). This is proved by the results of the research presented in the PwC Report (2016). They indicate that in Europe only just over 30% of all family firms transfer the business ownership to the successors and only 15% of them have a 'plan' for the succession process.

[3] Here it should be noticed that in the literature, among various categories of motives encouraging people to accumulate resources intended for leaving as succession, Kohli and Kunemund (2003, pp. 123-142) emphasize the motif of eternizing the resources – this is the so-called "Dynasty model". The succession is then the result of the necessity to transfer the accumulated resources that have been collected for the sole purpose of their increase or perpetuation. Therefore, they will be willing to leave the succession if their children want to continue the family business and do not change their lifestyle (Chu 1991).

[4] The issue of conflicts in family businesses is the subject of many studies. It is worth noting that such conflicts result from completely different factors that characterize business and family ties, i.e. goal orientation versus emotional aspects. In addition, stability and tradition are important for the family, whereas for the company it is important to react quickly to changes in the environment. Therefore, introducing changes in the enterprise may have a negative impact on family relationships and thus cause a conflict (Leach 2011, pp. 28-40; Harvey and Rodney 1994, pp. 329-350; Pieper et al. 2013, pp. 489-495).

Thus, it is often emphasised in the literature that it is vital to develop a plan of succession and indicate the role of the owners during the process and afterwards. In the latter case, it is also necessary to possibly plan the pension benefits through for example obtaining income from the company profits or remuneration for further work performed by the parent founders (Walsh 2011, p. 17). What is more, the research by Collins, Worthington and Schoen (2016, pp. 51-70) shows that "when family firm CEOs have confidence in the continuity of their firm after they retire, their retirement well-being expectations are higher". Bulut et al. (2019) also emphasize that beside sustaining the profitability of the family business, the most important criteria for the selection of a suitable successor for the family company also include the expectations of the parent founders related to their retirement benefit and resulting possibilities to secure the financial comfort of their family in the future.

3. Research results

3.1. Methodology of research

Primary research was conducted to identify the perception of owning a family business as a potential security for old age. Qualitative studies were performed in which the method of individual-in-depth-interviews was applied. They were followed by semi-structured interviews and field note-taking. The scenario consisted of several parts, and the paper presents the results of one group of questions, i.e. the perception of the role of owning a family business as a way of providing financial security in old age.

This study was conducted for 2 months in 2019, among representatives of family businesses, located in Wielkopolska and Kujawy (although in most cases they were operating throughout Poland).

Participants were selected through purposive sampling. This kind of sampling was found appropriate to obtain the best insights about the perception of a family business in the category of retirement security. Purposive sampling is useful in qualitative research, particularly among populations which are difficult to access, and when the research issues may be perceived by the respondents as difficult and sensitive. Therefore, participation in the research presented below was obviously determined by having a company and an adult child / children – the successors (potential or real).

The survey was conducted among 18 respondents:[5] 9 family business owners and 9 successors. There were 8 men and 1 woman, aged 48-70, among the respondents who were the owners of the participating companies, whereas the successors (including potential ones) were represented by 7 men and 2 women aged 22-42. Due to the subject matter of the study, the predecessors and successors were interviewed separately. It should be added that in the case of three enterprises, the

[5] Some interviews (12) were conducted as part of the master's thesis by Mateusz Filipiak: "*The role of intergenerational transfers in pension security on the example of family businesses*", Poznań University of Economics and Business, Poznań 2019.

succession process had already been completed, in one company it was in process during the implementation of the study, in three it had not been planned yet, and in two cases company liquidation was planned for the moment of reaching the retirement age of the owner. Sectors represented by the respondents included the construction services, car mechanics, hotel industry, gardening services, clothing production and trade, as well as the production of plexiglass products.

The analysis of the content of the collected material was performed according to the principles developed by Miles and Huberman (1984), and with the use of the descriptive, attribute and process coding of statements in accordance with Saldan's recommendations [2009].

3.2. Findings

The conducted research shows that the perception of family businesses in the context of pension security is very diverse. In their spontaneous answers (at the beginning of the interview), company owners (especially: younger owners or owners representing entities that were not in a very good financial condition or were operating in non-prospective industries), do not perceive their company as a way of making their old age financially secure (4 respondents out of 9). However, they declared that in the case of a possible termination of their activity before reaching retirement age, they would treat the capital obtained from the sale of the company as a form of retirement security. It is worth quoting the statement of one of the respondents at this point: "*My son does not want to take over the company. I have already planned its liquidation. I will keep these funds for serious expenses in old age. They will be kept and will constitute financial security in the event of illness, or disability*" (male 67 years old, gardening services).

It is worth noting that all owners of family businesses recognise the potential of these entities in the context of providing old age security. Firstly, they indicate that while conducting business activity, they have been trying / were trying to secure their future through saving cash (by establishing foreign currency deposits, purchasing bonds, etc.; this method was indicated by 5 out of 9 respondents). Secondly, they make investments in real estate, especially by purchasing flats for rent or other assets that can be easily sold (3 owners). Thirdly, some (3 respondents) would like to receive a certain percentage of profits or other financial support from successors regularly after the transfer of the enterprise ("*If I transfer everything I have worked for to my children, which is a good start for a child, then it is logical for the child to give a few percent of the profits to support his parents", (male aged 59, construction sector).* ("*I count on such support, because from the pension I receive, you can only buy medicines and do small grocery shopping. However, to have a decent life, go somewhere or visit some places, I only count on the support from the younger generation. (...) They received from us a well-organized workshop, (...) they have the opportunity to earn money, which we have created for them, so hopefully, they will offer us a share*" (male aged 65, construction industry)). Fourthly, some also indicated that they expect financial support from time to time (especially in case of illness), but this is not necessary. For them, maintaining a business is more important, so that "*all generational work*

is not wasted, and continuity is maintained", hence they would prefer the successors to support more the next successors – their children rather than the company founders (3 respondents). Fifthly, business owners would also like to work in their companies as long as their health would permit, even after the succession process and retirement (4 respondents). This factor, along with the financial aspect (obtaining additional remuneration for work), is associated with the wish to advise, influence and control the activities of the company founded or received by them. The last aspect of the perception of a family business in the context of retirement security is related to this. Namely, it is the intention to run the company as long as possible, and then its sale (despite having children) to obtain funds for old age security (2 respondents). The owners indicated that due to other interests of their children or potential conflicts, they do not intend to transfer the company ("*Ending my life is equivalent to closing the business. I close the door and the company ceases to exist. Conflicts appear where transfer of business to children starts. It has always been like that"* (male aged 57, hotel industry)).

On the other hand, analysing the opinions of the other side of the succession process – those of the successors – it can be noticed that in the context of retirement security for seniors they see two basic issues. The first of them is the problems related to financial support, whereas the second one is further work of the senior pensioner.

In the case of financial support, two clear attitudes can be identified:

1) full agreement as to the fact that there should be a kind of "compensation" made by successors for senior citizens for the received company ("*I want to support financially, but also send to health resorts or trips, so that he would feel appreciated, and would know that we are grateful*" (male aged 40, car mechanics)). They also think that financial support may depend on the form of takeover and the size of the assets that are in the hands of the parents. They point out that while taking over the entire company and depriving the seniors of the source of income, it is natural that they want to reward them somehow, so that they can have a decent life. They also emphasize that *"you have to remember that they have devoted all their lives to children and the company, and you cannot take over the company and leave them with nothing. They should be rewarded for the effort they put into the company development and ensure them a decent life*" (male aged 30, construction industry).
2) the lack of acceptance for the need to support the seniors (*"I am always annoyed that it is said that if parents give something to their children, they expect something in return. (...) These are no longer times that you have to run a business for the rest of your life and be faithful and unhappy", (women aged 40, hotel industry))*. It is worth adding that the successors think that their parents, while running well-profiting companies, can / could take care of their own livelihood in old age ("*The older generation should be able to manage their own wealth wisely so that people who take over the company do not have to think that they owe something to someone*" (male aged 28, construction industry)).

However, when analysing the attitudes of successors towards further work of the parent founders in the family businesses, they all express fairly consistent opinions. They indicate that after the succession process is finished, it is natural to consult parents in matters regarding decisions that are made. Over time, however, they expect full independence in the company management.

3. Conclusion

In conclusion, it should be emphasized that the role of family businesses in retirement security is a very multidimensional issue. The performed research shows that conducting business activities and reasonable management of accumulated assets should provide owners with adequate financial resources in their retirement age.

Analysing the role of a family business in the context of retirement security in the study, attention was also focused on such aspects as:

- the opportunity to work in such a company for as long as the senior citizen wants and as long as their health condition permits to do that; in this case age discrimination does not exist (naturally, if there are no conflicts between parent founders and successors in this respect),
- in the absence of a suitable successor – funds obtained from the sale of the company (which usually occurs just before reaching retirement age or even after reaching it) may also constitute a significant source of financial security in old age,
- in the succession process, the senior may expect a share in the future profits of the transferred enterprise,
- sometimes informal retirement support from successors to parent founders is expected.

It is necessary to add that the study has certain limitations. First, the results are based upon a small sample size, thus results should not be referred to the whole population of family businesses. Hence, in the future, a broader survey among family businesses with the use of qualitative or a quantitative research would be relevant. Another shortcoming of the study is that the author conducted the research only in the area of intra-family succession. It would also be advisable to perform further research over other areas of perceiving a family business as a way to secure old age, e.g. the transfer of the company to non-relatives.

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SOCIAL SECURITY ADMINISTRATION: TOWARDS ONE OF THE RESERVES OF SUSTAINABILITY

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1. Introduction

Social security especially in its forms such as pension and health insurance, is currently characterized by a financial imbalance of government obligations with financial revenues: insurance premiums, social taxes. This imbalance is characteristic of almost all countries with social insurance systems. In 2016, the twenty largest OECD countries together had 78 trillion. US dollars deficit in underfunding of solid-state (pay-as-you-go) and funded (defined benefits) state pension obligations, which is equivalent to about twice the collective national debt of these countries. The under reservation of private pension obligations is also insufficient, for example, private pensions in the United States are provided with only 82 percent of the reserves necessary for pension funds to fulfill their obligations, the deficit is about 3 trillion. US dollars. It is predicted that the average share of pension expenses in the GDP of countries in the world will grow, according to expert estimates, from 9.5% in 2016 to 12% in 2050 (City bank 2016). Health expenditures also show a significant upward trend, as the corresponding expenditures in OECD countries grew by 3.4% in 2016, which was the largest increase since the post-crisis 2009. At the same time, the share of health expenditures is also quite high with an average value of 8.9% of GDP for OECD countries in 2016, and from 17.2% of US GDP to almost 6% of GDP in Turkey and Mexico (OECD Health Statistics 2018).

Taking into account the demographic trend of aging and strengthening of digitalization on employment, it is obvious that this situation will continue in the future. One of the reserves for balancing the obligations of social insurance funds and reducing administrative costs is the improvement through the integration of administrative structures, the creation of unified centers for the provision of social services, and the widespread use of electronic forms of their provision. Criticism of the concept of social insurance, its lack of effectiveness in recent years is not always caused by global demographic problems or financial crises. In many respects, the inefficiency of social insurance is determined by the inefficiency of its management, while ‘in debates on social insurance reforms, the inability to distinguish between management and conceptual issues often criticizes the principles of social insurance, when the main focus should be on weaknesses in the ways of administering such a system’ (Gillion et al. 2001). On the whole, one of the main claims to increasing state social expenditures lies not in their size, but

in the requirements (requests of society, citizens) of the absence of losses, i.e. the effectiveness of their distribution, targeting, testing the need for social benefits. Losses as a result of this targeted redistribution should be minimized or generally eliminated as the consequences of the so-called 'leaky bucket', when a significant redistribution of resources is accompanied by uncontrolled 'leaks' (Okun 1975; Korpi 1985, 1996; Padovano and Turati 2012; Saltkjel 2017). The impact on the country's economy and its growth depends on the size of its social sphere, i.e. the larger the social system, the greater the impact it has. However, the vector of this influence depends on the effectiveness of the social sphere, its redistribution profile and administration (Cichon et al. 2004).

According to a number of estimates, unproductive administrative costs in the redistribution of social resources, for example, in the health sector, can reach almost 8% of all expenses in this social sphere, while the total pressure of administrative expenses is more than 30% of all expenses, of which a significant part is accounted for by private providers (Evans 2013). However, the loss of accumulated social insurance resources when they are redistributed between generations, income strata, and other categories of recipients of insurance payments, in our opinion, is not so much in increased administrative costs (which in state social insurance are usually from 1 to 4.5%), how much is the organization of the mechanism of social insurance itself, its compactness, economy, and efficiency (Stefan 2015). At the same time, administrative costs are always a potential source of inefficiency in the productive reallocation of resources (Cichon et al. 2004).

In this paper, we consider approaches, trends and expenditures in social security administration (SSA), mainly using the countries of the European Union. The potential of SSA in the current context are largely underestimated. We focus on the institutions and approaches in SSA, the comparative evaluation of expenditures and administrative costs of SSA in the EU countries, and related issues and challenges of SSA based on the comparison of different approaches. Drawing on this context, we define research questions as: What are the leading institutions and approaches in SSA? Whether and in what a reserve of SSA is present for social security sustainability? We use an analytic approach, data and assumptions about how SSA potential is influencing social security sustainability.

2. Assessment of indicators of the SSA in the EU area

The widespread increase in the social security expenditures is associated with general issues of the current state of society and economy: demographic and technological. Most of these changes lead to a transformation of the traditional employment model with the participation of the state, corporations and employers in these expenditures. The increase in the pension burden, health care expenditures and the growth of informal employment with the wide participation of non-state social service providers lead to a subsequent in government spending on social security, which increased by about 18% over the past 9 years, from 2008 to 2017 using the example of the EU countries (Table 1).

Table 1. Changes in social security expenditures and their administrative costs in total and per habitant, %, 2008-2017, (at constant 2010 prices)

	Total social security expenditures	Total administrative costs	Social security expenditures per inhabitant	Administrative costs per inhabitant
EU 28 countr.	17,7	15,2	7,6	5,4
Euro area 12 count.	16,5	13,8	8,9	6,4
Belgium	14,0	7,3	32,6	24,8
Bulgaria	38,7	46,8	14,2	20,9
Czechia	16,1	13,8	11,8	9,6
Denmark	21,7	16,0	50,4	43,3
Germany	24,4	23,6	26,3	25,5
Estonia	27,4	29,3	70,8	73,4
Ireland	18,5	10,7	28,8	20,3
Greece	-17,2	-14,7	-54,7	-53,3
Spain	4,9	3,5	-12,7	-13,9
France	21,3	16,4	7,8	3,5
Croatia	5,6	10,2	-34,3	-31,5
Italy	6,8	3,8	-12,2	-14,7
Cyprus	7,0	-2,1	1,7	-6,9
Latvia	27,4	42,8	2,8	15,3
Lithuania	2,2	15,6	-2,2	10,6
Luxembourg	35,4	10,9	25,6	3,0
Hungary	-7,5	-5,2	-21,4	-19,3
Malta	41,4	23,7	38,1	20,8
Netherlands	17,2	12,5	7,7	3,3
Austria	13,7	7,6	-3,3	-8,5
Poland	39,7	40,2	22,5	23,0
Portugal	7,9	10,6	-30,2	-28,5
Romania	27,1	33,2	95,0	104,4
Slovenia	12,5	10,0	-15,5	-17,4
Slovakia	27,6	26,2	4,0	2,9
Finland	22,6	18,3	-31,7	-34,1
Sweden	22,3	12,1	23,4	13,1
United Kingdom	18,0	10,4	-41,3	-45,1
Iceland	29,5	19,7	-23,1	-28,9
Norway	32,2	19,5	9,4	-1,1
Switzerland	35,7	22,8	40,8	27,4
Serbia	-5,1	-0,6	-30,3	-27,0
Turkey	79,2	58,6	96,2	73,5

Source: Eurostat, Social protection expenditure.

Such an increase (with some exceptions) is not uniform in different countries, which may indicate different efforts and reforms in the field of social security in depth and effectiveness. Compared with a smaller increase in administrative expenses, whose growth amounted to about 15% for the period 2008-2017, this difference is more likely to be characterized by improved SSA.

Despite the differences in changes in total social security expenditures and administrative expenses, in the latter show a downward trend in most developed countries, on the contrary, a tendency to increase administrative expenses is typical for countries where social security systems are still under construction. If developed countries have already formed their social security systems and are already implementing reforms in the field of their administration, then developing countries need first of all the formation of their social security systems and relevant institutions. Based on this, we can conclude that not only the formal framework as such, but also the period and quality of SSA affect its effectiveness in each country. The same situation is characteristic in the pair between total expenses and administrative expenses per inhabitant. There are more volatile and different situations that characterize the various consequences of the reforms of different countries when adapting social security systems to changing conditions of society and the economy. Since we have received confirmation that institutions and approaches in SSA have a significant role, which can lead to lower administrative costs, at least, it is important to compare some characteristics of such institutions.

3. Institutes and approaches in SSA: recent trends

To what extent social insurance is associated with the provision of social assistance, it is embedded in the tax and budget systems of the country, non-state providers are involved in the provision of social services, and representatives of trade unions and employer associations are involved in management – these and other issues determine the features of its administration institutions. The main tasks of SSA include, in our opinion, the following: (1) collection or accumulation of insurance premiums (social taxes); (2) investing funds; (3) performance of social functions: from the provision of social services to the calculation of insurance benefits; (4) financing SSA. To solve these and other tasks in the practice of SSA, different levels and institutions are used.

Classically, the SSA is carried out at the state level with responsibility in the status of ministries: finance and social relations (labor). In addition, social insurance can be partially or fully managed by additional social and economic institutions (partners, providers), acting state and non-state structures. There are also structures reflecting the interests of social participants: employers and workers. An approximate classification of SSA institutions with the functions they perform is presented in the Table below (Table 2). The presence of identical functions performed by different institutions in SSA determines the variability of its administration. Moreover, the same functions can be performed simultaneously by different institutions, for example, for different types of social insurance, and in different forms: as cash payments or the provision of social services, for example, medical care.

Table 2. The relationship between functions and institutions of SSA

Functions / Institutions	State				Non-state	
	Financial institutions (tax, financial or treasury)	Insurance (budget) funds	Insurance agencies	Providers of social services (health care, employment institut.)	Insurance companies (funds)	Providers of social services (health care, employment instit.)
Collection (accumulation) of insurance premiums (social taxes)	x	x			x	
Investing of insurance reserves	x	x	x		x	x
Performing Social Functions			x	x	x	x
Calculation of insurance payments (insurance rights)	x	x	x		x	
Making insurance payments (pensions, benefits); social function financing	x	x	x	x	x	x

Source: authors.

If we consider such administration in the initial order, from the receipt of contributions (insurance premiums, social taxes), then they are collected, as a rule, in two main forms: tax, financial or insurance. In the first case, administration of the contributions is carried out by the tax (financial, treasury) services of the country, in the second – through insurance institutions (funds, cash desks) of both state and non-state forms. One of the common examples of tax administration of collection of payments is the United States, where social contributions for wages are accumulated by the Internal Revenue Service as branches of the Ministry of Finance (or the State Treasury of the country) and then distributed to social security funds (for pension insurance, loss of breadwinner, disability) and medical funds. Such funds are managed by the Treasury Department, in which all receipts to the funds are recorded and assets are accumulated. The balance of SSA under the law is invested in the country's securities, the additional income from which forms the accumulation of such funds. Social insurance is administered by the state Social Security Agency. Insurance payments, for example, pensions (a number of federal benefits) are made by such an Agency through individual social accounts that each recipient of such payments has. Thus, the SSA in the

United States is closely integrated into the tax system of the country. Among the countries that have a similar tax- and centrally-oriented SSA with some additions, it should be noted Iceland, Hungary, Canada, Great Britain, Norway, Sweden, Italy, Ireland, Estonia, Latvia, Croatia, Romania, Albania, Montenegro, Russia , Slovakia, Slovenia, Australia, New Zealand, Argentina, China. At the same time, many countries, such as Russia since 2017 or China since 2018, have changed the insurance administration to the tax administration.

In Germany, there is another option for the SSA with the central responsibility of insurance organizations (providers). The insurance contributions of employers and workers for all types of social insurance are collected (accumulated) by medical insurance organizations (sickness funds), which then transfer funds to the following areas: providers of medical and nursing care, health care facilities (for health insurance and long-term care insurance); federal employment agency (unemployment insurance); state accident and health insurance providers; to federal pension insurance; to the artist insurance fund. That is, the central link in the administration of social insurance in Germany is the public or parastatal organizations that collect insurance contributions, and taxes are levied by the local tax authorities. At the same time, medical insurance companies (about 132 organizations in 2014), which administer the collection of insurance premiums, form a national association with broad powers. Such administration through social insurance (security) institutions is present in Belgium, France, Germany, Poland, the Czech Republic, Georgia, Lithuania, most republics of the former Soviet Union, as well as Japan, South Korea, the Philippines, Thailand, Brazil, Mexico, Uruguay. This is the so-called parallel option when tax and insurance administration of fees is carried out separately.

There is also an alternative in the case of accumulative financing of pension insurance, an example of which is in countries such as Malaysia, Singapore, Chile, El Salvador, Peru. Such funds, as a rule, accumulate contributions, manage investments and make payments. On the one hand, they are public institutions, but they also have much in common with private sector systems based on fund management (Barrand et al. 2004).

Among the advantages of using tax agencies to collect social contributions are noted such as (1) synergies between organizations and their main functions; (2) possible reductions in administrative and regulatory requirements; (3) more efficient use of resources, reduction of administrative costs (infrastructure, IT labour costs), (4) improvement of intra-governmental coordination (Barrand et al. 2004). At the same time, social insurance agencies in the form of insurance structures (funds, cash desks) are more targeted and focus on establishing individual rights to receive benefits and pay them to recipients. At the same time, there is some conflicting responsibility of such agencies for collecting (accumulating) insurance premiums and providing benefits to recipients of insurance payments (Rofman and Demarko 1999).

The investment function in the SSA, its effectiveness is, in our opinion, one of the key reserves of its financial stability. The significance of investing in social funds is determined, firstly, by the expansion of individual accumulative and professional

(corporate) insurance programs as a result of the influence of demographic factors, in particular, for defined benefit plans, such investment requirements are unconditional. Secondly, unlike social support, which provides assistance in both monetary and non-monetary forms, social insurance, as a rule, provides for cash payments. In this connection, the cost of money is not only accumulated, but also paid, i.e. invested is important (Andersen 2012). Thirdly, social insurance funds are, in essence, a deferred part of employees' wages; these are, as a rule, compulsory savings made in order to receive 'profitable' payments in the future. At each moment of time, the balance in the individual retirement account belongs to the depositor as his personal 'wealth', even if he or she does not have the right to use it for purposes other than social security. This implies both the availability of these funds in absolute terms and their maximization, as well as long-term guarantees (Cichon et al. 2001). Fourth, social insurance funds are financial resources, in the monetary form of which the theoretical requirement of their investment and obtaining additional investment income has already been laid, and therefore the current deficit of such funds requires its placement in those types of assets that are in line with national interests. These and other reasons determine the accumulation by national social insurance systems of potentially significant amounts of money that are collected today to finance future obligations, especially in pension insurance. In this regard, questions arise of appropriate investment, financial planning, investment strategies, permitted types of assets, guarantees, i.e. generally appropriate investment policy.

What institutions and approaches are common in the implementation of investment policies of social insurance and SSA? The investment functions of social insurance, reflected in Table 2, can be performed both by insurance structures (funds, cash registers) of state and non-state forms, and by financial and tax departments (services). Thus, institutions where the insurance fund is an independent organization with legislative (legal) powers and its own management service are present in Denmark, Finland, Hungary, Italy, Japan, Norway, Poland, the Netherlands, Switzerland and as insurance offices in Austria and Germany. In contrast, a contractual insurance fund consists of a separate pool of assets without legal personality and is managed by a separate financial organization: a bank, insurance or management company. The governing body of the fund is usually present as the board of directors of such a managing financial organization. Examples of contracted pension funds include Spain, the Czech Republic, Mexico, Portugal, Slovakia, Turkey, and open-ended funds in Italy and Poland. The third common form: trust funds have both institutional and contractual (contractual) characteristics. Trustees legally owning the assets of the funds transfer them to management in the interests of the participants (beneficiaries) of the investments. Although the function of trusts is similar to the function of funds, trustees are not a legally significant part of such trust (trust), while there is fiduciary responsibility of both managers and proxies. Examples of such funds are present in the USA, Great Britain, Australia, and Ireland (Stewart and Yermo 2008). Thus, in the implementation of the investment function in the administration of social insurance, the leading role is assigned not to a specific institution (as in the case of collection of insurance premiums), but rather to the format of investment

management, investment strategies, state regulation of investment activities of social insurance funds (Tessaromatis 2013; Stewart and Yermo 2008; Cichon 2004; Tamagno 2001).

The social service in the SSA is carried out by various state and non-state institutions, the question of attracting the latter to participate in such public administration can be considered a definite and confirmed practice. Nevertheless, the presence in recent years, in particular after the 2008 crisis, of a contradictory tendency: both to strengthen the state position in social services, and to expand the participation of non-state providers in it, determine the current significance of this issue. Arguments in favor of engaging non-governmental, private institutions in the provision of social services include arguments such as a more effective assessment of moral hazard risks and adverse selection, often over-insurance in case of unemployment and disability insurance (Koning 2006; Dixon 2002). On the other hand, public administration is less costly than the costs of private insurers and provides a more uniform and universal social service. The compromise between the extreme positions is to allow a mixed model of public service, using the advantages and limitations of state and non-state forms with the state (government) as a regulator (Galazoulas and Tsetoura 2014; Vonk 2010; Koning 2006).

Despite the more extensive options for public or private components in the provision of public services, there are currently no reliable empirical studies on the effectiveness of using one or another component. In our opinion, the social insurance service, because of its economic and social significance, is state-oriented both in terms of providing services and their control. Social service provides for significant investments in infrastructure, research with a rather uncertain outcome in the future that is not able to finance private institutional structures. The need to provide universal social insurance services also determines the activities of state providers. Another fundamental factor in the state-centralized social service is the receipt and use of information on the cost, recipients, conditions of social services, which may be limited in the case of private providers (Cichon et al. 2004).

In general, as with the implementation of the investment function of insurance, there are substitution effects: the absence of state social service entails its implementation by non-state market structures and, conversely, broad state social services reduce the participation of private providers (Andersen 2012).

The administrative expenses for social security do not directly correlate with any model of the welfare state, but are generally higher, for example, for the Scandinavian countries, i.e. administering more social redistribution. On average, in OECD countries, administrative expenses for social insurance ranged from 1% to 4.5% of GDP in 2016 (Stefan 2015). However, there are non-linear (but correlated) relationship between the amount or ‘wealth’ of social expenditures and administration cost per inhabitant (Table 3). It is worth to note that the most ‘expensive’ in administration are the countries with insurance-based financial approach in opposite to tax-based.

Table 3. The comparison of social security expenditures and their administrative costs per inhabitant in the EU countries, 2017, %

Country	Administrative costs in social security expenditures per inhabitant, %
Switzerland	6,0
Netherlands	5,0
Ireland	4,3
Denmark	3,9
France	3,8
Germany	3,7
Belgium	3,7
Czechia	2,9
Bosnia and Herzegovina	2,7
Lithuania	2,7
Slovakia	2,6
Poland	2,3
Italy	2,0
Sweden	2,0
Romania	2,0
Bulgaria	1,9
Austria	1,8
Turkey	1,8
Norway	1,7
Serbia	1,7
Spain	1,7
Finland	1,7
Croatia	1,6
Hungary	1,6
Estonia	1,6
Slovenia	1,5
Latvia	1,4
Luxembourg	1,4
Portugal	1,3
Cyprus	1,3
Malta	1,1
Greece	0,9
United Kingdom	0,7
Iceland	0,6

Country	Social security expenditures per habitant, Euro
Norway	18 763
Luxembourg	18 685
Switzerland	16 511
Denmark	15 338
Sweden	12 428
Netherlands	11 739
Finland	11 248
France	11 154
Austria	10 727
Germany	10 716
Belgium	10 071
Iceland	8 940
United Kingdom	8 687
Ireland	8 660
Italy	7 765
Spain	5 440
Slovenia	4 467
Greece	4 438
Portugal	4 394
Cyprus	4 279
Malta	3 525
Czechia	3 178
Slovakia	2 564
Poland	2 419
Croatia	2 392
Estonia	2 383
Hungary	2 230
Lithuania	1 973
Latvia	1 765
Turkey	1 420
Romania	1 239
Bulgaria	1 121
Serbia	953
Bosnia and Herzegovina	804

Source: Eurostat, Social protection expenditure.

4. Conclusions

The variability of social security institutions and their forms determine both the complexity of the administration process and its mixed forms. Despite the trajectories of the institutional environment in the SSA and social insurance, the state remains in the role of the main guarantor of the standards of social services, social policy in general. On the whole, different administrative structures provide different purposes, state control, redistribution, and intermediation. Since the SSA has additional potential for improving of social security and social insurance, thanks to its use it is possible to make guarantees, benefits, and services more efficient and provide better quality for citizens. This article is one of the first attempts to focus on recent trends in the SSA with its role as a reserve in social sustainability; promising research in this area may be associated with a quantitative assessment of the relationship between different forms of administration and the resulting achievements for social security.

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THE IMPORTANCE OF FAMILY: A MACROECONOMIC PERSPECTIVE

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1. Introduction

Plenty of economic phenomena cannot be explained in the absence of family structure. For example, the immense changes in women's labor force participation are strongly affected by family structure: married women work less than single, and mothers work less than childless women (Greenwood et al. 2017). A significant share of these differences is a result of the family-specific design of tax and social security systems (Borella et al. 2019). Family structure is also a natural framework for studying intergenerational mobility and parent-child correlations. More and more macroeconomics papers reconcile the importance of a family and explicitly model decisions within the household. In this paper, we propose a systematic overview of this stream of literature.

We are not the first ones to review family economics in the context of macroeconomics, e.g. Browning et al. (2014). Doepke and Tertilt (2016) provide an excellent summary of advances in family economics and its successes in explaining classic macroeconomics phenomena. We extend their study by focusing on family-dependent policy interventions, the joint aspect of taxation, and the impact of labor market structure on fertility. What is more, an outstanding guideline of family economics models by Greenwood et al. (2017) pointed out several remaining research questions – concerning childcare subsidies, fertility policies, taxation, and within-family insurance. We prove that many of them have already received a satisfactory empirical and theoretical answer.

The definition of family differs substantially across macroeconomics literature. However, we can systematize these definitions using two dimensions: the household structure and decision process. We can distinguish two types of households: the first consists of the parent(s) and child(ren), the second consists of husband and wife. The latter fits analyzing gender inequality, unequal tax treatment, or family-dependent components of social security. The parent(s) and child(ren) family structure is the most common and helps explaining human

capital accumulation, inequality, and fertility decisions. Both setups are employed to study different drivers of women's labor force participation.

In terms of the decision-making process, we can distinguish unitary households and households based on game-theoretic bargaining models. The members of the unitary household maximize the so-called household utility function, which describes the joint interests of all household members under aggregated budget constraint. However, the formation, as well as the dissolution of a partnership, usually require decisions of the individuals involved. Thus, it always contains the possibility of conflict. Bargaining models better reflect this feature and describe household behavior as the cooperation of utility-maximizing individuals. Despite that, the unitary household is a typical framework, even in recent literature. Models with bargaining are mostly used to describe the formation and stability of marriage and recently to analyze fertility decisions.

In the following part of the paper, we review both macroeconomics and family economics literature in the context of labor force participation, fertility choice, human capital accumulation, inequality and taxes, and social security. Depending on the policy in question, the literature proposes models with significantly different structures and features, e.g., types of heterogeneity, choice set, applied utility functions, and model timing. All of them contribute to the mechanism of the model and its fit to the data (Borella et al. 2018). We discuss below different model setups, with particular caution to policies' welfare effect. In this way, we provide a method guideline useful for future research.

2. Working parents and fertility

The labor-force participation of women increased sharply during the twentieth century. Even a more considerable increase has been observed for married women. However, the employment rate of married women with and without children still differs substantially. The size of the gap varies noticeably across countries. Child-related transfers and family policies can account for a considerable part of this variation (Hannusch 2019). Childcare and parental leaves are essential tools for reducing labor market cost of motherhood and, therefore, more gender equality in the labor market.

Almost all OECD countries offer paid leaves to parents of a newborn (parental leaves). However, systems differ significantly between countries both in terms of length of parental leave and the generosity of transfers.

There is a consensus in the literature that parental leave has a positive impact on the labor market. Byker (2016) shows that the availability of parental leave increases labor-force attachment. Parental leave increases labor force participation as well (Blau and Khan 2016; Stichnoth 2019; Yamaguchi 2019).

The welfare effects of parental leave are not unambiguous. Erosa et al. (2010) show that the introduction of paid parental leave benefits women substantially due to the redistribution effect and a stronger bargaining position on the labor market. The increase in women's welfare occurs at the expense of the welfare of men, and aggregate welfare effects are negative. However, Bastani et al. (2019) show that

parental leave leads to welfare improvement if we account for the fact that firms have to offer standardized contracts to all employers. Without parental leave, more family-oriented worker obtains a suboptimal level of contract flexibility due to asymmetric information or anti-discrimination legislation.

The critical but absent ankle in researches mentioned above is household structure and, thus, insurance within a family. As Tominey (2016) shows, parental leave enables mothers to come back to work quickly if the father receives negative productivity shock, thus reduce the magnitude of a negative income shock. Blundell et al. (2018) obtain similar results. Lower-income risk comes at the expense of time spent with children. When negative income shock hits fathers, mothers work more, as residual earner model would predict. Due to the complementarity of leisure between wife and husband, working mothers spend less time with children and stay at home fathers do not compensate for that. Thus, if we take into consideration the welfare of the child, the effect is ambiguous. Both studies consider the US economy, where parental leave is unpaid. Paid parental leave would lead to a higher degree of insurance within the family because income smoothing may happen without cutting time devoted to childcare**.**

Public childcare addresses the asymmetry in childcare burden. Doepke and Kinderman (2019) show that the fertility level across countries increases with the fraction of the childcare burden taken by fathers. Using a quantitative model of household bargaining, they show that policies targeted to help mothers, i.e., public childcare, increases fertility level and welfare more effectively than nontargeted policies (e.g., direct child transfers). Childcare helps limit the depreciation of mothers' human capital. Guner et al. (2020) analyze public childcare in a model where human capital is a direct function of labor force participation. More affordable childcare relaxes time constraints and thus increases labor force participation. Hence human capital and welfare increase as well.

The natural alternative to maternal childcare is grandparental care. The access to grandparents' help increases mothers' labor force participation (see e.g. Posadas and Vidal-Fernandez 2013; Yu et al. 2019). However, it not necessarily leads to an increase in women's income due to lower mobility (Garcia-Moran and Kuehn 2017). There is also plenty of empirical evidence of the positive impact of formal childcare on child development (Currie and Thoms 1995; Boca et al. 2016b).

The marketization of childcare is a more and more important alternative to informal and public childcare as the gender gap shrinks, and income inequality grow. The marketization of childcare help explains why over the last 40 years, the US total fertility rate has been rather stable, while female wages have continued to grow. Rising relative wages increase women's labor supply and, due to higher opportunity cost, lower fertility at first. However, it also leads to a reallocation of home production and childcare from women to men and a marketization of childcare, which counteracts the first-order effect (Siegel 2017).

The marketization of childcare may also explain why highly educated women no longer have fewer children, contrary to a standard assumption of strictly negative fertility-income relation (Jones et al. 2010). Hazan and Zoabi (2015) argue that

there are three possible explanations: group composition, medical advantages, and marketization of home production, including childcare. As more women get an education, more highly educated women enter marriages and build a family. Medical improvement enables highly educated women to realize postponed fertility. Finally, women with high education can reduce the time spent on childcare and purchase more services as substitutes. Bar et al. (2018) propose a theoretical framework to formalize this intuition. They assume that parental time investment is necessary to raise a child. However, parental time may be substitute by paid childcare. Due to increment in income inequality, the relative price of childcare drop for high-income households. They showed that changes in inequality could quantitatively account for much of the changing relationship between mothers' education and fertility over time.

Not only fertility and family policies shape the labor market decisions of parents, but also the labor market condition affects fertility decisions. Wage uncertainty is an essential channel of this interaction. Having a child is a long-term commitment; thus, more insecurity regarding future income implies lower intended fertility rate and longer postponement of first birth (Sommer 2016).

Guner et al. (2019) study how uncertainty created by temporary and open-ended contracts combined with the inflexibility of work schedules reduces the fertility level of women with higher education. In a life-cycle model with endogenous fertility, endogenous labor, and skill formation, they show that reduction of the labor market duality and inflexibility of work schedules increase the completed fertility of college-educated from 1.52 to 1.88. Due to reform, women have more children and have them earlier. The labor force participation of women increases. The employment gap between mothers and non-mothers shrinks. Lopes (2019) use a similar setup to study the effect of the decline of job security in Portugal on fertility. She shows that job security is especially crucial at first birth. For subsequent birth decisions, the income effect is relatively more important.

Another significant stream of literature analyzes the interaction between fertility and income risk on the aggregate level. On the one hand, wages decline observed during recessions lowers the cost of having a child in terms of foregone earnings. Thus, fertility may increase during the recession. On the other hand, the presence of the borrowing constraints makes poorer households unable to cover the consumption cost of an additional child (Papagni 2006, Filoso and Papagni 2015). The above mechanism may be reinforced by the "added- worker" effect and even further by the gender asymmetry within the industries (Coskun and Dalgic 2019). Empirical studies show fertility decline during the Great Recession (Matysiak et al. 2018), the Great Depression (Sobotka et al. 2011, Jones and Schoonbroodt 2016), the fall of the Berlin Wall (Liepmann 2018), and post-communist countries (Billingsley 2010). It suggests that the economic constraints and uncertainty channel are more important than the lower opportunity cost of having a child.

Lower fertility, due to labor market uncertainty, should concern social planer. The stochastic character of fertility (see Wolpin 1984; Hotz and Miller 1993), implies that the total number of children depends not only on couples' intentions but also on the stochastic realization of those intentions. Thus, there is a risk of obtaining

too high or too low fertility as an outcome. Imperfect contraception, combined with income risk, may lead to unwanted pregnancies. Abortions are important fertility control mechanisms, especially when unplanned pregnancy coincides with unfavorable income realization (Choi 2017, Miller et al. 2020). Income shocks cause postponing birth. Taking into account the decline in fertility with women's age, it may lead to suboptimal fertility realization. Both IVF and abortions help to overcome the market's incompleteness in the aspect of fertility and to close the gap between the desired and the realized number of children.

3. Human capital accumulation

With family structure, two channels are affecting human capital accumulation of the young generation – characteristics of parents and parental investments. In light of rising inequality, one needs to realize that human capital investments are the vehicle for social mobility. Since education also generates positive externalities (e.g., peer group effect, exchange of ideas), there is also a strong inducement for governments to promote investments in human capital. Moreover, market imperfections distort private investment choices, making room for policy interventions. Since they are very costly, it is necessary to quantify their effects. There is extensive empirical literature on this subject (Acemoglu and Angrist 2001; Krueger and Lindahl 2001; Heckman and Mosso 2014).

The inability to finance human capital investments through financial markets (and because of their imperfections) is often listed as the leading cause of policy intervention (Keane and Wolpin 2001). However, in an excellent overview of human capital policies, Heckman and Carneiro (2003) estimated that "only 8% of American youth are credit constrained in the traditional usage of that term". Still, despite empirical skepticism towards intergenerational borrowing constraints hypothesis (Mulligan 1999; Heckman and Mosso 2014; Boca et al. 2016a), the literature widely employed Becker and Tomes (1986) model for policy analysis. A key feature in their approach is that parents cannot borrow for human capital investments against the future income of their children. Recently, their two-period framework expands in a way that parents can invest in the human capital of their children along the multiple life stages, which is also in line with empirical result (Cuhna et al. 2006).

Challenging previous findings, Caucutt and Lochner (2019) investigate the role of borrowing constraints in a life-cycle model with two stages of human capital investments. Later on, they extend the analysis into a dynastic framework. To provide a tool for quantitative analysis, they equipped their model with earnings shocks that allow wages to variate within education classes. Also, their borrowing constraints depend positively on the future human capital of an individual. They find that almost half of the young parents and 12% of old parents face borrowing constraints. Increasing the borrowing limit of the young parents by only half of the average monthly income improves early human capital investments by 11% and college graduation rates by 10%. These effects are more

significant for college-educated parents because they are the ones facing credit constraints for offspring's human capital investments.

Koeniger and Prat (2018) combined both characteristics of parents and parental investments with a parental decision on bequests. They employ a dynastic model featuring hidden stochastic abilities and ex ante heterogeneous productivity persistent across generations. First, they find that parental human capital investments should be decreasing in bequests. It stems from the fact that receiving inheritance translates to the increase in wealth and hence to the decrease in labor force participation (see also Holtz-Eakin et al. 1993). Second, because the abilities of children are positively correlated with parental earnings, publicly provided human capital investments should be increasing in parental labor income and decreasing in their wealth. Third, the optimal policy is to tax bequests and subsidize human capital accumulation. The risky human capital investments and hidden abilities of children are the driving force of this result. The study also provides a compelling argument in the discussion about the persistence of earnings across generations. According to the paper, the intergenerational earnings elasticity observed in data is close to the social optimum.

4. Inequality and taxes

The importance of inherited wealth and parental background has recently attracted much attention in the academic literature (Boserup et al. 2018; Abott et al. 2019; Fogli and Guerrieri 2019). With the development of finite-horizon models, it becomes possible to study intergenerational interactions in the macroeconomic framework – for example, in the context of taxation and other policies supporting equity. Even though the intergenerational mobility seems to be stable over the last decades (Chetty et al. 2014), with rising inequality providing the equality of opportunities assumes growing importance.

A standard approach in taxation literature is to judge against two criteria of equity and efficiency. While equity is hard to measure and its evaluation requires explicitly defined criteria, the efficiency indicate minimizing distortions to economic output. Until recently, Chamley (1986) and Judd's (1985) result suggested optimality of zero capital income tax rate (ergo taxation on wealth, bequests, or any accumulated factor). It stems from the fact that tax on capital income generates distortion on intertemporal choices. However, Straub and Werning (2020) show that when the intertemporal elasticity of substitution is less than or equal to one, the long-run optimal tax rate is positive. For elasticity higher than one, the tax rate converges to zero, but it might stick to positive values for ages before so. They were not the first ones to challenge the zero tax rate result (Piketty and Saez 2013). By relaxing assumptions about the model, i.e., accounting for idiosyncratic labor income shocks (Krueger and Ludwig 2018) or accidental bequests (Blumkin and Sadka 2004), the result of untaxing capital can be overturned.

Intergenerational transfers can take the form of passing estates, inheritance, accidental bequests, and *inter vivos* (during lifetime) gifts. All of them might be taxed, and the general conclusion from the latest literature is that they should

be (Kopczuk 2013; Piketty and Saez 2013; Saez and Stantcheva 2018). The rationale behind it is that taxes on transfers are highly progressive, and they level the wealth concentration. Koeniger and Prat (2018) find that at the social optimum, the wedge for human capital is much lower than the wedge for bequests. Hence, human capital investments are often subsidized, whereas bequests should be universally taxed. However, there was no agreement on this matter for a long time. To understand those conflicting results, one should focus on model choices that drive the differences. Curiously enough, the motivations behind bequeathal decisions are also crucial in determining the efficiency of taxation (Gale et al. 2001; Cremer and Pestieau 2006).

Becker and Tomes (1979), followed by Davies (1986), show that in dynastic framework with idiosyncratic labor productivity shocks, the rise in estate tax increases long-run inequality and deteriorates welfare. They model pure dynastic altruism and, in their setup income of subsequent generations, directly enter the utility function of the current generation. This model choice causes two amplifying effects. Firstly, the higher the taxes on bequests, the lower the averaging labor productivity luck in a lineage. This inheritance effect alters "how much luck" is passed from the previous generation on to the present and consequently changes current income. Secondly, the rise in taxes leads to a drop in government revenues through redistribution effect. As a result, the lump-sum transfer from the government to households is lower, causing inequality to increase. However, the direction of the redistribution effect changes with the employed utility function.

Under the *warm-glow* or *joy-of-giving* motive, bequest taxation has an equalizing effect. In this setup, bequest enters the utility function as a consumption expenditure in the last period of life. Further, with Cobb-Douglas preferences, taxation is neutral to average wealth and thus, by lowering the variance of bequests, indicates lower wealth inequality. As proved by Bossman et al. (2007), followingly by Wan and Zhu (2019), the redistribution effect dominates the inheritance effect. Redistribution reduces the variance of wealth while keeping the average wealth constant and consequently decrease the inequality, measured not only as a coefficient of variation but also as the Gini coefficient. This result also holds for different forms of constant relative risk aversion (CRRA) utility function (Heer 2001; De Nardi and Yang 2016).

As pointed out by Cremer and Pestieau (2006), there are two primary ways to tax intergenerational wealth transfers – with the estate and inheritance taxation. What is worth emphasizing, both taxes can implement the optimal allocation, but we refrain from a detailed review on this topic. However, drawing from the literature on optimality, one should stress that from a policy perspective, the inheritance tax is preferable. Firstly, the optimal formula of bequest taxation depends much not only on the magnitude of inheritance but also on the behavioral response of future generations (Piketty and Saez 2013). Hence, it seems reasonable to impose a tax on the donee rather than the donor (Kopczuk 2013). Secondly, when allowing for household heterogeneity in the number of children, it is not possible to derive optimal estate tax formula independent of the family size (Fahri and Werning

2010). At the same time, there exists the inheritance tax that implements the optimal allocation. Furthermore, when heterogenous households treat their children unequal with their share in a bequest, a social optimum may require progressive inheritance taxation rather than estate taxation that is calculated on the aggregate (Cremer et al. 2011). Nevertheless, the existing wealth transfers taxation schemes are very far from the optimal formulas derived in the literature. For more details on optimality, see Chari and Kehoe (1999), Golosov et al. (2003), Kocherlakota (2005), Fahri and Werning (2010), Piketty and Saez (2013) and Stantcheva (2020).

By incorporating family structure into macroeconomics models, it becomes possible to study another aspect of taxation – separate versus joint taxation. With separate household taxation, each earner's marginal tax rate increases only in his own income; in systems of joint taxation, one earner's marginal tax rate increases not only in his own income but also in the income of someone else. Thus, it heavily influences the labor supply within the household, and consequently partially explains gender differences in labor force participation (Apps and Rees 2004; Kaygusuz 2010; Guner et al. 2012; Guner et al. 2014; Bick and Fuchs-Schündeln 2017; Borella et al. 2019). Moreover, it is also significant from the perspective of optimality. Wu and Krueger (2020) demonstrate that when accounting for joint taxation and idiosyncratic wage shocks, the optimal degree of tax progressivity is substantially lower than what suggest one-earner models. It stems from the fact that in one-earner models, the progressivity, precautionary savings, and social security are the only sources of insurance against idiosyncratic shocks. To capture this mechanism, one should account for endogenous labor, or alternatively residual, or binary labor supply for the secondary earner in two-earner models.

Using a model with binary labor supply for the secondary earner, Kleven et al. (2009) portray the household decision as a multi-dimensional screening problem. Brett (2007) and Cremer et al. (2012) also employed this approach. In their setup, the decision-makers are heterogeneous with respect to marital status, abilities, and taste for work. Those parameters are unobservable by the principal (government or tax authorities) who wants to maximize social welfare. Those studies build extensively on the literature solving one-dimensional screening problem in the spirit of Mirrlessian optimality (Apps and Rees 2011; Alesina et al. 2011). In fact, optimal taxation calls for negative jointness. It means that the tax rate on the secondary earner should be decreasing in the earnings of the primary worker. It results from a social planner's interest in redistribution from two-earner households to one-earner households with low primary earnings. Surprisingly, many tax-transfer schemes in Europe feature negative jointness, which is driven by many family-based governmental transfers (Kleven et al. 2009). However, reforms that lower the tax burden on the secondary earner in the household are welfare improving through the labor supply channel.

The negative jointness as an optimal tax scheme also results from the study by Gayle and Shephard (2019). Their approach includes a marriage market equilibrium and intra-household allocations on top of the usually employed screening problem.

Introducing joint versus separate taxation is welfare improving, but those gains are relatively small. However, the welfare gains are increasing as the gender wage gap is growing.

5. Family and social security

There are three main reasons why accounting for families is essential in the social security context: the design of the pension system, insurance within the family, and the pension-fertility link.

First, family structure affects retirement incentives and, thus, decisions. Pension benefits design implies a high implicit tax and discourages the labor supply of the secondary earner. Borella et al. (2019) show that elimination of survivor benefits and spousal pension would increase labor force participation of married women by 10-20 percentage points. A similar magnitude of labor force reaction has been presented by Guner et al. (2012). Sánchez-Marcos and Bethencourt (2018) replicate those results in a model that accounts for human capital loss due to nonparticipation. Groneck and Wallenius (2019) and Kaygusuz (2015) use a simpler model with a less elastic labor supply. They account for a 6% increase in women labor force supply due to the elimination of the family dependent components. Nishiyama (2019) shows that labor market effects are much smaller if one accounts for utility from home production. Survivor benefits and spousal pension imply redistribution mostly to single-earner married households and thus favor married women over singles — such redistribution calls welfare concerns in the context of the rising share of single mothers. In all of the mentioned papers, elimination of family dependent components of the pension system increases welfare.

The design of pension benefits also leads to coordination in couple's retirement decisions, see Coile (2004), and Casanova (2010) for the US. However, couples use to retire together, even if the pension system does not generate such strong incentives as US spousal pension, see Hospido and Zamarro (2014). The potential reason may be couples' preferences, namely leisure complementarities between spouses and assortative mating. If couples enjoy spending leisure time together, the marginal utility of retirement would be higher if the spouse is already retired. Similarities in preference for leisure can explain retirement at a similar time. Michaud et al. (2019) show evidence of complementarities in partners' leisure and a positive correlation between partners' labor supply preferences. However, the first channel dominates. Even if the reason behind joint retirement is not well understood yet, the spillover effects of pension system reform are huge and cannot be ignored. For example, Coile (2004) finds that the omission of spillover effects biases the estimated effect of policies aimed to enhance longer labor force participation by 13% to 20%. Thus, there is a need to replace the individual model of retirement by a collective model of multi-person households while studying pension system reform.

Second, the family helps mitigate wage risk. When negative income shock realized, a single individual can adjust their labor and savings. For individuals living in couples, there is an additional channel of insurance; namely, the labor

supply of both partners can be adjusted. De Nardi et al. (2019) show that in the US, family insurance plays a more critical role than the one offered by the government. On the other hand, in countries with more generous welfare states like the Netherlands, family insurance was "crowded-out" by government transfer. Nakabayashi (2019) proposes a model to explain the differences in the size of government support across nations. A more extended welfare state is likely to be chosen in civil law countries, like Germany or Japan, whose family law arranges a higher duty of support within the family. Thus, government insurance is higher in countries that use to have a high level of family insurance.

Family and government insurance works differently for different income levels of individuals. Income risk is the highest for impoverished and wealthy households, i.e., the first and the last decile of earnings. The common pattern across countries is that family risk-sharing plays a more prominent role for high-income individuals, and government insurance is mostly addressed to poor households, see De Nardi et al. (2019). However, even after government transfer, in the US, the standard deviation of income remains the highest among the first decile of earners. Those households are also more likely to be run by a single individual (or single parent) and thus have limited access to family insurance, see Watson and McLanahan (2011) and Schneider et al. (2019).

Third, there is plenty of cross-country evidence that fertility level is negatively correlated with the size of pension system. The observed pattern is in line with the Boldrin and Jones' (2002) model of fertility decisions. In contrast to Barro and Becker's (1989) model where children are a consumption good, Boldrin and Jones (2002) assume that children serve investment purposes and ensure parental consumption in the after-work periods. As the size of the old-age support offered by the government increases, the incentives to have children shrink. Boldrin et al. (2015) show that the size of the pension system accounts for 55-65% of the observed difference in the US-Europe fertility rate. Fenge and Scheubel (2017) use the introduction of Bismarck's pension system and show the negative impact of public pensions on fertility. Billari and Galasso (2014), based on the pension benefits cut in 90-ties in Italy, show that even in modern societies, investment motive prevails, and benefits cut implies a rise in fertility rate.

The fertility rate is not only lower but also too low in the presence of the pension system. Schoonbroot and Tertilt (2014) show that the lack of property rights for children's future income implies too low child-related investment. The public pension system operating on a PAYG basis offers a contract between parents and unborn children and forces born children to support retireed parents, thus complete the market. However, the standard PAYG pension system links the aggregate income of future generations, therefore the average fertility rate, with the pension benefits on today's parents. Hence children generate private cost and public benefits. Fenge and Meier (2009) and Fenge and von Weizsäcker (2010) show that the socially optimal fertility rate may be obtained by the mix of standard PAYG system and individual fertility-related pensions. Child-related subsidies may achieve the same allocation as a fertility-related pension (see Fenge and Meier 2009). Cremer et al. (2011) show that if endogenous human capital

accumulation is taken into account, one should consider subsidy education and tax the number of children.

6. Conclusion and avenues for further research

The growing stream of macroeconomic literature acknowledges that the interactions within the family are vital in explaining many economic regularities. We propose a systematic review of this literature in the context of inequality and taxes, human capital accumulation, social security, labor force participation, and fertility choice. We concentrate on externalities and market failures that appear or escalate when one accounts for interaction within the family. We discuss the policy recommendations addressing these externalities and market failures. We put special attention to the welfare effect and critical elements of the models' that drive the results. Hence, we present a method guideline valuable for future research.

Incorporating recent advances in empirical work on human capital accumulation is a major challenge for family economics. First, the literature neglects the interactions between siblings in family structure and different parental preferences towards children, depending on birth order or gender. Second, there is usually a complementarity in the accumulation of human capital in different stages of life. However, empirically, this is not the case. Even though the life-cycle models capture well the ongoing process of acquiring human capital, the early investments prove to be the most effective. Third, empirical literature stands clearly that income risk affects not only fertility decisions but also human capital investment. Since low-income individuals face high volatility of income, it would be to useful account for that feature in the context of social mobility. Lastly, in the vast majority of papers, the fertility is exogenous. However, the interactions between fertility timing and human capital investments are distinct. Investing in the quality of a child takes time and money – resources constrained for young parents. With fertility rates dropping below replacement rates, the analysis of policies in this framework may be crucial.

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EQUALITY OF DESERT IN THE PENSION SYSTEM FROM THE GENDER PERSPECTIVE. THE CASE OF POLAND

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1. Introduction

Equality is treated as one of the effects of *welfare state* (Golinowska 2018, pp. 22-23) and at the same time as the key category of *welfare economics* (Blake 2006, p. 3, 171ff.). Equality is considered in connection with distributive justice[1], taking into account both normative (distributive justice defined through equality) and positive relations (distributive justice results in equality in a given area) between these two categories (Szarfenberg 2008, p. 71). Hence, equality is a relevant criterion in defining, operationalisation, implementation, control and assessment of social policy (Schmähl 2009, p. 122; Szumlicz 2015, p. 14).

Analysis of the literature on the subject of equality in social policy shows an important cognitive weakness: the concept is seldom conceptualised and particularly rarely operationalised (Österle 2002, p. 46). At the same time, in literature on pensions we can observe remarkable chaos in terminology concerning equality. It is also characteristic that both researchers and decision-makers, when referring to pension provisions, usually cite distributive justice in its default sense, while literature mentions numerous definitions thereof.

Equality as a principle of distributive justice in the pension system is usually referred to in two contexts: either as a constraint on or the goal of pension reforms (Howse 2007). In the former case, justice referred to equality is a criterion on the basis of which the character of proposed reforms is analysed, evaluated and selected. It is assumed at the same time that their implementation cannot infringe justice in the pension system (e.g. excessively burden the generations which are financing the provisions), without explicitly defining the set of its qualities (referents/denotations). In the latter case, when justice is the goal of the reform and the premise of the changes undertaken in the pension policy, the reform is aimed at achieving defined referents of justice in the pension system (e.g. achieving inter-generational justice).

[1] Distributive (allocative) justice refers to "distribution of something that people cannot provide to themselves sufficiently compared to their needs or demands" (Rysz-Kowalczyk, 2002, p. 199).

Pension system is one of the most important institutional platforms for the fulfilment of distributive justice principle. The base pension provision (i.e. common, obligatory, state-initiated and often state-delivered), which primarily amounts to the volume of collected and transferred financial means, constitutes a significant area for distributive justice to take place.

Equality in the pension system is usually taken into consideration in the description and assessment of pension systems. For instance, in the open method of co-ordination of the EU pension systems equality is indicated directly as the aim of modernisation and indirectly in the context of adequacy (e.g. the level of replacement rate) and financial stability of pension systems (Żukowski 2010; Chybalski 2012, p. 79ff.). The World Bank approaches equality as one of the six criteria of pension systems assessment (Holzmann et al. 2008, p. 8ff.). It's worth noting that intra-generational equality in pension systems is by far less frequently analysed (Kohli 2008, p. 196).

Equality in the context of gender, understood as formally identified equal rights and treatment of both men and women is a crucial premise in the EU legislation and activities (Śledzińska-Simon 2011). Research of pension systems from the point of view of gender equality encompasses mainly regulations and the benefit levels for men and women. The regulations refer to formal equality and are directed at the analyses of pension regulations in terms of the access to the provision and its amount. The latter are concentrated on the impact of regulations on actual access to a pension system and on estimation of provision amounts for men and women considering their differing biographies.

The concern with analysis and especially evaluation of pension systems from the gender perspective is important for several reasons. Firstly, it stems from the increase in female activity on the labour market, especially starting from the 60's of the twentieth century. Obtaining income from labour leads to individual pension entitlements in pension systems and this in turn inspires research of pension level differences between genders (Jefferson 2009; James 2011). Secondly, changes in the family model including a limited occurrence of the single breadwinner model seem to question the traditional forms of pension security for women based on derived entitlement in the form of a survivor's benefit. Thirdly, pension reforms conducted in various countries are clearly directed at strengthening equivalence of the contribution and the pension, which has an adverse effect on pension amount received by females. This is caused by unstable or interrupted careers on the labour market as well as differentiation between retirement ages of men and women in some of the countries.

The aim of the article is to operationalize equity with regard to one of the equity dimensions, i.e. the equity of desert within a generation in the pension system. In the next step the intergenerational (in)equity between women and men in the Polish (obligatory) pension system will be identified. The calculations will focus on the results of the descriptive microsimulation model, which bases on the female and male biographies and pension outcomes received from the new pension system.

2. Equality of desert – definition

The studies of literature and analyses of the available research findings indicate clearly that the category of equality is a key instrumental value of social policy and it determines another value, which is distributive justice. In the course of the research I assumed that the relations between these two categories are both conceptual and normative in character. A conceptual relation may be considered at least in two aspects (Fig. 1).

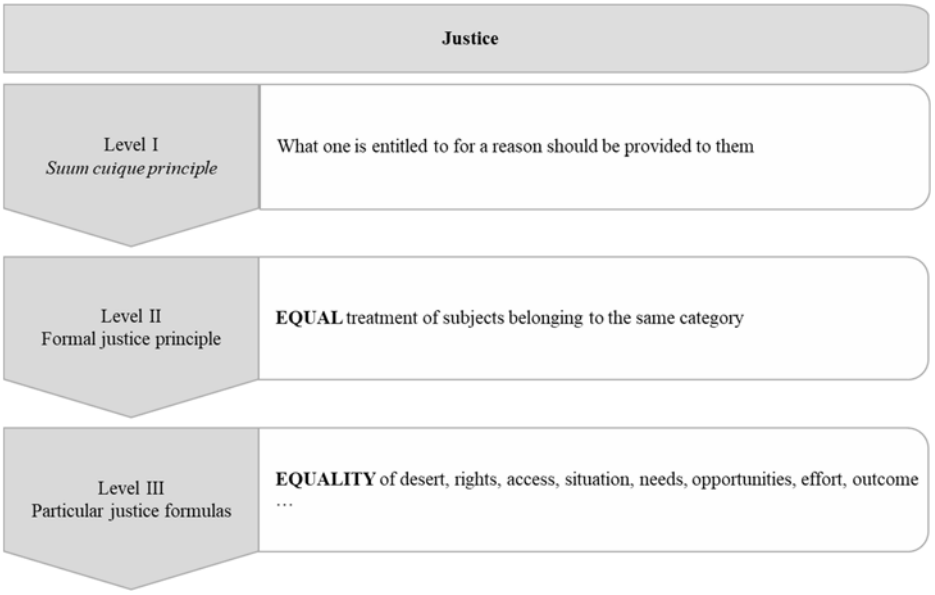

Fig. 1. Conceptual relations between justice and equality
Source: author's own work.

Firstly, equality may be understood as a principle which determines operation of other principles („the principle's principle", meta-principle) and understood as undiscriminating (treating equally) for all the subjects belonging to the given category. Secondly, equality refers to the criteria (distribution principles) which are implemented in (re)distribution of limited goods. In the adopted approach, equality is not limited to just one distribution principle i.e. equality of situation which leads to a narrowly taken egalitarianism. I have assumed that there is a set of distribution principles consisting of five criteria: desert, situation, needs, access and opportunities.

The relation between equality and distributive justice may be normative in character. In such case the factual condition is the subject of description and evaluation from the point of view of an equality principle or a bundle of equality principles. Hence, a discovered inequality (as opposed to diversity or differentiation) may become the premise for activities directed at its limitation or even abolition.

It should be emphasised that the paper discusses the subject of real equality (referred to the outcomes of the pension system). This limitation has made it possible, among

other things, to organise research findings on various aspects of equality which are / can be referred to as equality dimensions. In research so far, one could use three equality dimensions i.e. (1) a subjective one, giving the answer to the question who is the subject of equality, (2) an objective one, answering the question what is the object of equality and (3) a dimension of distribution principles, answering the question of how/on the basis of what / which? equality criterion a given good is distributed. I have used two additional criteria, which are: (4) the time dimension which answers the question when equality is examined and (5) the space dimension, which answers the question in which area of pension provision and where equality is examined. As a result, I have developed an original five-dimensional matrix of equality dimensions (who? what? how? when? where?) and a set of features of these dimensions (denotations) with reference to the base pension provision (Fig. 2).

<table>
<tr><th>Equality dimension</th><th>Who?</th><th>What?</th><th>According to which rule?</th><th>When?</th><th>Where?</th></tr>
<tr><td rowspan="8">Denotation of a given dimension</td><td rowspan="2">individual</td><td rowspan="2">burdens (e.g. pension contribution)</td><td>deserts</td><td rowspan="2">at a given moment (retirement)</td><td>The whole of the pension system</td></tr>
<tr><td>needs</td><td>Selected pension subsystem</td></tr>
<tr><td>group (women and men)</td><td>revenue (pension)</td><td>situation</td><td rowspan="2">within a given period of time</td><td>Selected layer of the pension system (base)</td></tr>
<tr><td rowspan="4">cohort or generation</td><td>rights</td><td>access</td><td>part of the pension system</td></tr>
<tr><td rowspan="4">duties</td><td rowspan="4">opportunities</td><td rowspan="4">in the whole period of „functioning" in the pension system</td><td>political area (Poland)</td></tr>
<tr><td>administrative area</td></tr>
<tr><td>economic area</td></tr>
<tr><td>geographic area</td></tr>
<tr><td></td><td colspan="5">Formal equality</td></tr>
<tr><td></td><td colspan="5">Real equality</td></tr>
</table>

Fig. 2. Multidimensional approach to equality in a pension system
Source: author's own work.

In this paper a real equality of pension provision between women and men in the first year of their receiving obligatory pension, which is distributed according to the principle of desert is used.

Desert is an ambiguous term and it is sometimes used as a synonym for the term *merit*. However, "merit is a broader concept, the genus of which the desert is the species" (Pojman 1999, p. 86). Merit results from any feature or quality of a subject which is a base for the positive or negative (demerit) attribution of that subject even if the treatment is not undeserved. Desert is connected with the positive attribution of merit resulting from intended action and is strictly linked to the

responsibility of subject for his or her action. The question remains, what is treated as a merit and for what is the individual subject responsible, so what is the desert exactly? Is the desert only the result of the action or should the effort be also taken into consideration? Furthermore, there is a question of how the desert should be transferred into the distribution of desired good.

In the pension system, the term desert is noted twofold: (1) as an input into the pension system and (2) as a position.

An input covers both financial and non-financial input. The first one is associated with a pension contribution, which is paid in the pension system (fund) directly, mostly on a base of individual earnings. As a result the final individual pension entitlements should reflect the previous pension contributions proportionally. It is also called individual pension equivalence, which means individual actuarial pensions (Disney 2006, p. 269). Pension reforms introduced in the last decades were at least partly aimed at individualization of pension entitlements and followed the individual pension equivalence (Holzmann 2013).[2] The non-financial input is associated with the activities conducted in the private sphere. The decision about which of those activities are treated as an input into the pension system and how they are transferred into individual pension entitlements is a normative issue. There has been e.g. a criterion of positive external effects used, which are generated by the individual, family, generation or sex (Leisering 2004, p. 16 and f.). For the evaluation of the private activity in the pension system it is important, if an activity was performed instead of a paid-work or not. In other words, there is a question of a trade-off between paid and unpaid work or between financial and non-financial input into the pension system. If an unpaid activity (e.g. care) is done in a place of paid work, this activity can be evaluated on the basis of non-performed paid work. It means that the individual pension entitlements refer to the level of contributions, which would be transferred to the pension system if the paid work was not stopped by the private activity. It is in line with the idea of pension insurance, which is a selective one and covers employed workers. The other approach is to treat the private activity (e.g. care) as non-financial input even if the paid work is performed simultaneously. In this case the non-financial input is treated as a *per se* input into the pension system. Evaluation of such input can refer to the value of the positive external effects or increase in the GDP (Döring 1998, p. 2018).

Position is treated in the pension system merely as a professional one and identified with a (public) service. There is an assumption that the service also involves the pension retirement phase and the old-age security is a part of the salary in a broader sense. Because of this a DB pension formula is very often used. From that point of view, the term 'position' in the pension system can be treated as a part of specific desert (Raphael 2003, p. 172; following Šimo 2009, p. 70).

[2] It is true that individualization of the pension entitlements often follows the shift towards a private pension system, but the DC pension formula was also introduced without movement towards funding (Moshe and Ratajczak 2020).

3. Equality of desert – operationalization

In the operationalization of the equality of desert only the financial and non-financial input is considered. Financial input refers to the individual contributions. In the pension systems which receive state subsidies (like in Poland), individual share of those subsidies could also be taken into consideration and counted as financial input. However, there are at least three difficulties in doing it: a) the amount of subsidy has been various in different years, b) the subsidy is covered by diverse tax revenues paid by the group which differs from the group of pension contribution payers, c) the contribution payers/ insured people pay different taxes. The non-financial input covers non-paid activities, which are recognized in the pension system and which increase the individual pension level. In this paper the non-paid activities include all care periods, for which pension contributions are paid by the third subject, e.g. the state. In Poland it includes especially (Ratajczak 2019, pp. 83-86): (1) periods of maternity, parental, paternity and child care leave or long-term care for dependent children and (2) long-term care for dependent elders.

The assessment of the relation between (financial and non-financial) input and output (pension provision) is related to actuarial equivalence. It is assumed, that:

$$PV_{sn}(t) = PV_{en}(t) \tag{1}$$

where:

$PV_{sn}(t)$ – present value of the pension contributions of the *n*-contributor at the moment of retirement in the *t*-year,

$PV_{en}(t)$ – present value of the *n*-beneficiary at the moment of retirement in the *t*-year.

In the Polish pension system the present value of the pension contributions consists of the pension capital on the individual pension account and individual pension subaccount in the first pillar at the moment of retirement (at the moment of achieving the minimum retirement age).[3] Because of that:

$$PV_{sn}(t) = K_{in}(t) + K_{sn}(t) \tag{2}$$

where:

$K_{in}(t)$ – pension capital on the individual account in the first payg pillar of the *n*-person at the moment of retirement in the *t*-year,

$K_{sn}(t)$ – pension capital on the individual sub-account in the first payg pillar of the *n*-person at the moment of retirement in the *t*-year.

The pension capital can be treated as a lump-sum contribution. From the actuarial point of view, pension payments are lifelong annuities, paid in advance ($\ddot{a}_x$), with a constant interest and payment:

[3] It was assumed, that there is no funded pillar and the total pension contribution is split between individual account and subaccount in the first, payg financed pension pillar. This assumption is justified, because the aim is to estimate the differences between sexes, so resigning from the funded pillar both for women and men should not influence the outcome of calculation. Furthermore, it could have some influence if the structure of women and men who belong to the first payg and second funded pillars differed, but there is no proper data concerning that issue.

$$\ddot{a}_x = \sum_{k=0}^{\omega-x} v^k \cdot {}_kp_x \quad (3)$$

where:

x – age of the person who retires,
ω – top age limit (110 years old) of the person who retires,
v – discount factor,
${}_kp_x$ – probability of survival up to time k of a person at the age of x.
It means, that:

$$PV_{sn}(t) = \ddot{a}_x \cdot E_{ap}(t) = \sum_{k=0}^{\omega-x} v^k \cdot {}_kp_x \cdot E_{ap}(t) \quad (4)$$

where:

$E_{ap}(t)$ – lifelong annuity of a males/females in the year t,
p – sex (m – male, f – female).

For the calculation of the lifelong annuity uni-sex tables are used. It is consistent with the EU-recommendation.

For the operationalization of the equality of desert a difference between the factual pension provision and lifelong annuity will be calculated. This difference will be called the indicator of pension equivalence $E_{ep}(t)$ for the beneficiaries born in the year t:

$$E_{ep}(t) = \frac{\left(E_p(t) - E_{ap}(t)\right)}{E_p(t)} \cdot 100\% \quad (5)$$

where:

p – sex (m – male, f – female),
$E_p(t)$ – median of the pension provision of males/females born in the year t,
$E_{ap}(t)$ – median of the annuities of males/females born in the year t.

As it was mentioned above, a decision about what is the non-financial input and how it is transferred into the pension entitlements is a normative one. In the next step of operationalization of the equality of desert the following assumption is made: every activity which is considered a non-financial input will be evaluated with the contribution calculated on the basis of the paid work. It means that the contribution base for every non-financial input will be the monthly salary (the average wage by sex and age). In the case of the Polish pension system the mentioned leaves because of child care or dependents as well as the non-activity periods caused by delivering care will be taken into consideration. As a result, the corrected indicator of pension equivalence $SE_e(t)$ is proposed and calculated as following:

$$SE_{ep}(t) = \frac{\left(E_p(t) - E'_{ap}(t)\right)}{E_p(t)} \cdot 100\% \quad (6)$$

where:

p – sex (m – male, f – female),
$E_p(t)$ – median of the pension provision of males/females born in the year t,
$E'_{ap}(t)$ – median of the annuities of males/females born in the year t for the corrected contribution base for the care periods.

The present value of the contributions for the corrected contribution base for the care periods $PV'_s(t)$ is calculated as:

$$PV'_s(t) = K_i'(t) + K_s'(t) \tag{8}$$

where:

$K_i'(t)$ – pension capital on an individual account in the first payg pillar of the *n*-person at the moment of retirement in the *t*-year for the corrected contribution base for the care periods,

$K_s'(t)$ – pension capital on an individual subaccount in the first payg pillar of the *n*-person at the moment of retirement in the *t*-year for the corrected contribution base for the care periods.

The annuity for the corrected contribution base for the care periods $(E'_{ap}(t))$ for women or men born in the year *t* will be calculated according to (4) and by consideration of the lump-sum net contribution.

The indicator of the equality of desert is calculated as a weighted average mean of the difference in the indicator of pension equivalence according to gender $RE_e(t)$ and the difference in the corrected indicator of pension equivalence according to gender $RSE_e(t)$, when the weight of both partial indicators amounts to 50%.

4. Equality of desert in the Polish pension system

Empirical analyses adopt a specially designed model which belongs to the category of micro-simulation descriptive models. The model makes it possible to obtain macro-aggregates of data (e.g. the median of female pension income) on the basis of projections of information about individuals (here – the participants of the pension system). Such models are applicable for studying redistributive effects of various policies (Bourguignon and Spadaro 2006; Żółtaszek 2013, p. 42ff.). It is worth emphasising that in Poland the microsimulation descriptive model has not been yet used for the analysis of the old age provision and the models which have been applied (SIMPL, EUROMOD sub-model and the Ministry of Finance model) are mainly connected with the subject of taxation and benefits. (Żółtaszek 2013, p. 8, 18ff.). Furthermore, the microsimulation method has only been partially used so far in pension system in Poland and mainly for estimation of inter-generational redistribution (e.g. Jablonowski and Müller 2013).

The scope of the empirical study encompasses Poland and refers to a cohort aged 18-25, affected by the new pension system of 1999 only and will reach retirement age in 2034-2046. While the estimates concerning the levels of provision were based on genuine data until the end of 2018, starting from 2019 simulations of career related and non-career related biographies have been absolutely necessary. A descriptive microsimulation model contained four modules: (1) earnings, (2) breaks in earnings (14 reasons for lack of earnings were distinguished); (3) family situation before reaching retirement age; (4) pension calculation. On these grounds, hypothetical individual biographies with annual frequency were generated, where the events affecting the value of the raised capital were selected at random. Each occurrence was modelled by means of categorical distribution, or for its possibly

exceptional case Bernoulli distribution. Probability for the distributions was calculated on the basis of authentic data. In total, I performed 20000 simulations for the cohorts born between 1974-1981 (more Ratajczak 2019, pp. 71-83).

The regulations concerning the access to the obligatory pension system and pension provision (including minimum pension) as well as the pension calculations refer to 2019. It was assumed, that the pension provision is acquired at the moment of achieving the minimum retirement age of 60 for women and 65 for men.

For the measurement of the equality of desert in the pension system the pension provision covers both the individual pension and the survivor's benefit. The reason for that is that the derived pension benefits constitute an important source of income, especially for older women (OECD 2018, pp. 233-254).

The results of the calculation show that the median pension provision of male beneficiaries born in the years 1974-1981 is about 36 percent points lower than the median male actuarial annuity (Table 1). In the case of women the difference amounts to less than 4 percentage point, which means that their median pension provision only slightly differs from the actuarial one. When comparing the results between women and men it has to be stressed that there is an inequality against male beneficiaries and the level of this inequality (in percentage points) seems to be quite stable across all cohorts.

Table 1. The indicator of pension equivalence $\boldsymbol{E_{ep}(t)}$ and the corrected indicator of pension equivalence $\boldsymbol{SE_{ep}(t)}$ for beneficiaries born in the years 1974-1981

Cohort born in the year t	The indicator of pension equivalence $E_{ep}(t)$ (in pp)		The difference in the indicator of pension equivalence according to gender $RE_e(t)$ (in pp)	The corrected indicator of pension equivalence $SE_{ep}(t)$ (in pp)		The difference in the corrected indicator of pension equivalence according to gender $RSE_e(t)$ (in pp)
	male	female		male	female	
1974	–36,31	–3,58	–32,73	–37,34	–8,23	–29,11
1975	–35,98	0,00	–35,98	–36,68	–4,48	–32,20
1976	–36,29	–0,70	–35,59	–38,14	–6,10	–32,04
1977	–35,00	–0,32	–34,69	–35,81	–7,34	–28,47
1978	–35,70	–2,19	–33,51	–36,75	–7,40	–29,35
1979	–35,90	–2,29	–33,61	–36,86	–9,31	–27,54
1980	–35,49	–2,69	–32,80	–37,58	–8,84	–28,75
1981	–35,97	–1,43	–34,54	–36,64	–8,92	–27,72
Total	–35,59	–3,83	–31,77	–37,62	–10,93	–26,69

Source: results of author's own calculations based on the microsimulation model.

If we assume that all periods of care for children and dependents (i.e. periods of maternity, parental, paternity and child care leave or long-term care) are evaluated for the pension provision as if paid work was performed during the care and there

is no limitation for long-term care in treating those periods as contributory ones in the pension system[4] the results show only a little difference for men. Their corrected indicator of pension equivalence increases by about 1-2 percentage points depending on the cohort. It is because care is mostly delivered by women. In their case the higher evaluation of care periods for pension provision causes their pension capital to increase by about 4-7 percent. Consequently, the median female 'care corrected' pension provision is lower than their actuarial annuity by about 11 percentage points.

As a result the indicator of equality of desert in the obligatory pension system amounts to 29 percentage points and according to the partial indicators is negative (Fig. 2). It means that the inequality of desert is the male case and their median pension provision differs from the actuarial annuity much more than the female one.

Fig. 3. The indicator of equality of desert (in pp) in the Polish pension system according to gender for the beneficiaries born in the years 1964-1981
Source: results of author's own calculations based on the microsimulation model.

5. Conclusions

It has been stressed that what has been measured is the level of inequality of desert in the pension system between women and men only. It means that the main focus is on is the difference between sexes and not the absolute level of various indicators. Secondly, the purpose of the paper was to operationalize and estimate the equality of desert and not to ask why some pension regulations were introduced.

The pension reform of 1999 was aimed at strengthening the link between individual contributions and pension provisions and following the justice understood as an equality of desert. To achieve this goal the defined contribution pension formula has been introduced. In this paper the desert was defined as both

[4] If the contributions for long-term care were paid in the Polish obligatory pension system, they are limited up to the period required for acquiring the minimum pension (20 insurance period for women and 25 for men).

financial and non-financial input into the pension system, which differs from the previous research. Furthermore, the pension provision from the obligatory pension system was simulated on the basis of real biographical data and not given biography scenarios.

The results of this research show that there is a large inequality of desert in the obligatory pension system in Poland. It seems to contradict the leading principle of individual equivalence.[5] This inequality is especially to men's disadvantage. The reasons for this situation can be a field of further research. One of the explanations could be the establishment of a minimum pension from which women benefit more often than men. Furthermore, the interest rate taken for the calculation plays a role, too.[6] Lower interest rate (for a given cohort and mandatory retirement age) increases lump sum contribution needed for a given level of pension provision and consequently lead to lower annuities. As a result, if the lower interest rate was taken for the calculations, inequality drops down or even reverses. On the other hand, the spotlight in this research is on the difference in equality between women and men. The assumed interest rate is the same for both sexes, so it should be less important for the results. Another issue is that uni-sex tables lead to higher life expectancy for men and lower for women than in the case of single-sex tables. However, this factor does not seem to be crucial (Malec 2017) especially, because uni-sex tables were consistently applied both in the calculations of pension provision and annuities.

It has to be stressed, that higher evaluation of non-paid care input into the pension system causes reduction of the inequality by about 5 percent points. Therefore a question arises about the possible recommendation of this approach for policy making sake. However, these recommendations should follow the decision concerning the desired direction of achieving equality of desert (if we assume it as a goal at all): should it be achieved by reduction of non-paid work rewarded in the pension system or its evaluation for the pension purposes (which will lead to higher inequality indicators among women) or should we broaden the non-financial input into the pension system by rewarding activities which are much more typical for men than for women (which will lead to lower inequality among men)? This normative question, however, goes far beyond the scope of this paper.

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[5] However, for the broader view the comparison between 'old' and 'new' pension system will be helpful.

[6] Following the European Commission the interest rate is assumed at the level of 3% (for this and other macroeconomic assumptions see European Commission, 2017, p. 80, 92, 204).

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GENDER GAP IN RETIREMENT PENSIONS IN SPAIN. THE IMPACT OF THE MATERNITY SUPPLEMENT

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1. Objectives and methodology of this study

The objective of this paper is to describe the gender gap in the contributive retirement pensions in Spain and to analyze the impact of the maternity supplement in this gap. This is done through an empiric study using data from the Continuous Working Life Sample (*Muestra Continua de Vidas Laborales* or MCVL in Spanish) corresponding to the year 2017.

The MCVL is a tool provided to the researchers by the Spanish Social Security institution. The sample gathers the whole working life of people having any kind of relationship with the Social Security (i.e. active, unemployed subsidized or pensioners). Dada is taken from a 4% of the population in the files of the Social Security. With this size, the results taken from the MCVL are representative at country level. The estimates for the whole population result from applying a weighting factor of 25.

The analytical unit in this study is the "individual pensioner" getting a retirement contributive pension from the Social Security, even though they may simultaneously have more than one contributive pension, usually a pair "retirement pension and widowhood pension", but also two retirement pensions from different regimes, like the general and the self-employed workers. The methodology used here differs from what is common in other studies, like the Social Security statistics and others, where the analytical units are the pensions.

The population observed in this study is that of the pensioners having obtained a retirement pension during the year 2017 and still receiving it in December that year. Pensioners from all the Social Security regimes are included (general, self-employed and other special regimes). Anyhow, people in particular circumstances are excluded; these are the pensioners receiving part of their pension from abroad –the Spanish part available from the sample does not show the total amount of their pension–, pensions linked to "survivor pensions" and those receiving the so called "SOVI pensions" which comes from an extinct social protection regime.

1.1. The "new retirement pensioners" in 2017

The retirement pension amount for the "new" pensioners tends to be higher than that received by previous year's retirees. This results from both the salary increase tendency and the greater proportion of qualified jobs. However, the pensions

reforms undertaken in 2011 and 2013 did cut back the salary increase effect –more years are used to calculate the regulatory base of the pension and one needs more contribution years to obtain the maximum pension.

The figures obtained at the end of 2017 in the Social Security show a total of 252,650 "new pensioners with retirement pension", 60.8% of these are men and 39.2% are women. The percentage of new pensioners having, concurrently, a retirement and a widowhood pension is a 5.48%, but the proportion is higher for women, with a percentage of 11.3% meanwhile in men is 1.7% – see Table 1).

Table 1. Percentage of pensioners by group of pensions

	Males	**Females**	**Total**
Number of new retirement pensioners in 2017	**153,650**	**99,000**	**252,650**
% having only retirement pensions	98.26%	88.71%	94.52%
% having both retirement, widowhood pensions	1.74%	11.29%	5.48%

Source: Author's development based on data from MCVL 2017.

1.2. Some economical magnitudes of the "new" retirement pensions

The difference between the average pension of men and that of women is quite significant. The median pension highlights its imbalance. While 50% of men receive a pension equal o lower to 1,410 euro per month, 50% of women receive a pension equal o lower to 1,021 euro per month. Figure 1 shows the pensions difference between men and women in all the population deciles. They become equal on the higher stretch because the Spanish regulation establishes a maximum limit to the pension amount an individual can receive. The limit for 2017 was 2,573.70 euro per month.

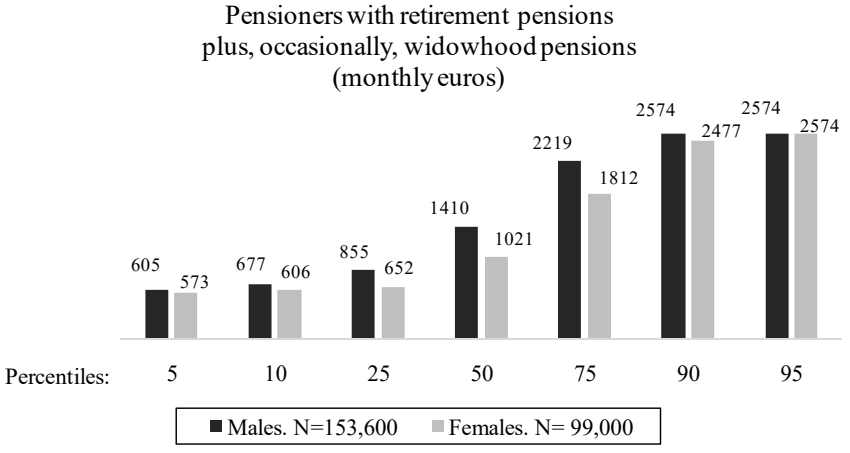

Fig. 1. Total pension amount percentiles. New retirement pensioners in 2017
Source: Author's development based on data from MCVL 2017.

2. The gender gap in the contributive pensions

Some reports evidence persistent differences between levels of pension income to men and women in all EU countries (Bettio et al. 2012). This results from past developments on the labor market and changes in the pension systems. Both areas have seen significant changes in recent years. The number of women active on the labor market has increased, so they now contribute proportionately more towards their future pensions. Reduction in the ratio between pensions and wages has often resulted from changes in the pension systems, frequently targeting an improved fiscal sustainability of pensions. Many countries have also introduced closer correspondence between lifetime earnings and pension entitlement. This means that labor market differences, particularly between men and women, are accentuated into pension differences.

2.1. The gender gap in Spain

The gender gap in pensions mainly results from differences on the labor market and the educational levels in the past and the present. Life-long accumulation of pay inequalities converts into a pension gap and women's poverty in old age.

Spain is the ninth country in the European Union where the gender gap in retirement pensions is more accentuated. Table 2 shows that, in 2017, its gender gap for the contributive pensions as a whole is above the mean of the EU countries. Also, the decreasing tendency observed until then turns into an increase in 2018, which puts the Spanish pensions gender gap over that of surrounding countries like France, Italy or Portugal.

Table 2. Gender GAP in pensions. Total contributive pensions (age 65 or over)

	2015	**2016**	**2017**	**2018**
European Union – 28	**:**	**-31.5%**	**-30.8%**	**-30.1%**
Spain	**-33.7%**	**-32.5%**	**-31.2%**	**-32.4%**
France	-34.1%	-33.4%	-31.6%	-29.7%
Italy	-32.2%	-32.5%	-32.1%	-32.0%
Portugal	-31.5%	-31.2%	-31.6%	-31.4%

Source: Eurostat. EU_SILC. Extracted 11-02-2020.

2.2. The gender gap in the current retirement pensions

A report by "Pensions Policy Institute" (Jethwa 2019, p.7) shows that most damage to women's pension wealth is done while in their thirties – the general age when women are taking time off work to care for their families.

The pensions of the women that retire nowadays show the consequences of the traditional "family" concept and the social policies effective when they were raising their children. The dominant ideology by then looked at the family like a economical unit where the man was the main monetary support while the role of the women was that of housewife and family carer (children, husband, parents, in-laws and other relatives). So, woman undertakes an "invisible" not paid social work without any protection for the old age.

In the framework of the traditional family when a woman opted, or was obliged, to work, either because she had no family burdens or because she had to contribute to the family economy, her employer used to consider that she had to be in low responsibility and less important tasks (secretary, office assistant, switchboard operator), in a factory she had assigned routine and low paid works (labourer, weaver), in commerce she carried manual tasks (saleswoman, needlewoman, hairdresser) and in other professional fields, jobs not requiring higher studies, like nurse or teacher. Quite often, in order to combine housework with labor work, she took part-time or temporary jobs. Furthermore, in the sixties and seventies of the XX century "home working" boomed but as an invisible not declared work; many work hours poorly paid.

By that time, many women did not contribute to the Social Security. Some returned to the labor market after the children upbringing period, but they had a shorter working period ahead. That's why pensioner women usually have less years of contribution than men and lower pensions, as shown later. At the old age, women that did not contribute should live from her husband's pension –economic dependency– unless they have other sufficient means.

2.2.1. Inactivity rate evolution

Table 3 shows inactivity rate data for some of the last century eighties-nineties, children raising period for the women currently retiring. It can be seen that women represent between 70% and 75% of the inactive population. In the specific housework inactivity cause, almost all of them are women. This is an evidence of the inequitable distribution of the domestic chores between both genders – (see Table 3).

Table 3. Inactivity rate (age between 16 and 60)

	Year (*)	**Males** (%)	**Females** (%)	**Total** (thousands)	**Housework /General** (%)
Housework inactive people	**1982**	**0.0%**	**100.0%**	**7,472.4**	**55.2%**
General inactive people		24.4%	75.6%	**13,538.6**	
Housework inactive people	**1986**	**0.0%**	**100.0%**	**7,145.5**	**49.3%**
General inactive people		27.1%	72.9%	**14,496.1**	
Housework inactive people	**1990**	**0.4%**	**99.6%**	**6,148.2**	**41.7%**
General inactive people		30.2%	69.8%	**14,738.3**	

(*) 4th quarter data

Source: Author's development based on data from the Spanish Statistical Institute (Instituto Nacional de Estadística).

3. Gender pension gap in pensioners with retirement pensions

In this paper, the analysis unit is the "pensioner" who can receive one or more pensions. In most cases, pensioner receives one retirement pension but in other cases he/she could receive retirement and widowhood pensions at the same time. In order to analyze pensions gap, it is distinguished two terms: the theoretical pension and the total amount of pension.

Theoretical pension is the pension earned by the person along years of contribution to the Social Security. It varies according to the number of years paid. Formula: Average bases of contributions x percentage of years.

Total amount is the pension received by the pensioner.
Formula: theoretical pension + supplements (+/-) pension caps + annual revaluations + especial increase for severe invalidity people.

- Supplements. Minimums supplement and maternity supplement. The former is to guarantee a minimum amount of pension. The later is a "plus" to the female pensioners who have had two children or more.
- Revaluation. It is an increase to compensate for the variation in the cost of living.

3.1. GAPs of the pensioners with retirement pensions

Table 4 shows the results of the different interpretations of the gender gap.

- GAP in the theoretical retirement pension. The result is 27.61%. It means that women would receive on average 420 euro per month less than men.
- GAP in the amount on retirement pension. "Only" pensioners with retirement pension. The result is 19.02%. It means that the effect of the supplements, as well as the ceiling on the amount of the pension, reduces the theoretical GAP by 8.6 percentage points.
- GAP in the total amount of pension of pensioners with "concurrent" pensions. The resulting GAP is 14.82%. This means that pensioners with "concurrent" pensions reduce the GAP by 4.2 percentage points compared to those who only receive retirement pensions. Also, it means that the effect of the supplements, as well as the ceiling on the amount of the pension, reduces the theoretical GAP by 12.8 percentage points.
- GAP in all pensioners with at least one retirement pension. The GAP in the total pensioners is 16.80%. If this GAP is compared with that of the "theoretical retirement pension", it is observed that the set of measures used to increase or decrease the "theoretical pension" lowers the GAP by almost 11 percentage points (10.81) – (see Table 4).

Table 4. Gender GAP in pensions. New retirement pensioners in 2017

	Average pensions amount (monthly euros)			
	Males	**Females**	**Total**	**GAP**
Theoretical retirement pension	1,586	1,148	1,415	-27.61%
People having only retirement pensions	1,529	1,238	1,422	-19.02%
People having both retirement, widowhood pensions	1,855	1,580	1,633	-14.82%
Total pensioners	1,535	1,277	1,434	-16.80%

Source: Author's development based on data from MCVL 2017.

4. Maternity supplement. Impact on gender retirement pensions gap

The maternity supplement consists of a supplementary percentage (between 5 and 15% of the pension) added to the women's contributory pensions of retirement, permanent disability or widowhood if they have had two or more biological or adopted children. This measure started to apply in 2016.

The Government justifies this measure "for the mission of contributing demographically to the Social Security system" but, in reality, the purpose is to reduce the gender gap in pensions. Spain is one of the countries with a gender gap above the average of the European Union.

In the EU, only Cyprus and Lithuania have "pluses" that benefit only women. In most countries neutral mechanisms have been established to compensate for the time spent caring for children, although sometimes establish preferential clauses for women. For example, Germany, France, Italy, Czech Republic and Greece among others. (European Commission 2019).

4.1. Number of beneficiaries and average monthly amount of the maternity supplement

The amount of the supplement is 5% when there are two children, 10% if there are three children and 15% if there are more than three children. In the event that the woman has two contributory pensions and one of them is that of retirement, the percentage is applied to it, and if neither of the two pensions is a retirement pension, it is applied to the most favorable pension. In the event that the amount of the pension plus the maternity supplement is greater than the "cap" of the pension, half of the amount exceeding is added.

There were 316,989 women who received the supplement of maternity in 2017, figure that represents more than half of the women pensioners who became retirement pensioner of the Social Security in that year.

The average monthly amount of this supplement is 59.93 euros (57.76 euros according to Social Security Statistics). The distribution of pensioners according to the percentage applied is the one shown in Table 5.

Table 5. Maternity supplement. New retirement pensioners in 2017

Type of supplement	Percentage in this category	Average monthly euros
5%	**60%**	42.72
10%	**27%**	78.38
15%	**12%**	103.57
TOTAL		**59.93**

Source: Author's development based on data from MCVL 2017.

4.2. Some controversial aspects on the retirement pensions

"Maternity supplement" opens a debate about its opportunity and fairness. The main controversial aspects are outlined by some authors (Balaguer 2016; Montserrat 2015).

- Family planning is not done thinking about the plus that the woman can receive after thirty or forty years when she retires,
- The maternity supplement is contradictory to the objective defined in the Law. In fact, it does not intend to compensate -exclusively- family care contribution defects since, also, it is granted to the beneficiaries of widowhood pensions of which are not linked to the effective work of women,
- The maternity supplement is not universal and excludes means-tested pensions as well as pensioners who had retired before 2016,
- Discriminatory measure by gender. It contradicts Directive 79/7 of the European Union. The Justice Tribunal of the EU in the light of the demands made on this issue considers that the situation of a father and a mother can be comparable in regard to the care of children (CJEU 2019).

4.3. Impact of the supplement of maternity reducing the gender gap

The maternity supplement has reduced the gender gap by 2.11 percentage points in the new pensioners of 2017 – (see Table 6).

Table 6. Impact of the maternity supplement on the gender gap

	Pension average (monthly euros)			GAP
	Males	**Females**	**Total**	
Excluding the maternity supplement	1,535	1,244	1,421	-18.91%
Including the maternity supplement	1,535	1,277	1,434	-16.80%

Source: Author's development based on data from MCVL 2017.

However, the fact that the maternity supplement does not apply to all women pensioners with two or more children means that the reduction of the gender gap in the total of pensioners with retirement pensions is only 0.38% (of 22, 11% to 21.73%).

5. Items that affect women's pension

Factors such as the duration of working life, education, tax benefits, among others, have an effect on the pension gap.

5.1. Impact of maternity leaves

In Spain maternity leaves do not have an impact on the pension amount. It is included as contribution periods, the breaks in employment for mothers/fathers for the care of children under the age of six and for mothers due to the birth of their children. So, the gender gap in pensions mainly results from differences on the labor market.

5.2. The number of years of contributions to Social Security by women is lower than for men

According to the sample data, women have a shorter working life than men. On average, women have contributed 7.6 years less than men. The upbringing of children, difficulties in rejoining the labor market, part-time work and the "temporality" of many of the jobs affects the duration of working life. The GAP in the number of years contributed to Social Security is 18.84% – (see Table 7).

Table 7. Years of Social Security contribution. New retirement pensioners in 2017

	Number of years (average)	**GAP in Social Security contribution**
Males	40.34	**-18.84%**
Females	32.74	
difference:	-7.60	
Total	**37.43**	

Source: Author's development based on data from MCVL 2017.

5.3. Educational levels and pensions

A high percentage of women who are currently retiring did not had access to higher education only a percentage slightly higher than a third (36%) of the total of this level educational. Instead over fifty per cent (53%) of new pensioners in 2017 with graduate or technical education level were women. In the rest of the educational levels, women represent approximately one third of the total group.

Figure 2 shows the relationship between educational levels and the theoretical retirement pension. It is observed that the gender gap is more pronounced in the lower educational levels (between 35% and 40%) than in the higher educational levels, around 9%.

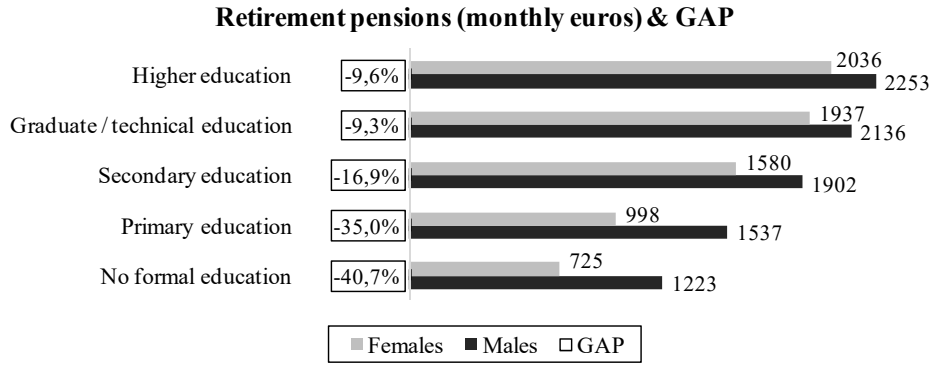

Fig. 2. Theoretical retirement pensions by education level. New retirement pensioners in 2017

Source: Author's development based on data from MCVL 2017.

6. Policy debates

To reduce future pensions' gender gap, policies should focus on closing related gaps in employment and wages as well as promoting actions to develop infrastructure and credits for childcare, promoting measures for working-life balance, reducing gaps on educational levels and so on. For the pension system itself, policies should include appropriate compensatory measures. Some proposals from different reports:

- Encourage greater employment levels throughout women's entire life at working age. This includes facilitating smooth school-to-work transition and reduction of risks that lead to lack of employment at the start of the labor market path.
- Strengthen reconciliation of work with family life. Such as, access to high quality and affordable child-care facilities in addition to supporting care for adult family members in need of care owing to age or disability. This would allow women improved access to the labor market during prime working age.
- Extend working lives, offering access to Age Management Medicine and lifelong learning to encourage development and updating of skills to accommodate the changing needs of the labor market.
- Tax and social policy incentives aimed at broadening women's participation in the labor market could lead to productivity gains. Furthermore, wider access to high-quality care services (e.g. childcare and long-term care) should ensure more opportunities for women to enter or stay in employment and so reduce the risk of poverty and social exclusion among children and vulnerable groups.

7. Conclusions

The Spanish maternity supplement is not the most appropriate measure to reduce pensions gap. It is a "plus" that is granted at the time of retirement but does not provide any solution to reduce the gender gap in the future. It is not a universal benefit and penalizes women pensioner before the creation of this supplement. It is also a discriminatory measure by gender.

To reduce future gender pensions gap, policies should focus on closing related gaps in employment and wages as well as promoting actions to develop infrastructure and credits for childcare, promoting measures for working-life balance, reducing gaps on educational levels and, in general, promoting women's participation in the labor market.

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INTRA-FAMILY FINANCIAL AND NON-FINANCIAL SUPPORT FOR PENSIONERS: SHARE SURVEY RESULTS IN 19 EUROPEAN COUNTRIES

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1. Introduction

The initial concept of three pillar model first delineated by the World Bank in 1994, was further developed by the pension experts and extended to include two additional pillars: a zero pillar (universal non-contributory social assistance pensions) and a fourth pillar that included the broader context of social policy. The so called "fourth pillar" was added because a large part of retirement consumption may be derived from sources that are not formally defined as pensions, such as homeownership, interfamily financial transfers and family support, personal savings, and social programs other than pensions (Holzmann and Hinz 2005; Holzmann et al. 2008).

The present paper is based on the data of the Survey of Health, Ageing and Retirement in in Europe. The process of selecting and preparing the data for the analysis is outlined in section 2, as well as major descriptive statistics of the questionnaire respondents.

The author hypothesized that the probability to give / receive financial and non-financial support may depend on the individual socio-demographic characteristics (age, gender, living single or in a couple, having children, relative income level), as well as reciprocity practices in family and macro-level country specific characteristics (spending on old-age pensions, income inequality, at-risk-of-poverty rates). Section 3 discusses the results of the study, presenting the obtained proportions of intrafamily transfers in different European countries, as well as crude and adjusted regression coefficients.

The paper concludes with the section summarizing the main findings.

2. Selection and preparation of the data for the analysis

SHARE questionnaire contains a group of questions in which respondents are asked:

– if they have given / received financial gifts of EUR 250 or more to/from a family member (or other person) during the preceding 12 months (it is

possible to mention up to 3 such persons stating the respondent's relationship with them and up to three more persons without specification)[1],

– if they have given / received help to / from separately living family members (or other persons) during the preceding 12 months (similarly, it is possible to mention up to 3 such persons)[2].

This group of questions is not asked in all countries in all waves. Therefore, in order to obtain sufficient amount of data, three most recent waves of SHARE – wave 5 (2013), wave 6 (2015) and wave 7 (2017) – have been included into analysis. Previous research (Ostrovsky-Berman and Litwin 2019) demonstrated that intra-family support patterns significantly changed during the recession years, therefore earlier waves (up to 2011) were not taken into consideration.

The data from 19 countries was used for the analysis: Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Israel, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden and Switzerland.

As SHARE is a longitudinal study, same persons participate in subsequent waves. For the participants who had answered this group of questions in more than one wave only the latest wave answers were used for the analysis. In result, 30.5% of cases are taken from wave 5, 35.2% – from wave 6, and 34.3% – from wave 7. 10 countries participated in all three waves; Estonia, Israel, Luxembourg and Slovenia asked this group of questions to their participants only in waves 5 and 6; Greece and Poland – in waves 6 and 7; whereas in three countries these questions were asked only once during the last three waves – the Netherlands (wave 5), Portugal and Croatia (both in wave 6).

In total, 30,688 cases were analyzed. Number of cases per country ranged from 311 (Croatia) to 2,436 (Czech Republic).

Only respondents whose status is "old-age pensioner" were included, irrespective of their age. Median age was 73 years (Q1 = 67; Q3 = 80). 59.5% of respondents live in households with a couple, where both are respondents, 31.5% live in households consisting of one person, 8.6% – in a household with a couple and one

[1] The exact wording of the questions: „Some people provide financial or material gifts, or support to others such as parents, children, grandchildren, some other kin, or friends or neighbours, and some people don't. Now please think of the last 12 months. Not counting any shared housing or shared food, have you or your partner given (received) any financial or material gift or support to any person inside or outside this household amounting to EUR 250 or more? By financial gift we mean giving money, or covering specific type of costs such as those for medical care or insurance, schooling, down payment for a home. Do not include loans or donations to charities."

[2] The exact wording of the questions: "We are interested in how people support one another. The next questions are about the help that you may have given to people you know or that you may have received from people you know. Thinking about the last 12 months has any family member from outside the household, any friend or neighbour given you or your partner personal care or practical household help? In the last 12 months, have you personally given personal care or practical household help to a family member living outside your household, a friend or neighbour? Please exclude looking after grandchildren."

non-responding partner, while the rest 0.4% – in other household types (consisting of several singles or several couples, etc.). In total, 31.8% of the respondents are singles and 68.2 have a partner.

Ranking into income quintiles was made within countries and within waves separately and also within singles and couples separately, as the income is reported at household level.

50.2% of respondents were women. 90% of all respondents have child(ren).

3. Results

Major recipients of financial gifts from pensioners are their children – 67.2%, followed by grandchildren – 15.5%.

Major donators of financial gifts to pensioners are also their children – 57.6%, quite unexpectedly followed by the parents of the respondents (including step- and in-law-parents) – 19.5%. Provided that the respondents themselves are old-age pensioners, their parents should be in quite old ages. The last ratio, however, varies very much among the countries: in Italy, Denmark, Switzerland, Belgium and Czech Republic more than 30% of financial gifts originated from pensioners' parents, while in Germany, Poland, Portugal, Slovenia and Croatia – less than 10%.

7% of all financial gifts were given to non-relatives, and 7.6% were received from non-relatives.

The majority of European pensioners neither received nor gave any financial gift, and there are more donators than recipients. The share of recipients varies from 1.9% in Spain to 15.5% in Poland, donators – from 10.9% in Spain to 37.9% in Luxemburg (Fig. 1).

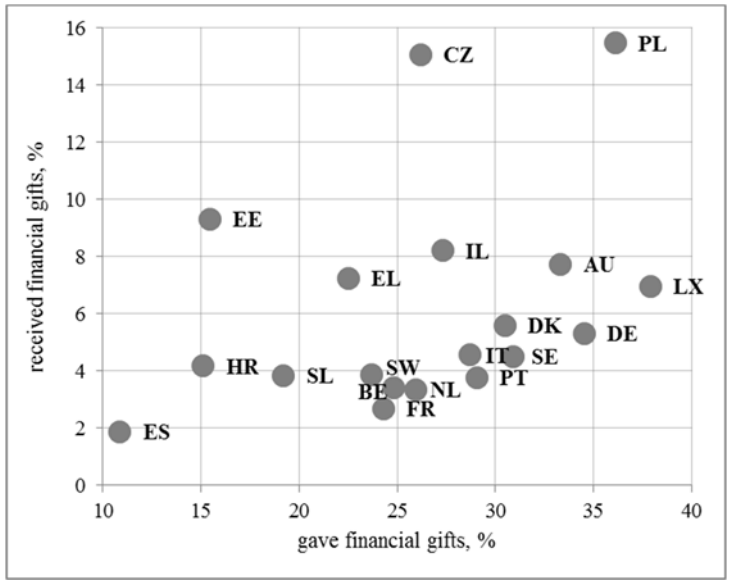

Fig. 1. Shares of respondents who gave and received financial gifts
Source: author's computations on SHARE data.

Proportions of the respondents who gave and received non-financial assistance were higher – on average, 21.5% gave help to and 25.5% received help from non-members of their households. Spanish pensioners were the least active in providing help to others – 6.5%, while 41.4% of Danish respondents answered positively. The most frequent recipients of non-financial help live in Czech Republic 42.9%, whereas only 14.5% of Portugal pensioners receive non-financial help from people not living in their households (see Fig. 2).

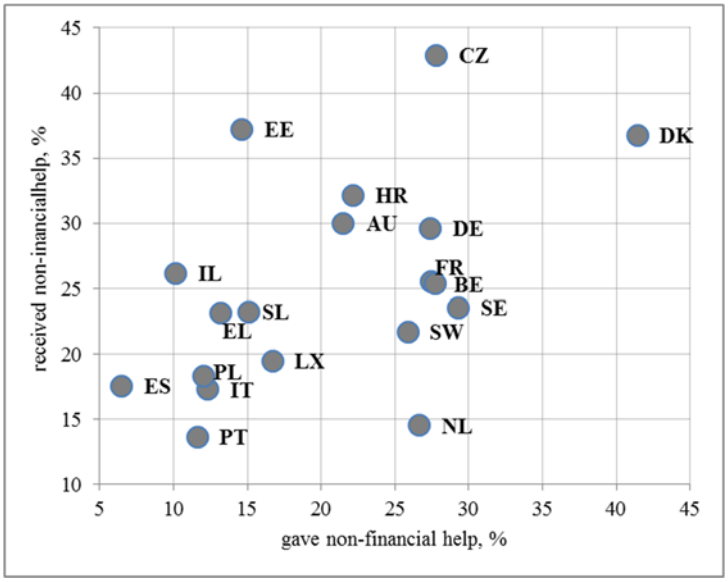

Fig. 2. Shares of respondents who gave and received non-financial support
Source: author's computations on SHARE data.

Research on intergenerational relations often discusses whether the exchange of support between family generations is based on reciprocity (Leopold and Raab 2011on SHARE data; Hämäläinen and Tanskanen 2019 on Finnish survey data). Research on both receiving and providing support tends to demonstrate a positive relationship between them, i.e. those who provide support are more likely to receive support. Similarly, a recent study on a questionnaire from the Panel on Health and Aging of Singaporean Elderly (Verbrugge and Ang 2018) demonstrated that strong reciprocity exists between receiving and giving support, both tangible and intangible.

Table 1. Reciprocity in receiving and giving help from/to non household members (odds ratios with 95%CI)

Receive help	Give help	
	Give financial gifts	Give non-financial help
Receive financial gifts	3.179*** (2.890-3.496)	1.860*** (1.672-2.070)
Receive non-financial help	1.029 (0.971 – 1.092)	1.366*** (1.282-1.455)
*** $p < 0.001$, else $p > 0.05$		

Source: author's computations on SHARE data.

As demonstrated in Tab. 1, those who received financial gifts were significantly more often also giving financial gifts, as well as (although to a lesser degree) more often were providing non-financial help to others. Those who received non-financial help, were also more often giving non-financial help, but the effect is far less pronounced. The relationship between receiving non-financial help and giving financial gifts is not in place.

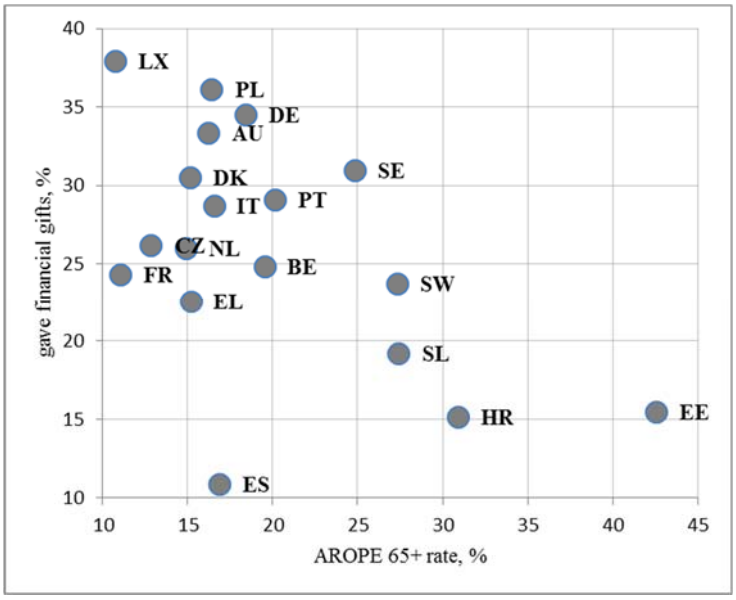

Fig. 3. Share of financial donators in countries with different AROPE 65+ rates
Source: author's computations on SHARE data and Eurostat.

Another goal of the research was to evaluate possible relationship between the observed rates of donators and recipients of support and macroeconomic indicators in the respective countries – such as at risk of poverty and social exclusion (AROPE) rates and indicators of income inequality in old age groups. The research hypothesis suggested that the countries with high inequality and high risk of poverty among the elderly would have higher proportions of respondents who receive help from people outside their households.

The hypothesis, however, has not been confirmed – no relationship was detected. However, macroeconomic indicators show some signs of association with proportions of donators: higher S80/S20 ratios were found in those countries where pesnioners less frequently provided non-financial help to others (Spearman's rho = -0.523, p = 0.026, n = 18), while in the countries with more poverty and social exclusion the respondents less frequently gave financial gifts (Spearman's rho = -445, p = 0.064, n = 18) – see Fig. 3.

The observed proportions of donators-recipients do not allow to group countries into any sort of clusters according to their welfare state regimes. Probably, more structure in the data could be found with larger samples or on longer time spans.

Further analysis of the factors, potentially influencing the outcome variable (binary variables "gave financial gifts", "gave non-financial help", "received financial gifts", and "received non-financial help") was made taking all countries together, using binary logistic regression.

Crude odd ratios (Tab. 2 and Tab. 3) demonstrate that women receive financial gifts more frequently than men, while men are slightly more frequent donators. Women also more often receive non-financial help, but there was no statistically significant difference in giving such help between men and women. Singles receive financial and non-financial support more frequently while give support less frequently than those who live in couples.

Table 2. Factors (crude odds ratios with 95%CI)

	Give help	
	Give financial gifts	Give non-financial help
Gender (F/M)	0.918** (0.872 – 0.966)	1.024 (0.967 – 1.085)
Couple / Single	1.555*** (1.468 – 1.648)	1.202***(1.130 – 1.277)
Has child(ren) (Yes/No)	2.230*** (2.009 – 2.477)	1.264***(1.143 – 1.397)
Income (QU5/QU1)	3.083*** (2.823 – 3.366)	1.757*** (1.598 – 1.931)
** p< 0.01, *** p < 0.001, else p > 0.05		

Source: author's computations on SHARE data.

The most expressed difference was detected among income groups: in financial intrafamily exchanges, higher income quintiles are more both more active providers and more active recipients (probably, due to the threshold set at EUR 250 per one transaction; should this threshold be lower or no present at all – like in Singaporean questionnaire – lower income quintiles would possibly appear among recipients and donators of financial gifts at a similar rate as higher income quintiles). As considers non-financial support, higher income quintiles were more frequent providers but less frequent recipients of help from others.

Table 3. Factors (crude odds ratios with 95%CI)

	Receive help	
	Receive financial gifts	Receive non-financial help
Gender (F/M)	1.330*** (1.209 – 1.463)	1.550***(1.471 – 1.633)
Couple / Single	0.823*** (0.746 – 0.908)	0.339*** (0.322 – 0.358)
Has child(ren) (Yes/No)	2.200*** (1.776 – 2.725)	0.976 (0.896 – 1.063)
Income (QU5/QU1)	1.279*** (1.104 – 1.483)	0.704*** (0.649 – 0.765)
*** p < 0.001, else p > 0.05		

Source: author's computations on SHARE data.

Having children increased odds to give both financial and non-financial support to non-members of the respondents' household. It also increased the odds to receive financial gifts, but did not influence the odds to receive non-financial help.

Table 4. Multiple binary logistic regression models (adjusted odds ratios)

	Give help		Receive help	
	financial	non-financial	financial	non-financial
Gender (F/M)	0.959	0.963	1.272***	1.275***
Couple / Single	1.455***	0.994	0.659***	0.429***
Has child(ren) (Yes/No)	1.939***	1.234***	2.079***	1.259***
Income (QU5/QU1)	3.036***	1.536***	0.884	0.743***
Income (QU4/QU1)	2.660***	1.511***	0.806*	0.785***
Income (QU3/QU1)	1.998***	1.318***	0.822*	0.805***
Income (QU2/QU1)	1.519***	1.211***	0.821*	0.918
Age	0.987***	0.934***	0.982***	1.058***
Received (given) financial gifts (Yes/No)	3.067***	1.581***	3.005***	1.185***
Received (given) non-financial help (Yes/No)	1.207***	1.858***	1.464***	1.909***
Nagelkerke R^2	0.088	0.094	0.068	0.143
** p< 0.01, *** p < 0.001, else p > 0.05				

Source: author's computations on SHARE data.

At the last stage, all predicting variables were included into regressions at one time (Enter method). The results are presented in Tab. 4. When adjusting for other variables, in giving both financial and non-financial help gender has no statistical significance, while all other factors do. However, the overall predictive power of the models was rather low.

The author attempted including of macroeconomic indicators into the model (S80/S20 ratio, pension expenditure as share of GDP and in euros per capita), but the results were quite controversial and mostly statistically insignificant.

4. Conclusion

The variables considered show a great variety of intra-family support patterns in different European countries. The overwhelming majority of pensioners can cope on their own without any significant support from their separate living relatives. The major source of their financial support is their children, but the second major supporters are their parents. There is the evidence that those in harder financial situation (lower income quintiles) get more financial help, which supports the importance of that informal "pension pillar" in redistribution of incomes and in improving their material situation. This is also true for receiving of non-financial support – lower income groups receive more informal family support from outside their households complementing formal social assistance and care systems. As concerns giving support – both financial and non-financial – those who have better financial resources more frequently give gifts and help to their relatives.

Reciprocity is important: those who give help more frequently receive help from others and vice versa.

It seems that the significance of individual factors varies from country to country, but due to the small number of recipients/donors it is impossible to construct a statistically significant model.

The author plans further work on the model and interpretation of the results. Hopefully, more countries participate in answering the financial block of questions in the 8th wave, which will allow for another attempt to verify the association of intrafamily support patterns with welfare state regimes.

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CO-HOUSING OF SENIORS – 'OPEN POPOWICE' CASE STUDY**

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1. Introduction

1.1. Popowice Laboratory

The paper presents findings from the "Open Popowice" ["Otwarte Popowice"] meeting that took place in September 28th, 2018. "Open Popowice" meeting in Wroclaw, Poland was organized as part of the inauguration of the Popowice Laboratory [Laboratorium Popowice]. This event was the first of the planned series of meetings and workshops with the inhabitants of Popowice as part of the Popowice Laboratory, ProPoLab in short. It was to examine the needs of residents, mostly seniors, in relation to public services and the involvement of Popowice district residents in the activities of the Popowice Laboratory (ProPoLab 2018b, p. 3).

ProPolab is a visible part of pilot called Co-housing of Seniors. The pilot challenge is to implement the concept of senior co-housing using the tools used in the co-creation model. The experiment takes place in Popowice district, part of Wroclaw municipality, where involving local residents – seniors – local leaders, we (project implementers) want to develop the space to implement joint plans and meet the diagnosed needs (ProPoLab 2018a, p. 6).

What will the laboratory look like will be decided by the stakeholders (municipality, housing cooperative, developers, residents, social and church organizations, others) involved in the project. As project implementers, we encourage the main stakeholders to develop their own definitions, tools and model of the JOINT PUBLIC SERVICES creation, which will be a huge step in changing public awareness in Poland, including thinking about public services.

The project is therefore a combination of theory and practice. The University of Wroclaw provides theoretical tools and diagnoses that allow them to be used in practice as a "living laboratory". The Active Senior Foundation [Fundacja Aktywny Senior], local non-government organization, is responsible for the

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practical issues related to the ProPoLab and seniors. After all, seniors functioning in their place of residence know best what their needs are. The project will help them to realize their needs.

Co-housing of Seniors along with other eight individual (but interlinked) pilots form up EU CoSIE project. CoSIE is an acronym for Co-creation of Service Innovation in Europe. CoSIE is an consortium of 24 partners from 10 countries. According to the CoSIE, public service innovations can be achieved by creating collaborative partnerships between service providers and service beneficiaries. During the implementation of CoSIE (2017-2020), the collaborative partners will test and develop the diverse methods of co-creation in the field of public services (Sakellariou 2018, p. 8).

1.2. Theoretical framework of the research

Population is aging. Mainly as a result of increasing longevity and low fertility rates. According to the data the world's share of persons aged 65 years and over will increase from 8% in 2015 to almost 18% by 2050. In developed countries, the aging of population is even more severe. For example, in the countries of the Organization for Economic Cooperation and Development (OECD) ratio will increase from 16% to 27%. Moreover, in the OECD countries the share of the population aged over 75 in 2050 will be similar to the share of the population aged over 65 years right now (OECD 2015, p. 8).

This issue leads to a serious challenge in terms of economic, social and political sense. Challenges are so important and contemporary that European Commission has announced 2012 the European year for active ageing and solidarity between generations. Therefore, one can find studies which deal with the issue taking into account various points of view.

Economists may be interested in economic changes or in building “appropriate” pension system. One can recall here the works of Stiglitz (1986); Barr (1992); International Labour Organization (1993); World Bank (1994); Szumlicz (1994); Golinowska (1995); Żukowski (1997); OECD (1998); Góra (2003); Blake (2006); Jakubowski (2013); Chłoń-Domińczak (2016).

Financiers can examine fiscal costs linked to pensions, health care and long-term care; trade off between adequacy and sustainability as well as investment efficiency and rate of return of pension funds. Here among others one can find works of Queisser (1999); Davis (2001); Ambachtsheer and Ezra (2001); Yermo (2002); Stańko (2003); Willmore (2004); Dybał (2008); Chybalski (2012); Bielawska (2015); Szczepański (2016); Makarski et al. (2017); Rutecka-Góra (2017); European Commission (2018); Marcinkiewicz (2018).

Sociologist on the other hand may dispute over the quality of life of seniors. Here one can recall the works of Nussbaum and Sen (1993); Golini (1997); Długosz and Kurek (2006); Gałuszka (2006); Daszkowska (2007); Długosz, Kurek and Kwiatek-Sołtys (2011); Milkowska (2012); Mollon and Gil (2014); Błędowski (2014); Janiszewska (2015).

Co-housing is example of co-creation which could be defined as a process in which people who use services work together with professionals to design, create and deliver services (SCIE 2015). Therefore, co-housing means co-creation of social housing policy for elderly people, which is a heart of Popowice Labolatory. Here one can recall the works of Osborne (2006); Kim (2006); HAPPI Report (2009); Durrett (2009); Zaniewska (2011); HAPPI2 Report (2012); Zralek (2012); Alves (2013); Best practice report (2013); Voorberg et al. (2014); Killock (2014); Sundberg (2014); Labus (2015); HAPPI3 Report (2016); Osborne (2018); Brandsen et al. (2018); Wiktorska-Świecka (2019).

Since co-housing is not so widespread in literature like co-creation or co-production, we put trust that this paper could be an valuable addition to it.

1.3. Research methodology

The paper presents mainly findings from the "Open Popowice" meeting. The meeting took place in the Open Space formula. This American method has been chosen because of the freedom and decision-making nature it gives its participants (Owen 2008).

The form of the meeting was chosen so that the guests could freely talk to each other about the issues affecting the neighborhood. The meeting in its formula was to be OPEN to all interested parties, including socio-economic entities that have a real influence on changes. The inclusion of stakeholders in the discussion with the residents is in our opinion necessary to jointly create solutions tailored to the residents. In our opinion this meeting method fully supports co-creation process of co-housing (Spotkanie 2018).

Open Space is a method for convening groups around a specific question or task or importance and giving them responsibility for creating both their own agenda and experience. Therefore, our key task was to identify the question that brings people together: How do we (seniors) live in Popowice now and how we want it to be in the future?

The answer for this question one may find in next section of the paper. In the following step we compared data from Open Popowice meeting with the 2017 Wroclaw social diagnosis – report on sociological research over the city's inhabitants (Kajdanek and Pluta 2017). The findings from this comparative analysis one may find in other subsection.

To sum up research object are residents (mostly seniors) of Popowice district (sensu stricto) and Wroclaw inhabitants (sensu largo). Research subject is quality of life of seniors. Research aim is to identify needs of residents in relations to public services. To achieve the goal following research tasks has been implemented:

- find out answer for the question how do we (seniors) live in Popowice now and how we want it to be in the future?
- compare above answer with 2017 Wroclaw social diagnosis report.

The research years cover mainly 2018 with the feedback of 2017. In the paper following research methods has been used: analysis of scientific literature and normative documents, open space methodology, comparative analysis, statistical analysis.

2. Analysis of the research results

2.1. Research context

As mentioned at the beginning, the paper presents findings from the "Open Popowice" meeting that took place in September 28th, 2018. This event was the first of the planned series of meetings and workshops with the inhabitants of Popowice as part of the Popowice Laboratory (ProPoLab). It was to examine the needs of residents, mostly seniors, in relation to public services.

ProPoLab is supported both by University of Wroclaw (theory provider) and Active Senior Foundation, local NGO with valuable contacts and achievements with senior residents of Popowice estate. Jointly we form Polish team and its pilot called Co-housing of seniors. Together with other eight pilots we represent EU consortium CoSIE (Co-creation of Service Innovation in Europe) under the Horizon 2020 programme.

In ProPoLab we wanted to reach as many people from Popowice district as possible, who are not indifferent to the housing estate which they live in and want to participate in the process of its development. We believe that a sustainable change in public services can be achieved, among others by stimulating the inhabitants as to their values and current needs. We also believe that it is worth discussing surrounding problems in order to work out solutions together.

In our project, our supreme goal is to involve the widest possible groups of residents to jointly design social activities. The concept of co-creation has been emphasized in such a way that all possible interested social groups can jointly implement various or different projects in the field of social activities. Our sub goal is to activate the inhabitants of Popowice to engage in social life and change the surroundings. It is also about encouraging to get to know each other better and build neighborly bonds, and above all to co-create future together. Co-creation is a joint action aimed at improving the quality of life and the usefulness of the activities offered to society (public services). It occurs at every stage of development of these services. Co-creation manifests itself in the constructive exchange of various types of resources (ideas, competences, experience, knowledge, goods, etc.) that increase the value of public services, both individual and collective. In our opinion the advantages of co-creation are associated with increased prosperity, a shared vision of the common good, strategies of action and the emergence of new, previously unknown public services (ProPoLab 2018a, p. 7).

2.2. Research process

The "Open Popowice" meeting was organized on 28 September 2018 as part of the inauguration of the Popowice Laboratory, which is part of the EU CoSIE project. This event was the first of the planned series of meetings and workshops with the residents of Popowice. The meeting was held in one of the hall of the local church. The event started at 10 AM and lasted until 4 PM. Motto, and at the same time the introduction to the conversation, was a simple question: How do we live in Popowice now and how we want it to be in the future? There was more than 70 participants and around 16 stakeholders such as developers, Popowice housing association management, architects, representatives of municipal authorities, NGO`s, European Parliament local office representatives, media, etc. During the meeting 23 topics were raised and 128 cups of coffee were drunk.

After the participants took the seats, the rules of the meeting were presented by Zawisza from the DO Foundation. According to the open formula of the meeting, each participant could submit any topic for discussion in a smaller group and invite other participants to the conversation. Immediately after the opening, the interested parties began to submit specific, important topics for them, including living conditions, neighborhood relations as well as leisure and cultural entertainment. Each submitted topic has been saved on the appropriate card. And the person reporting it himself, on a specially prepared wall for this purpose, chose the time and space for further discussion in the area of interest. In this way, the participants of the meeting independently created agenda, which served them as a list of topics and contents discussed, available at all times. Participants of the meeting divided themselves into smaller groups, corresponding to the thematic areas, which were discussed. It is worth noting that during the meeting the participants chose in which areas they want to participate and on what topics they want to talk about (Spotkanie 2018).

The result of thematic meetings in smaller groups was a set of notes prepared by the participants. Notes are publicly shared and could be reach at http://propolab.f-as.pl/wp-content/uploads/2018/10/otwarte_popowice_materialy.pdf

During the break, participants of the meeting could eat a tasty meal. During the meal, discussions and conversations of the participants continued in an unrestricted and relaxed form. During the summary of the meeting, everyone present could express themselves. They could tell in a few sentences about their expectations about the meeting, the conclusions drawn on it, and the impressions and feelings after the meeting. All present listened to each other with great attention (Spotkanie 2018).

The Open Popowice meeting gave its organizers valuable material, allowing to determine the expected directions of changes, indicated by the participants. At the same time, it was the first meeting in many years, during which, in an open atmosphere, residents were able to freely exchange views and outline visions of their expectations and future changes. The findings from the meeting and comparative analysis with 2017 Wroclaw social diagnosis report one may find in next subsections.

2.3. Open Popowice findings

The result of thematic meetings in smaller groups is a set of notes prepared by the participants. One may find here http://propolab.f-as.pl/wp-content/uploads /2018/10/otwarte_popowice_materialy.pdf all notes written by the Open Popowice meeting participants. According to the data we have 23 topics raised.

Due to the raised subjects we can divide all topics into 5 main parts:
- infrastructure;
- safety;
- environmental protection;
- participation in a social life, personal development, culture;
- social security, health protection.

It is worth saying that infrastructure topic was most welcomed by the participants. Probably due to the highest visibility of the topic. In this section participants quoted following subtopics:
- most beautiful Popowice housing estate;
- lighting of Popowicka clearing;
- development of inter-block space to improve the living comfort of people (seniors mainly);
- platforms for wheelchairs and strollers on ground floors in buildings at Jelenia street;
- benches in greater quantity;
- monument 17 00'00 " meridian on Popowicka clearing;
- "hostling" issue.

As one can see people did not only complain about infrastructure but also passed their general feeling that they are satisfied with the estate. Mostly due to spacious green areas, clearings, parks, Odra river bank access, good logistic. Nevertheless participants pointed out several activities that could improve comfort of living, mostly seniors. Residents also mentioned "hostling" issue – renting private apartments for short stay without any required permission.

Security was another raised topic. Here inhabitants quoted following subtopics:
- not enough local police;
- local police officers are not know by the residents;
- not enough municipal police;
- dangerously on the streets in the evening;
- drinkers destroy well-kept parks;
- no one pays attention to the devastating people;
- graffiti on the walls, destroyed lawns and shrubs.

From the above list and discussion on the meeting one can draw following conclusions. Residents feel that there is not enough law enforcement, especially during evenings and in parks. As a result public goods are devastating and inhabitants do not feel save.

Environmental protection topic was third most welcomed by the participants. In this section participants quoted following subtopics:

- ecology in Popowice;
- caring for greenery;
- cutting out dead trees;
- cutting out mistletoe;
- development of general space;
- construction of parking lots destroys greenery;
- limiting trimming of bushes on lawns;
- more trees and shrubs.

From the above list and discussion on the meeting one can draw following conclusions. Residents are environmentally conscious and they know that environment should be protected even for the price of technical inconvenience (longer route to the parking lot).

Second to last topic was quiet broad because covered issues like: participation in a social life, personal development, culture. In this section participants quoted following subtopics:

- creating a community: integration, cooperation, kindness;
- sport and integration;
- schools should become centers of activity of the local community (in the afternoons);
- intergenerational integration – activities of young people and the elderly;
- communication between residents and the Council of Popowice estate;
- construction of a Culture House;
- creation of the Culture Center in the part of the clinic building.

From the above list and discussion on the meeting one can draw following conclusions. Residents are eager to meet new persons and learn/develop new skills. The problem is communication and integration but could be solved through sport, proper used of already existed constructions or developing new ones. The elderly could also share their invaluable experience.

Last but not least topic was dedicated to social security and health protection. In this part participants quoted following subtopics:

- security broadly understood;
- security on the estate;
- day care home for seniors + volunteering;
- issue of rescue silence;
- issue of loneliness.

From the above list and discussion on the meeting one can draw following conclusions. Residents, mostly seniors feel lonely but know what supposed to be changed. They require a space where can prepare meals, develop skills and interests, see the movies, organize a library, meetings and lectures, offer volunteering and experience

2.4. Comparison with 2017 Wroclaw social diagnosis report

According to the 2017 Wroclaw social diagnosis report respondents are pleased with its living conditions. To be precise 73.7% of respondents are pleased living in their homes/apartments, 83.8% are pleased with living estate conditions and 83.1% are pleased living in Wroclaw (Kajdanek and Pluta 2017, p. 56). Moreover, residents of Popowice estate are the most satisfied from all survived estates. So we can confirm our findings from "Open Popowice" meeting that Popowice inhabitants are satisfied with its estate.

Diagnosis says that the most troubling problems of spatial and ecological order in the place of residence are, above all, those generated by cars and their drivers / owners. Almost 2/3 of respondents notice the problem of incorrectly parked vehicles, and more than half the problem of cars moving at excessive speeds. About 1/3 of respondents pay attention to the issues of throwing unsorted garbage, vandalism and property devastation as well as illegal throwing and tossing garbage to neighbors. Problems noticed by a minority of respondents are primarily the phenomena of destruction and devastation of greenery and tree felling (20%), driving cars emitting high emissions (13%) and burning poor quality fuel at home (10%) (Kajdanek and Pluta 2017, p. 61). It is worth to mention that also during "Open Popowice" meeting problems of infrastructure and environment were raised and said as a crucial one.

The second category of problems raised in 2017 Wroclaw social diagnosis report was the disruption of public order and a sense of security. Residents of Wroclaw included the most troublesome phenomenon of soliciting for money and begging (nearly 1/3 of them). Roughly every tenth Wroclaw citizen pointed to problems of fights and beatings near their place of residence, also among neighbours, as well as thefts and burglaries (Kajdanek and Pluta 2017, p. 64). It should be noted that participants of "Open Popowice" meeting also mentioned security as an important issue.

According to the 2017 Wroclaw social diagnosis the most important issues to ensure a good quality of life in the estate are: the availability of parking spaces (43.4%); condition of streets and pavements (40.7%); air purity (39%); the number and condition of green areas close to home (37.5%); access to public transport (25.6%); availability of furnished public places where you can meet, sit down and talk (21.6%); availability of furnished playgrounds for children and recreation places for adults (16.5%); the ability to supply food and necessities for the home (15.2%); mutual kindness of residents (12.2%); availability of pubs and restaurants, cafes (8.5%); offers of cultural events (7.0%); availability of kindergartens and nurseries (5.8%); social activity of inhabitants (2.7%) (Kajdanek and Pluta 2017, p. 68). It is worth saying that majority of above issues was raised during "Open Popowice" meeting.

3. Conclusion

Research aim of the article is to identify needs of residents in relations to public services. To achieve the goal following research tasks has been implemented:

- find out answer for the question how do we (seniors) live in Popowice now and how we want it to be in the future?
- compare above answer with 2017 Wroclaw social diagnosis report.

According to the data, Open Popowice meeting participants raised 23 topics structured into 5 main parts:

- infrastructure;
- safety;
- environmental protection;
- participation in a social life, personal development, culture;
- social security, health protection.

It is worth saying that infrastructure topic was most welcomed by the participants. Inhabitants did not only complain about infrastructure but also passed their general feeling that they are satisfied with the estate. Mostly due to spacious green areas, clearings, parks, Odra river bank access, good logistic. Nevertheless participants pointed out several activities that could improve comfort of living, mostly seniors. Residents also mentioned "hostling" issue – renting private apartments for short stay without any required permission.

According to the data, Popowice residents feel that there is not enough law enforcement, especially during evenings and in parks. As a result public goods are devastating and inhabitants do not feel save. Participants of "Open Popowice" are environmentally conscious and they know that environment should be protected even for the price of technical inconvenience (longer route to the parking lot). Moreover, residents are eager to meet new persons and learn/develop new skills. The problem is communication and integration but could be solved through sport, proper used of already existed constructions or developing new ones. The elderly could also share their invaluable experience. Last but not least, residents, mostly seniors feel lonely but know what supposed to be changed. They require a space where can prepare meals, develop skills and interests, see the movies, organize a library, meetings and lectures, offer volunteering and experience.

Findings from the "Open Popowice" meeting are supported by the 2017 Wroclaw social diagnosis report. Diagnosis says that the most troubling problems are related to spatial and ecological order as well as the disruption of public order and a sense of security.

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WHAT IS THE COST OF PENSION REFORM REVERSAL IN SLOVAKIA AND COULD THE NDC SCHEME SOLVE THE FISCAL IMBALANCE OF PAYG SCHEME?

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1. Introduction

Slovak pay-as-you-go pension scheme has been organized as a point system where the pension benefits depend partly on the life-long income of an insured person. Since 2005, part of the paid social insurance contributions is redirected into the funded pension scheme, where the savers can choose the pension fund as a vehicle for their pension savings. The financial crisis has forced government to lower the part of social insurance contributions flowing into the funded pillar and introduce balancing mechanism, where the statutory retirement age is tied to the life expectancy of a retiring population. The automatic adjustment to the retirement age was introduced in 2012 as a part of stabilization measures for public finances and came into force in 2017. Rising retirement age on average by two months annually swiftly became a nutrient medium for a political populism that turned out into reform reversal regardless the long-term consequences on pay-as-you-go pillar balance and expected pension benefits. In 2019, Slovakia abandoned the mechanism of automatic adjustment to the retirement age based on the life expectancy of retiring population and Slovak national parliament constitutionally introduced retirement age ceiling at 64 years for men with further bonification of half-year for a raised child up to three children for women. If no correction mechanisms are implemented, this reform reversal would have significant impact on future pension expenditures as well as on the level of pensions received not only from the pay-as-you-go scheme but also from the funded pillar as pointed by CBR (2018b). Seeking for the stabilization measures, introduction of the notional defined contribution (NDC) scheme emerged as a possible solution, which is being investigated by Ministry of Finance of Slovak republic.

In this study, by applying microsimulation pension model supported by statistical and administrative data on Slovak population, we analyze the fiscal and redistributive consequences of retirement age ceiling and impact of NDC scheme introduction on the Slovak pay-as-you-go pillar fiscal balance and expected pension benefits. However, we work with some limitations on the NDC set-up according to the preferences defined by the governmental institutions.

The paper is organized as follows: The second section discusses current knowledge and existing papers dealing with pension reform, reform reversals supported by rising pension populism and existing experience with the introduction of NDC schemes. Third section presents more details on Slovak pension system and elaborates details on the research objective, data, and methodology with the presentation of no-policy change set-up as well as NDC scheme set-up. Fourth section presents the research results of the fiscal and redistribution implications of the policies examined and discusses the findings and potential challenges that need to be further elaborated if the NDC scheme should be implemented, especially the poverty risk for low-income cohorts and minimum retirement income granted to a retiring person regardless the level of paid contributions.

2. Theoretical background

There is a vast amount of literature analyzing the pension reform reversals, either permanent or transitory, after financial crisis with special attention to the central European countries, which introduced multi-pillar pension systems. When inspecting existing research on this topic, two different approaches towards pension reforms reversals emerge. While the typical reduction in contributions flowing into the funded schemes could be connected to the need of financing pay-as-you-go pension deficits and overall problems with the public finances, the second group of reform reversals could be characterized as driven by political populism transformed into the pension system. The first group of pension reversals is analyzed by many studies, where for example Price and Rudolph (2013) examine the impact of the financial crisis on privately funded pensions in the Europe and Central Asia region. Following their report, Chłoń-Domińczak (2018) estimated the reform reversals on the individual pension value and confirmed negative impact of these steps financial balance of PAYG pillars. Especially for Slovakia, reform reversals starting in 2012 gave rise in implicit liability of PAYG pillar. Székely and Ward-Warmedinger (2018) associate reverse steps in pension system reform and populist intervention with the financial crisis and the fact that the transitional period to a multi-pillar system reduced PAYG pillar revenues financed mainly from public debt growth. These conclusions can be found also in the study of Sivák et al. (2011). Other studies covering the impact of pension reform reversals with focus on Slovakia include Beblavý (2011) end especially Drahokoupil and Domonkos (2012), who confirmed that unresolved problems in the implementation of previous reforms are associated with the financing of the transition costs. At the same time, they show that not only fiscal constraints, but also political conditions have shaped the changes in the pension systems. More radical ideas on the reasons and following expected consequences of fiscal crisis

on achieved pension reforms could be found in the paper of Casey (2014), who claim that the need to comply with the EU wide rules on fiscal discipline, the easiest way was to treat the funded pension savings as “piggy banks” and seize the transitional cost reserves. This has opened the door for interventions into the pension systems, which in turn became unstable and unpredictable regarding future development. The need to finance public finance deficits immediately thus motivated shortism and political populism in the pension system in these countries. This new wave of reverse steps can no longer be associated with the need for fiscal consolidation. They are mainly associated with political populism, which increases the spending of the PAYG pillar and the rate of intergenerational redistribution in order to gain political preferences. These interventions can be explained by classical political economics, where focusing on the median voter means a shift in orientation to the older generation due to demographic change in population structure.

Absence of automatic balancing mechanisms that effectively limit political populism in the pension system, the PAYG pillars would face interventions by politicians that tend to increase fiscal imbalances and shift the burden to future generations. Brooks and James (1999) unveil the background of pension system reform from the perspective of political economy and point out that it is precisely the legacy of the past and the fragmentation of political views supported by different interest groups that hinder effective and long-term financially stable pension reform. Later, James (2002) concludes in his study that setting up the interaction of institutions covering different pillars in the pension system is in many cases more political than a professional issue. Both studies indirectly point to the need to perceive the existence of political risk, which is linked to 'politics' and not directly to 'policy' in the pension system. The existence of political populism in the pension system was pointed also by Baroni (2007). At the same time, Galasso (2008) points out that the apparent deviation of the pension system from long – term fiscal equilibrium provides distorted expectations of economic agents during their working career, which in turn increases the political risk and instability of the pension system.

The basic pension scheme in Slovakia takes the form of a pay-as-you-go (PAYG) scheme with a strong intergenerational redistribution of income. The PAYG scheme is based on a point system where for each fully worked calendar year, an individual earns one point and at the same time, its value is determined by a personal wage point representing the ratio of wages to the average wage in the economy for a given year. At time of retirement, the accumulated points are multiplied by the average personal wage point throughout the entire career. The accumulated points are then multiplied by the current pension value, whose value changes according to the change in the average wage in the economy over the last two years. The point system set in this way would be fully merit. Therefore, an element of solidarity is introduced into the system, which increases the pensions granted to low-income individuals and reduces the entitlements for medium and higher income cohorts. By this adjustment, the Slovak PAYG scheme deviates from merit and reduces the relationship between paid contributions and the old-age pension, which leads to intra-generational redistribution.

In terms of financial stability, Slovak pension scheme shows a tendency towards imbalances and increasing deficits due to an increasing dependency factor, despite the fact that an automatic mechanism for increasing the retirement age based on the life expectancy of the retiring population was active since 2017 (CBR 2018a; 2018b; Porubský and Novysedlák 2018; Šebo et al. 2017). On top of this, there came a radical reform reversal in 2019, where the Slovak National Council amended the Constitution by removing automatic stabilization mechanism of flexible retirement age and introduced constitutionally fixed retirement age at 64 years. When inspecting the shift from the flexible retirement age based on the life expectancy of retiring cohort to the fixed retirement age from the political economy, one can see that support for this move was obtained from the older population and labor unions even if these groups would not gain any additional benefits (CBR 2018a). Council for Budgetary Responsibility, as well as researchers, unsuccessfully asked for the calculations of the fiscal impact on PAYG pillar as well on the benefit ratio to be performed and presented to the general public before final voting in the parliament. At the same time, there were no stabilization measures accepted that would limit the negative impact on the PAYG pillar deficits and decreased benefit ratio.

To reduce the financial and political pressure on intergenerational redistribution, NDC schemes were implemented. The model of NDC scheme is a pay-as-you-go system that mimic FDC (financial defined contribution) scheme. This means that the pension depends on the amount of contributions paid and virtual returns (Chłoń-Domińczak et al. 2012; Holzmann et al. 2012). Contributions are evaluated by a fictive return that reflects the financial health of the pension system. The account balance is called notional (non-financial, fictious, virtual) because it is used only for keeping evidence. It means that the system does not invest funds on the financial markets and contributions are immediately redistributed to the pensioners. When an individual reaches retirement age, accumulated virtual capital is recalculated into an annuity, which considers the life expectancy of the concerned cohort, indexation, and technical interest rate. This theoretical return is based on statutory parameters such as the GDP growth, average wages, change in amount of contributions paid or labor costs (Alonso-Garcia a Devolder 2016). NDC schemes were implemented in various countries including Sweden (Holzmann 2017), Italy (Belloni a Maccheroni 2013), Poland (Chłoń-Domińczak and Strzelecki 2013), Russia (Eich et al. 2012) or Latvia (Dundure and Pukis 2015). Generally, the amount of the future pension depends on the duration and amount of paid contributions in every NDC scheme. However, additional factors which reduce this dependency and increase redistribution are also implemented. These additional factors, mostly motivated by political preferences, change internal financial stability of NDC schemes (Holzmann et al. 2012). Implementation of any policy measure and changes in policy parameters will have an impact not only on the balance sheet of the pension schemes but also on redistribution between and within generations. Sivák et al. (2011) show that intergenerational equality cannot be achieved in the long – term without cardinal changes of the parameters in PAYG scheme because of the ageing population. Many authors who examine redistribution

in public policy systems assert that the level of redistribution in pension systems in OECD countries has been decreasing over two last decades (Fenge and Werding 2003). According to Fenge and Werding (2003) and Werding (2003) the ageing process in many countries is a result of imbalances in redistribution between generations. As a result, we can see a significant financial burden of future generations in pension systems.

2. Methodology and data

The aim of the paper is to examine fiscal and redistribution impacts of the pension reform reversals undertaken in 2019 and estimate the impact of NDC scheme introduction on the fiscal sustainability of PAYG scheme. Secondary, using the example of several previous studies oriented on the NDC scheme introduction, we estimate the redistribution impacts of NDC scheme compared to the no-policy change scenario with automatic balancing mechanism of flexible retirement age tied to the life-expectancy of retiring cohort and pension reform reversal policy of fixed retirement age introduced in 2019. Overall, we test the fiscal and redistribution impacts of the following policies:

1) No policy change (NPC) scenario with an automatic adjustment of the retirement age according to change in life expectancy of the retiring population.
2) Pension reform reversal policy of fixing retirement age at 64 years.
3) Implementation of the NDC scheme with a fixed retirement age at 64 years.

For modeling pension policy and examining their impacts, we use a cohort-based dynamic microsimulation model. The model contains four basic modules: (i) macroeconomic module which simulate future economic development (wage growth, unemployment, asset prices, and inflation), (ii) demographic module which simulate future population structure from 2017 to 2080 according to data from Slovak Demographic Centre, (iii) microsimulation module which contains individual attributes (characteristic) of individuals according to a transition matrix for individual conditions, and (iv) pension policy module. In its baseline the model is built on individuals across the population and individual status attributes are determined on models that determine probability distribution of status attribute values within a cohort based on empirical data estimates. The model shifts the population over time and the pension system is exposed to random economic development, using a moving-block bootstrap method to stochastically simulate future economic developments while maintaining the relationship between macroeconomic variables.

We work with the main assumption that the education of an economic agent is a permanent determinant of his/her income and has a significant impact on the course of life-long income function (Šebo et al. 2017; Balco et al. 2018). Our approach is based on the initial study of Šebo et al. (2015), who focused on modeling the age and education specific life-cycle income function for individuals in Slovakia. We modify the model published by Šebo et al. (2017) that estimates the annual changes in the earnings. The dependent variable is the income (y) of an economic agent at the age of x year (x_m when the age is expressed in months) of the given education cohort j. Modeled real age-education specific life-cycle

income function, using longitudinal data from USA (Julian and Kominski 2011) supplemented by data from Statistical Office of Slovakia about income structure of population presented by Fodor and Cenker (2019), has the following form:

$$y_{j;x} = a + b_j x + c_j x^2 + \varepsilon \quad (1)$$

Estimated coefficients are then applied to the cross-sectional average earnings of age-educated cohorts for each year from 2008 to 2016 obtained from the Statistical Office of the Slovak Republic (2018). Thus, the real lifelong income function of an individual has a concave shape that corresponds to the results of Guvenen et al. (2016) and an estimate made by Fodor and Cenker (2019) on data for the Slovak republic.

According to Cooper (2014) and Guvenen et al. (2016), if an economic agent drops out of the labor market for a certain period, his wage departs from a full uninterrupted income function, since the skills, working habits, and experience during the period of unemployment don´t improve. Once the economic agent returns to the labor market, he can expect to have a lower wage than the same-age economic agents who have a full career. However, his pay after taking up employment follows at least the inflation growth, and so we can say that the wage of the economic agent has the same real value as in the period before unemployment. However, accepting the concavity of the life-cycle income function, this does not apply over the whole working career. We have solved the problem of incorporating inflation into the equation (1). Given the existence of unemployment risk and inflation, the nominal wage (*w*) of a given education cohort could be expressed as:

$$y_{j;t} = \begin{Bmatrix} y_{j;t};\ t = 1 \\ y_{j;t-1} \cdot (1 + \tau_t); U_t = 1, t \in < 1, T > \\ y_{j;t-1} \cdot y^*_{j,;x_m;t} \cdot (1 + \tau_t); U_t = 0, t \in < 1, T > \end{Bmatrix} \quad (2)$$

Where τ_t represents the inflation in time *t*, *U* means the employment at time t. $U_t = 1$ means that the economic agent is unemployed at time t, while $U_t = 0$ means that the economic agent is employed at time t. If an economic agent is employed ($U_t = 0$), his income function depends on the development of inflation and the increased labor capital over time. In the case that the economic agent is unemployed ($U_t = 1$), his lifetime income function changes over time only by the impact of inflation and the labor capital remains constant.

In unemployment period ($U_t = 1$), wage development is influenced only by inflation (τ_t). We can say that cohorts with lower education (lower income level) are at higher risk of unemployment (Guvenen 2009). This fact reflects educational and age-specific probability of unemployment based on the data of the Statistical Office of the Slovak Republic and the Ministry of the labor, social affairs and family of the Slovak Republic for the period 2003-2017.

The model shifts population by months while incorporating the impacts of the macroeconomic indicators on the labor market and population to the level of an individual. The output of the model is a population status and status of each individual according to defined age-educational cohorts on a monthly basis. With

this approach it is possible to examine the impacts of selected policies at micro-level (level of individual with specific status parameters).

The amount of paid contributions during an individual's career (C_j^T) can be determined as:

$$C_j^T = \sum_{t=1}^{T} y_{i\ j,t} \cdot c_{j,t} \quad (3)$$

We assume that each individual retires after he/she reaches retirement age. A rational explanation of this assumption can be found in the existence of a policy that allows concurrence of work income and pension benefits. At the same time, the model works with a different life expectancy according to gender and education level of individuals (Holzmann and Palmer 2006; Van Sonsbeek 2010; Hummer and Hernandez 2013; Porubský and Novysedlák 2018; CBR 2018b). Differences in life expectancies according to education are determined according to data of Slovak Demographic Centre of the Slovak Republic.

All individuals are retired at the same year (exception of the NPC scenario), which means that they enter in labor market in a different year depending on their educational attainment. This means that higher education cohorts spend less time on the labor market than cohorts with lower education.

2.1. No policy change scenario (NPC scenario) and scenario with fixed retirement age

For the purposes of examining the impacts of the considered policy measures, we formulate a baseline scenario without policy change (NPC scenario). The NPC scenario is an adjustment of the pay-as-you-go pension system parameters based on the current legal status, with the entitlement to pension is granted according to the currently valid formula with solidarity and the retirement age is linked to a life expectancy. Pensions are valorized according to a level of inflation, but at least 2 percent per year.

If an individual earns an average personal wage point (POMB) at level 1, throughout his/her working career, he/she has been paid at the level of the average in the national economy. During the calculation of the expected pension, the model works with solidarity that effectively increases POMB to those, who have achieved POMBs below 1 during their career. Also, the solidarity decreases POMB for those, who have achieved the POMB higher than 1,25 during career. The effect of solidarity ($uPOMB_T$) can be determined as:

$$uPOMB_T = \begin{cases} POMB_T; & ak\ POMB_T \in \langle 1; 1{,}25 \rangle \\ POMB_T + 0{,}2 \cdot (1 - POMB_T); & ak\ POMB_T \in \langle 0; 1 \rangle \\ 1{,}25 + 0{,}68 \cdot (POMB_T - 1{,}25); & ak\ POMB_T \in \langle 1{,}25; 3 \rangle \end{cases} \quad (4)$$

The calculation of the first granted old-age pension for each individual can be determined as:

$$RI_T = ADH_T \cdot N_T \cdot uPOMB_T \quad (5)$$

where:

RI_T – first granted pension from PAYG scheme;

ADH_T – actual value of pension point for the period, in which agent leaves the labor market for retirement;

N_T – number of years of pension insurance at the time of retirement;

$uPOMB_T$ – personal wage point of an individual modified by solidarity.

When considering the scenario with fixed age, the key indicator explaining potential increase of fiscal burden can be presented using the load factor, which compares the number of retirees and contributors within the PAYG scheme.

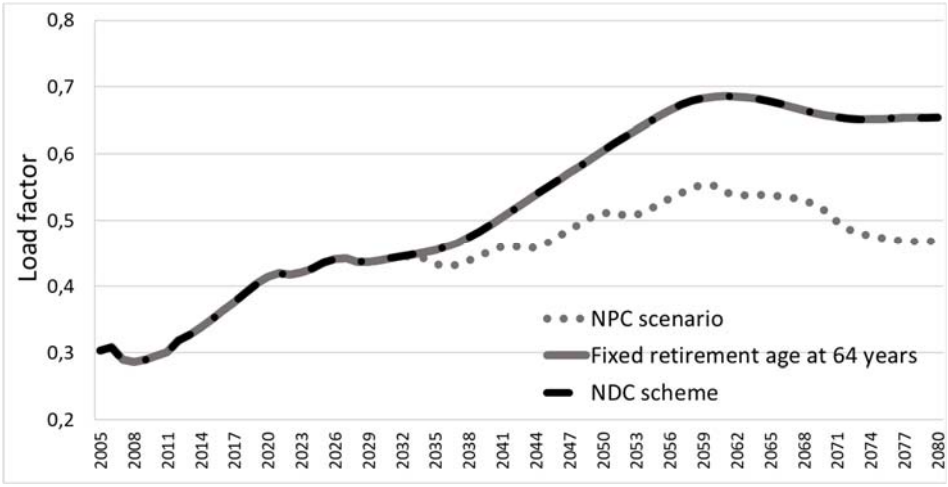

Fig. 1. Load factor for PAYG scheme

Source: Own calculations, 2020.

The load factor is higher in scenario with fixed retirement age and NDC scheme scenario than in NPC scenario due to fixed retirement age at 64 years. For the NPC scenario, we could expect to have approximately 55 retired individuals for 100 contributors in 2060. But for the scenario with fixed retirement age at 64 years we could expect to have 68 retired individuals to 100 contributors in 2060. Earlier retirement age increases the number of retired individuals and reduces number of contributors, as confirmed by Porubský and Novysedlák (2018) respectively CBR (2018b).

2.2. Introducing the NDC scheme

We modify a point system of Slovak pension system to a notional defined contribution scheme (NDC scheme) with a fixed retirement age at 64 years. The aim of the NDC schemes is to imitate structure of funded defined contribution schemes while maintaining fiscal stability. As any pension scheme, in NDC scheme individuals goes through two phases which correspond to the time when he/she is active at labor market and the time when he/she receive his/her pension. During the first phase paid contributions (C_t) are assigned to a virtual account in

NDC scheme, which is often called a net present value of notional pension wealth (NPW). In NDC schemes every individual's account has a value that varies yearly according to the chosen indexation coefficient (appreciation). For the individual, this development can be described as (Auerbach and Lee 2011):

$$NPW_{(t+1)} = NPW_t\left(1 + r_t^i\right) + C_t \tag{6}$$

where:

r_t^i – indexation rate (appreciation of existing positive balances of individual's notional pension wealth generated from paid contributions);
C_t – amount of paid contributions during the period t;
NPW_t – notional pension wealth at time t.

NPW is notional value of assets and the indexation rate is based on internal rate of return of scheme, which is often derived from the labor market performance in the economy. At the time when individual retires, granted pension is based on the value of *NPW*. Thus, indexing of *NPW* should copy performance of the labor market in the economy, not just average wage (*w*) but also number of workers in each economy (*n*). However, the Swedish system uses indexing based on changes in average wage (*g*) instead indexing based on labor market performance expressed as changes in labor force (*Δn*) and changes in average wage (*g*) or alternatively based on individually expressed rate of return (r_t^i). This mechanism of *NPW* indexation in its economic meaning and mathematic modification is equal to mechanism in Slovak PAYG scheme where the mechanism of indexation is based on annual reevaluation of the actual value of pension point (*ADH*) which is linked to the change of average wage in economy (*g*). At the same time individual accounts of living individuals are modified by account balances of death individuals of specific age cohort. This means that the indexation of NPWs of the specific cohorts as a whole (*r*) is equal to *g*, where $r = g < r^i$. The net present value of notional pension wealth (NPW_t) in Swedish NDC scheme is based on the current mortality and predicted indexation rate of *NPW* is set at 1,6 percent, e.g. *g = 0,016*. The superscript t represents age cohort which reaches retirement age at year T. Granted pension (RI_T^t) according to Swedish type of NDC model, for individual who is going to retire at year *T*, we can describe as:

$$RI_T^t = \frac{NPW_T^t}{\sum_{s=t}^{D}(1+g)^{-(s-t+1)}p_{T,s}^t} \tag{7}$$

where:

NPW_T^t – net present value of notional pension wealth at year of retirement,
$P_{T,s}^t$ – survival probability from year T to year s, evaluated in year t for all population which will retire at year T,
D – maximal life expectancy according to mortality tables.

In subsequent years, if the value increase (falls) above (below) the value 0,016, the individual's pension is valorized according to changes in average wage (*g*), and hence $r_t = 1 + g_t$. We can assume that, if the wage growth is at the level of

1,6 percent then the level of granted pension (*RI*) will be constant during the whole life of retired individuals (Auerbach and Lee 2009).

Although the Swedish system is relatively stable system, a balance mechanism was implemented into system. This mechanism slows growth rate of net present value of notional pension wealth in case of threatening financial stability of NDC scheme through smoothing coefficient (*b*):

$$b = \frac{F+C}{NPW^{NDC}+P} \tag{8}$$

where:

F – financial assets of NDC scheme,

C – expected pension contributions which are equal to three-year moving median from pension contributions and three-year moving average of turnover date (average of expected duration of contributions and benefits),

NPW^{NDC} – aggregated net present value of notional pension wealth of current contributors,

P – expected liabilities to current beneficiaries.

This balance mechanism in Swedish NDC scheme is also called "a brake". The aim of the balance mechanism is to prevent excessive accumulation of debt but not of assets. This mechanism is activated only if NDC scheme is under-funded (the value of the coefficient (b) falls below 1). During the period when is this balance mechanism active these two factors are affected:

1) Pension assets of cohort are not accumulated with a rate equal to $(1 + g_t)$ but with rate equal to $(1 + g_t)b_t$, where b_t is smoothing coefficient,
2) The rate of valorization of granted pensions (*RI*) adjust pension benefits which are equal to $(1 + g_t)b_t$, what means bigger probability of declining for each cohort because real income growth equals to $\frac{(1+g_t)b_t}{1{,}016}$.

The balance mechanism stays active until the smoothing coefficient (*b*) reaches a value bigger than 1,0. If balance mechanism falls for the first time below 1,0 in year t, the balance mechanism shall be applied until year s, where $s > t\ ak\ \prod_{v=t}^{s} b_v < 1{,}0$ (Auerbach a Lee 2011). This balance mechanism prevents debt accumulation through the maintenance of lower pension benefits.

2.3. Indicators used for evaluation of redistribution and fiscal stability of PAYG scheme

Redistribution and fiscal impacts of analyzed policies are examined using three indicators:

1) individual replacement ratio *(IRR)* which is an individualized indicator of adequacy expressed as the ratio of the amount granted reduced pension (RI_T) (resp. combined pension (RI_T^*)) pension to the latest known wage, e.g. $\frac{RI_T}{\bar{w}}$, resp. $\frac{RI_T^*}{\bar{w}}$,

2) PAYG scheme deficit. It is a relative indicator that represents financial balance of PAYG scheme on a cash basis. PAYG scheme deficit is expressed as ratio of total amount received contributions ($c_{I\,k} \cdot n_k$) of age-educational cohort k ($\sum_{k \in K_{CON}} c_{I\,k} n_k$) and total amount of paid pensions ($d_{I\,k} \cdot n_k$) of age-educational cohort k ($\sum_{k \in K_D} d_{I\,k} \cdot n_k$) reduced by 1, e.g.: $f_s = \frac{\sum_{k \in K_{CON}} c_{I\,k} \cdot n_k}{\sum_{k \in K_D} d_{I\,k} \cdot n_k} - 1$,
3) The last indicator is designed as a solution to the discussion of number of papers (e.g. Auerbach a Lee 2009; Chłóń-Domińczak et al. 2012; Holzmann et al. 2013; Alonso-Garcia a Devolder 2016; Godínez-Olivares et al. 2016; Holzmann 2017), which are discussing about the optimal setting of contribution rate for PAYG scheme and funded scheme which are linked schemes and they are sharing one common contribution rate. We formulate an indicator of effective contribution rate (c_{ef}), which express required contribution rate to cover deficits of PAYG scheme (f_s) in two-pillar contribution system, e.g.: $c_{ef} = \frac{c}{f_s + 1}$.

For each policy, we ran 3600 simulations. The results of simulations are classified into percentiles according to performance of economic for whole simulated period. This method increases the interpretability of the results as the results can always be interpreted in relation to a specific percentile according to economic performance. In our study results are presented on 50th percentile of all simulations.

3. Results and discussion

The individual replacement ratio (*IRR*) of pension system examines the adequacy of the pension system at individual level, as opposed to aggregate replacement ratio which examines adequacy of benefits compared to average wage in economy. IRR represents the impact of selected policies on individuals with different status characteristics. As the NDC scheme considers the amount of paid contributions to the system, we can assume that pensions will be lower compared to other policies. Figure 1 shows IRR of individuals with different educational cohorts.

Implemented fixed retirement age at 64 years reduces IRR compared to an NPC scenario due to shorter working career. Implementation of NDC scheme with fixed retirement age at 64 years will reduce the expected IRR further. The NDC scheme is suitable for individuals with long working career, where the effect of compound interest has a significant impact. In contrast, pointing system evaluates each paid contribution equally. At the same time, NDC scheme increases equity in pension system in a contrast with current system where the IRR of individuals with lower educational level are increased by solidarity.

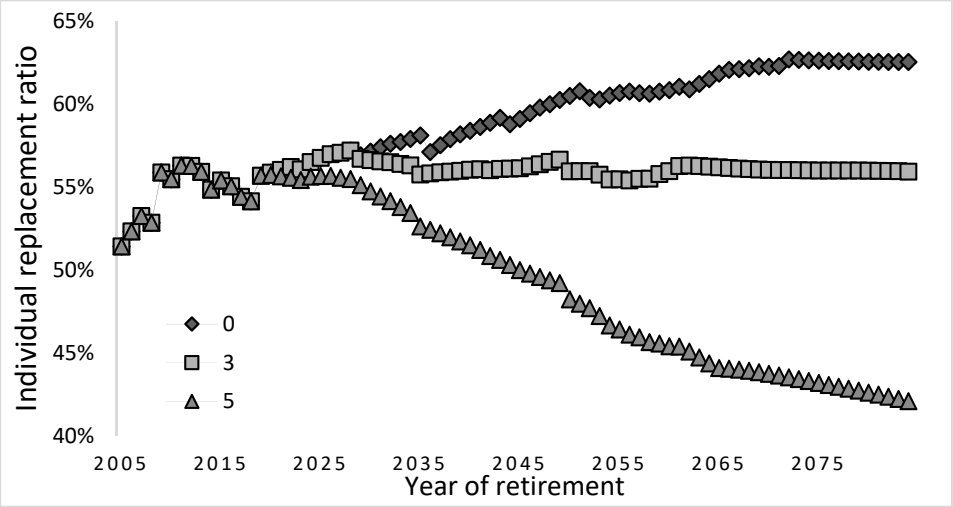

Fig. 2. Individual replacement ratio (IRR) of an average earner
Source: Own calculations, 2019.
Notes: 0 – No-policy change scenario; 3 – Policy with fixed retirement age; 5 – NDC scheme

As presented by Janíčko and Tsharakyan (2013), reduced number of contributors due to the aging population and increased life expectancy causes problems with funding of PAYG scheme. Therefore, the increasing number of retired individuals caused by the policy of fixed retirement age at 64 years should increase the PAYG scheme deficit.

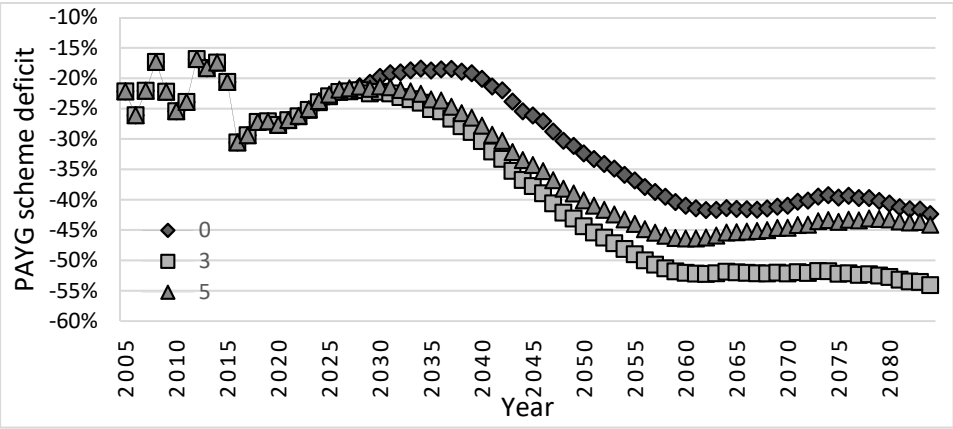

Fig. 3. PAYG scheme deficit
Source: Own calculations, 2020.
Notes: 0 – No-policy change scenario; 3 – Policy with fixed retirement age; 5 – NDC scheme

We confirm that implementation of NDC scheme has significant stabilizing effects on PAYG scheme even if the retirement age is fixed at 64 years, which is consistent with study of Holzmann (2017). However, even the NDC scheme introduction cannot fully neutralize the deficits caused by the policy of retirement age fixation. The policy of flexible retirement age is therefore considered as an effective stabilization mechanism for the PAYG scheme.

The last indicator, effective contribution rate, presents what level of contribution rate should be needed to fully stabilize the PAYG scheme. In other words, the figure below presents the fiscal burden shifted to the working population.

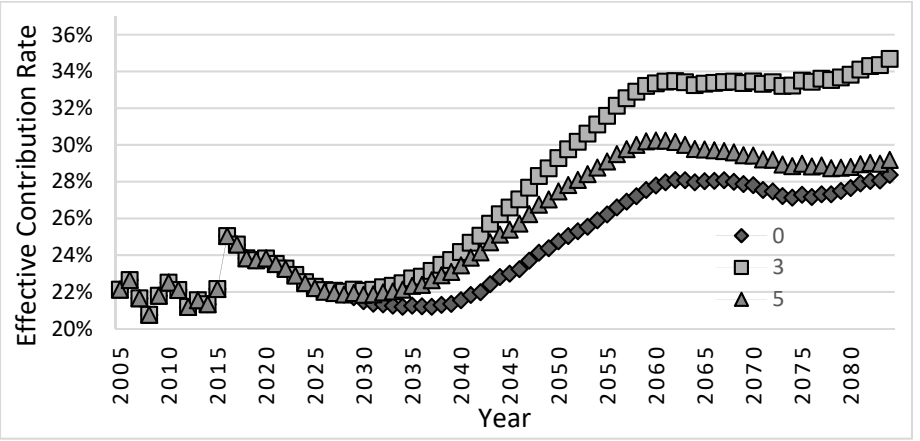

Fig. 4. Effective contribution rate

Source: Own calculations, 2020.

Notes: 0 – No-policy change scenario; 3 – Policy with fixed retirement age; 5 – NDC scheme

The NPC scenario would have a long-term stabilizing effect on the contribution rate, while a fiscal pressure on working population would show up after the year 2050, where a strong population cohorts would start leaving the labor market. However, fixing the retirement age would significantly increase the fiscal burden and the contribution rate would need to increase from 22% in 2015 to almost 34% in 2060. Introduction of the NDC scheme would lower the fiscal burden, however, on the expense of significantly lower replacement ratio.

3. Conclusion

Fixed retirement age enacted by a Constitutional law in the Slovak Republic has proven to have a negative impact on sustainability of the PAYG scheme and public finances that can lead to additional interventions in pension system. We have examined the redistribution and fiscal impacts of possible stabilization interventions in the form of widely discussed NDC scheme according to a Swedish model. Using a stochastic microsimulation model we estimated redistribution and fiscal impacts of three selected policies. Our results are consistent with many

published research outcomes showing that the implementation of NDC scheme has stabilizing effects on PAYG scheme, but on the other hand lowers the individual replacement ratios of retired individuals. Introduction of NDC scheme could promote greater transparency in pension systems and provide better information for individuals about his/her pension entitlements from PAYG scheme. Future research should investigate the further redistributional impacts on various income cohorts.

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PENSIONS AND ELDERLY POVERTY IN TURKEY

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1. Introduction

Social security systems are frequently considered as insurance mechanisms against poverty, especially at later stages in life. Provision of resources to be used at later stages in life can take two forms. One is the reallocation of resources between different sections of the society, especially between working young individuals and retired old individuals. This is the well-known pay-as-you-go (PAYG) system.

The second system focuses on the reallocation of the individual's resources through one's lifetime, with state supported compulsory or voluntary mechanisms. This is the funded system. Either way, retirement aspect of social security systems includes transfer of resources and has implications on income distribution. Thus the redistribution implications of these systems and the implied clash for resources are often debated in both academic and policy circles. If one considers pensions as a claim on output, along the lines of Barr (2002); then the struggle for claim on output becomes evident. Debating the Polish pension reforms, Gora (2013) implicitly connects such a struggle to the class conflict and points that the 21st century may see the rise of a new group on the political scene. This portion of the society is retired, but not old enough to withdraw from the daily life, and have an interest in the distribution of output with political implications.

This redistributive mechanism has important implications for old age poverty. In advanced ages, labour income is hardly an option and pensions become a crucial income source. Especially for those with limited alternative income sources, pensions may end up as the only protection against poverty. Hence the poverty reduction role of pensions in advanced ages is a frequently visited research area.

The already existing, or expected, poverty of the retired is already creating new dynamics. For the case of Germany, feeling the lack of sufficient resources, pensioners are emigrating out ("Germany's other migration wave" 2020). Such movements had already been identified by Holzmann et al. (2016). The dissatisfaction with the pension systems is already contributing to social turmoil

in the second half of 2019 through protests and strikes in Europe and Latin America.

Given the importance of retirement related debates, it becomes important to examine what pensions entail as income sources. Especially the impact of pensions on poverty reduction is important. Building upon this opinion, the aim of this study is to analyse the impact of pensions on elderly material well-being for the Turkish case, with an emphasis on poverty alleviation. The task is of an empirical nature that addresses two basic research questions. Firstly, we investigate the importance of diverse income sources for elderly individuals. Secondly, the impact of pensions on the poverty of elderly is studied.

The paper proceeds with a literature review on measuring the elderly income sources and empirical works on poverty. Following section presents the data and the adopted analysis approach. The observations from the data are presented and the paper is concluded by a summary of the findings.

2. The Literature

Analysis of poverty is a broad topic. The research focus ranges across different portions of the society, as the researcher focuses on segments of the society deemed disadvantaged or materially vulnerable. Focus on elderly poverty is shaped by similar concerns. Leaving the work force, an old person is generally expected to become retired and to receive pension income. The question is then whether this pension income is sufficient to maintain a decent life.

The concern is actually quite intertwined with social security system reforms. The introduction of private pensions in 1990s and 2000s is especially important. As the World Bank (1994) recipe on social security system design spread, privatised social security with a funded aspect began to supplement or replace public PAYG (pay-as-you-go) systems. This inevitably gave way to whether pensions, public or private, aided in eliminating the reduction of poverty among older households or individuals.

There is an established expectation in the literature that stronger public pensions lead to reduced poverty and income inequality, due to the stronger solidarity feature of PAYG public pensions compared to the private, funded systems (Been et al. 2017, pp. 1081-1082; Sarıca 2019, pp. 488-489; d'Agostino et al. 2020; Narayana 2019; Verbic and Spruk 2014). Thus a considerable amount of effort has been spent on examining the impact of different pension system configurations on elderly or pensioner poverty.

The related research literature quite frequently employs various survey data available for a number of countries. Hauser (1999) considers the economic well-being of pensioners in 14 developed economies using the Luxembourg Income Study, but does not consider explicitly the effect of pension income (or lack thereof) on the position of retirees in income distribution. Behrendt (2007) states that ageing carries the potential to create new conflicts with respect to resource sharing and erode the social contract; therefore, proceeds to examine income sources of the elderly in 15 industrialized countries mid-1990s using the Luxembourg

Income Survey. An analysis of the re-distributive impacts of public and supplementary pensions reveals that total pensions as sum of private and public pensions significantly reduces elderly income distribution variation across the sample of countries. However, no significant pattern is identified with regard to poverty risk of the elderly. One possible pattern is that countries with basic income implementation have lower poverty risk.

Employing a number of measures of income and consumption poverty for Canada, Milligan (2008) examines how elderly poverty changes in Canada through time using headcount measures, i.e. Low Income Measure and Low Income Cut-Off provided by Statistics Canada. The author augments by introducing Elderly Relative Poverty Measure that compares the well-being of the population aged 65 and more to the benchmark case of the working age population. Milligan (2008, pp. 85-88) identifies a correlation between the fall in elderly poverty in 1980s and the increases in real income provided by the Guaranteed Income Supplement program, an income-tested pension for individuals aged 65 and more.

Rajevska and Rajevska (2018) consider the Latvian system and conclude it to be lacking in providing income security for the elderly. Rather than diving into the micro data they consider the Latvian case against the backdrop of a European average.

Hwang (2016) examines the income inequality impact of pensions for South Korea. Gini coefficient is used to trace the path of elderly poverty through time, with the observation that income inequality among the elderly is higher than that of the overall population. Higher education is observed to increase the likelihood of being a pensioner, compared to the cohort. Lower income quantiles are observed to be more reliant on assistance, public or private. Gini decomposition reveals that public pensions actually increase income inequality among the elderly, a result the author attributes to the institutional characteristics of South Korea where rapid expansion of the public pension system in the 1990s favoured the elderly with better socio-economic characteristics (Hwang, 2016: 94-95). Ku and Kim (2018) examine the evolution of old age poverty in South Korea and highlight the important, yet insufficient, role of public pensions in reducing old age poverty.

Some studies focus on country groups with aggregate data availability. Using OECD Social Expenditure data, Been et al. (2017) confirm for a dataset that covers 17 European countries for the time span of 1995 to 2011 that stronger public pensions imply lower elderly poverty and that a higher weight of private pensions in the pension mix has adverse effects on elderly poverty. Also working on the OECD countries, Jang (2019) investigates whether private pensions impact elderly poverty taking into account the institutional design of public pensions. It is stated that the coverage is an important factor, with high coverage implying reductions in income inequality. In another OECD focused analysis, Caminada et al. (2019, p. 24) report that fiscal redistribution reduces poverty, with pension-like transfers playing a non-negligible role.

The focus sometimes shifts to less developed countries as well, as long as the data permits it. But addressed research concerns diversify. Consider, for example, Mohd et al. (2018). They use Household Income Surveys to assess the evolution and determinants of elderly poverty in Malaysia, focusing on individual characteristics through a logistic regression rather than the importance of existence (or lack of) pensions.

For the Turkish case, Sarıca (2019) investigates the impact of different social payments including, but not limited to, pensions on the poverty of pensioners. Using year 2017 version of Survey of Income and Living Conditions, the author conducts the investigation for different age groups and genders. It is confirmed that pensions reduce elderly poverty. The provided tables imply that special attention should be paid in the case of widow and orphan transfers. These are observed to contribute greatly in eliminating poverty for women. It can be thought that since women do not participate in the labour market, they are not entitled to pensions themselves but benefit greatly from the pensions left by their spouses. Hence these transfers can be considered as a form of pensions for women and be included in the analysis in this regard. We agree with this and include widow and orphan transfers in our analysis.

2. The Method and the Data

Although some studies of elderly poverty employ aggregate data for a group of countries (for OECD SOCX usage examples see Been et. al. (2017) and Jang (2019)), survey data is also used frequently for specific countries (Sarıca (2019) for Turkey; Hwang (2016) and Ku and Kim (2018) for South Korea; Mohd et. al. for Malaysia) or groups of countries (Hauser (1999) and Behrendt (2007) with Luxembourg Income Study). This paper presents a country specific analysis through the Household Budget Survey (2016) conducted by the Turkish Statistical Institute.

The survey is applied on a sample of households[1]. The sampling procedure starts with the National Address Database that includes the address based registrations of all the citizens. From this database, blocks are formed by probability proportional to size sampling, with the household living at the identified address being the final sample unit. The sampling method is the stratified two-stage cluster sampling method. Population projections are used to weight the population of the survey.

The analysis conducted here is of a descriptive nature and does not use econometric analysis to identify the determinants of old age poverty. An old individual is generally regarded to older than 55 years of age, which does not exactly confirm to the 60 or more age cut off chosen in the literature. The reason

[1] For details on the design and the implementation of the Survey by Turkish Statistical Institute, visit http://www.tuik.gov.tr/MicroVeri/HBA_2016/english/index.html

is the early retirement phenomenon in Turkey. In early 1990s, legislative changes introduced 25 years of premium payment for men (20 for women) as a condition to earn the right to retire. If an individual enters the workforce at the age of 18, retiring at age 38 for women or 43 for men becomes possible. This early retirement opportunity was removed from the legislation in 1999, but its impact on the retiree demography persists. One can quickly browse the passive demography tables of Annual Statistics of the Social Security Institution to see that the number of retired individuals peaks in the 50 to 60 age group.

We supplement this with the requirement that the individual must receive a positive pension income. The pension income is available in the used dataset. However, we expand the pension income to include survivor benefits, especially widow and orphan benefits designed for female survivors. The reason is that women in Turkey are at a considerable disadvantage in the labour market with low labour force participation rates. Thus they struggle to become eligible for pensions. Widow and orphan benefits remedy this lack of advanced age income considerably, as pointed out by Sarıca (2019). Hence these are included in the definition of pensions as well.

The focus of the study is the old individuals, defined as individuals aged more than 55 and receiving positive pension income, where pension income is defined as the sum of pension income variable in the database, plus survivor benefits in the form of widow and orphan pensions. For comparison purposes, a benchmark group of worker individuals is also created. A worker individual is assumed to be in the 18-60 age group, with positive labour or capital income.

The study does not include private pensions, despite their existence in Turkey. The system is relatively young, having begun to function in 2003. It is currently difficult to consider it as a viable source of supplementary income for retirees. Değer (2019) considers three criteria regarding the Individual Pension System in Turkey. Firstly, the level of saving remains low and the accumulated funds fail to provide considerable resources for investment in physical capital. Secondly, they are observed to fail as long term saving plans. Thirdly, they are reported to fail significant pension incomes to partakers. Out of the 42625 individuals in the dataset, only 22 observations with positive income from the individual pension system exist. Hence private pensions are excluded from the analysis.

No cleaning of the data is done. However, given the diversity of the income variables available in the dataset, three distinct income groups in addition to pension income are identified to ease the exposition. First one is labour income, consisting of wage income and bonuses. Second one is capital income that includes entrepreneurial income, agricultural income, real estate income, bank and bond income and share-cropper income. Third is the sum of the transfer incomes excluding pensions. These transfers all originate from the state and include old age benefits, state housing aid, health aids, veteran benefits, scholarships, unemployment payments and agricultural supports.

Basic descriptive statistics have been calculated and are available in Appendix Tables 1 to 5. Appendix Table 1 presents the number of observations in the old and worker groups. For worker individuals, the number of females is nearly half of the males, reflecting the low labour force participation by females. The ratio improves slightly when one considers the old individuals, most likely due to the impact of survivor benefits. Regarding income sources, Appendix Tables A2 and A3 underline the gender gap in earnings, heavily in favour of males especially with regards to capital income. This gap appears to persist in pension incomes, as can be observed in Appendix Tables A4 and A5.

The analysis of the data starts with visually examining the shares of these income items within the aggregate incomes of old, retired individuals. We then proceed to present Gini coefficients for these individuals, with and without pensions to quantify the impact of pensions on income distribution. Lastly, headcounts below and above the poverty line, drawn at 50% of the sample median income are presented. All the calculations are done in R (R Core Team 2018), using the Rstudio (Rstudio Team 2016) interface and additional R libraries as they become necessary.

3. Analysis

As stated, we firstly consider the relative importances of different income sources for the elderly through Figures 1 to 3. Figure 1 presents the shares of different income sources in the total incomes of old individuals, in percentage units. First observation is the falling importance of labour income. Transfers do not appear to account for significant portions of older individuals' incomes. The last panel of the figure clearly shows the rising importance of pensions as the individual gets older.

The analysis is repeated for men and women in Figures 2 and 3, respectively. The findings are robust to gender. The variation in the number of observations in Figures 2 and 3 are evident. The sample includes 2778 old men and 1453 old women, where old is defined through age and pension income. This is because pension recipients are mostly men and has strong implications for further research as to why women are not receiving pensions, which remains outside the scope of this text.

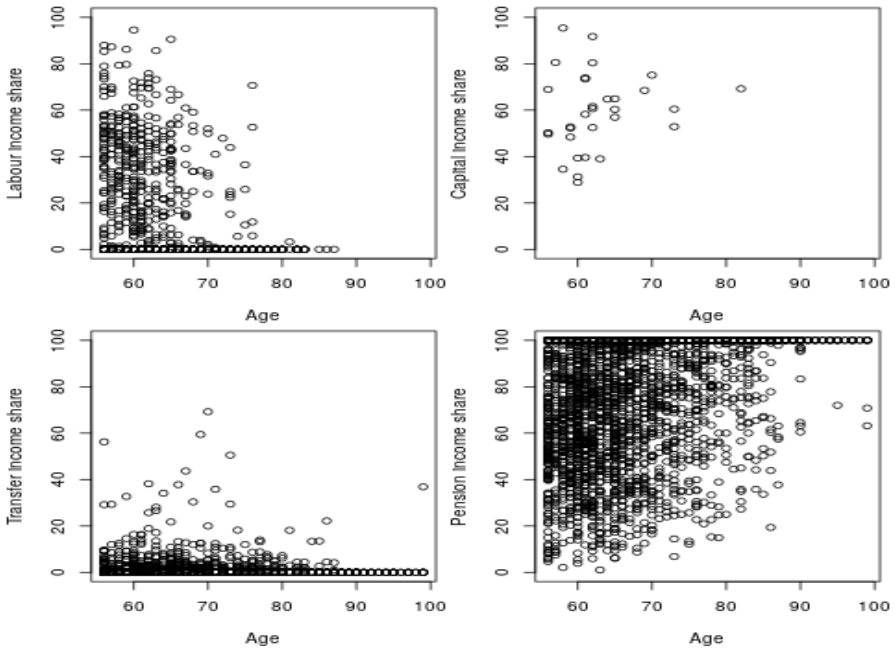

Fig. 1. Share of income from different sources (%), both genders
Source: Authors' calculations.

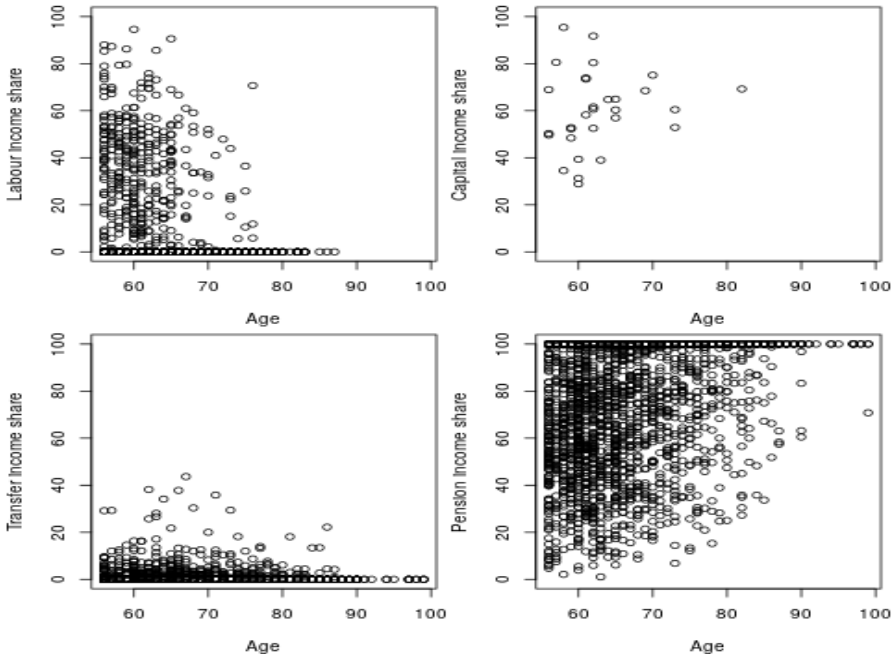

Fig. 2. Share of income from different sources (%), men
Source: Authors' calculations.

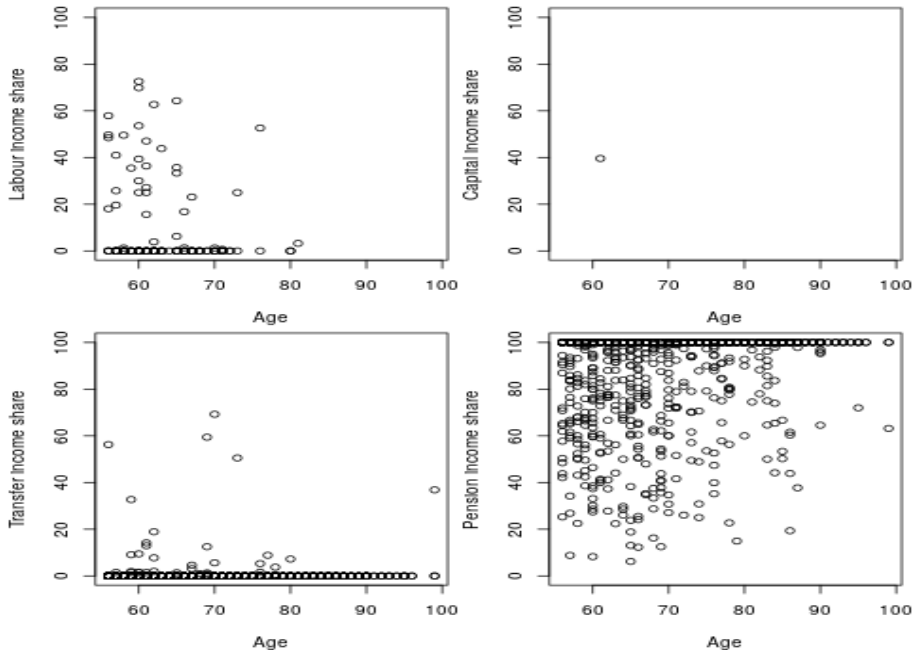

Fig. 3. Share of income from different sources (%), women
Source: Authors' calculations.

In order to further investigate the shares in income, Figures 4 and 5 have been prepared to present average shares of different income sources for ages 55 to 84, with six different five-year age groups. As a supplement, Table 1 shows standard deviations of labour and pension incomes. The fall in volatility from labour income is apparent from Table 1. But the fall in the number of observations as the age category progresses could also be playing a role in this reduced volatility. Volatility regarding pension income, however, does not display as strong a falling trend through age categories.

Figures 1 to 3 imply that capital and transfer income take a backward seat in advanced age income provision. Especially for women, the capital income item has practically no role in old age income provision. Hence Figures 4 and 5 leave out capital income while representing average shares in income for different age categories. These figures confirm the importance of pension income at older ages, with falling importance for labour income and negligible importance of transfer payments. Taken together, Figures 1 to 5 and Table 1 confirm the importance of pensions as an income source in advanced ages.

Table 1. Standard deviations of income sources by age group and gender, TL

	Men		Women		All	
	Labour Income	Pension Income	Labour Income	Pension Income	Labour Income	Pension Income
55-59	15932 (299)	6512 (507)	4825 (35)	7582 (223)	15236 (334)	16896 (730)
60-64	13144 (374)	6306 (796)	10329 (48)	6762 (295)	12848 (422)	6530 (1091)
65-69	14406 (227)	5667 (612)	3613 (27)	7148 (272)	13680 (254)	6377 (884)
70-74	3805 (102)	6158 (356)	2028 (14)	5886 (231)	3637 (116)	15087 (587)
75-79	4809 (52)	4294 (273)	5515 (2)	5706 (191)	4806 (54)	5128 (464)
80-84	0 (16)	7822 (147)	57 (3)	5379 (126)	22 (19)	7128 (273)

Source: Authors' calculations. Number of observations in each cell is reported next to the provided standard deviation.

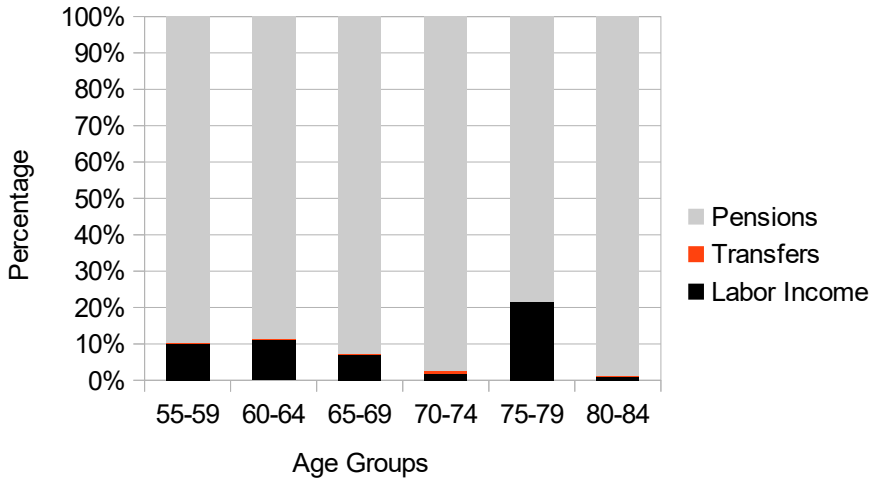

Fig. 4. Mean share of income from different sources by age groups (%), women
Source: Authors' calculations.

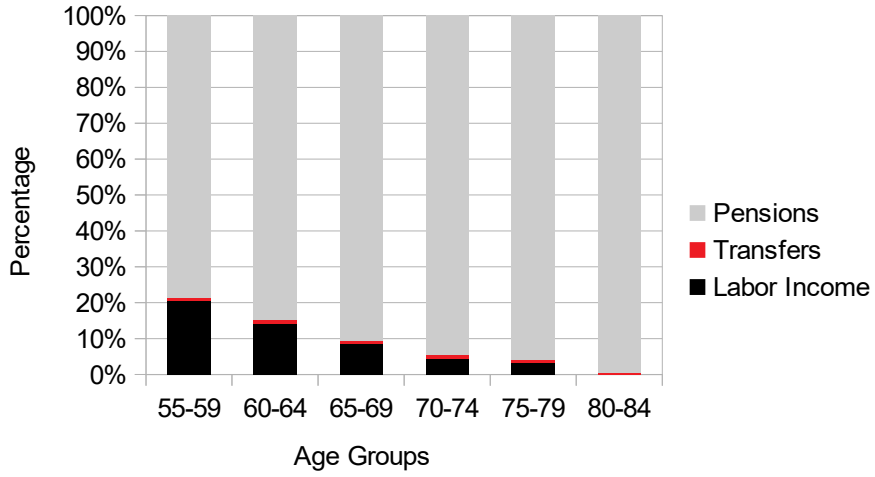

Fig. 5. Mean share of income from different sources by age groups (%), men
Source: Authors' calculations.

Table 2. Gini coefficients

	Full sample	Elderly	Elderly, less pensions
Both genders	0.4589	0.3364	0.5979
Men	0.4137	0.3173	0.5874
Women	0.5145	0.3009	0.6039

Source: Authors' calculations.

Secondly we consider Gini coefficients. The coefficients are calculated in R using the *ineq*, Inequality Measures, package (Zeileis and Kleiber 2014). Results are presented in Table 2. For the whole population, the coefficient is calculated as 0.4589. This is higher for women, implying a less equal distribution of income for women.

For the sample of old individuals, the parameter falls to 0.3364, 0.3173 and 0.3009 for both genders, men and women respectively. The income distribution is more equal across all subsamples of elders. An interesting point to note is that the distribution is more equal among women. When pensions are removed from the income definition, elderly are observed to display an income distribution that is more unequal than the full sample's distribution. Women, once more, display a more unequal income distribution. This points to a strong re-allocative function undertaken by pensions towards the elderly and, to a lesser degree, women.

Finally headcounts of individuals that satisfy a certain poverty criteria are considered. The headcounts present the percentages of individuals that fall below a poverty line, drawn at 50% of the median income calculated as the median of the total incomes of all the individuals in the sample. The relevant numbers are available in Table 3. The first row and the first column of the Table shows that for the full sample 68.28% of the individuals fall below the poverty line. Of these individuals below the poverty line, men account for 22.53% and women represent 77.47%.

The second column presents the same figures for the sample of retired individuals. Only 2.17% of elders are below the poverty line. For the elders, the poor are almost all women; the share is 96.74%. Old men under the poverty line are only 3.26% of the individuals below the poverty line. The third column of Table 3 shows the headcount with elderly incomes net of pensions. Now, 67.17% of the elders are below the poverty line; pointing out the role of pensions in moving elders out of poverty. The split between men and women is more even, highlighting an equalizing role of pensions in favour of women.

Table 3. Poverty headcounts (%)

	Full sample	Elder	Elder (less pensions)	Elder (compared to workers)	Elder (compared to workers, less pensions)
Share below poverty line, both genders	68.28	2.17	67.17	6.61	78.64
Men's share in poor	22.53	3.26	55.49	7.14	59.51
Women's share in poor	77.47	96.74	44.51	92.86	40.49

Source: Authors' calculations.

The fourth column adopts another poverty line, based on the incomes of workers where a worker is defined to be aged 18 to 60 with positive labour or capital incomes. This new poverty line is calculated as 50% of the median of the incomes of these working individuals. Fourth column of Table 3 shows that with this new poverty line, 6.61% of the retired individuals are below the line. As expected, poverty increases with the new income definition. Once more, the poor are predominantly women. Last column deducts pensions; share of the individuals below the poverty line is now 78.64%. The split between men and women has closed.

4. Conclusions

This paper examines the income sources for the old, retired individuals in Turkey. The analysis extends to the role of pensions in alleviating poverty and reducing income inequality. The analysis is employs the Household Budget Survey data from the Turkish Statistical Institute, year 2016. The analysis is a descriptive nature and is conducted using the R statistical computing language.

A visual inspection of the income sources of individuals by age reveals that as age progresses, the importance of pension income increases. Based on Gini coefficients, it is observed that the income distribution is more equal among the elderly population. For the full sample the distribution is more unequal for women but for the elders it is more unequal for men. When pensions are dropped from the income definition, income inequality worsens especially against women. This points to a strong redistributive function by pensions that favours elders and women.

Surprisingly low number of old individuals are below the poverty line, and nearly all of these are women. When pensions are excluded, the share of elders below the poverty line dramatically increases and men and women converge in poverty headcounts; pensions favour women in poverty elimination. A new poverty line is drawn based on the incomes of working individuals. The new line confirms the previous findings.

The analysis confirms the importance of pensions as income sources for higher ages. Further, the poverty preventing and inequality reducing roles of pensions is confirmed. Along the gender dimension, the pensions in Turkey are observed to favour women.

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Appendix: Tables

Table A1: Number of observations

	Worker	Old
Male	7867	2778
Female	3277	1453
Total	11144	4231

Source: Authors' calculations based on Household Budget Survey, 2016. Worker individuals are defined to be in the 18-60 age group with positive labour or capital income. Old individuals are defined to be aged 56 and more with positive pension income or positive survivors benefits in the form of widow and pensions benefits.

Table A2: Desciptive statistics, worker male individuals, Turkish Liras

	Labour income	Capital income	Transfer income	Pension income
Mean	20 588	40 375	166	1178
Std Dev	17 957	36 321	1842	4663
Median	16 800	29 750	0	0

Source: Authors' calculations based on Household Budget Survey, 2016. Worker individuals are defined to be in the 18-60 age group with positive labour or capital income. Old individuals are defined to be aged 56 and more with positive pension income or positive survivors benefits in the form of widow and pensions benefits.

Table A3: Desciptive statistics, worker female individuals, Turkish Liras

	Labour income	Capital income	Transfer income	Pension income
Mean	16 929	8 075	71	476
Std Dev	17 087	813	567	2 908
Median	12 900	8 075	0	0

Source: Authors' calculations based on Household Budget Survey, 2016. Worker individuals are defined to be in the 18-60 age group with positive labour or capital income. Old individuals are defined to be aged 56 and more with positive pension income or positive survivors benefits in the form of widow and pensions benefits.

Table A4: Desciptive statistics, old (retired) male individuals, Turkish Liras

	Labour income	Capital income	Transfer income	Pension income
Mean	4 825	32 391	242	16 863
Std Dev	13 487	31 403	1 145	6 181
Median	0	25 305	0	15 600

Source: Authors' calculations based on Household Budget Survey, 2016. Worker individuals are defined to be in the 18-60 age group with positive labour or capital income. Old individuals are defined to be aged 56 and more with positive pension income or positive survivors benefits in the form of widow and pensions benefits.

Table A5: Desciptive statistics, old (retired) female individuals, Turkish Liras

Retired female	Labour income	Capital income	Transfer income	Pension income
Mean	2 588	8 204	42	13 227
Std Dev	7 102	NA	492	6 631
Median	0	8 204	0	12 300

Source: Authors' calculations based on Household Budget Survey, 2016. Worker individuals are defined to be in the 18-60 age group with positive labour or capital income. Old individuals are defined to be aged 56 and more with positive pension income or positive survivors benefits in the form of widow and pensions benefits.

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RETIREMENT IMPLICATIONS OF LIFE DECISIONS IN POLAND

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1. Introduction

Adequacy of pension benefit is very important for retired people in the aim to maintain their previous standard of living. The issue of inadequate retirement pension has a significant impact on the polish social support system as well. In Poland, the size of elderly population is 21% of population in 2018 (Gus 2019, p. 210) and it is expected to rise to 27% in 2035 due to increased life expectancy. Additionally, in 2018, 28,4% of pensioners (ZUS 2019, p. 40) received less than 40% of average income, which can be assumed as a poverty risk.

Hence, it is crucial to understand how different kind of decision in the socio-economical and demographical field can influence on the level of pension benefit. Especially interesting can be answer how much time should be spent on education, how long stay in work, when we should to retire or how many children is advisable to have. This kind of knowledge can be useful to stimulate an individual foresight of each future pensioner and helps them to work out a high enough retirement pension yourself.

This paper aims to show consequences of life decisions for the level of retirement benefits. We accomplish it by investigation of individual career paths which leads to adequate pension benefit, men and women, in the Polish Pension System.
We examine, by using sequence analysis, the impact on the level of pension following variables: time of education, seniority and retirement age, and the number of children.

2. Data, Variables and Method

Data come from the Survey of Health, Ageing and Retirement in Europe – SHARE (Börsch-Supan 2019). We used unique data that were collected during the seventh wave of SHARE which is called SHARELIFE. This wave was conducted in 2017 and took place in 28 countries of EU. It provides detailed information about person individual income, pension income, as well as retrospective information about individual work-family trajectories starting from early adulthood until retirement. Data collection of SHARE is based on a probability sample and face-to-face interviews (Bergmann et al. 2019).

First we chose 5499 people who come from Poland. Secondly we restricted our sample to 2650 people who were retired. They were born between 1915 and 1967.

Than we identified pensioners who had given information about their first pension benefit and about the last income or last wage. For those 813 pensioners, the individual replacement rate (RR) was calculated (Borella and Fornero 2009; EU 2018; Chybalski 2016a; OECD 2018).

The replacement rate is a relation of pension benefit to a preretirement income. The RR was used as the measure of pension adequacy, although there are several methods for estimating pension adequacy (Chybalski and Marcinkiewicz 2016; Bajtelsmit et al. 2013). We chose RR because it is the easiest measure to calculate and interpreted by every person and more over "the replacement rate is a complete measure, good enough to use it to make a synthetic assessment of the adequacy of pension systems" (Chybalski 2016b, p. 27). In the last step we focused on the group of 409 people who achieved adequate pension benefit. As an adequate RR we assumed 70%, according to previous researchers (Czepulis-Rutkowska 2000; Palmer 1989, 1994; Duncan et al. 1984; Moore and Mitchell 1998). During the last decade in Poland the pension benefit received from the ZUS was over 60% of last income as well (ZUS 2019). This level of the benefit can be considered sufficient to maintain the previous standard of living.

The group of pensioners with adequate pension benefits was divided by gender finally. Table 1 provides an overview of sample taken into analyses.

Table 1. Sample size by gender and the level of pension benefit

Pension Benefit	Men	Women	Total
Adequate	197	212	409
No Adequate	192	212	404
Total	389	424	N=813

Source: own calculation on SHARELIFE data.

Among 813 pensioners in the Polish Pension System, there were 409 (50.3%) people who had achieved an adequate pension benefit. Adequacy varied very slightly by gender. There were 50.0% of men with an adequate pension benefit and 50.6% of women.

“Literature on pension system describes a vast range of factors potentially affecting the adequacy of pension benefit. Among them are factors directly affecting the level of pension benefits such as expected earnings’ growth (Cocco and Lopes 2011), retirement age, and seniority (Ponomarenko 2016). Other factors may affect the individual level pension benefit indirectly. These include various socio-economic factors, such as gender, education period, or the number of children (Aisenbrey and Fasang 2010; Madero-Cabib and Fasang 2015)” (Jajko-Siwek 2018).

In this paper we focus separately on three variables connected with adequacy of pensions and with work-family life: time of education, time of work and retirement age and number of children. We assigned each pensioner a states from the dimension shown in Table 2.

Table 2. Dimension of states in adequate pensioner's trajectories

Variable	Sign	State
Education	0	No Education
	1	In Education
Work	0	No Work
	1	In Work
Number of children	0	No children
	1	1 child
	2	2 children
	3	3 children
	4	4 children
	5+	5 or more children

Source: own calculation on SHARELIFE data.

Regarding education we focus on the period between 15th and 30th birthday for our analyses; regarding employment we take into accounting age between 20 and 65 years, and regarding number of children we concentrate on age between 20 and 45 years old.

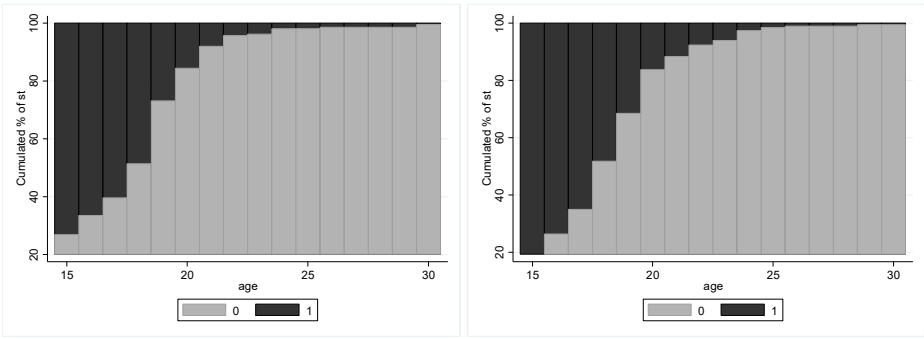
As the method of study of retirement decisions we applied sequence analysis, which provides a comprehensive look at the whole course of one's life. It also allows us for an identification of typical trajectories of the life course (Abbott and Forrest 1986; Sackmann and Wingens 2003; Brzinsky-Fay et al. 2006). An ordered sample of units we called a "sequence". Next, separate elements of sequences are called "states" and the focus is on the trajectories of transitions between states in the life course of an individual. To create sequences of states we treats individual life as a chain of discrete time units and assigns a number.
Sequence analysis is a method very popular in different social research such as motherhood (Rybińska 2014), family life course (Struffolino et al. 2015), determinants of vulnerability in late careers (Madero-Cabib and Kaeser 2016) or life course regimes (Möhring 2016).

3. Results

The results of the sequence analysis are presented on percentage plots, exactly there are in Figs. 1 – for education, 3 – for children and 5 – for work. Table 3-5 summarizes the most common sequences for every variable. Modal plots – Fig. 2, 4, and 6, show the most popular sequence for a whole group.

3.1. Education

As we see from the set of most common sequences in Tab. 3, 73% of women and 80% of men with adequate pension benefit spend some time on education. Noteworthy, the 26% of women and 19% of men do not continue education after 15th birthday. Less than 1% of analysed people continue education after 30th the age of 30 years (Fig. 3). We can see from the index plot (Fig. 3) that by the age of 19, 50% of women and men have already finished education.



Women Men

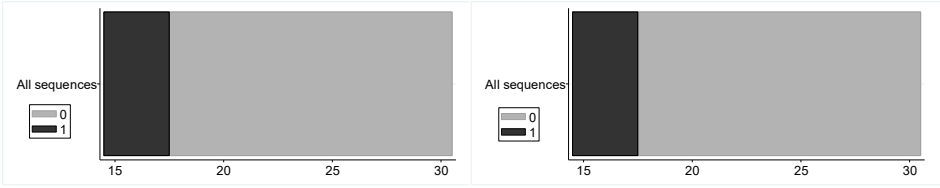
Fig. 1. Distribution of states connected with education across the life course
Source: SHARELIFE data and own calculation in STATA.

Table 3. The most common sequences connected with education

No.	Sequence Elements	Frequence	Percent	Cum.	No.	Sequence Elements	Frequence	Percent	Cum.
Women					Men				
1	1 0	154	0,7264	0,7264	1	1 0	158	0,8020	0,8020
2	0	57	0,2689	0,9953	2	0	38	0,1929	0,9949
3	1	1	0,0047	1,0000	3	1	1	0,0051	1,0000

Source: SHARELIFE data and own calculation in STATA.

There is no visible difference between the two groups, by gender, in the length of the period of schooling (Fig. 2). On average, men spend just 0.3 years more in education than women.



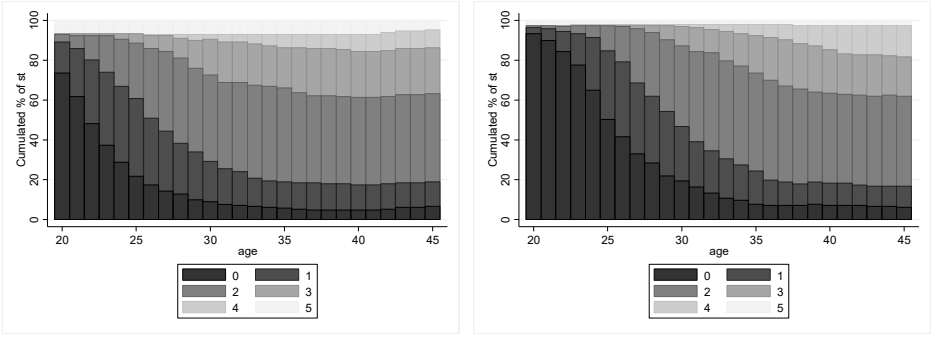
Women Men

Fig. 2. Modal plot of states connected with education
Source: SHARELIFE data and own calculation in STATA.

3.2. Number of children

Fig. 3 shows state distribution plot for women, connected with number of children across the life course. As we can see 35% of women followed the most common sequence which mean to have two children (Tab. 4). The second most common sequence is connected with having three children and by this path follow 19%

of women. The third path includes 10% of pensioners and mean having just one child. Another paths are less common.



Women Men

Fig. 3. Distribution of states connected with number of children across the life course
Source: SHARELIFE data and own calculation in STATA.

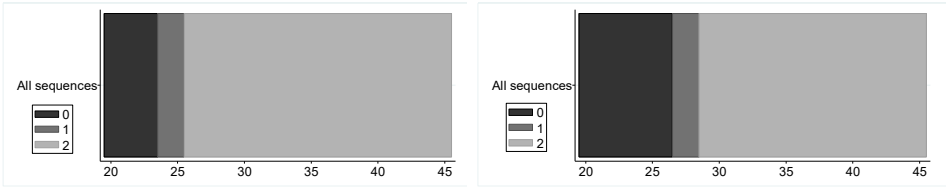
In men's case 42 % of people goes the same, most popular trajectory which lead to an adequate pension. This part of people have two children. The second and third popular way leading to an adequate pension, is connected with decision about having many children – three or four. Around 11% of men have just one child. 5-6% of women and men with adequate pension benefit have no children.

Table 4. The most common sequences connected with number of children

No.	Sequence Elements	Frequence	Percent	Cum.	No.	Sequence Elements	Frequence	Percent	Cum.
Women					Men				
1	0 1 2	74	0,3491	0,3491	1	0 1 2	83	0,4213	0,4213
2	0 1 2 3	41	0,1934	0,5425	2	0 1 2 3	37	0,1878	0,6091
3	0 1	21	0,0991	0,6415	3	0 1 2 3 4	30	0,1523	0,7614
4	1 2	14	0,0660	0,7075	4	0 1	21	0,1066	0,8680
5	1 2	6	0,0283	0,7358	5	0	12	0,0609	0,9289
6	0	10	0,0472	0,7830					

Source: SHARELIFE data and own calculation in STATA.

As it was said women most often have 2 children: first one with average age about 24.2, and second one around 27.3 years. While men also most often have 2 children, but around two years later than women, it means: first one with average age about 26.3, and second one around 29.3 years.



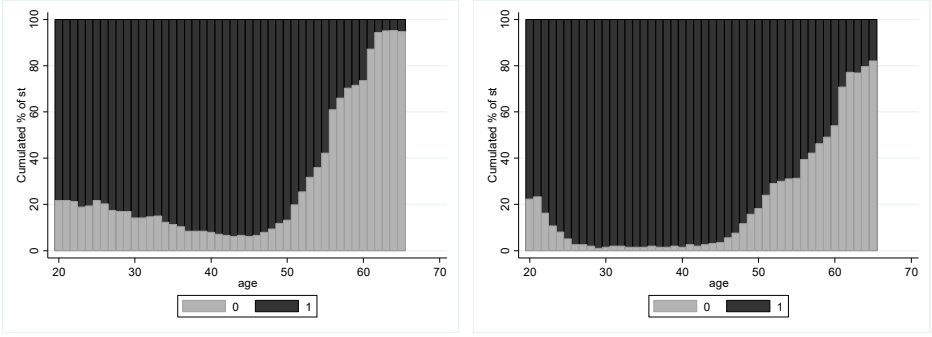
Women Men

Fig. 4. Modal plot of states connected with number of children
Source: SHARELIFE data and own calculation in STATA.

3.3. Time of work

The biggest differences among men and women can be observed in employment histories. Men and women spent different time in work and leave labor market at the different retirement age.

99% of women and 93% of men with adequate pension benefit after some time of working, retired. Only 1% of women remain in employment after the standard retirement age, while 6% of men continued working after that age (Fig. 5). Additionally, there was no person, who achieve adequate pension and did not work at all in whole life course.



Women Men

Fig. 5. Distribution of states connected with time of work across the life course
Source: SHARELIFE data and own calculation in STATA.

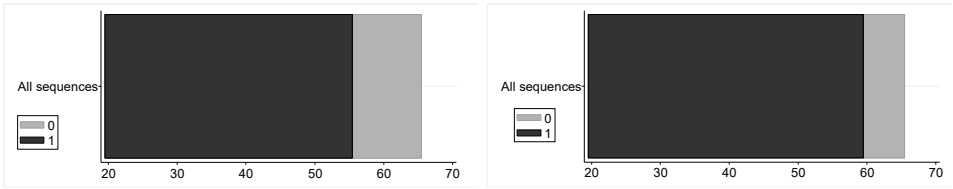
Table 5. The most common sequences connected with time of work

No.	Sequence Elements	Frequence	Percent	Cum.	No.	Sequence Elements	Frequence	Percent	Cum.
Women					Men				
1	1 0	210	0,9906	0,9906	1	1 0	185	0,9391	0,9391
2	1	2	0,0094	1,0000	2	1	12	0,0609	1,0000

Source: SHARELIFE data and own calculation in STATA.

On average women worked for 34 years, while men worked for 4 years longer. But the most common time of working is much higher for men and equal 43 years, while for women is the same as average.

Furthermore, women stop working earlier than men – on average and modal at the age 54, while men finish employment around 55, with modal value 59.



Women Men

Fig. 6. Modal plot of states connected with time of work

Source: SHARELIFE data and own calculation in STATA.

3. Conclusion

This study investigated the effects of life decisions connected with time of education, time of work and the number of children on pension adequacy using the sequence analysis.

The results show that 50% of people in the sample have adequate retirement income. Furthermore we determined the standard adequate retirement paths by using sequence analysis.

The results indicate no significant differences between retired people, by gender, in the field of education and in number of children, while the patterns of seniority and leaving the labor market are different.

First of all, pensioner with adequate pension benefit remain in education rather short time, only till 19th birthday. The second conclusion is that men spent more time labor market and retire later than women. In addition, a little number of person stay on labor market after retirement age. Noteworthy, every person who achieved adequate pension benefit worked while his course life.

Two children is definitely the most favorable number of children which leads for achieving adequate pension. 5-6% of people had not children at all.

For future studies of pension adequacy, using the multichannel sequence analysis and logistic regression are recommended.

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2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982) and Horizon 2020 (SHARE-DEV3: GA N°676536, SERISS: GA *N°654221)* and by DG Employment, Social Affairs, Inclusion. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

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THEORIES AND MECHANISMS OF PRODUCTIVE EMPLOYMENT IN THE CONTEXT OF CZECH PENSION REFORM

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1. Introduction

The realization of pension reform leading to the creation of a "zero" pillar (a uniform means-tested pension) and the strengthening of the first pillar's motivational role aimed at extending the period of an individual's productive engagement in the professional markets is now on the agenda in the Czech Republic. This approach is getting significant support in the ongoing reforms in Austria.

The discussions on the given topic have been very dramatic. Four opinion groups have arisen from them:

– The conservative part of the public supported by some left-wing oriented politicians who have endeavoured to cast doubt on the necessity of any reforms in the area of the pension system. They concede only the need for some parametric modifications oriented towards greater egalitarianism and the more distinctive adjustment of pensions even at the cost of them being partially funded from taxes. However, in no way do they concede the need to extend the retirement age. They argue, amongst other things, that the existing demographic development is favourable and that the pension system is sustainable until at least 2030,
– The group of experts who proceed from the principle of preliminary caution and the fact that to the pension system is distinguished by a significant amount of inertia. They propose an across-the-board extension of the retirement age (to more than 67 years) in association with the change in the predicted life expectancy of the citizenry. This is a relatively unpopular proposal, but it is also supported by part of the state administration which has so far used any excesses in the pension system to finance other government expenditure. The pension account is now separate, but any excesses can still be used as resources in the budgetary system,
– Another group of experts which proposes reforms to motivate the individual extension of the retirement age according to the specific physical and mental state of each individual and the available job opportunities, just as this reform was briefly characterised in the opening sentence.
– At present, they have got the support of the Minister of Labour and Social Affairs and the Committee for Fair Pensions at the Ministry of Labour and Social Affairs. The main theoretical representative of this group, which has the

best elaborated concept for the gradual realisation of the reforms, but whose approaches and proposals are of course only partially acceptable for the ministerial Committee for Fair Pensions, is Vostatek (2020). Not all the representatives of this opinion group understand the wider context of resolving the problem of pension security and pension insurance in this way,

– The group of representatives from the financial sphere which would like to revisit the idea of introducing the second pillar. This existed in the Czech Republic for only a very short time. The option of arranging pension savings was established in the Czech pension system as of 1st January 2013 and it ended as of 31st December 2015. Given the negative experiences of our neighbouring countries, this group finds itself in a certain defensive position and its activities are associated more with a form of criticising the other approaches to the question of the future form of the pension system with the intention of laying the groundwork for reviving the variant of moving funds from the pay-as-you-go system into private funds.

This situation offers great opportunities for any theory which can extract itself from the interest-group and ideological background of the clashes of opinions which are taking place very intensively in the expert and media environment and thus contribute to finding the most effective and socially just solution, while pointing to the risks of some of the approaches, quantifying some alternatives and indicating the wider context of the reform of the pension system which is not possible without a dispassionate theoretical view of the understanding of pension system reform.

2. Subject, methods, literature review

In this article, we have focused on showing the most significant benefits of the approach which motivates individuals to extend the period of their productive lives in the job markets, especially:

– its comparison with the approach which endeavours to introduce an across-the-board extension of the retirement age and which has been met with negative reactions across the world (the Russian Federation, France) which are also a response to biological limits. Here, we have made use of an original graphic expression of the given issue. The across-the-board extension of the retirement age is recommended, amongst others, by the National Budgetary Council (NRR), which is an independent expert body whose main mission is to evaluate whether the state and other public institutions have adhered to the rules of budgetary responsibility set out in Act no. 23/2017 Coll. At the same time, the activities of the National Budgetary Council contribute to the sustainability of the public finances of the Czech Republic and reduce the risk of the state becoming excessively indebted; see the Report on the Long-term Sustainability of the Public Finances (NRR 2019, p. 50). Those in favour of increasing the motivational role of the pension system leading to the voluntary individual extension of the period of gainful engagement are against this and have pointed out that the across-the-board extension of the retirement age would weaken this motivational role (see Barr 2002; Montizaan et al. 2013; Šatava 2015; Vermeer 2015; Mertl et al. 2018; Nakazava 2019),

– the use of some options associated with the realisation of the "Austrian type" of reforms proposed by Vostatek (2019), which provides the implementation of a postgraduate extension of the pension system (also presented at PenCon 2018). Here we shall use the method of graphical expression of both alternatives followed by the previously published numerical model presented at PenCon 2018 and their interpretation by conceptual representation of relevant phenomena and comparison of alternatives,
– the resolution of the issue of the "crowding effect" in the area of the pension system, i.e. so that the extension of the retirement age does not reduce the employment options for younger individuals. In this area, we have used the results of the Analysis of Industry 4.0 project and the significance of creative teams with an emphasis on interdisciplinary and intergenerational cooperation (Říhová et al. 2019). The method used is to interpret the results of empirical research carried out in the field of identifying the possibilities of extending the productive time of persons of retirement age,
– the presentation of the wider context of the reform in the narrower sense (the connection with the reform of health insurance) and in the wider sense, the connection with the change in the character of economic growth (Valenčík et al. 2015; 2017; 2019). The method used is the interpretation of previously developed theoretical starting points in the area of possibilities and the importance of extending the period of productive employment of persons of retirement age.

The aim of the paper is to demonstrate that the focus on voluntary extension of productive employment by means of incentives incorporated into the pay-as-you-go pension scheme can bring significantly greater effects than a general extension of retirement age, in particular when doing the comprehensive solution of this issue and in the long term creating conditions in the form of comprehensive reforms in the areas of social investment and social insurance.

3. The across-the-board or individual extension of the retirement age?

The dispute on whether to secure the sustainability of the pay-as-you-go pension system by enforcing an across-the-board extension of the retirement age or by strengthening the motivational function of the pension system so as to achieve the voluntary extension of the period of gainful employment is currently one of the most intense disputes in the Czech Republic.

A very valuable contribution to this discussion can be found in the study by Šatava (2015), who made following graph:

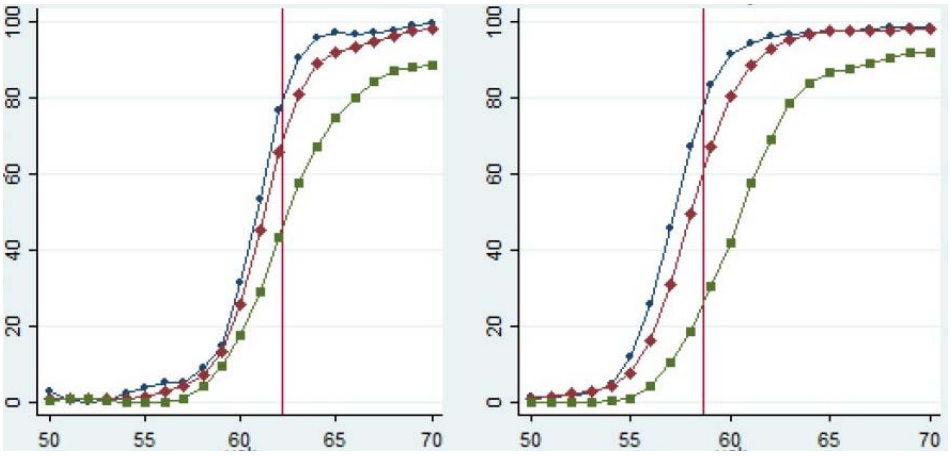

Fig. 1. Share of economic inactivity by age
Source: Šatava 2015, p. 16.

Age is on the horizontal axis, while the degree of inactivity as a percentage is on the vertical axis. The left-hand graph shows men and women are on the right. The blue curve pertains to citizens with a primary education, the red curve shows citizens with a secondary education and the green curve depicts citizens with a tertiary education.

We will subsequently show several original graphs in which we clearly express what lies at the heart of the dispute about whether to compulsorily extend the retirement age for all by administrative means or whether to strengthen the motivational role of the pension system so that individuals are motivated to extend the period of their productive (gainful) engagement in line with their individual possibilities.

The second case – the orientation towards the voluntary extension of the period of productive engagement – presupposes the strengthening of the solidarity between those who can and want to be productively active at a higher age and those who are unable to be productively active for various reasons.

All the other published graphs are purely illustrative, which does not reduce their informative ability in any way.

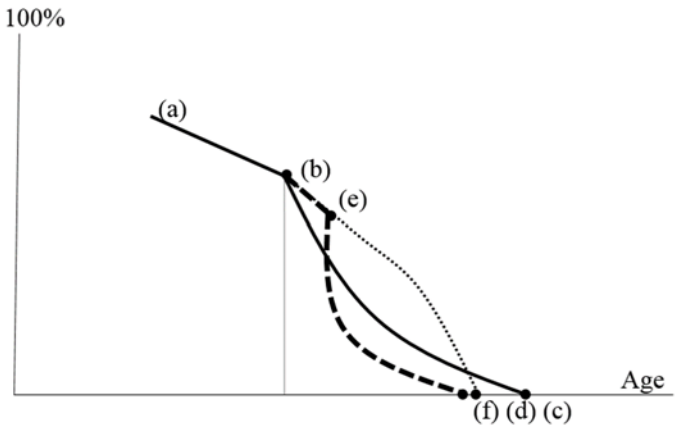

Fig. 2. A comparison of the existing state of affairs with the proposal for an across-the-board extension of the period of productive employment
Source: Own creation.

Curve (a)(b) describes the drop in the employment of people from a certain age as a consequence of aging.

Point (b) is the administrative boundary of the existing retirement age (currently over 63 and with a ceiling of 65).

Curve (b)(c) describes the status quo. The number of the gainfully employed individuals falls relatively quickly after reaching retirement age. This is more so in the Czech Republic than elsewhere. This means, amongst other things, that the motivation to remain gainfully active after reaching retirement age has been poorly set. At the same time, a certain percentage, albeit a small one, remains gainfully active until a high age.

Curve (b)(d) describes the hypothetical status, if the retirement age was unlimited.

Broken curve (b)(e)(f) describes what would happen, if the retirement age was extended across-the-board (for example, by two years). Initially, the number of gainfully active individuals would fall along curve (b)(d), i.e. less steeply than under the existing situation, up to the new retirement age, which is depicted by part (b)(e) of the curve, but then it would begin to rapidly fall as depicted in part (e)(f) of the curve. At the same time, this would be steeper than given the current retirement age. The across-the-board, enforced, administrative extension of the retirement age would reduce the individual motivation to prolong the period of productive engagement. The following figure describes the destructive influence on the loss of social efficiency.

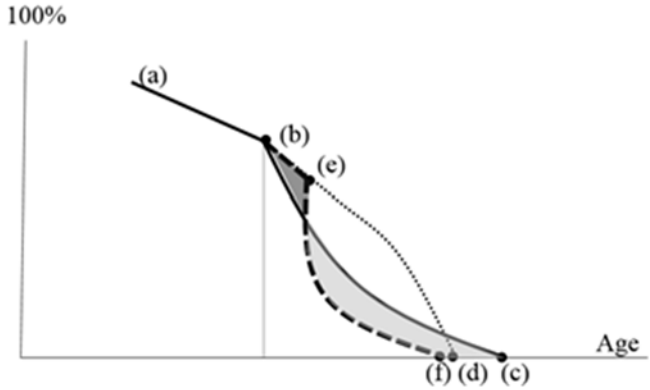

Fig. 3. The status quo in comparison with the across-the-board, enforced, administrative extension of the retirement age

Source: Own creation.

The hypothesis that the area (b)(e)(g) is significantly smaller than the area (f)(c)(g) would surely be useful to test on expertly estimated data. It seems that the darker area (b)(e)(g) estimating the scope for a short-term effect from the increase in the number of persons due to the extension of the retirement period could take the following form: In a short period (for example, after an extension of two years – from today's 65 to a potential 67 years after 2035) this 'extended period' could bring about 24 contributions to the account of the pension account's income. Their number is estimated by the National Budget Council at up to 5% (NRR 2019, p. 45). This estimate is probably exaggerated, because the expected life expectancy of people aged 65 (those concerned by the extension of retirement period) is different in the different regions of the Czech Republic by up to two years, which would undoubtedly be significantly reflected in the overall extension of the statutory retirement age (ČSÚ 2019).

The overall effect of the extension of the retirement age would also probably be (but this needs to be further verified using indirect indicators) negative from a purely economic point of view. This would occur for a number of reasons.

The across-the-board extension would only lead to the short-term possibility of taking part of the funds from the pension insurance system and transferring them to the budgetary system and as a result this would lead to the substantial weakening of the pay-as-you-go pension insurance system, which would have a highly negative impact on the stability of the social system and especially on the standing of individuals who are currently aged 15 to 30.

It is possible to contrast this with the variant involving the voluntary extension of the period of productive engagement.

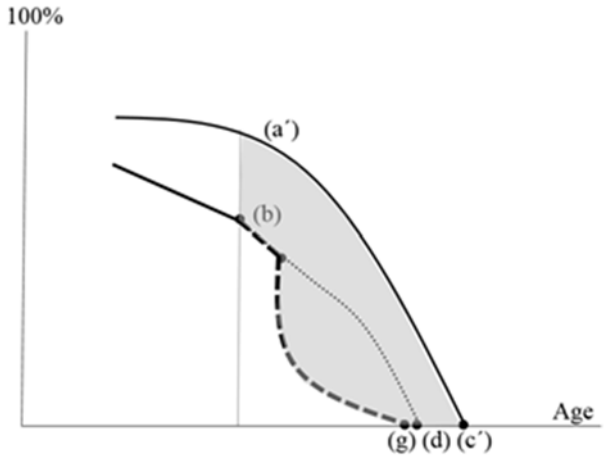

Fig. 4. The status quo compared with the extension of the retirement age based on increasing the motivational function of the pension system
Source: Own creation.

Curve (a´)(c´) shows the effect of increasing the motivational role of the pension system aimed at extending the period of productive engagement. The motivation to extend the period of productive engagement also works retroactively so that the number of productively (gainfully) active individuals is higher upon reaching retirement age.

If we consider the earnings of individuals instead of their numbers, the effect would be even more distinctive, because the effects of the motivated extension of the period of productive engagement would especially apply to individuals with higher earnings. This therefore leads to the extension of both the horizon and the zenith of productive engagement.

The difference between the across-the-board, enforced extension of the retirement age and the voluntary extension under the influence of motivation which has been built into the system is clearly expressed by the grey area in Fig. 4.

The economic effect of increasing the motivational role of the pension system (which would be "smothered" by the across-the-board extension of the retirement age) not only enables the permanent sustainability of the pension system to be secured (on a voluntary basis), but also (especially) the creation of the economic base for financing those branches which enable the extension of the zenith and horizon of a person's productive employment in the professional markets and as such enable the transition to a new type of economic growth based on the development of human abilities culminating in a substantial increase in the country's innovative potential. This is precisely the type of innovative potential focused on radically saving natural resources (including those which result in

a "carbon footprint") which is essential for establishing a permanent balance between man and the natural environment. Amongst other things, the commencement of the growth of the role of those branches which contribute to the acquisition, preservation and application of human abilities would shift curve (a´)(c´) on the Fig. 4 to the north-east and further raise the influence of the motivational role of the pension system.

3. The role of the incentive extension of pay-as-you-go pension system in connection with the Austrian reform

The motivational role of the pay-as-you-go pension insurance system can be achieved in several ways. The Austrian system of monetary accounts, into which a pension entitlement calculated according to a monetary formula is paid every year with the adjustment of the pension entitlements in the pension accounts according to wage growth and with the indexation of the paid out pensions according to a legal scheme, would appear to be the most advantageous for the Czech Republic (Vostatek 2020).

The new system is being implemented in waves in Austria – starting with new insured individuals and continuing with the ten subsequent years (of birth) and it will not be until the next wave that the system will be expanded to include the remaining clients, including individuals of pre-retirement age (Vostatek 2020).

The postgraduate extension to the pension system (Mertl et al. 2018), which is fully compatible with the Austrian type of system with accounts, enables the strengthening of the motivational role of the pension insurance system in relation to individuals of the pre-retirement age or to involve them in the system at the time of their retirement or even afterwards.

This would bring significant economic effects and enable the faster start of growth in the role of those branches which contribute to the acquisition, preservation and application of human capital, as shown in Fig. 5.

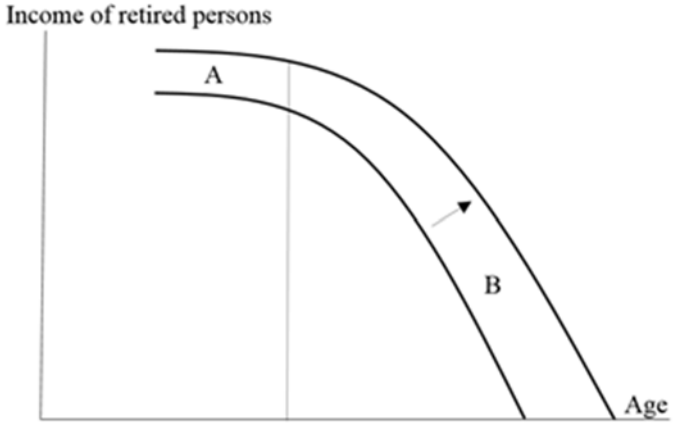

Fig. 5. The effects of the service branches which contribute to the acquisition, preservation and application of human capital

Source: Own creation.

The growth in income of gainfully active individuals of retirement age:
A – the area of tax effects,
B – the area of tax effects and the effects in the area of the income for the pay-as-you-go pension system.

The service branches contributing to the acquisition, preservation and application of human capital extend the zenith and horizon of productive engagement and increase the earnings of individuals of a post-productive age and therefore also the taxes and contributions to the pension system. This means, for example that the basic uniform pension in the zero pillar could be financed in the future from pension taxation without this in any way weakening the motivational role of the pension system to extend the retirement age.

4. The role of creative intergenerational teams from the point of view of the substitutional and complimentary effect of the extension of the period of productive engagement

One of the most frequent objections used to cast doubt on the size of the effects brought about by increasing the motivational role of the pension insurance system to voluntarily extend the period of productive engagement the involves pointing to the "crowding effect" which this extension will have. In other words, that individuals of a higher age will remain in their jobs and in doing so limit the job access for younger individuals. This objection is relevant, but it leads to the fact that we must differentiate between the substitutional and complimentary effect of extending the period of productive engagement.

More employment among older individuals not only has a "crowding effect", but also the exact opposite effect. This applies in cases where a complimentary relationship is created between older and younger employees. One of the most important cases involves creative intergenerational teams which are especially active in areas of technical innovation in association with Industry 4.0. Creative intergenerational teams:

– constitute the basis for the country's innovative potential and their systematic support is of fundamental significance for the stability and competitiveness of the country,
– offer the key to resolving the problem of the permanent sustainability of the pension system, because they are able to absorb an essentially unlimited number of individuals of post-productive age, not on the basis of any substitutional relationship (where older people remaining in the job market limit the access of younger people to professional positions), but on the basis of a complimentary relationship (where the employment of older individuals create the prerequisites for the better employment of younger individuals and their faster professional advancement), and provide the option of complimentary employment to individuals who are oriented towards the strategy of extending the period of their productive engagement,

– they are effectively able to absorb the production of the branches of productive services (i.e. services oriented towards acquiring, preserving and applying human capital) and at the same time create the economic basis for the advancement of these branches (by enabling their financing according to their achieved economic effects on the basis of HCC contracts, i.e. contracts in the areas of acquiring, preserving and applying human capital),
– they play a key role during a fundamental change in the character of economic growth where the focal point of the economic growth shifts to the area of productive services, which enables an increase in the dynamic and the unlimited sustainability of the economic growth. This takes on a new quality which manifests itself, amongst other things, in the radical reduction of the amount of natural inputs (material and energy) into the economy which leads to its fundamental "easing",
– the intergenerational dimension is significant for keeping stability, for development and for expanding creative intergenerational teams.

The aforementioned also points to the fact that, if the reform of the pension system is to be successful, it must be based on the identification and analysis of the conditioning context both from the point of view of the use of the opportunities which it opens up and from the point of view of the creation of the essential conditions for achieving the expected effects. The issue of the systematic and conceptual creation of conditions for the maintenance, expansion and healthy development of creative intergenerational teams is one of the areas which is directly associated with the reform of the pension system.

5. The wider context of pension reform

As we have already mentioned several times, the strengthening of the motivational role of the pension insurance system is about much more than merely the sustainability of the pension system. It also creates the economic basis for financing branches which contribute to the acquisition, preservation and application of human capital (for example, education, including lifelong learning, healthcare, but also upbringing in the family, the requalification system, the spa industry and so on) on the basis of HCC (human capital contracts). As such, it is suitable to not only understand the present period as a certain stage in the Industrial Revolution (for example, the commencement of Industry 4.0), but also as a change which is fully comparable with the Industrial Revolution where a new economic sector is becoming dominant, in this case the sector of productive services enabling the acquisition, preservation and application of human capital.

This opens the path to investment opportunities associated with the acquisition, preservation and application of human capital being used (in the case of all members of society) according their yield rate. From this point of view, it is suitable to go ahead to an analysis of investment chains, i.e. a sequence of consecutive investment acts where the full investment effect only manifests itself after the realisation of the entire investment chain. The most important links in investment chains in the area of investments in human capital under the current conditions include:

– the quality of tertiary education (the role of tertiary education in a chain based on social advancement enabled by education,
– the creation of networks of graduates as the prerequisite for the full application of the production of universities – both with regard to graduates and research results,
– the expansion and development of creative intergenerational teams,
– the focus of healthcare on the long-term engagement of individuals of retirement age,
– the motivational role of the pension system with regard to extending the period of productive engagement.

A very significant part of the chains which make use of investment opportunities associated with the acquisition, preservation and application of human abilities applies to the area of the extension of the zenith and horizon of an individual's productive (educational) engagement. The kind of idea which a person creates about his or her future fundamentally influences his or her motivation in the education process, the choice of a career, taking care of his or her health and so on. Therefore, the way the pension system works, the way it "increases the value" of investment chains, substantially influences the condition of the entire society. This especially involves the investments [in:]
– lifelong learning,
– care for one's health,
– the creation of social contacts, including university graduate networks,
– inclusion in creative intergenerational teams.

One of the areas where the gradual introduction of a pay-as-you-go pension system which motivates individuals to voluntarily extend the period of their productive (gainful) engagement opens the path towards increased efficiency is healthcare. Here, the model of the Chinese Emperor's physician is considered to be one of the difficult to achieve patterns. He was paid during the period when the Emperor was healthy, but his pay was suspended whenever the Emperor fell ill. The expansion of this example and its application under contemporary conditions comes up against a number of difficulties.

If a system which effectively motivates an individual to extend the period of his or her productive engagement is introduced, it is possible to consider a certain extension of the aforementioned model. We can show this using the example of healthcare financing in the Czech Republic. This is financed by seven health insurance companies in the health insurance scheme. The health insurance funds are fully allocated according to the parameters of the insurance portfolios of the individual insurance companies. Unlike the original ideas about the possibility of competition in the given area, it has been shown that no other solution is possible under the current conditions. The reform of the pension system offers the option of competition which increases the efficiency and quality of the healthcare in certain areas, provided we exclude that part of the contributions paid by individuals who are older than retirement age, but have remained gainfully active, from the allocation of funds (for example, the current insurance contribution paid by an employee – 4.5%). The contributions to the healthcare

system from their earnings are significantly higher than the payments made by the state for non-working pensioners. The insurance companies would then be (in a similar way to the Chinese Emperor's physician) interested in ensuring that part of their insurance portfolio consisted of individuals who could remain gainfully active at retirement age and for as long as possible thereafter. By contrast, however, individuals who would be interested (supported by the motivating role of the pension system) in extending the period of their productive engagement would look for insurance companies which would keep them in the best possible condition for as long as possible. It is of course necessary to resolve the question of how to set up the health insurance system for these cases, including the connection with prepaid healthcare programs, very sensitively.

It is also similarly possible to motivate the providers of healthcare, for example in the spa and wellness industries, but also in other areas of expertise or directly in individual spas, to provide efficient and comprehensive care for productively active citizens of a higher age within the framework of prepaid healthcare programs, whose significance has been emphasised by Mertl (2018). This can also involve various forms of lifelong learning aimed at acquiring a general overview, upgrading and supplementing one's education, refreshing one's spirit and so on within the framework of the cultural programs offered by these spas, which a number of spas already offer at present.

6. Summary and discussion

The reform of the pay-as-you-go pension system leading to people being motivated to extend the period of their productive engagement is realistic and it can be implemented gradually and without any risks or social pain. It is part of a comprehensive system of reforms which will potentially increase the role of those branches of productive services focused on the acquisition, preservation and application of human capital. From a long-term point of view, this involves a change which is comparable with the Industrial Revolution and which opens space for a new type of economic growth. The role of the pension system is significant precisely because most of the investment chains involved in the acquisition, preservation and application of human capital culminate in this area.

The problems associated with pushing through the paradigm presented above are methodological on the one hand (new things always come up against stereotypes) and involve special interests on the other hand (they are at odds with the interests of certain lobby groups which see attractive spoils in the enormous amounts of funds which pass through the pension system). The elimination of the various barriers is an independent question and it is associated with the specific conditions of the individual countries, whereby these conditions tend to change drastically.

From the point of view of the practical application, it is important to pay attention to the specific possible engagements for individuals of an advanced (retirement) age and the role of creative intergenerational teams which constitute the most valuable part of the economic potential of each country, whose significance will grow and will decide on which places or countries will face difficult development in the future. The

exchange of experience between individual countries in this area will also be highly significant.

7. Conclusion

The current period is associated with several risks which the public is sensitively aware of and which it responds to, amongst other things, through its preferences in public choice and the political cycle. In this regard, one of the primary obligations of the social sciences is to come up with a comprehensible, promising and realistic vision which corresponds to the life experiences of people and their ability to contribute to its realisation. For a number of reasons, the pension system is one of the important components of any such vision-based idea on how to secure permanent sustainability (from the point of view of demographic development) and stability (from the point of view of possible turbulence in the financial markets and dynamic changes in professional markets).

The experience gained from the preparation of the pension system reform, the clashes of opinions which have taken place in this area, the individual prepared steps in the reform and, we hope, also their realisation are of significance not only for the lives of the citizens of the Czech Republic, but, provided they are continuously evaluated with the use of the theory and practical participation in these changes, also for the further development of the theory and the options for its use in other countries. The traditional series of PenCon international conferences, the significance of which may one day be shown to be greater than it would seem from the position of our absorption with the present, offers a significant opportunity in this regard.

Acknowledgements

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THE EFFECTS OF APPLYING BEHAVIORAL IMPULSES ("NUDGES") TO STIMULATE THE DEVELOPMENT OF OCCUPATIONAL PENSION SCHEMES – COMPARATIVE ANALYSIS

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1. Introduction

Due to demographic aging of the population – a process that has been progressing in nearly all economically developed countries (for example the EU or OECD Member States) – public pension systems are not able to maintain the standard of living after retirement, to provide adequate old-age income. Additional pension systems – individual or occupational pension schemes – should fill this financial gap. There are, however, serious concerns about individuals under saving for retirement, in spite of economic incentives offered by state institutions and regulations (most popular – tax incentives). Policymakers in many countries take actions to stimulate the development of additional voluntary forms of retirement savings (Rutecka 2014; Jedynak 2016; Marcinkiewicz 2018). Traditional incentives – such as tax incentives, matching contributions or institutional regulations supporting retirement savings are not always efficient. For example, tax benefits for participants of supplementary pension systems are most often used by wealthy people. They have some positive impact on retirement savings but generally it is limited in generating new savings[1].

The achievements of behavioral economics are used to stimulate additional retirement savings generally and in the following three ways, impact the decision-making process: 1) changing the choice architecture, 2) changing the reference system (framing) and 3) offering appropriate behavioral incentives (nudges).

Nudges can be defined as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler and Sunstein 2008, p. 6). Nudges have been implemented in a variety of contexts (pension systems, health systems, other areas of public policy) to alter people's behavior.

[1] This assessment of the limited effectiveness of traditional incentives to participate in additional pension schemes applied to pension schemes of voluntary nature. Mandatory or quasi-mandatory additional or supplementary pension schemes (in such countries as the Netherlands, Sweden or Switzerland) usually play an effective role in stimulating additional pension savings.

Relatively new instrument to increase savings for retirement – using choice architecture and nudges in a form of a default option – is "automatic enrollment", where employers enroll employees automatically into an occupational pension scheme. Nudges are specifically designed to preserve agency and control the subject making pension decisions. There is always an "opt-out" option (possibility to not make use of the nudges). This solution is based on findings of behavioral economics (Thaler and Benartzi 2004; Benartzi and Thaler 2013; Madrian 2014; Thaler 2016).

Automatic enrollment as a default option reduces complexity of the decision to save in an occupational pension scheme and which financial instruments to choose. Default contribution rates paid by employers and employees and default allocation make decisions regarding pensions much easier. It also helps to avoid another serious problem of retirement savings and financial planning for retirement – the lack of self-control and procrastination (understood as "voluntary delay of an intended course of action despite expecting potential negative consequences for the delay" (Steel 2007).

Automatic enrollment (or auto-enrollment) has been implemented in various countries (USA, New Zealand, UK, Italy, Turkey and since 2019 also in Poland). It is gaining popularity as a means to increase the rate of participation in additional pension schemes and retirement savings. It is a kind of compromise between obligatory and voluntary participation in additional pension schemes.

This paper studies the effect of introducing automatic enrollment into workplace pensions in the following chosen countries: New Zealand, Great Britain, Turkey). The main aim of the research, preliminary results of which have been presented in this paper, was to seek an answer to a fundamental question: whether behavioral stimuli (nudges) proved to be effective in different countries and in different pension schemes, or whether there were significant differences in the strength of their impact. And if such differences were identified – what factors would influence the effectiveness of nudges in pension systems of different countries.

2. Behavioral economics literature on retirement savings and investment choice

Behavioral economics – a relatively new branch of social sciences, developed over last 30 years – has considerable real-world applications (Corr and Plagnol 2019). It has appeared in response to unrealistic assumptions and a specific anti-psychology of the so-called mainstream economics. Behavioral economics criticizes the assumption about the rationality of decision-makers (based on the homo economicus model) and takes a more realistic view of human behavior based on evidence that human beings are fallible, easily confused in complex scenarios, unable to calculate risk accurately and more irrational than the neoclassical theory would suggest. Behavioral economics literature shows that there are many deviations from the neoclassical decision-making model, for example: intuitive thinking, motivated reasoning and prospect theory (OECD

2016, p. 2). The testing of people's decisions has led to formulation of concepts of bounded rationality and bounded self-interest.

Behavioral economics has been used to explain the phenomena occurring on the financial market, and especially regarding the behavior of investors. From the point of view of pension economics, it is important that the retirement savings behavioral theory has also been established along the retirement behavioral theory. Traditional neoclassical economic theory (especially the theory of utility maximization) assumes that people in their retirement decisions act in a rational and consistent manner. In standard economic models (for example in the Life Cycle Hypothesis, Ando and Modigliani 1963) individuals rationally plan their-long term consumption and savings needs: a part of their earnings in working years is saved for the post-working period. Empirical research and comparative studies show that most of people do not achieve their long term saving goals, especially such as appropriate retirement savings (Lusardi 1999, quoted after: Peksevim and Akgiray 2019).

This article will not present an overview of possible applications of behavioral economics in pension economy and public policy as this topic has been comprehensively discussed and presented in both foreign and domestic literature (Camerer et al. 2004; Cartwright 2018; Corr and Plangnol 2019; Pieńkowska-Kamieniecka 2017; Szczepański 2017; Jedynak 2019). However, it seems necessary to indicate selected results of research on behavioral economics, in particular regarding decision-making processes that have been used both in pension economics and in the construction of additional pension systems.

In funded pension systems with individual accounts their participants bear investment risk during the accumulation phase. This risk applies to both public pension systems with a capital pillar, as well as to additional pension systems (individual and company pension systems). The basic policy question in these systems is "how much choice workers should have over key decisions, such as the choice of provider, the choice of investment portfolio, and the choice of income stream at retirement" (Tapia and Yermo 2007, p. 4). There is a number of behavioral biases – referring to systemic patterns of deviation for rational human behavior – identified in behavioral economics (see Table 1):

Table 1. Chosen behavioral biases which have impact on retirement savings

Biases	Description
Choice and information overload	The impact of the number of investment choices upon investor behavior. More choice is not always better. Information overload and too many choices. Too many options and information overload can lead decision-makers to refrain from acting or make wrong decisions.
Unstable and undefined preferences	The problem of incoherent preferences for making investment decisions complicates optimal retirement plan design.
Heuristic decision-making	Heuristics are mental shortcuts, based on intuitive thinking, so called "rules of thumb", which reduce the complexity of assessing probabilities. Many heuristics, which are useful in everyday situations, lead to false decisions when problems are more complicated and require analytical thinking
Inertia/procrastination:	Inertia and procrastination have significant impact on decisions about starting retirement savings, amount of savings, investment strategy etc. Many decision makers (investors) postpone their decisions. This problem is connected with "bounded self control" – the problem identified by Mullainathan and Thaler (2000) in retirement saving decisions.
Passive decision making	Individuals take pass or option of least resistance in retirement savings decisions and plans.
Loss aversion	People dislike potential losses more than potential gains
Framing effect	Individuals make or accept certain savings decisions because of how the selection or choice is framed
Present bias	Individuals struggle to save more or spend time considering savings decisions because they manifest limited self-control and willpower and prefer immediate gratification over future gains
Status quo bias and anchoring/pure endowment effect	Individuals become anchored to default funds and contribution rates as the status quo and treat them as a superlative endowment

Source: own elaboration based on Tapia and Yermo 2007, pp. 6-9 and Townsend 2018, p. 86.

Key conclusions from the study (Tapia and Yermo 2007) are that a wider array of choices, too many investment options can cause information overload and confusion. This conclusion was formulated on the basis of comparative analysis of 10 countries where participants of pension systems (public pension systems with a funded pillar) had to make investment choices. Tapia and Yermo recommend introduction of default options and reduction of investment choices in public pension schemes with individual accounts and the funded pillar. Similar recommendations – also with regard to additional pension schemes – were made by many other authors (Thaler 2004; Rutecka 2016).

However, it turns out that the use of nudges does not always carry the expected results. A comprehensive literature review on the strength of impacts and restrictions on the effectiveness of nudges, prepared by Hummel and Maedche (2019, p. 1), indicates that "the effect of its influences vary considerably across studies (…)".

3. The effects of using nudges in the chosen countries – comparative study

3.1. Automatic enrolment in the U.K.

An example of the use of defaults to restrict procrastination, delaying decisions to start saving was an automatic enrolment of workers to the UK's occupational pension schemes with an option to opt out. Between October 2012 and February 2018, the government rolled out automatic enrolment into workplace pension schemes. All employers now have a legal duty to enrol all qualifying workers aged between 22 and State Pension age who were earning over GBP 10 000 in 2018/19 into a qualifying workplace scheme. To support automatic enrolment, the government established the National Employment Savings Trust (NEST), a trust-based occupational defined contribution scheme, to ensure that all employers are able to access a good quality, low cost pension scheme. NEST carries a public service obligation to accept all employers that wish to set up a pension scheme with them regardless of their income (OECD 2019).

This solution was being successively implemented since 2012 (until 2018) in order to increase the level of participation in occupational pension schemes, increase the rate of replacement of retirement income relative to the period of professional activity and ultimately reduce dependence on the public pension scheme, which provides only basic financial security for old age (basic security against poverty – see Table 2).

Table 2. Main features of the pension system in the UK

Three pillars	
Pillar I	The public pension scheme, comprising of the following two components: the basic pension and the additional pension.
Pillar 2	Gathering the occupational pension plans, sub-divided into the following two categories: the defined-benefit plans (salary-related) and the defined-contribution plans (money purchase arrangements);
Pillar 3	Individual (voluntary and supplementary) pension savings products

Source: Pension Savings: The Real Return 2019, p. 501.

The public pension system in the U.K. provides only a modest part of retirement savings. Privately managed, funded pension products play a very important role in a pension system (see Table 3).

Table 3. UK Pension system overview

Pillar 1	Pillar 2	Pillar 3
Public pension scheme	Occupational pension schemes	Personal pensions: Group Personal Pension or Individual contracts (Stakeholder and Self Invested Personal Pensions)
For men born before 1951 and women born before 1953: Basic, Additional State pensions Since April 2016, for men born after 1951 and women born after 1953: new State pension	Defined Benefits and Defined Contributions pension schemes	Defined Contributions pension schemes
Mandatory	Since 2012, auto-enrolment or explicit opt-out. Since 2019, compulsory contribution equal to 8% of earnings	Voluntary
Quick facts		

Source: own elaboration based on Pension Savings: The Real Return 2019, p. 502.

Automatic-enrolment obliges employers to include in the qualifying occupational pension scheme all employees who meet certain criteria of age (at least 22 years old), income (at least £10,000 per year), and who work exclusively or primarily in the UK and pay at least the minimum contribution (Department for Work 2016, p. 1). Employees with lower incomes are also entitled to join occupational pension schemes but on a voluntary basis. Enrolled employees hold the right of opting out. After three years, employers are obliged to enroll them once again unless they resign voluntarily. Initially, auto-enrollment covered only large employers, then medium ones, and by 2018 all employers (large, medium and small enterprises and other workplaces) are required to include their employees in an occupational pension scheme and pay the required contribution themselves and for their employees.

Data on automatically enrolled employees who opted out of the program during the first month and withdrew their contributions comes from a quantitative survey conducted in 2013 on a representative sample of 3000 employers, and a qualitative survey involving enterprises included in the quasi-compulsory occupational pension scheme in 2014 (Automatic Enrollment 2014). Both of these studies show that the percentage of workers who opted out of the occupational pension scheme in which they had been enrolled automatically was relatively small – between 9% and 10% in 2012-2014. This is much less than originally accepted during the program's start-up phase in 2012 when it was assumed that up to 30% of employees had opted out. People with the lowest income predominated in the first month after enrollment among those who opted out.

There is no doubt that the introduction of automatic enrollment has substantially increased participation in the occupational pension scheme (about 60% in 2018) and led to an increase in savings regarding a workplace pension (Cribb and Emmerson 2016, Pensions Regulator 2018).

3.2. Automatic enrollment in New Zealand – the KiwiSaver system

The case of New Zealand can be also regarded as a success story of automatic enrollment. New Zealand's pension system is based on a tax and transfer 'pay-as-you-go' (PAYG) system, including a unique near-universal flat rate one-pillar pension. Since 2007, NZS has been complemented by KiwiSaver—a hybrid, Pillar 2/3 scheme (a combination of an occupational and an individual pension scheme). "KiwiSaver is funded by a mix of individual and employer contributions plus a government subsidy known as member tax credit" (MacDonald, Gues 2019).

KiwiSaver's statutory purpose under the KiwiSaver Act 2006 was to encourage long-term savings and asset accumulation by those who would be unable to maintain their pre-retirement standard of living with solely New Zealand public pension scheme and voluntary individual pension scheme, so called private superaanuation (the first pillar of the New Zealand's pension system – see Table 4).

Table 4. Main design features of the New Zealand pension system

Three pillars	
Pillar 1	NZS, a universal pension, funded from PAYG. The New Zealand Superannuation Fund was established in 2001 to commence partial funding of NZS from 2020.
Pillar 2	KiwiSaver is a hybrid of 2nd Pillar and 3rd Pillar schemes. Minimum employer contributions is a 2nd Pillar feature, and the employee opt-out, along with optional higher contribution rates, is a 3rd Pillar feature.
Pillar 3	Voluntary private superannuation separate from KiwiSaver. Taxation is the same as for KiwiSaver. No private saving tax incentives.
Public pension	
Eligibility	Age 65, subject to residence test*
Amount**	Singles 42% of 2016 median weekly wage/salary. Approximately 40% of average national income (male and female) per beneficiary. Couples 32% each of 2016 median weekly wage/salary
Means testing	None
Taxation	Taxable at marginal rate
Private pension (superannuation)	
Minimum contribution rates	Employer contribution Minimum 3% of gross earnings. Employee contribution Minimum and a default rate of 3% (optional rates 4% or 8%) of gross earnings. Applies to employees aged 18-65 but employers may choose to continue to contribute for employees aged 65+. A contribution holiday cannot be taken in the first year of membership without evidence of financial hardship. Beyond the first year, it can apply for between three months and five years without providing a reason, renewing the holiday at any time or taking an unlimited number of future contribution holidays. Employer contributions also cease during this period***

*For New Zealand residence requirements, see Ministry of Social Development (n.d.). **These figures are calculated from the 2016 median New Zealand weekly earnings of NZ$924 (A$883) and maximum after-tax weekly 2016 pension payments of NZ$384.76 (A$367.66) (Statistics NZ 2018).

***As of June 2017, approximately 5 per cent of the membership base is on contribution holidays, the majority of which are over 60 months in length (IRD 2017).

Source: Adapted from Guest (2013).

Individuals are auto-enrolled when starting work for the first time or when changing jobs. The auto-enrolled individuals can only opt-out within 8 weeks of being automatically enrolled. After this period, they can apply for an unlimited number of contribution holidays of up to five years. In NZ, members have a unique KiwiSaver account throughout their working life. After 13 years, KiwiSaver has over 2.8 million members and has become a permanent feature of New Zealand's pension system and savings sector. "The individual is being automatically enrolled (as there is only one default fund type) and only requires a contribution rate selection. This means that even those automatically enrolled members who wish to select their preferred fund are unable to do so. Default members are automatically and randomly allocated into one of the nine government appointed default provider funds, with a default contribution rate of 3% unless a different rate is consciously selected" (Townstead 2018).

The number of KiwiSaver members is systematically increasing (see Figure 1). Participation rate in KiwiSaver 2018 amounted to about 75%.

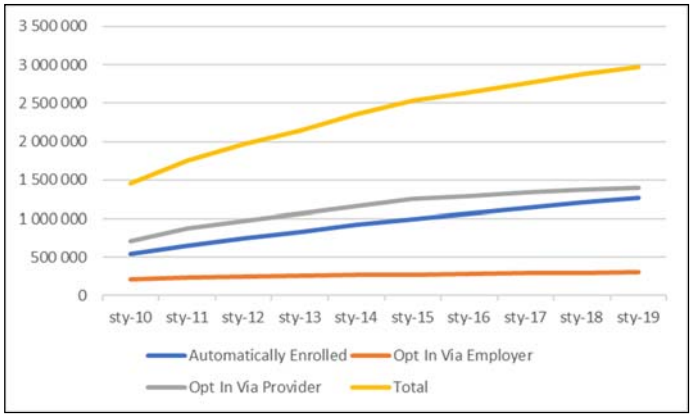

Fig. 1. Number of active KiwiSaver members by enrollment method
Source: https://www.kiwisaver.govt.nz/statistics/annual/joining (access: 10.02.2020).

It is worth mentioning that both in New Zealand as well as in the U.K. auto-enrollment into pension scheme (nudge, behavioral incentive) is combined with traditional financial incentives (see Table 5).

Table 5. Behavioral and traditional financial incentives in pension systems of New Zealand and the U.K.

Country	Minimum contribution rate	Financial incentives
United Kingdom	Employee: 3% but will increase to 5% in 2019 Employer: 2% but will increase to 3% in 2019	Tax Incentives
New Zealand	Employee: 3% Employer: 3%	Government match up to NZD 10/week

Source: own elaboration based on OECD (2019) Pensions at a Glance and G20 Indicators.

However, there are significant differences between these two countries as far as default fund structure (investment strategy of default funds) is concerned (see Table 6).

Table 6. Behavioral and traditional financial incentives in pension systems of New Zealand and the U.K.

Country	% Members in the Default Fund	Type of Default Fund	Other Fund Choices
United Kingdom	60-100%	Life-cycle Funds	NEST Funds- Pre-retirement Fund, Higher Risk Fund, Lower Growth Fund, Ethical Fund, Sharia Fund, and Climate Fund
New Zealand	93% (members in employers- chosen pension schemes)	Conservative Fund	KiwiSaver Funds- Low risk (100% bonds), Defensive (< 20% invested in growth assets), Conservative (30% shares and property), Balanced (50-50% high risk and low risk investments), Growth (70-85% shares and property), and Aggressive (90% or more shares)

Source: own elaboration based on Poksevim and Akagiray 2019, p. 19.

Automatic allocation system in New Zealand into default fund and contribution rate is based on an assumption that most pension scheme participants have not got enough financial literacy and limited knowledge about financial markets and investment strategy. This assumptions seem to be quite realistic. But there are also negative consequences of using nudges (or "soft compulsion"), such as auto-enrollment into default low risk fund. Most of automatically enrolled workers stay in conservative KiwiSaver default fund. Some authors (Townstead 2018) propose to change default option from conservative fund to a target date fund (life cycle fund)[2].

KiwiSaver has been evaluated as a success of public policy to increase participation in additional pension schemes with the use of behavioral incentives (nudges), "rational behavior for the government, but not necessarily the best interests of KiwiSaver members" (limited effect on the accumulation of net wealth, potentially negative impact due to, already mentioned, conservative nature of default schemes – see IRD 2015).

3.3. Automatic enrolment in Turkey – still an initial stage

Quite a different situation has been observed in Turkey so far, where auto-enrollment legislation was introduced in 2017. It is important to indicate that – in spite of the U.K.'s pension system, with very long tradition of private pension

[2] Such a solution has been introduced in Employee Capital Plans (PPKs) in Poland – new occupational pension schemes which will gradually be implemented from 2019 till 2021.

funds and huge capital market – the Turkish private pension system is relatively new, with short history of 15 years (see Table 7).

Table 7. Main features of the Turkish pension system

Pillar 1	**State (public) pension scheme** The PAYG social security programme, which covers employees' old-age pension benefits and other social protection needs such as health care, survivorship, disability, work-related accident and occupational diseases, unemployment, and life insurance.	PAYG public pension scheme: • Earnings related pension benefits, • Income-tested safety net and flat rate supplementary pension.
Pillar 2	**Occupational pensions** The second pillar of the Turkish pension system mainly consists of two mandatory occupational pension schemes: OYAK and TTK plans. OYAK has been established to provide pension and other social benefits for military personnel, and TTK pension plan covers employees of the state-owned coal mining companies.	Two mandatory occupational pension funds: • OYAK: Armed forces pension plan. • TKK: Employees of the enterprise fund • 250 small occupational pension plans
Pillar 3	**Private Pensions** A voluntary private pension system (BES) was first introduced in Turkey in 2003. The main purposes of introducing the third pillar pension were to increase domestic savings rates and develop domestic capital market.	Voluntary fully-funded DC pension systems • 18 licensed pension companies and 408 mutual investment funds • Introduction of auto-enrolment in 2017

Source: own elaboration based on Poksevim and Akagiray 2019, p. 19.

Automatic enrollment has been put into effect by Turkish government together with a traditional incentive (government contributes up to 25% of the amount paid by the employee). First results (data from 2017-2019) show that auto-enrollment is expected to boost participation among first-time savers in Turkey (like in New Zealand and in the U.K.), but the opt-out rate from the system is relatively high: 54% in 2018 (Peksevim and Akgiray 2019).

5. Conclusions and recommendations

A full assessment of the effects of the introduction of a pension scheme with auto-enrollment in Turkey will be possible over a longer time horizon. However, there are significant differences in the first period of implementation of this program compared to United Kingdom and New Zealand where a much higher opting-out rate has been observed in Turkey. This may be due to the long tradition of additional private savings and the maturity of financial market in the UK and short tradition and smaller development of the financial market in Turkey. In New Zealand the time to opt out

is relatively short and limited after automatic enrollment. It has impact on the smaller number of withdrawals in the first years of the system's operation.

Also cultural factors should not be underestimated – a different institutional tradition and diversity of pension awareness (however, this is a subject to be investigated further).

Undoubtedly the level of generosity of the public pension system affects the willingness to participate in additional pension systems. Public pension systems in the UK and in New Zealand offer only basic security against poverty and flat rate pension benefits. Turkey's public pension system belongs to the most generous in the world, with replacement rate at 102.1% (OECD 2017, p. 107), the highest in OECD countries (!). Turkish society is still relatively young but the process of demographic aging has already begun there as well. Public PAYG pension system will not be able to maintain such high replacement rate in the future and additional retirement savings are needed to fill in this gap.

The general conclusion that can be formulated on the basis of the comparison of pension programs with automatic enrollment in these three countries can be formulated as follows: Nudges are not a universal panacea for the problem of insufficient retirement savings. But they can provide a valuable addition to traditional (economic and institutional) incentives.

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EFFECTIVENESS OF PENSION SYSTEMS IN POST-SOVIET COUNTRIES – EVALUATION USING THE CCR MODEL

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1. Introduction

Efficiency allows you to create combinations. It is still understood as the actual productivity of the analyzed subject to its maximum production efficiency. Efficiency has found wide application in economics, not only in business operations. Almost all activities checked for efficiency and distribution. One of the oldest approaches to assessing effectiveness is based on indicators analysis[1]. Parametric methods are also used. However, using them, you must know the functional relationships that occur between input and output variables. Especially in public organizations, it is extremely difficult to assess the value of the results got. In practice, a non-parametric approach is often practiced. Among them, the Data Envelopment Analysis (DEA) method is very popular, which is operated in many areas, not only related to businesses or management[2]. Managing this one, assuming constant inputs, the researcher is able to find the most effective object in the group he analyzes based on empirical data.

Population aging and a systematic increase in the percentage of older people in society results in a greater financial burden on pension systems. Citizens require that, after years of paying social security contributions, they receive a decent retirement, which will make sure them adequate living conditions in old age. It is also important that society is aware of the destination of social security contributions[3]. These trends mean that the adequacy, stability and efficiency of pension systems will be checked more and more often. The mainly reasons is the control of existing policies and legal reforms so that these systems function better.

The purpose of this publication was to show the most effective pension system among post-Soviet states. The author did this using the CCR model, which belongs to the group of models from the DEA method. This action will allow further analyses to show the essential features of an effective pension system so

[1] One of the most popular indicators are: Jensen, Sharpe and Treynor.
[2] The DEA method has been used, among others in evaluation: pension funds (Jablonsky 2007), healthcare in Kenya (Kirigia et al. 2004), Australian universities (Abbot and Doucouliagos 2003) and in international comparative analyzes (Sengupta 2002).
[3] The ability to check your personal retirement account via the Internet is also gaining popularity.

that other post-Soviet countries can model it and reform it. Besides the critical analysis of the literature on the subject, the article uses statistical analysis measures and, in line with the goal, an analysis of effectiveness using the CCR model.

In the subsequent parts of the publication, interpretations of effectiveness are presented, the theoretical foundations of the DEA method are quoted, and have been showed the essence of the CCR model. Then, the process of the study was submitted, and the results got were discussed and it based the conclusions on them.

2. Efficiency

Efficiency is one of the key concepts in economics and is also a popular criterion for assessing functioning. The best-known term of efficiency among economists is the so-called Pareto optimum. It is a situation in which it is not possible to change production or distribution in such a way as to improve the situation of a certain group without deteriorating the situation of other entities (Varian 2010, pp. 15-16). Another approach that is also widespread in economics is Kaldor-Hicks effectiveness. It occurs when the profits of one group are higher than the losses incurred by another gather because of the changes made (Stringham 2001). On the other hand, in the DEA method, efficiency is defined as the ratio of weighted effects to the sum of weighted inputs.

According to Chybalski, analyses of the effectiveness of pension systems have become more important because the demographic dividend phenomenon is no longer present. He also indicates that the effectiveness of pension systems should be considered at two levels. The first is the micro-level, which refers to smooth consumption in life. The second is the macro-level, which concerns the current GDP distribution (Chybalski 2016, pp. 16-17). Góra and Palmer (2004, p. 3) point out that an effective social security system does not affect individual decisions regarding the division between work and leisure, as well as consumption and savings. What is important in such a system, the value of the premiums paid by the entity are equal to the value of the benefit that it may receive, after the account is liquidated, after a period of t.

3. Data Envelopment Analysis Method – theoretical aspect

The Data Envelopment Analysis method belongs to the group of nonparametric methods evaluating effectiveness. Using it, the researcher is able to estimate on the basis of data related to inputs and effects how the analyzed objects work in the examined group. This method assesses the efficiency of economic entities referred to as decision making unit (DMU).

The units that are being analyzed can be graphically represented using an efficiency curve (called: best practice frontier), which is estimated based on empirical data. Effective units are found on the curve and their efficiency is 1 (the Greek letter theta is usually used–θ). Ineffective objects are under the curve because they are dominated by effective objects. The level of their effectiveness is 1-θ.

It is important to be aware of the pros and cons of DEA. An undoubted plus is the fact that data with heterogeneous measures can be used for the analysis. The analysis using the DEA method also assumes the absence of a random component and also rejects the functional assumptions that exist between the studied variables. This allows estimating efficiency in the public sphere where it is difficult to determine the relationship between inputs and effects (the efficiency curve is estimated based on empirical data) (Thanassoulis 2003, pp. 227-250). Important, the DEA method allows you to use more than one input and output variable in the analysis, which is not allowed by traditional indicator methods. The analysis of empirical data in the DEA method also indicates factors that do not have a direct impact on the effectiveness of the entity (Thanassoulis 2003, pp. 227-250). It should be borne in mind, however, that the set level of efficiency can only be referred to the analyzed set. Any modification (adding or removing an object) will affect the results, so the researcher should be choose the exact number.

The undoubted disadvantage of the DEA method is also redundancy, i.e. the multiplication of effective solutions. Therefore, it is likely that several of the examined objects will be effective. The limitation, which may also be considered to some extent as a disadvantage, is the homogeneity requirement of the analyzed DMUs[4]. The condition of stability may also impede the analysis. A. Emrouznejad, G. Amin (2009, p. 489) point out that the standard DEA model is stable when:

$$n \geq \max\{m * s, 3(m + s)\} \quad (1)$$

Where n is the number of DMUs observed, and m and s are the number of entries and exits, respectively, In the development of the DEA method a great contribution was made, among others: Banker et al. (2004); Cook and Seiford (2009).

4. The essence of the CCR model

The CCR model was proposed by Charnes, Cooper and Rhodes in 1978, is the first model from the DEA group[5]. It considers efficiency in Farrell's sense, which allows the creation of a hierarchy of examined objects from the most to the least effective. The guiding idea of assessing the efficiency of facilities using the CCR model is to determine whether the technology that is used in the examinee facility best accomplishes the assumed tasks (Guzik 2009, p. 55). In addition, the CCR model allows you to create benchmarking formulas for facilities that have been ineffective, i.e. $\theta < 1$, and show results deficits or excess investments in them. All objects

[4] Polish researcher Guzik (2009) said that this is more because of the convenience of analysts than the needs of practice.

[5] For more on the origins of the DEA method and the beginnings of the CCR model, see Cooper et al. (2004, pp. 8-15).

considered effective, i.e. $\theta = 1$ in the CCR model are treated equally[6], which can be considered a minus of this model.

According to Tollo and Nalchigar (2008, pp. 597-598), the disadvantage of the CCR model may be the fact that it must be run n times, for each DMU, to calculate the efficiency of all facilities. They also believe that a permanent of scale may be a kind of trap, i.e. a proportional increase in outlays means a proportional increase in results.

If we compare the CCR model to the regression equation, we can see it that in both cases a larger number of explanatory variables will cause higher efficiency (coefficient of determination). However, increasing the number of variables in the CCR model will worsen the efficiency got or leave it unchanged. With regression equations, it is difficult to determine whether this will increase or decrease the determination coefficient. While comparing this model to the production function, in both cases the relationship between inputs and effects is analyzed.

5. Methodology of the research

The subject of the analysis is pension systems in the post-Soviet countries. The spatial scope of work is limited by the number of countries that arose after the collapse of the Union of Soviet Socialist Republics (USSR). They are Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Lithuania, Latvia, Moldova, Russia, Tajikistan, Ukraine, Uzbekistan. Turkmenistan was turned off for the lack of availability of data from the analysis. This study covers the years 2012, 2015 and 2018. Due to the fact that the literature recommends that the number of objects covered by the analysis exceed the number of inputs and results accepted for the study, three indicators have been analyzed – one input and two output (see Table 1). The adoption of relative values allowed the author to abstract, among others, on the size of the analyzed countries.

Table 1. Indicators used in the study

Name of the indicator	Role in the model
Insurance contribution for retirement security (in %)	Input
Replacement rate (in %)	Output
The value of an average pension in USD	Output

Source: Own study.

The author knows that he could take other variables as measures of inputs and results, which could change the order of the benchmark presented in Table 2. However, the

[6] To rank objects that have proved to be 100% effective, other models are used that are a development of the CCR model. An example can be models of hyper-efficiency, which were initiated by Andersen and Petersen (AP model) in 1993 (Andersen and Petersen 1993, pp. 1261-1264), which in later years were subject to numerous modifications. More about super-efficiency models, e.g. Esmaeilzadeh and Hadi-Vencheh (2013). Another method is even the cross-effectiveness used by Jahanshahloo et al. 2011). The classification of various methods for ranking objects analyzed by the DEA method was presented by Adler et al. (2002) and Aldamak and Zolfaghari (2017).

selection of variables was determined by data availability. From the expenditure side, the amount of the insurance premium for retirement security (in %) was adopted for analysis. The values discharged by both the employee and the employer have been added. This is due to the fact that in most common pension systems, both the employee and the employer pay the premium to secure old age. The analysis omits the contributions that are required to pay from farmers or self-employed persons, as they often have different conditions (e.g. percentage of declared income or a specific amount). From the effects side, the replacement rate was adopted, which is the relation of the average pension to the average salary in the economy. It was chosen by the author because it is used as a reference point in many international documents (e.g. International Labor Organization regulations). In addition, it is an effective indicator for comparative analyses. The author is aware of the disadvantages of this indicatior[7]. However, he believes that it allows a good comparison between countries that do not have one common database. The second indicator related to the effects of the pension system is the value of the average pension in a country. It has been converted from local currencies to USD at the average annual rate so a researcher can compare your retirement benefits. Thanks to this approach, it is easier to estimate in which of the analyzed countries pensions are the highest and the lowest.

Although in the literature one can come across an approach to compare the CCR model with the BCC model[8], the author has not decided on such an approach. The main reason is that the CCR model has more discriminatory power (it shows higher levels of inefficiency than the BCC model).

6. Evaluation of the effectiveness of pension systems in post-Soviet countries

When analyzing the efficiency coefficients calculated on the basis of input and output data for 2012, 2015 and 2018, it can be seen that the most effective pension systems in Armenia and Estonia. However, the pension system in Georgia was definitely the least effective (efficiency at 20%). In 2012, the system in Belarus was also among the most effective. Subsequently, it was possible to rank Kazakhstan and Russia. However, from the end of the ranking for 2012, Moldova, Tajikistan and Georgia can be qualified (respectively efficiency ratios of 0.227, 0.214 and 0.200). This year, 7 countries achieved an efficiency ratio higher both in relation to the average (0.605) and median (0.598).

In 2015, the most effective pension systems included those operating in Armenia, Estonia, and Lithuania. The Belarusian pension system deteriorated in relation to the analyzed systems and came in 5th place. Kazakhstan remained in the same position, although its performance indicator slightly deteriorated. However, analyzing the last three items in 2015, the same countries were again noted (only the order of Tajikistan

[7] About the imperfections of the replacement rate, among others Chybalski and Marcinkiewicz (2016).

[8] A model created by Banker et al. (1984) that assumes scale variability.

and Moldova changed). This year, the median efficiency ratio was higher than the average for this indicator (0.036 difference).

In 2018, only Armenian and Estonian were fully effective among the analyzed pension systems. The Lithuanian pension system has deteriorated significantly, which placed it 4th in the ranking. Significant drops also apply to Belarus and Russia (respectively from 5th to 9th and 6th to 10th). However, in 2018 significant improvements in efficiency ratios were also noted. Uzbekistan improved its position from 10th to 6th, and Azerbaijan from 7th to 5th This year also the median was higher than the average for the analyzed coefficients.

When analyzing the average of individual indicators[9] from 2012, 2015 and 2018, it can be concluded that the most effective pension systems (based on the variables adopted by the author) in post-Soviet countries occur in Armenia and Estonia. Systems in Lithuanian, Kazakh and Belarusian rank further. However, the last five positions in the created ranking included: Uzbekistan, Ukraine, Moldova, Tajikistan and Georgia (respectively efficiency ratios are 0.554, 0.411, 0.242, 0.232 and 0.200). It is worth noting that the highest average and median values for efficiency coefficients were achieved in 2015. At the same time, the standard deviation and coefficient of variation were the lowest.

Table 2. Values of efficiency coefficients and position in the ranking of individual post-Soviet countries in 2012-2018

	2012		2015		2018		Average	
	EC	Rank	EC	Rank	EC	Rank	EC	Rank
Armenia	1,000	1	1,000	1	1,000	1	1,000	1
Azerbaijan	0,491	9	0,673	7	0,772	5	0,631	6
Belarus	1,000	1	0,722	5	0,552	9	0,691	5
Estonia	1,000	1	1,000	1	1,000	1	1,000	1
Georgia	0,200	14	0,200	14	0,200	14	0,200	14
Kazakhstan	0,771	4	0,760	4	0,984	3	0,715	4
Kyrgyzstan	0,589	8	0,666	8	0,648	7	0,631	6
Latvia	0,607	7	0,602	9	0,599	8	0,603	8
Lithuania	0,728	6	1,000	1	0,831	4	0,836	3
Moldova	0,227	12	0,242	13	0,266	12	0,242	12
Russia	0,752	5	0,689	6	0,539	10	0,564	9
Tajikistan	0,214	13	0,246	12	0,241	13	0,232	13
Ukraine	0,450	10	0,493	11	0,268	11	0,411	11
Uzbekistan	0,438	11	0,589	10	0,672	6	0,554	10
Average	0,605		0,634		0,612		0,594	
Median	0,598		0,670		0,624		0,617	
Standard deviation	0,285		0,270		0,287		0,257	
Coefficient of variation (in %)	47,2		42,5		46,9		43,4	

Source: Own calculations based on data from statistical offices of individual countries.
Note: In the average column, the efficiency coefficient was calculated based on the average parameters for 2012, 2015 and 2018. EC means the efficiency coefficient.

[9] The author separately calculated the average for the amount of the insurance premium for retirement security, replacement rates and the average pension value in USD.

7. Conclusion

After analyzing the amount of the insurance premium for retirement security, replacement rates, as well as the value of the average pension in USD as variables of the CCR model, it was found that the most effective pension systems among post-Soviet countries exist in Armenia and Estonia. In all three analyzed years (2012, 2015 and 2018) they achieved 100% efficiency. Apart from them, Belarus (in 2012) and Lithuania (in 2015) were included in this group once. The average efficiency coefficient throughout the entire period exceeded 0.6. The least effective pension system was in Georgia, as the efficiency ratio was only 0.200. At the turn of the analyzed years, i.e. 2012-2018, two significant improvements in ranking position as well as two deteriorations can be listed. The improvement of the effectiveness of the pension system was noted primarily in Azerbaijan and Uzbekistan (from 9th to 5th and 11th to 6th, respectively). However, a significant reduction in the level of efficiency was observed in Belarus and Russia (from 1st to 9th and from 5th to 10th, respectively).

The results showed that the rulers of responsible pension systems in post-Soviet countries should look more at the solutions adopted in Armenia and Estonia. Implement similar activities in your countries, taking into account other conditions not included in the analysis, including the growth rate of the proportion of older people, cultural conditions can help reform functioning systems.

In further research, it is worth considering expanding the number of countries to be analyzed, e.g. by remaining countries from the Eastern Bloc, or by countries belonging to the European Union. According to the author, it is also worth considering in the next analyses of the effectiveness of pension systems the increase in the number of variables subject to examination. However, one should keep in mind the condition of stability of the DEA method, which was presented in part 3 of this article[10]. It is also worth considering the use of models other than CCR from the DEA group of methods.

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[10] It is suggested to introduce additional variables gradually, because the CCR model is not very selective in a situation when there is a large number of inputs and results.

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APPLICATION OF DEFERRED ANNUITIES IN AN OCCUPATIONAL PENSION SCHEME

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1. Introduction

Occupational pension schemes are an important element of the pension systems of many countries. In the face of problems related to the financing of public systems, private forms of saving for retirement are becoming crucial (Antolin et al. 2012, p. 7). In recent years, changes in the types of occupational pension schemes can be observed. The once popular defined benefit (DB) schemes are replaced by defined contribution (DC) schemes (Wise 2001, p. 122; Turner and Hughes 2008; Bovenberg and Gradus 2015). As a result the risk associated with financing the pension scheme is transferred from the employer to the member. In order to enable risk sharing hybrid schemes have been developed in many countries by combining elements of two traditional forms (Turner 2014; Broeders et al. 2013). They are often a modification of the DB scheme e.g. by introduction of an indexation conditional on the financial position of the scheme, as is the case in the Netherlands (Blommestein et al. 2009, Ponds and van Riel 2009). On the other hand, the growing popularity of DC schemes has contributed to the development of hybrid programs that modify such a scheme by, for example, introduction of a guarantee on the minimum rate of return on investment, as is the case in Switzerland (Bütler and Staubli 2010). In addition, many authors search for solutions that would offer the benefits of the DC scheme for the employer (pre-determined contributions) with the advantages of the DB scheme for the member (pre-determined benefits).

Sutcliffe (2010) presented a proposal for a retirement program which satisfies the above criteria. It uses a deferred pensions financed by a single premium (SPDA – single premium deferred annuity). Aim of this paper is to construct a model that would allow to calculate expected benefit amount in a scheme financed by SPDA, and to compare it with an amount that could be achieved in a traditional DC scheme. Second aim is to extend the concept of SPDA scheme to allow for the risk of high annuity prices to be shared between member and employer.

2. Scheme financed by SPDA

Scheme which uses single premium deferred annuities (SPDA) was described by Sutcliffe in 2010. SPDA is an insurance product which can be purchased at any time by paying a single premium, in exchange for payment of the benefit (pension) which will start at a certain point in the future. The insurance company sets the

price of the deferred pension by adopting assumptions as to the probability of survival of the insured until the start of payment, further life expectancy from the time of start of payment or the interest rate used to discount future value of benefit to the time of purchase.

In a scheme financed by SPDA a contribution (determined in advance as a percentage of the member's salary) is paid every year. It is used to purchase a deferred pension, the payment of which will begin when the member retires at a certain age in the future. In this way, the contributions are defined in advance (as in the DC scheme), while the benefit is fixed (as in the DB scheme) at the time the deferred pension is bought. The use of various types of deferred annuities, e.g. those offering a benefit adjusted with inflation, paid for a specified period of time or until the end of the member's life, allows the type of benefit to be adapted to the requirements of a given occupational scheme or a given member. An additional advantage of this solution is the fact that the investment risk and the longevity risk are borne by the insurance company offering the deferred pension, and not by the employer (as in the DB scheme) or the member (as in the DC scheme). Insurance companies are subject to strict legal regulations, which reduces the risk that the benefit will not be paid to the member (Sutcliffe 2010, pp. 16-18).

The disadvantage of this solution is the underdeveloped market of deferred pensions in many countries, which means that buying this product may not be possible or may be very expensive (Blake 1999, p. 360). In addition, the costs that the insurance company will take into account when calculating the pension price may be higher than the management costs in the program offered by the employer. Sutcliffe (2010, p. 21) notes that the use of deferred pensions will likely result in a lower amount of benefit than that obtained in the DC or DB scheme. The member is also exposed to the risk of an unknown purchase price of the deferred pension, which may increase in relation to the assumed.

3. Assumptions

In order to compare benefit amount that could be achieved in a scheme financed by SPDA and a traditional DC scheme models of both schemes were constructed. It was assumed that a member saves for their retirement for 35 years, during which contributions are paid annually at the start of each year, and retires aged 60. Contribution rate was set at 3.5% of salary, the required contribution in the new occupational schemes in Poland. The assumptions are summarized in Table 1.

Table 1. Assumptions used in modelling benefit amount in pension schemes

Parameter	Value
Retirement age	60 years
Saving period	35 years
Contribution rate	3.5% of salary
Salary increase rate	1% per annum

Source: own work.

In a DC scheme, the contributions are accumulated in the member's account with an investment rate of return earned by the scheme's investments. Model assumes that investment rate each year is a random variable following normal distribution with mean 3% and standard deviation 8%. At retirement value accumulated in the account is used to purchase an annuity from an insurance company. The price of this annuity is calculated using interest rate of 1% and expected future lifetime of a person aged 60 according to the formula:

$$a_{\overline{n}|} = \frac{1-\left(\frac{1}{1+i}\right)^n}{i} \quad (1)$$

where i is the annual interest rate and n is the expected future lifetime in whole years. If expected future lifetime is not an integer, an additional payment equal to a fraction of the last year survived will be made. It is assumed that when the member joins the scheme the expected future lifetime of a person aged 60 is equal to 21.85 (GUS 2018), and by the time of member's retirement in 35 years this expected future lifetime for a person aged 60 will have increased by a certain amount every year. This amount is a random variable which follows normal distribution, with mean 0.1 and standard deviation 0.05 (see also Gierusz 2019).

In a scheme financed by SPDA contribution paid is used to purchase a deferred annuity from an insurance company. This annuity is priced by calculating the value of annuity payable to a person aged 60 (as described above) and discounting it to the time of purchase using a certain discount rate, according to the formula:

$$_{k|}a_{\overline{n}|} = \left(\frac{1}{1+r}\right)^k \; {}_kp_x a_{\overline{n}|} \quad (2)$$

where r is the annual discount rate, k is the number of years remaining till member reaches 60 years of age, x is the current member's age, ${}_kp_x$ is the probability that a member aged x survives the next k years.

It is assumed that discount rate follows normal distribution, with mean μ and standard deviation 1%. Mean μ itself is also a random variable following normal distribution, with mean 2% and standard deviation 0.5%. A lower mean for discount rate was chosen than for an investment rate (2% vs 3%) due to the fact that discount rate is set by insurance company based on expected return on investments that will be used to back up the pension guarantee. These are likely to be more secure investments, such as corporate and government bonds, in comparison with investments that could be used by a DC scheme, such as equities and other more risky assets (see also Sutcliffe 2010, p.22). In addition, the insurance company will include its costs and profit margins in the discount rate. The insurance company also takes into account probability that the member will survive from the time of purchase to retirement using life Tables as published by (GUS 2018). The amount of member's pension is then calculated as the sum of all the deferred pensions purchased during the scheme membership.

4. Results

Method of simulation of different financial and demographic scenarios was used to calculate and compare benefit amounts that could be achieved in both pension schemes. One of those scenarios is presented in more detail below. Figure 1 shows expected deferred annuity prices (calculated assuming that random variables – discount rate and expected future lifetime – will take values equal to expected value) and actual deferred annuity prices observed in this particular scenario.

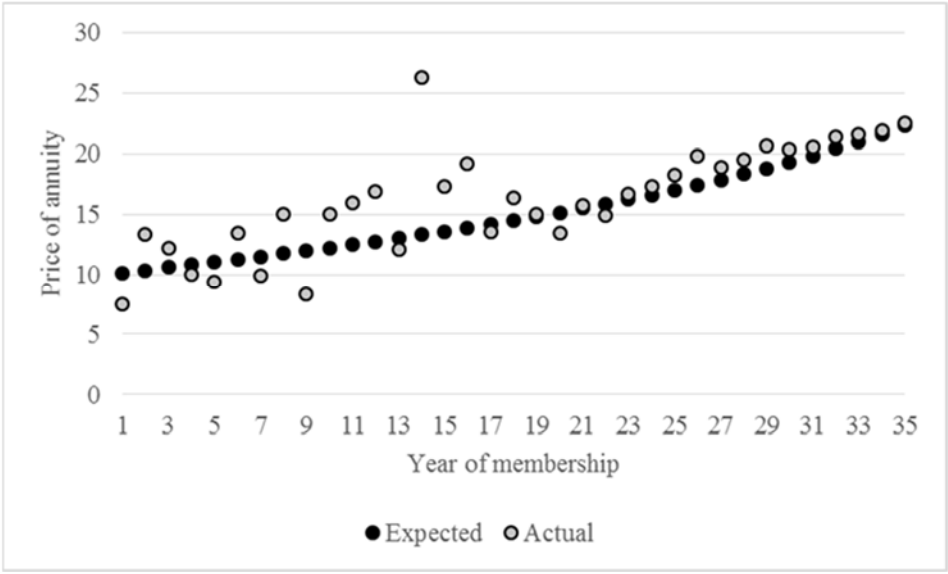

Fig. 1. Expected and actual deferred annuity prices in analysed scenario
Source: own work.

As shown in Figure 1, expected annuity prices increase with time left to retirement. This is mostly due to shorter discounting period. Using these expected prices, the expected benefit amount (expressed as % of member's final salary) was 7.3%. The actual prices were broadly similar to expected, with some deviations, for example in year 14 when the actual price was much higher than expected due to low discount rate in this year.

Each year a contribution rate paid into the scheme financed by SPDA was used to purchase a deferred pension payable from age 60. Figure 2 presents how the total member's pension (sum of all deferred pensions purchased each year) was accumulated. Amounts are expressed as percentage of member's final salary. Each year the total pension accumulated by that time is split between accumulated in previous years and accumulated in current year.

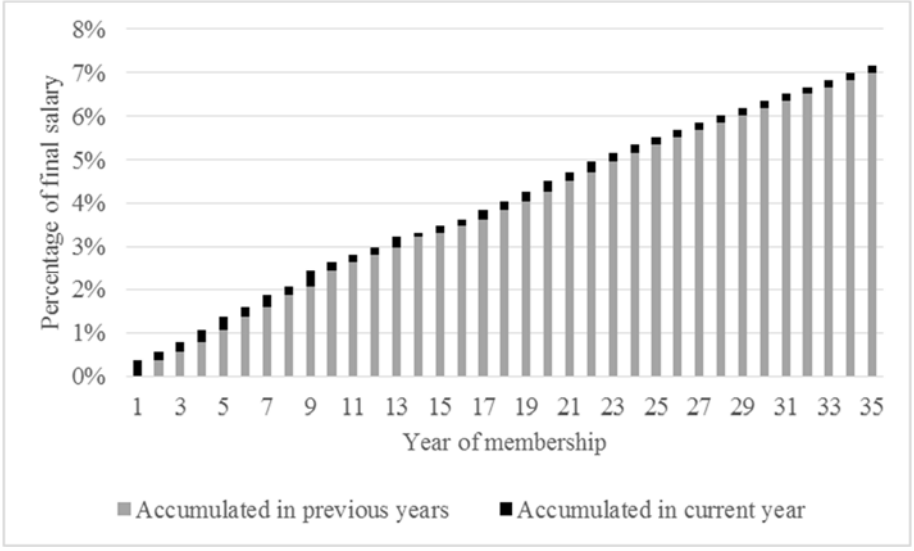

Fig. 2. Pension (expressed as % of final salary) accumulated each year, split between accumulated in the current and in previous years

Source: own work.

As shown in Figure 2, the pension amount (expressed as % of final salary) increases in an almost linear way. Black rectangles show how much of the pension was bought using current year's contribution, and grey show total pension benefit bought in previous years.

In this scenario, at retirement the total pension amount was equal to 7.2% of final salary. In comparison, the replacement rate that could have been achieved from a DC scheme was slightly higher, and equal to 8.3% of final salary.

The simulations were then repeated 10000 times and for each scheme mean and standard deviation of benefit amount were calculated. These are shown in Table 2.

Table 2. Mean and standard deviation of benefit amount as % of final salary in each scheme – simulation results

Scheme	Mean benefit amount	Standard deviation of benefit amount
DC	8.1%	2.5%
SPDA	7.5%	0.8%

Source: own work.

The mean replacement rate for a DC scheme was slightly higher than in the SPDA scheme due to higher mean investment rate assumed for reasons explained above. The variability of results was much lower in case of SPDA scheme, as it is not subject to year on year variability in investment rates, but only to variability in annuity prices. An additional advantage is that the member can observe the amount of pension that is being accumulated in SPDA every year (as shown in Figure 2), but in a DC scheme the pension amount remains unknown until retirement when it is purchased, hence member is also at risk of sudden changes in either investment rate or annuity price at retirement.

In the scenario investigated in more detail above the replacement rate obtained in SPDA scheme (7.2%) was slightly below the expected (7.3%). This was due to high deferred annuity prices in some years. Member in this scheme is exposed to risk of high annuity prices, leading to a low benefit obtained from the scheme. In order to share this risk between member and employer the following modification of SPDA scheme was constructed, making it a hybrid scheme. If the actual deferred annuity price in a given year was much higher than the expected price, additional employer contribution was paid into the scheme so that the effect of higher actual price did not lower significantly the amount of pension bought.

Firstly a price indicator for a given year was calculated as a ratio of actual and expected prices minus 1, expressed in %. Secondly, a new required deferred annuity price was calculated as follows:

– if the price indicator was below 5% required price stayed the same as actual price,
– if the price indicator was between 5% and 20%, the required price was equal to expected price times 105%,
– if the price indicator was over 20% the required price was equal to expected price times (100% + price indicator – 15%).

The benefit amount purchased in a given year was then based on the required price, and employer had to pay an extra contribution equal to a difference between the amount required to purchase such a benefit and the contribution paid that year. Figure 3 presents benefit amount purchased each year in the hybrid SPDA scheme.

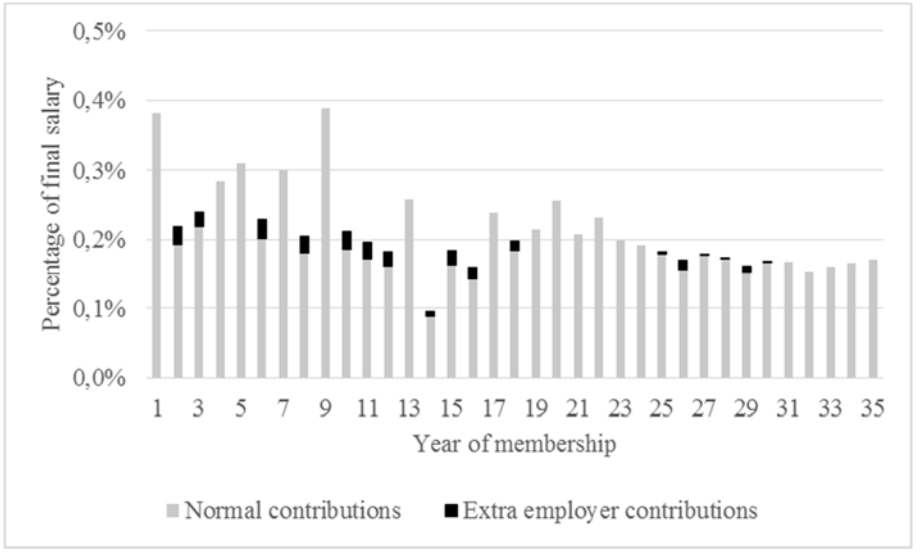

Fig. 3. Pension (expressed as % of final salary) bought each year, split between amount bought by normal contributions and extra employer contributions
Source: own work.

In the investigated scenario the actual price was higher than the expected price by more than 5% in 17 out of 35 scheme years. In those years extra contributions were paid by employer, increasing the amount of benefit bought to 7.4%. Simulations of different scenarios were then run and results are summarized in Table 3.

Table 3. Mean and standard deviation of benefit amount as % of final salary in SDPA scheme and hybrid SPDA scheme – simulation results

Scheme	Mean benefit amount	Standard deviation of benefit amount	Proportion of scenarios were benefit was lower than expected
SPDA	7.5%	0.8%	42%
Hybrid SPDA	7.7%	0.7%	30%

Source: own work.

As shown in Table 3, by sharing the risk of high deferred annuity prices between member and employer the mean benefit amount was increased, and variability of the benefit amount was lowered. This was achieved by additional employer contributions. Mean employer contribution was 3% of member's final salary, and on average the contribution was required in 11.8 out of 35 scheme years.

5. Conclusions

Pension scheme financed by SPDA combines features of a DC scheme (fixed contribution amount) with those of a DB scheme (part of benefit amount is fixed once the deferred annuity is purchased). The simulations performed in this paper have shown that the mean benefit amount obtained by the member from such a scheme was lower than that which could be obtained in a traditional DC scheme, but it was characterized by a lower variability (lower standard deviation of benefit amount). An additional advantage of SPDA scheme is that the member can monitor the amount of benefit already purchased at any time of the scheme membership, in contrast to the DC scheme where the benefit remains unknown until retirement.

One of the main risks to the member in scheme financed by deferred annuities is the risk of high annuity prices. A modification of the scheme allows to share this risk between member and employer by obliging the employer to pay additional contributions in years when annuity prices are much higher than expected. Such a hybrid scheme was proposed and investigated in this paper. Simulations have shown that the mean benefit amount was slightly higher than in a SPDA scheme with no risk sharing, with lower standard deviation and lower proportion of scenarios where the benefit was lower than expected.

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FINANCIAL SCHEMES FOR ACTIVE AGEING AND ELDERLY WELL-BEING IMPROVEMENT

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1. Introduction

The ageing population (Pestieau and Jackson 2000) is a big challenge for all advanced systems of social security (Tinker 2002; Soest et al. 2010). The problems are twofold: with prolonging human life expectancy individually, and with imbalances between generations, where different population behaviour can create unfavourable demographic pyramids and introduce tough issues of intergenerational relationships and solidarity. Similarly split are the tasks for resolve: how to handle the specific needs and high costs of the care for the elderly (regardless of their count), and how to resolve imbalances that are emerging in public budgets because of unfavourable demographic development in general (because of their count).

Challenges of prolonging active participation emerged, as the developed countries face the pressure of increasing the pension age, which is connected with health status, politically sensitive and has got many risks and caveats, as well as opportunities for those individuals and jobs that can extend their productive activity with adequate support from social systems (Gessa et al. 2017). Also, ability to individually adjust workload is important. (Virtanen et al. 2014). In part, pension age problems can be solved by schemes that allow for individual adjustment of retirement age and the expansion of work activity; this may be better than changing the statutory retirement age for each participant. However, a recent OECD's editorial (OECD 2017) also states that "older workers are a diverse group and the flexibility of retirement is double-edged because it can increase the participation rate and standard of living of those who want and can work longer, but can also lead to an underestimation of financial needs in retirement and early retirement with reduced benefits and living standards". It can also be difficult to plan flexibly for those with lower working incomes or fail to find good opportunities in the labour market, on the contrary, it can be easy for those with higher working incomes and want and can work in their profession longer than statutory retirement age.

Various pension and health systems have responded to this issue differently. We could observe the reaction in different types of health care systems, such as introduction of government-financed health plans like Medicare in the USA since 1960s (Berkowitz 2005), compulsory social insurance payments for health care and long-term care and special disease management programs for pensioners in Germany and the willingness to pay for health insurance there (Bock et al. 2016) or public administration's efforts to improve the care for the elderly in

government-run systems like Great Britain's one (Bowman et al. 1999; Ajayi et al. 1995).

This paper aims to enlighten those issues and suggests prepaid health schemes as a supplementary financing scheme for voluntary healthcare provision, provided that the solid universal health care system is maintained well. At the same time, it tracks the changes in specific needs of the elderly and emphasizes the link to pension systems and their extensions as the reliable resource of financing voluntary care for the elderly.

Methodologically we use empirical analysis of social system settings, SWOT analysis for the prepaid programmes, theoretical explanation of the financing mechanisms targeted at older age and general theory of public finance and social security.

2. The importance of public financing of universal standards

Generally, when a public financed universal health system is run, the question of pensioners' health financing is whether they ought to pay some contribution or tax for health care. The practice in OECD countries differs in this case, for example in Czechia, pensioners currently pay neither income tax, neither health contributions from their pensions, but in some countries like Germany or the Netherlands they must pay some compulsory contributions. Of course, if we impose some health contribution on pensioners, we must take it into account when doing pension system design, as it will decrease the "net pension" (disposable income) that the elderly will have for other expenditure. In this regard, the financing of the universal part of the system is mainly a question of public choice and configuration of the fiscal space for health (Cashin and Tandon 2010; WHO 2018). according to the incomes and pension schemes for the elderly. Usually, when a person enters pension age or retires, his or her social status changes, however and this has consequences on the rules of health contributions, too.

We can see that with changes according to age works also the USA system, where reaching 65 years of age means that you can enrol to the government-subsidized and organized health plan called Medicare. It is obvious, that its existence is determined by the needs of the elderly and the behaviour of private health insurance, where the premiums can rapidly rise with age and therefore can be unattainable for many older people. The dilemmas associated with this can be very complicated, as can be seen on the following quote (which we cite in full because it shows well how it empirically works in the USA) about termination of company-based coverage at 65.

"If you're not yet 65 but are retired and receiving retiree health benefits from your former employer, make sure you're aware of the employer's rules regarding Medicare. Some employers don't continue to offer retiree health coverage for former employees once they turn 65, opting instead for retirees to transition to being covered solely by Medicare. Without coverage from your company, you'll need Medicare to ensure that you are covered for potential health issues that arise as you age.

Some companies will not cut a retiree off completely at the age of 65, but instead continue to offer supplemental retiree benefits, which can be used in conjunction with Medicare (they may require you to enrol in both Medicare Part A and Part B

in order to receive full benefits—as secondary coverage—from the retiree health plan). The supplemental retiree health benefits may include prescription drug coverage, doctor visits, and other outpatient health care. Medicare will be your primary coverage if you're covered under a retiree health plan, with the plan offered by your former employer serving as secondary coverage.

If you have individual market coverage, purchased in the exchange or outside the exchange, you'll need to contact the exchange or your insurer to ask them to cancel your coverage when you transition to Medicare. Prior to the Affordable Care Act, individual market insurers typically wouldn't insure anyone over the age of 64, so plans were automatically terminated when people turned 65. That is no longer the case, so enrolees need to make sure that they actively cancel their individual market coverage when they switch to Medicare." (Montgomery 2019).

From the cited example, we can see that the differentiation of coverage according to age, albeit it can be defended from the individual freedom principle arguments, does not bring much when we must cover the necessary and required care. Therefore, in most health care systems, the public contributions as the share of income are the preferred way to finance health, the American approach of the government being one of the plans' provider targeted on the elderly works in American context only. The same applies to pension schemes – we can say that the replacement rate to some level (e.g. 50-60% of previous wage – OECD average net replacement rate is approx. 58% in 2018) ought to be achieved from publicly (compulsory) financed and guaranteed scheme, so that the pension system is similarly stable as the health one in its basic functions.

3. Lifestyle changes and the role of voluntary schemes for older age

Given the importance of universal care and financing, there is a possibility to utilize also voluntary schemes that consist of the care that primarily help to the well-being, quality of life, comfort and responsiveness of health services consumed by the elderly. They are not limited to the elderly and can be used at any age, but the older age is especially suited for them as the needs of seniors are both higher and more specific than general population in productive age.

Paradoxically, a person with a certain health limit who wants to lead an active life requires a greater range of better-quality services from the health system than if he would only passively experience his illness. At the same time, a far larger proportion of patients previously isolated or largely excluded from normal life are actively involved in it, which is certainly desirable from the point of view of national economic and others, but on the other hand, it puts increased demands on the health system because the direct quantified costs of "putting" such a person in an adequately compensated state are higher than in the past. The financial benefits of integrating people into society are quantifiable only in the long run, if at all, and we will add to it the probably difficult-to-quantifiable contribution of moral and ethical, especially in relation to the specific fate and life feelings of a particular person. In addition, people who can live a normal life through health care, in most cases, thanks to the experience of life, are very grateful to patients

and are subsequently able to improve their health, which they have acquired through adequate treatment of their disease, really translate into your performance at work and improve the quality of your life as a whole. This is already the reason for which it is worth looking for ways that will improve the possibilities of such people to engage in everyday life.

In other words, the current standard of living places far greater demands on health care than in the past, as many life activities are conditional on at least compensation for the patient's negative health in a particular area, which is not necessary for its "normal" survival, but for the conduct of modern, active life is necessary. Even the range of activities that people perform in life is increasing. People of a high age play sports, travel, work in responsible positions, even if part-time. This puts increased demands on the system, as these “patients” come to the doctors, saying they do not want to put up with their illness or their limitations and want to overcome them. That is why people who, due to their profession or penchant, need to be in good health and simply want to be “fit” and, in the case of health problems, if they already arise, want to solve them effectively, preferably with minimal impact on their employment or leisure activities. The difficulty of these patients is also manifested in the level of the services required, comfort in terms of time, etc. This leads to a significant differentiation of patients in terms of needs, as the aforementioned groups mix with those who do not require or need these services.

The above factors cause current medicine, of course, to continue to face problems of medical nature in the treatment of a particular patient, but increasingly with socio-economic constraints. This is exacerbated by the increasing dependence of effectively performed medicine on medical equipment and advanced pharmaceutical procedures. Thus, the results of the health system are closer to integration with the economic level and the mechanisms of allocation of funds to the health sector.

The current society has brought about fundamental changes in the view of the individual and his lifestyle. From the pursuit of mere survival, the emphasis is on the effective and responsible conduct of all actors in the economy. The economization of all areas of life and the emphasis on individual responsibility of the individual assume that each person will be able to take into account for their own actions and thus his own health, as well as the position of man in society and the relative level his remuneration is mainly due to his currently award-winning performance.

The corresponding health situation thus becomes one of the basic conditions for one to be able to take advantage of the possibilities offered by the market economy, both in terms of the long-term life perspective and in terms of exercising its capabilities at a certain time. Therefore, in the market economy, the pursuit of a person's good health is not only an objective finding, which results from a general desire and an effort to survive, but also an important condition for a person's optimal position in individual life situations and the whole economy.
Therefore, we can well justify that at least part of the population that has got “health investor’s” approach (Chytil et al. 2015) will have higher requirements that the universal part of pension and health system can adequately cover. So, we can

construct additional schemes of services' provision. However, for financing such a program on a regular basis, the elderly need a reliable source of financing, and since their working capabilities can gradually decrease, they rely on pension system to supply them disposable income that they can spend also on the health and social care. Simultaneously, in some countries like Czechia, the current pension pillars have not been designed with this requirement in mind, rather they followed the assumption that the universal system will cover all the services that seniors are going to need. This philosophy is good concerning the universal segment of care, but cannot cope with the individual needs of those, who can and want to have a higher level of well-being at the older age.

Therefore, a model of voluntary incentive pension system extension had been created and published (Mertl et al. 2019) which features the required scheme that allows the participants to gradually decrease the work load and provides supplementary pension benefits. Part of those benefits can be used also for financing health care, including the prepaid packages shown in this paper.

The main advantage of the model is that it shows the real possibility of creating an economic base for the expansion of productive services enabling the acquisition, preservation, and employment of human capital. Therefore, it is not only about how to ensure a decent standard of living and quality realization for people in older age, but primarily that a very strong and big demand for productive services and, at the same time, sources for their financing, which are created on a purely economic basis, is created by employing these people (to which the incentive extension motivates). This is not the only one, but significant and easily achievable, and concrete form of transforming the development of human abilities into the most dynamic factor of economic growth and the change in the character of this growth.

At this point, it is important to show how the benefits from the incentive extension can be utilized. There are various possibilities and various life situations, but in the context of this paper, the following usage may become essential (Mertl et al. 2019):

1) Voluntary forms of health care and services financing, which are oriented to prolonging the productive time and quality of life. From the pure point of view of financial flows, we consider this area to be the most important. As a practical alternative to private health insurance, which has strong limitations caused especially by the necessity of individual health risk evaluation (medical underwriting) and related information asymmetry, prepaid schemes for individually adjusted health packages can be considered.
2) Providing at older age social and support services that can enable the relevant productive person to spare time and energy in order to continue performing the relevant work activities. Still nowadays in Czechia, this is an underdeveloped sector of economy, which, of course, for many older citizens' case with retained abilities and qualification, means a waste of human resources.

4. The role of voluntary prepaid programmes

The development of medicine and socio-economic environment has brought new treatment options and health services for patients. Likewise, some patients' demand for comfort, time of health professionals and the extent of consumed health services are increasing. Although it has several ethical connections, it is currently recognized in developed countries that doctors can also provide care to those patients who have higher requirements than others, and these requirements are not strictly objectively justified by their health status. This moves us from the category of care that must be provided into the category of care a patient can or wants to consume. In this context, optional healthcare schemes can be created that can be used to finance and provide it.

The first option is logically private health insurance. Although it has suitable features for some scenarios, it also has got many problems that are not addressed well using the market mechanism. This is mainly due to the information asymmetry and adverse selection issues, which in many cases lead to the failure of the health insurance market (Cutler and Zeckhauser 1997; 1999). The individual's health risk is one of the worst quantifiable and insurable risks on the market, develops unpredictably among individuals, and its possible evaluation through medical underwriting constitutes a reason for major legal and ethical disputes. Moreover, health risks of the elderly are very high and therefore insuring them is very difficult. In addition, in case of high-quality healthcare, it is sometimes difficult to look for a randomness element that is generally necessary for the use of insurance mechanisms. Still, accident insurance, critical illness insurance, hospitalization or long-term care insurance can work. Even general private health care insurance can be offered, but its marketability is low for the stated reasons, especially for older people who had not bought such insurance product when they were younger and had lower risk.

It is also possible to pay for optional health care directly out-of-pocket, which is the simplest form, but it has many limitations (Arrow 1963) (e.g. financial hardship at the moment of the treatment, time-limited decision in asymmetric position, highly limited ability of typical patient to "shop around" for the best price) leading to marginal role of these schemes in developed countries (OECD 2017).

Suitable possibility for extending schemes of optional healthcare financing comprises prepaid health care programmes. Their economic construction is relatively simple and consists in the regular allocation of the amount chosen (e.g. monthly or yearly), for which the client receives a healthcare package according to their preferences and needs. Therefore, we need not quantify health risks or otherwise restrict access into the product, although it is of course really useful to adapt the package to the needs and health of the client according to their preferences or as a result of expert advice when purchasing the product. Different clients can consequently have different packages for the same money, as will be shown below.

Let us assume that a patient can give 1 000 CZK for his health services monthly, e.g. 12 000 CZK annually (can be lower or higher amount according to the individual budget limitation and willingness to pay). Therefore, he can buy a prepaid package for this price, which we can see also as a subscription price.

He then is offered, according to his preference and/or health status, a package of health services that he can consume for that money during a year. It can be offered purely according to his demonstrated preference, or he can get advice from a doctor according to his health status, which services he would the most benefit from. Model (theoretical) example of such program can be found in Table below.

Table 1. Prepaid packages' model examples for 12 000 CZK yearly subscription

Healthy	Already sick (e.g. cardiovascular condition)
1 000 CZK for services of nutrition advisor 3 000 CZK for wellness services 2 000 CZK for annual specific complex screening of civilization diseases 2 000 CZK for lifestyle activities and therapies (exercise, relaxation) 2 000 CZK for better services at general practitioner (email/callback/SMS), additional consultations/screening 2 000 CZK for vitamins, vaccination and reimbursement of regulation expenditures if introduced/expanded in universal part of the system	3 000 CZK for additional services/consultations at cardiologist, lower co-payments for advanced drugs that he takes regularly 2 000 CZK advisory services of physiotherapist and physical training aimed at cardiovascular rehabilitation 1 500 CZK for vitamins and dietary supplements 1 500 CZK contribution for a home cardio monitoring device 2 000 CZK for better services at general practitioner (email/callback/SMS), regular monitoring of health status 2 000 CZK for lifestyle activities (exercise, relaxation) specific for cardiovascular diseases

Source: (Mertl 2018), updated.

It is clear, that the structure of benefits can differ according to the status of the patient and is highly dependent on the creativity of the scheme providers. In addition, we can imagine that the employers will provide partial or full financing of those packages as a specific employment benefit. Thus, it can serve also as the factor of market differentiation and choice. If desired, special prepaid schemes can be created for e.g. dental, eye or spa (wellness) care.

A real example from one provider's content in the branch of rehabilitation care is cited lower in the Silver Card content (Klinika Malvazinky 2020):

– comprehensive examination by a rehabilitation specialist,
– package of rehabilitation services (7 x individual physiotherapy, 6 x massage services, 6 x group workout or gym, 12 x entrance to the pool, 2 x sauna access, 6 x full body bath, 50% discount on entrance to the rehabilitation pool, hydrotherapy procedures, group exercises and access to the fitness and functional zone at times designated for the public),
– individual approach in planning examinations and procedures according to the client's wishes,
– extended basic medical check-up at the general practitioner,

– free inclusion in the preventive-rehabilitation program (once a year in the chosen term and to the extent corresponding to the individual needs of the client),
– preferential approach and mediation of appointment when ordering for expert examinations in our clinic: internal medicine, cardiology, surgery, orthopaedics, rehabilitation, neurology, general practitioner, clinical psychology, etc.,
– free coffee and water at the Malvazinky Rehabilitation Clinic Cafe (1 x per visit).

As we can see, in Czechia's reality, we can already find some examples of those packages at the level of health providers and management organizations. They offer prepaid programmes with specified content, either general or medical branch specific (Santé 2020; Klinika Malvazinky 2020). It is possible to provide them on this basis, but systemically there are some disadvantages with integrating the provider and the payer, as it could be seen on the example of American Preferred Provider Organizations and Health Maintenance Organizations (Shin and Moon 2006; California State University 2020). Therefore, it would be better if also the health insurance companies could offer them to their clients, with strict separation of public and private resources, of course. The reasons are that they have better information about prices and providers, can target much higher number of clients and can combine multiple providers into integrated packages. Therefore, synergic effects and economies of scale would be higher when health insurance companies provide those programmes.

In practice, these schemes make sense especially as an extension of a universally available system because international experience with health savings accounts shows that they have disadvantages that become highly prominent if they are not supported with the aid of compulsory universal system – then they quickly fail with the poorer or sicker population or when clients grow old and require more expensive care. One of the disadvantages of health savings accounts is also the "pressure to save", which means adverse health care seeking behaviour to preserve money saved into the account. Therefore, suggested prepaid health packages supply no special incentives to save money there and the amount paid should be fully spent for specified health services during chosen period.

Employer can contribute to financing of these programmes, even in relation to workload compensation by influencing their content. Similarly, if the client is involved in the voluntary extension of the pension system (Mertl and Valenčík 2017), then a part of the benefits from this extension may also be used to pay for the subscription.

As opposed to out-of-pocket payments, these schemes have the benefits in a possibility for the creativity of health insurers and healthcare facilities in organizing and implementing care, economies of scale (large volumes of care can be planned and provided based on the batch of valid pre-paid contracts), promoting regional development, predictability and transparency of funding for the client and for healthcare facilities and reducing the difficulties with financing and decisions at the time of the treatment and health services' consumption. The overall position of these healthcare schemes can be summarized in the following SWOT Table, which we

have created based on the socioeconomic characteristics of prepaid health programmes as a voluntary extension of universal system.

Table 2. SWOT analysis of prepaid health programmes' role

Strengths	**Opportunities**
Synergic effect with universal health coverage, while keeping public and private resources separated Non-discriminatory approach according to the health status of a client Patient has real choice about the character and volume of provided services Lowering transactional costs, reducing information asymmetry and increasing economies of scale compared to situation when the patient buys the services individually and/or at the moment of treatment	Possibilities of truly voluntary allocation of private resources for health care Possibility of individual or group targeting of those schemes, e.g. the elderly people, people with some chronic condition Options for health providers and health insurance companies to be creative about the content of those packages Transparency for client about the allocation of his resources
Weaknesses	**Threats**
Construction of the package can be perceived as "not necessary for healthy and not enough for sick" The amount of resources that individual can allocate might be too low for programme to be useful for him/her Does not cover bigger (catastrophic) expenditures nor provides full coverage for listed situations (as health insurance does) Those who can utilize it the most (sick/poor) might not afford to buy it	Some medical branches can offer more into packages than the others Character of competition and regulation on the market Unclear influence on the overall health system effectiveness Requires to be backed up by universal system (which is present in Czechia but if not maintained well can threaten even the operation of programmes)

Source: (Mertl 2018), updated.

5. Conclusion

The importance of universally financed health schemes and solid government guaranteed pension pillar is clear, but there is also space for voluntary extensions that can improve the well-being for the elderly. This is supported by the fact that the lifestyle and requirements of older population change and increase, and some countries face unfavourable population pyramid shapes that must be handled within social policy framework. Such schemes can be created both in pension and health systems, and the benefits from pension systems extension (additional pillars) can be used amongst other expenditure also for financing prepaid health care programs. In pension system, we can utilize the incentive extension described here (Mertl et al. 2019). The client can either have full engagement and then fully retire, or since some point, he can gradually decrease his engagement and start to receive the partial benefits during relaxed phase. The model can work with any realistic parameter settings.

The health status and available care is closely connected with pension age and prolonging active participation, both being key issues of pension reforms.

As a possible alternative to private health insurance, which has strong limitations caused by individual health risk evaluation (medical underwriting), prepaid schemes can be considered. Systemically in the form of health savings accounts they also have got disadvantages that become highly prominent if they are not supported by solid universal system – then they can quickly fail with poorer or sicker population, or when the clients get older and demand more expensive care. In this paper, we have shown the prepaid schemes as an extension to well-covering universal health care system, with link to incentive pension system extension as a financing resource and without special incentives to save money there, overcoming those disadvantages largely.

As seen from SWOT analysis, they have got some unique properties that are lower transaction costs and high economies of scale, non-discriminatory approach to the health status of clients and voluntary allocation of money for concrete health services chosen individually with possible medical advice. These prepaid schemes are also more suitable for "health investor" than "health consumer" human behaviour (Chytil et al. 2015).

We showed that some attempts of such prepaid schemes have been occasionally spotted in Czechia already, but they are highly selective, elementary and usually they are provided by larger hospitals or network of ambulances, being a limited offer to their patients.

We do not want to pretend that prepaid schemes are a miracle that can resolve the issues of well-being for the elderly. The analysis shows also their threats and weaknesses and for some scenarios other financing schemes can be more appropriate. But we suggest that they should be seriously considered as an option for specific health packages consumption and financing especially in the form of voluntary extension of universal system, and pension system could provide reliable cashflow resources for them when the clients partially or fully retire.

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IMPACT OF SAVINGS WITHIN THE CAPITAL PENSION SYSTEM ON THE FLOW OF FUNDS ACCOUNTS

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1. Introduction

In economic analyzes, savings can be considered on a microeconomic or macroeconomic scale. In the microeconomic approach, it is emphasized that savings of individuals or households are accumulated as a result of their propensity to save. Savings are treated as a way of attain their objectives, often long-term related to, for example, securing old age. The importance of this saving motive seems to grow due to increasing longevity and unfavorable forecasts for the decline in the replacement rate at retirement (European Commission 2018; OECD 2019). Numerous empirical studies indicate that households are not saving enough for retirement (see e.g. Campbell 2006; Lusardi and Mitchell 2011).

Simultaneously, on the macroeconomic scale, savings provide the sources of financing investments in the economy through financial institutions as intermediaries in the flow of funds between entities with a surplus and those with a demand for them. Financial savings gathered by households circulate in the financial system and therefore finance the debt of other sectors, which, in turn, cover their expenses by incurred liabilities, e.g. the investments of corporations. In this way, financial savings and tangible investments are closely related, linking the financial and "real" sphere of the economy.

Considering these two perspectives on the savings exploration, the study therefore focuses on achieving two main objectives. The first one is to indicate the changes in the structure of household financial savings with particular emphasis on the share of retirement savings, including compulsory savings in open pension funds (until 2014) and voluntary retirement savings in the form of employee pension scheme (PPE), individual retirement account (IKE), individual security pension account (IKZE). The second objective is to examine the impact of savings within the capital pension system on the financial system reflected by flow of funds accounts. The role of households' retirement savings in the network of intersectoral linkages in the financial system has been examined on the basis of financial input-output model. Multipliers of the model indicate the increase in the flow of funds induced by the unit increase in the supply of households' funds. Simulation analyses based on these multipliers concern changes in financial assets and liabilities of institutional sectors as well as possible limitations of tangible

investments financing through the financial system resulting from a decrease in supply of funds due to the planned liquidation of open pension funds.

The research is based on statistical data published in the Eurostat database, i.e. annual accounts – financial balance sheets by institutional sectors and four subsectors of financial corporations. Statistical data derived from the annual financial accounts are constructed in accordance with *European System of Accounts ESA 2010* (Eurostat 2013), published in the Eurostat database.

The structure of the paper is the following. The first part is a brief literature review on saving reasons, paying special attention to savings aimed at securing old age. In the next part the structure of flow of funds accounts and the idea of the financial input-output model as a tool for simulation analyses are described. The third part is an short empirical report on the changes in households' financial assets structure in Poland in 2000-2018[1] against the backdrop of the EU. Finally, simulation analysis results are presented. The concluding paragraph contains a brief summary and some directions of future research.

2. Propensity to save for retirement

Saving means limiting consumption during a given period, i.e. refraining from spending part of the income in order to meet current needs, taking into account future ones (e.g. after the end of professional activity or its reduction). Among the motives (factors) of saving mentioned by Keynes (1936), particularly important from the point of view of saving for retirement are: the foresight motive based on predictions about the relationship of current and future income, the precautionary motive – creating reserves for unforeseen expenses, to bequeath property. Future pensioners save to ensure an adequate standard of living in material and cultural terms, also during retirement, enabling them to spend their free time in a pleasant or even extraordinary way (e.g. having the opportunity to participate in tourist trips, travel abroad, etc.).

It seems that the propensity to save for retirement, as the implementation of the aforementioned motives for saving, should grow in connection with the increase in life expectancy, which leads to the extension of the retirement period. When longevity increases households need more wealth to finance their retirement consumption. Research conducted by Cocco and Gomes (2012) indicates that individuals who expect to live longer and have higher earnings save more.

From the perspective of institutions operating within the pension system, increasing life expectancy leads to an increase in their expenses which causes underfunding if at the same time the working age population is decreasing. The remedy for growing underfunding of these institutions, especially state-sponsored pension schemes, is a reduction in retirement payments or an increase in contributions. Predictions of low pensions in the future should generate a need for households and individuals to save more for retirement.

[1] The analyzed time period results from the availability of statistical data compiled by the standards of ESA 2010.

The increase in the propensity to save for retirement on a macroeconomic scale requires the following factors: growing importance of employer programs, government endorsement, financial educations, advertising (e.g. public awareness campaigns on the subject). One way to institutionally stimulate the propensity to save voluntarily are tax and other incentives for funds held in particular types of saving account. Tax incentives increase the rate of return to saving but they effectively contribute to increasing savings for retirement resulting from reducing consumption level as opposed to simply moving funds from one form of saving to another (Attanasio et al. 2004). Since financial products are becoming more and more complex financial literacy seems to be an increasingly important factor of retirement planning behavior (Fornero and Monticone 2011). Numerous studies show that financial literacy positively and significantly affects the probability of participation in a private pension scheme (see e.g. van Rooij et al. 2012, Lusardi and Mitchell 2011). Moreover, research conducted by Fornero and Monticone (2011) indicates too low financial knowledge, which is one of the barriers to saving, especially in the context of voluntary forms of saving for retirement (see also Behrman et al. 2012).

Empirical research on American expenditures and savings (Choi et al. 2002) referring to behavioral theory of the life cycle show that people postpone the decision to save, although they are aware of the need to save, they are also characterized by a passive attitude towards planning savings for retirement. It is difficult to indicate research on behavioral inclinations of Poles in terms of saving for retirement. Some elements of this theory are included in the research by Liberda's team (Liberda et al. 2012). The results of their analysis show that the perception of income affects the household saving. More precisely, if the household perceives its disposable income as average or at least sufficient to fulfil the household needs, this household saves quite a high share of income.

3. Analytic framework

Flow of funds accounts (FFA), which are the basis of empirical analyses reported in the paper, show financial assets acquired by institutional sectors[2] and liabilities incurred by these sectors in the form of various financial instruments[3]. FFA in the national accounts system are referred to as financial accounts. The data are compiled in accordance with the European System of Accounts ESA 2010 (Eurostat 2013). FFA are presented in two forms: financial flows and stocks.

[2] Six institutional sectors are distinguished in the system of national accounts: non-financial corporations, financial corporations, general government, households, non-profit institutions, rest of the world. Financial accounts are also compiled for four sub-sectors of financial institutions: 1) monetary financial institutions, 2) Other Financial Institutions (except ICPFs), financial auxiliaries, CFIs, and money lenders, 3) Non-MMF investment funds, 4) Insurance corporations and Pension Funds. Household sector and non-profit institutions serving households are combined.

[3] Financial accounts are compiled for over twenty financial instruments in eight groups: 1) Special drawing rights (SDRs), 2) Currency and deposits, 3) Debt securities, 4) Loans, 5) Equity and investment fund shares, 6) Insurance, pensions and standardised guarantees, 7) Financial derivatives and employee stock options, 8) Other accounts receivable/payable.

Flows are recorded as financial transactions, other changes in volume and revaluation account, while stocks of assets and liabilities are shown in the form of financial balance sheets. Financial transactions take place between resident institutional units, and between them and the rest of the world. They show how the surplus or deficit of the capital account is financed by transactions in financial assets and liabilities. More precisely, the financial account indicates how net borrowing sectors obtain resources by incurring liabilities or reducing assets, and how net lending sectors allocate their surpluses by acquiring assets or reducing liabilities. All financial flows represent the difference between the opening financial balance sheet at the start of the year and the closing balance sheet at the end of the year.

Financial balance sheets provided by Eurostat take the form of asset-by-sector Tables[4] of financial assets (E in Table 1) and liabilities (R in Table 2). The data contained in Tables E and R show financial instruments in which entities (institutional sectors) invest surplus of funds and financial instruments in which they incur liabilities, respectively. Each financial instrument is recorded as asset of one entity and simultaneously as liability of another[5] therefore the total amount of financial assets must be equal to the total amount of liabilities.

Table 1. Matrix of financial assets

Sectors / Financial instruments	j	$s_i^E = \sum_j e_{ij} = \sum_j r_{ij}$
i	$\mathbf{E} = [e_{ij}]$ Assets of sector j in the form of i-th instrument	$\mathbf{s^E}$ Total amount of i-th financial instrument
$\sum_i e_{ij}$	$\mathbf{e}^T$ Total assets of sector j	
$\varepsilon_j = z_j - \sum_i e_{ij}$	$\boldsymbol{\varepsilon}^T$ Excesses of liabilities over assets of sector j (if exist, 0 otherwise)	
$z_j = \max(\sum_i e_{ij}, \sum_i r_{ij})$	$\mathbf{z}^T$ Stock of assets or liabilities of sector j, whichever is larger	

Source: own elaboration based on Tsujimura and Mizoshita 2004.

[4] They are analogous to commodity-by-industry make and use tables in classic input-output analysis – cf. Miller and Blair 2009, pp.185-187.

[5] Only monetary gold does not have an equivalent in liabilities on the financial balance sheet in order to preserve the double registrar principle. Therefore, this instrument has been excluded from the flow of funds table.

Table 2. Matrix of liabilities

Sectors / Financial instruments	j	$s_i^R = \sum_j e_{ij} = \sum_j r_{ij}$
i	$\mathbf{R} = [r_{ij}]$ Liabilities of sector j in the form of i-th instrument	$\mathbf{s^R}$ Total amount of i-th financial instrument
$\sum_i r_{ij}$	$\mathbf{r}^{\mathrm{T}}$ Total liabilities of sector j	
$\rho_j = z_j - \sum_i r_{ij}$	$\boldsymbol{\rho}^{\mathrm{T}}$ Excesses of assets over liabilities of sector j (if exist, 0 otherwise)	
$z_j = \max(\sum_i e_{ij}, \sum_i r_{ij})$	$\mathbf{z}^{\mathrm{T}}$ Stock of assets or liabilities of sector j, whichever is larger	

Source: own elaboration based on Tsujimura and Mizoshita 2004.

However, this method of recording flows of funds does not show who (which sector) is the creditor and who is the debtor regarding the financial instrument. The sector-by-sector square matrix (intersectoral flow of funds Table) is constructed from a set of balance sheets of financial assets (E) and liabilities (R). The idea of compilation procedure of intersectoral flows tables, proposed by Tsujimura and Mizoshita (2004), is based on input-output methodology (see also Klein 2003; Okuma 2012; Trębska 2018). It was adopted in this study to construct the financial input-output table for financial flows in Poland in 2018. The scheme of financial input-output table is shown in table 3.

Table 3. Financial input-output table (asset oriented system)

sector / sector	j	ρ_k	z_k
k	$\mathbf{Y} = [y_{kj}]$	$\boldsymbol{\rho}$	$\mathbf{z}$
ε_j	$\boldsymbol{\varepsilon}^{\mathrm{T}}$		
z_j	$\mathbf{z}^{\mathrm{T}}$		

Source: own elaboration based on Tsujimura and Mizoshita 2004.

The y_{kj} element of matrix Y reflects flows of funds from sector j to sector k as a realization of the j-th sector's demand for financial instruments issued by sector k. In a different sense, y_{kj} shows the j-th sector's supply of funds to sector k[6]. Vectors ρ, ε^{T}, z are the same as those in Tables of assets and liabilities (see Table 1, Table 2).

[6] Since each element of matrix Y has double interpretation, Tables of intersectoral flows can be based on liability-oriented system or on asset-oriented system. Liability-oriented

The following balancing equation is true for table 3:

$$\mathbf{Y} \cdot \mathbf{i_n} + \boldsymbol{\rho} = \mathbf{z} \tag{1}$$

where Y is $n \times n$ square matrix, i_n is the summing vector (n-element unity column), n is number of sectors.

Taking into account the formula (1), and setting matrix $\mathbf{C} = \mathbf{Y} \cdot \hat{\mathbf{z}}^{-1}$ ($\hat{\mathbf{z}}$ is diagonal matrix of z_j), a financial input-output model is obtained:

$$\mathbf{C} \cdot \mathbf{z} + \boldsymbol{\rho} = \mathbf{z} \tag{2}$$

Thus,

$$\mathbf{z} = (\mathbf{I} - \mathbf{C})^{-1} \boldsymbol{\rho} = \boldsymbol{\Gamma} \cdot \boldsymbol{\rho} \tag{3}$$

γ_{kj} elements of matrix $\mathbf{G}$ are the financial multipliers, which indicate the supply of funds in sector k induced by the increase by unit in the j-th sector's supply of funds (increase in savings). The column sums of matrix $\mathbf{G}$, i.e. total multipliers show the total effect – the sum of the increases in all institutional sectors' resources z_j.

Assuming an increase in the supply of funds, which is recorded as $\Delta\rho$ in financial input-output model, $\Delta z = (I - C)^{-1}\Delta\rho$ for each institutional sector and total increase in financial flows $\Delta Y = C \cdot \Delta \hat{\mathbf{z}}$ can be determined. The row and column sums of ΔY show increase in liabilities (Δr) of sector k and increase in assets (Δe) of sector j respectively as a result of $\Delta\rho$ – changes of savings. The increase in savings implies changes in demand for funds aimed at tangible investments of sectors whose liabilities excess financial assets: $\Delta\varepsilon = \Delta z - \Delta e$.

4. Retirement savings in the structure of Polish households' financial assets

Securing the old age period is one of the motives for households' saving. This saving goal can be achieved by accumulating assets in various forms, not only financial ones. However, the savings analysis presented in this paragraph of the paper is limited to financial assets. It is based on Eurostat database – financial balance sheets. Attention is focused on those financial instruments that are important in terms of household savings, e.g. currency and deposits, equity and investment fund shares, life insurance and annuity entitlements, pension entitlements. All of these assets can be a form of old age security.

The specificity of the structure of Polish households' financial assets consists primarily in a relatively high share of currency and deposits and a small share of insurance systems, pension and standardized guarantee schemes, especially life insurance and annuity entitlements (see Fig. 1).

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financial input-output table is a transposition of table based on asset-oriented system. Columns of table Y in liability-oriented system show sectors which demand the funds that are supplied by sectors reflected in rows. Vector $\boldsymbol{\varepsilon}$ of excesses of liabilities over assets (investments) is exogenous.

In the group of UE28 countries the share of currency and deposits in households' assets fluctuated between 28% and 31% in 2004-2018, only in 2008-2009, i.e. during the financial crisis and poor economic conditions in the capital markets, it increased to 33%. In Poland, this share decreased from 60% in 2000 to 34.5% in 2007 and ranged from 44 to 50% in the years 2008-2018. While the share of current deposits grew due to the increasing prevalence of settlement accounts, the share of other deposits decreased mainly because of low real interest rate. This may mean that the importance of deposits other than transferable as a form of saving for retirement has decreased.

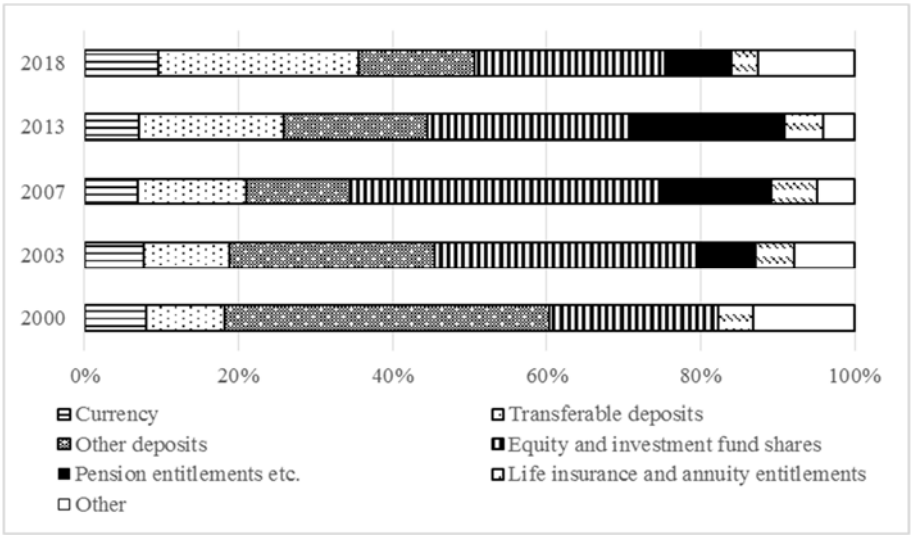

Fig. 1. Structure of households' financial assets[7] in Poland in selected years of the period 2000-2018

Source: own elaboration based on Eurostat Database (update: 31-01-2020).

The decline in interest in the long-term deposits was accompanied by an increase in the share of equities in households' financial assets. This share exceeded 40% in 2007 in Poland (28.5% in the UE28), but the financial crisis and the significant downturn in the capital markets led to a 50% decrease in stock of equities in 2008. A similar trend was observed in most EU countries.

The share of life-insurance in financial assets of Polish households ranged between 3.4 and 7% in the analyzed period (the average for UE28 oscillates around 15%) without a clear upward trend. Only the increase in the interest of households in life insurance combined with insurance capital fund is visible, which might be treated not only as precautionary saving, but also as a kind of saving for retirement.

Formally, securing the old age period as a reason of saving is realized by instruments related to pension systems, including savings in open pension funds

[7] Data for household sector and non-profit institutions serving households are combined, but assets of non-profit institutions constituted less than 1,5%.

(compulsory until 2014 in Poland) and voluntary retirement savings within the capital pension system in the form of employee pension scheme (PPE), individual retirement account (IKE), individual security pension account (IKZE), etc. In financial accounts, these assets are recorded as pension entitlements (financial claims that current and former employees hold against their employers, a scheme designed to pay pensions or an insurer). These are reserves created by open and employee pension funds for the payment of pensions for their members, as well as funds accumulated under employee pension programs, on individual retirement accounts and individual retirement accounts. Pension entitlements are assets of the households sector. On the other hand, pension entitlements can be the liabilities of any institutional sector, although in practice they are mainly liabilities of subsectors of insurance corporations and pension funds. The entitlements related to social security funds subsector, which is part of the general government sector, are not recognized in financial accounts.

The share of pension entitlements in the households' assets grew systematically until 2013, reaching 20%, which was similar to the average in the UE28. However, due to a series of acts[8] changing regulations of the pension scheme in Poland, this share decreased to 10% in 2014 (8.7% in 2018) with a decrease of assets collected in open pension funds by almost 50%.

The stock of voluntary retirement savings, which are accumulated for achieving old age security in the capital pension system, was steadily rising to reach 23.8 billion PLN in 2018 (see Fig. 2). The total share of PPE, IKE and IKZE slightly exceeded 1% of total financial assets of households in 2016 (1.1% in 2018).

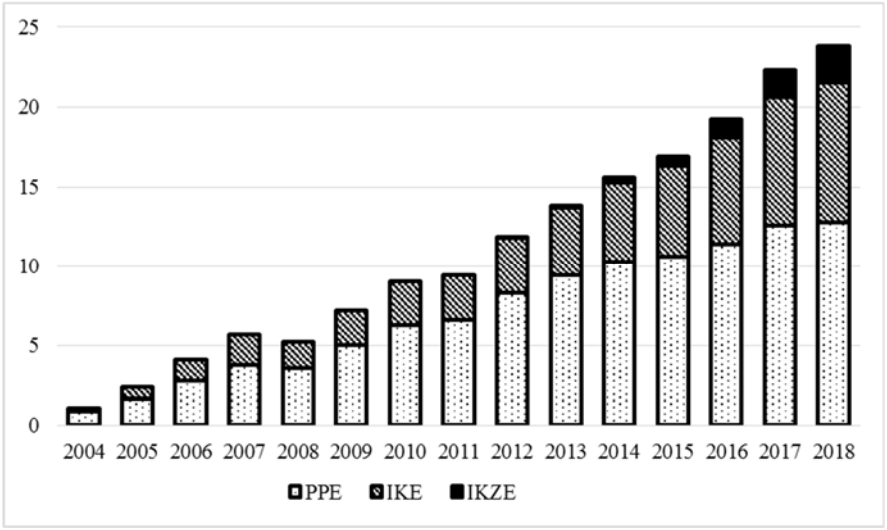

Fig. 2. Voluntary pension entitlements (in billion PLN)
Source: own elaboration based on data from The Polish Financial Supervision Authority.

[8] These acts involve transfer of part of the funds from the open pension funds to the social security finds and reduced contribution transferred to open pension funds from 2011 onwards (J.o.L. 2011 No. 75 item 398 as amended) and the abolition of compulsory participation in the capital part of the pension scheme from 2014 (J.o.L. 2013, item 1717).

The liquidation of open pension funds (OFE) in Poland, planned for 2020, consisting in the transformation of entitlements in OFE into individual retirement accounts (IKE), will lead to a significant increase in the resources of voluntary retirement savings.

5. Impact of the changes in pension entitlements in private schemes on intersectoral flow of funds

Financial input-output model is used herein as a tool of simulation analyses aimed at estimating effects of the liquidation of open pension funds (OFE) in Poland planned for 2020. Pension entitlements in OFE will be transformed into individual retirement accounts (IKE) after their reduction by a transformation fee of 15%. Savers will have the option of transferring entitlements in OFE into social security funds (public pension scheme).

Pension entitlements in OFE are recorded in the system of national accounts in financial accounts as assets of households and simultaneously as liabilities of pension funds (sub-sector of financial corporations). The transformation of pension entitlements in OFE into IKE means the change in the form of retirement savings. The amount of savings will decrease due to the transformation fee or declarations of funds transfer to social security funds. The structure of financial institutions in which households allocate their retirement savings will also change since IKE are managed by various types of financial institutions (not only pension funds). Data on assets accumulated on IKE by account operators, provided by The Financial Supervision Authority, indicate that about 22% of assets in this form are managed by banks, 17% by investment funds, 31% by entities conducting brokerage activities and 30% by insurance institutions and voluntary pension funds. The scheme of flows due to OFE liquidation presents Fig.3.

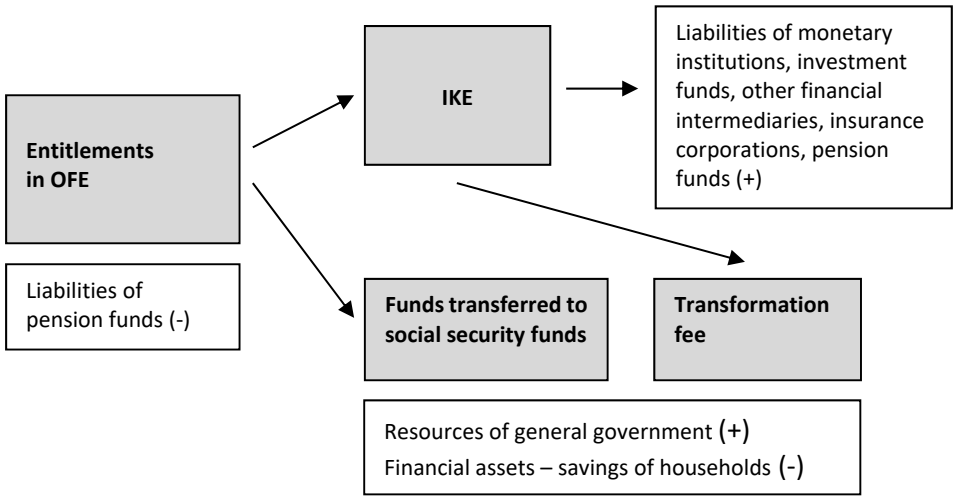

Fig. 3. Scheme of flows due to OFE liquidation
Source: own elaboration.

All these changes in assets and liabilities are introduced into financial input-output table (cf. table 3) compiled for 2018 by the following disturbances:

- changes of flows from households to financial corporations (every sub-sectors) recorded by relevant elements of the Y matrix, what modifies matrix C coefficients in the model (see formula (2)),
- decreases in total amount of households assets on z^T and z vectors,
- decrease in excess of assets over liabilities of households on ρ vector.

The main aim of the simulations is to determine the effects of the liquidation of open pension funds if it was introduced in 2018, when the stock of pension entitlements in OFE was 157.3 billion PLN.

Several variants of simulation can be considered:

1) The whole amount of pension entitlements in OFE (157.3 billion PLN in 2018) would be transformed into IKE, financial assets (savings) of households would decrease by 23.6 billion PLN (15% of 157.3).
2) 20% of the amount of pension entitlements in OFE would be transferred into social security funds (31.5 billion PLN), the remaining 125.8 billion PLN would be transformed into IKE, financial assets of households would decrease by 50.3 billion PLN (31.5 plus 15% of 125.8). This simulation variant is based on forecasts provided by The Polish Ministry of Finance.
3) The whole amount of pension entitlements in OFE would be transferred into social security funds, financial assets of households would decrease by 157.3 billion PLN.

In every variants the increase in general government resources due to transformation fee and funds transformed to social security funds would be distributed as current expenditures.

Above mentioned changes connected with OFE liquidation cause decrease in households savings in the form of financial assets. The larger amount of entitlements in OFE are transferred into social security funds, the greater decrease in savings level is. If the whole amount of pension entitlements in OFE was transformed into IKE, financial assets of households would decrease by 1.2%. On the contrary, transfer to social security funds of all entitlements in OFE would cause a decrease in financial assets of households by 7.8%. The structure of this sector's assets as the claims on other sectors also would change. In 2018 households' claims on insurance corporations and pension funds constituted 13.9% of households' financial assets but this share would decrease due to OFE liquidation. The scale of decrease depends on how much funds accumulated in the form of pension entitlements in OFE would be transferred into social security funds and how much would be transformed into IKE. The increase in the share of other sectors results from both decrease in the stock of households' assets and increase in financial institutions' liabilities in the form of IKE (cf. Fig. 4).

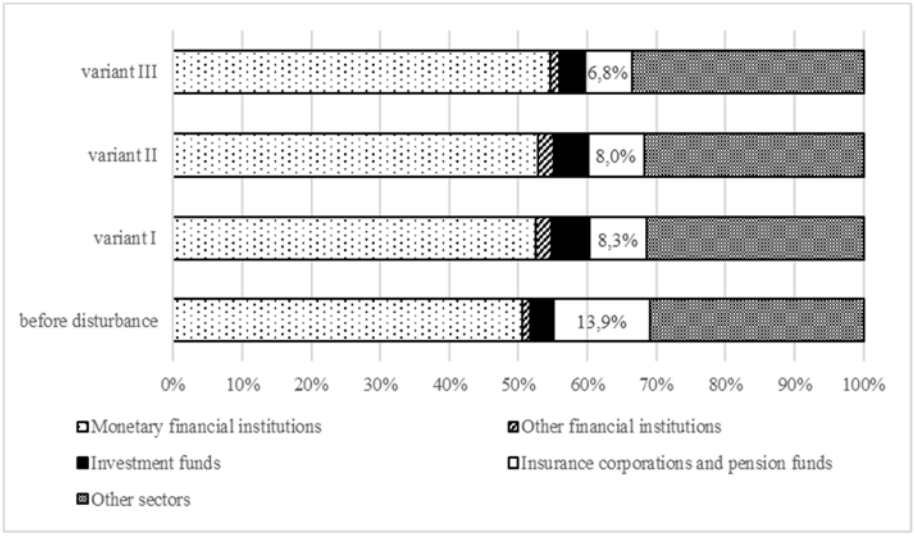

Fig. 4. Changes in the sectoral structure of households' financial assets
Source: own elaboration.

Changes in the structure of households' financial assets, which are reflected in **C** matrix in financial input-output model (cf. formula (2)), implies changes in multipliers (elements of matrix **G**), calculated according to formula (3). Financial input-output multipliers indicate that the supply of households' funds has the strongest impact on financial flows between sectors (in the table before disturbance, as well as in all variants of simulation). An increase in supply of this sector's funds by 1 billion causes an increase in financial resources of all sectors by 5.3 billion in total (5.26-5.28 depending on the simulation variant) as a direct effect and indirect effects resulting from chain reactions within the financial system (for comparison: the effect of the same increase in the supply of rest of the world sector's funds is equal to 4.4 billion). Changes in household savings have the greatest impact on the financial resources of corporations (each additional billion causes increase in corporations' liabilities by 1.3 billion). Effects of decrease in households' supply of funds presented in table 4 combine the effects of initial disturbance and cross-sectoral feedback within the financial system (chain reaction) that is determined by multiplier matrix. The greater effects observed for insurance corporations and pension funds result from the greater initial decrease in this sub-sector's liabilities.

Decrease in households' savings implies decrease in investments that are financed by them – corporations' investments will decrease to the greatest extend. Chain reactions linking household assets with corporations' liabilities may include, inter alia, households' (or institutions investing on their behalf) financial investments in equity and investment fund shares issued by corporations. Similarly, there may be a reduction in the households' acquisition of debt securities issued by the general government sector, which reduces the financing this sector's tangible investments.

Table 4. Effects of decrease in households' supply of funds by 50.3 billion PLN (second variant of simulation)

Sector	Initial disturbance of		Effects (initial, direct and indirect) in		
	liabilities	assets	liabilities	assets	excess of liabilities over assets
Non-financial corporations			-65.7	-32.7	-33.0
Monetary financial institutions	23.5		-35.6	-59.2	
Other financial institutions	18.2		11.8	-5.0	-1.4
Investment funds	33.2		25.9	-7.2	
Insurance corporations and pension funds	-125.2		-132.3	-6.8	-0.3
General government			-29.6	-14.0	-15.7
Households; non-profit institutions		-50.3	-15.8	-116.5	
Rest of the world			-24.1	-24.1	
Total	-50.3 billion -0.5%		-265.6 billion -2.7%		-50.3 billion -2.0%

The scale of total effects of OFE liquidation in particular simulation variants is proportional to the decrease in households savings (cf. Fig. 5), since the total multipliers for households saving change are almost the same in every simulation variants.

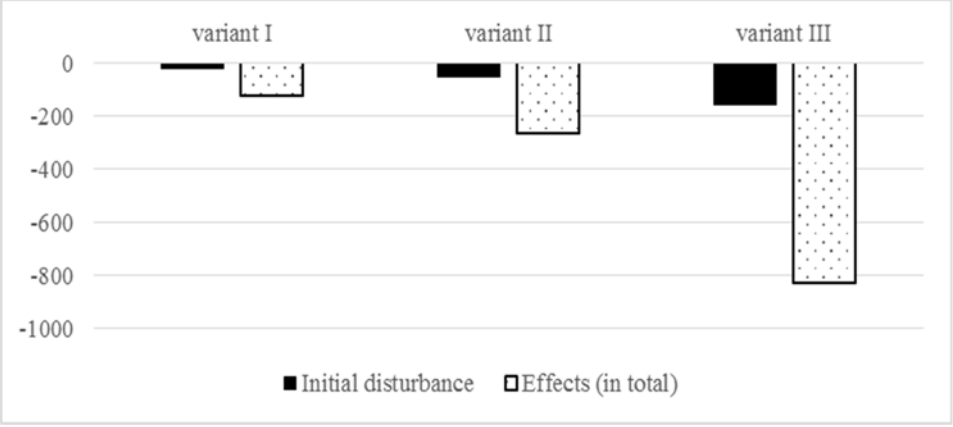

Fig. 5. Aggregated results of three simulation variants (in billion PLN)
Source: own elaboration.

Reducing household savings by 23.6 billion PLN (variant I) would result in a decrease in financial assets by 124.6 billion PLN (1.3%) as a sum of initial, direct and indirect effects. In turn, in the opposite extreme variant of the simulation, a decrease in households' excess of assets over liabilities by 157.3 billion PLN (variant III) would reduce the stock of financial assets by 827.6 billion PLN (assuming the financial input-output table structure is fixed).

6. Conclusion

Redesigning pension systems is inevitable due to demographic structure changes observed in most developed countries in the world. Since policies cannot substantially alter demographic trends, institutions need to adapt to them. The share of retirement-age population expands and the working-age population shrinks with declining fertility and increasing longevity. The share of GDP spent on financing pensions increases[9] and is projected to rise further (Góra 2019). Simultaneously, pensions will be reduced relative to wages (European Commission 2018). In this situation, it seems that institutional changes aimed at increasing the role of voluntary retirement savings are desirable. But if this makes the pension system so complex that it is difficult to understand for the average person, it leads misunderstanding about how the system works. The newest adjustment of the Polish pension system is designed in such way that the transformation of pension entitlements in open pension funds (OFE) into individual retirement accounts (IKE) is automatic, i.e. it does not require any action of holders of assets in OFE. Only people who want to transfer funds to social security funds (public part of the pension system) must make relevant declaration.

The study is not intended to assess whether this change will positively impact the finances of future pensioners. Such an assessment would require an analysis of its potential impact on changes in the willingness to save voluntarily for retirement. The results of simulation analyses presented in the study show the effects of reducing household savings. This reduction, on the one hand, is a consequence of the 15% transformation fee associated with the conversion of the entitlements in OFE into individual retirement accounts (IKE). On the other hand, it may result from the transfer of these entitlements to social security funds, which are not treated as household savings in SNA.

Simulations were conducted on the basis of financial input-output table for Poland in 2018 (the newest data available in Eurostat database), so formally the results show what the effect of the liquidation of OFE would be if it took place in 2018. In this sense, it is therefore a counterfactual simulation. However, since the structures of intersectoral flows are characterized by low variability, these results may constitute an estimation of the effects of OFE liquidation planned for 2020 in Poland. Assuming that only 20% of the amount of pension entitlements in OFE would be transferred into social security funds, financial assets of households

[9] Old age pensions as a percentage of GDP in European Union increased by 1.5 pp. in the period 2005-2017 (data on pensions from Eurostat database, update: 01.02.2020).

would decrease by 1.2%. It means that, the stock of household savings being the excess of assets over liabilities would shrink by 3.5% (2% of excess of assets over liabilities in total). While the 0.5% decrease in the flows of funds within the financial system does not have to be unambiguously negatively assessed, the reduction of the savings resource that can be used to finance tangible investments may constitute a limitation of corporations' activity (assuming the financial input-output table structure is fixed). This results from the principle of balancing of assets (as supply of funds) and liabilities (reflecting the demand for funds).

Although the methodology employed in the study is quite common internationally, it is relatively rare in Poland. The study presented herein is the first application of the simulation method based on financial input-output table for the Polish financial system. The applied approach disturbs not only savings (elements of the exogenous vector in the model), but also coefficients reflecting the structure of intersectoral flows of funds.

The classic input-output multiplier method used for production process analysis seems to be well enough examined from its beginnings (Leontief 1936). However, some of the principles of input-output analysis used for system of financial accounts simulations, may raise some reservations. Input-output multipliers show the effects of increasing selected elements of the exogenous vector (savings in the studied version of financial model) which are measured in the model by output increase (financial resources) assuming that the input-output coefficients are fixed (matrix **C**). Therefore, the following issues require testing: 1) stability of model coefficients, 2) equality of marginal and average increments of intersectoral flows of funds, 3) consequences of the switching from net lending to net borrowing sector (and vice versa), and many others concerning chain reactions within the financial systems. These issues verification will be direction of the author's further research on the financial input-output models application.

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CZECH PENSION POLICY

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1. Introduction

Inflation and the low indexation of bend points in the first half of the 1990s substantially reduced the dependence of newly granted old-age pensions on previous earnings. The pension reform from 1996 created a 'pension insurance' with two 'amounts': flat-rate and earnings-related. Each pensioner receives a flat-rate basic pension, replacing the previous universal 'state compensation contribution' of 1990, which compensated the cancellation of retail price subsidies. Its amount is now 10% of the national average earnings (NAE). The earnings-related 'percentage amount' of the pension generates a partial dependence of pension on previous lifetime earnings, adjusted by bend points and reduction coefficients: the crucial earnings are reduced to just 26% once the first low bend point of 44% is exceeded. Current second bend point is 400% of NAE with the reduction coefficient 0%. Figure 1 shows these current parameters of the Czech 'pension insurance'. The 'progressivity' of this system is high: a newly granted old-age pension is roughly by 30% earnings-related. Thus, 70% of it is a Beveridge type pension. This is a rarity in Central Europe as 'Bismarck' clearly dominates in all neighboring countries.

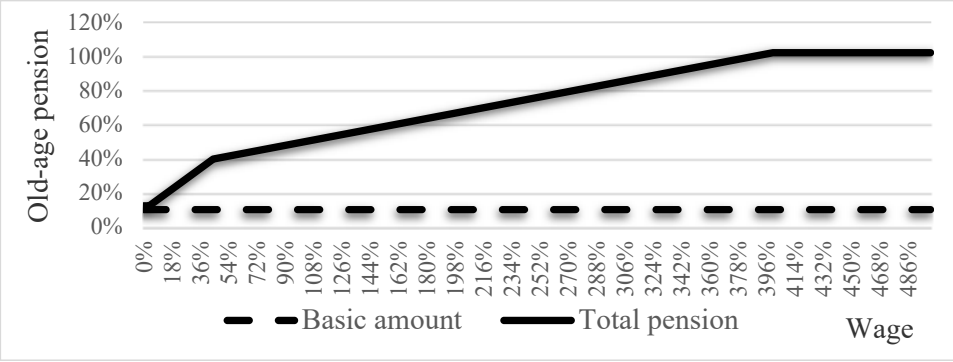

Fig. 1. Newly granted (net) old-age pension in relation to lifetime earnings, in % of NAE in 2020 (45 years of insurance)
Source: Author.

The transformation of the Czechoslovak predominantly Bismarckian pension system into the Czech predominantly Beveridgean system was influenced by the liberal policy of Klaus' government and by the creation of a complicated and

poorly understandable calculation of both newly granted old-age pensions and indexation (valorization) of pensions. Recently, the marketing approach of politicians on these issues has also contributed to strengthening the levelling of pensions. More than half of Czechs nevertheless prefer 'Bismarck' to 'Beveridge'.

In 2010, the Czech Constitutional Court concluded that 'whole complex design of the pension system is non-transparent to a degree that it is de facto incomprehensible for its addressees; and for the majority of the insureds the calculated amount of the pension benefit becomes unverifiable' (Czech Constitutional Court 2010). In addition, the court declared the provisions of the Pension Insurance Act on bend points unconstitutional, 'because in its consequences and in combination with other parameters and the existing construction of the pension system it does not guarantee a sufficiently constitutionally guaranteed right to adequate material security in accordance with … the Charter of Fundamental Rights and Freedoms and it leads to unacceptable inequalities between different groups of pension insureds' (Czech Constitutional Court 2010). The Constitutional Court abolished the section of the Act containing the bend points and reduction coefficients and it forced the government to react quickly; the government has reintroduced the first bend point within the scope of the so-called small pension reform. Unfortunately, this reform (2011) did not increase the transparency and clarity of the pension system. The only comprehensible parameter of the Czech 'pension insurance' has been the basic pensionable age, which is differentiated for women according to the number of children raised (a remnant of the Communist pension policy). To date, it has also not been possible to establish a comprehensible system of indexing the percentage amount of pensions; after the introduction of parameterization of the basic pension amount, the indexation of the percentage amount of the old-age pension depends on the total room for increasing the average old-age pension, the increase in the basic amount being deducted; so far, no one has even tried to explain the logic of this dependence of the indexation of the percentage-based amount on the valorization of the basic pension amount.

The fundamental challenge for Czech 'pension insurance' is its paradigmatic or rather technical reform, which would lead to the clarity and meaningful combination of the Beveridge (non-insurance) and Bismarck (insurance) components of this 'system'.

2. Proposal for a small pension reform

The non-restoration of the previous second bend point in the key range from 44% to 400% of NAE in 2011 created the preconditions for a simple reform of the basic and percentage amounts of the old-age pension without fundamentally changing the total amount of the old-age pension. Taking into account that earnings up to 44% of NAE are basically an exception, we can increase the total old-age pension in this range so that the total amount curve 'straightens' according to the grade of the straight line demonstrating the dependence of the total pension amount in the 44-400% of NAE range. The result of this operation is an increase

in the basic old-age pension amount from 10% to 32% of NAE and a reduction in the pension rate for 1 year of insurance from 1.5% to 1.5 * 0.26 = 0.39% see Figure 1.

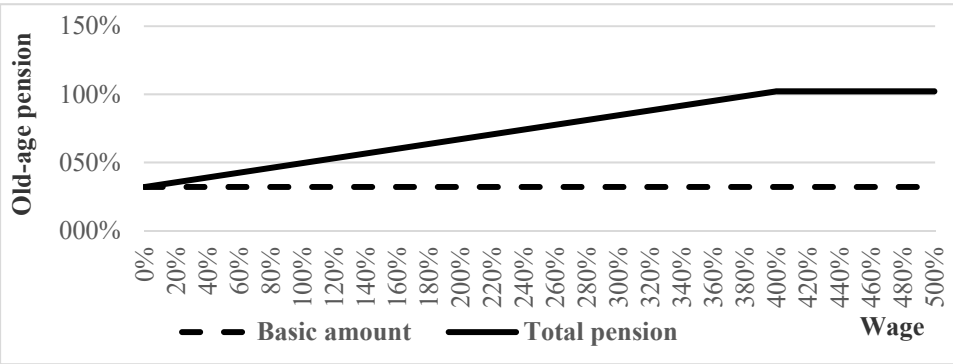

Fig. 2. Small pension reform: newly granted (net) old-age pension in relation to lifetime earnings, in % of NAE in 2020 (45 years of insurance)
Source: Author.

The outlined small pension reform does not change anything for the absolute majority of old-age pensioners. Only those whose pension is calculated from a wage lower than 44% of NAE will 'profit' from it. (The costs of this reform are some CZK 7 bn. only, according to the Ministry of Labor and Social Affairs.) I believe that such a small pension reform can be feasibly implemented in a span of one year. Its main effect will be a demonstration of the real 'progressivity' of the Czech pension system: it will be clear to everyone that 'pension insurance' is not, in fact, mainly a social pension insurance, but a flat-rate pension. I assume that later the interest in changing the structure in favor of earnings-related pensions will prevail. In order to facilitate this restructuring, it would be useful to cancel the parameterization of the basic old-age pension amount (32% NAE) and set a fixed sum for this amount: under the conditions of 2020, it would be CZK 11,141 per month (near the OECD poverty threshold). This redefinition of the basic pension amount will also allow for a substantial simplification of the indexation of the (new) earnings-related pension amount, which will become understandable – as well as the indexation of the basic old-age pension amount.

Disability pensions can continue to 'copy' the old-age pension formula after the small pension reform. For survivor pensions, it will be necessary to derive separately their basic and earnings-related pension amounts, as we have derived the rationalized the basic and earnings-related old-age pension amounts.

The key objective of the small pension reform is the 'irreversible' removal of the basic bend point used in calculating the earnings-related amount of old-age pension. This will significantly increase the understandability of the Czech pension system. A small pension reform can be implemented by the current Czech government, with the approval of the opposition.

3. Proposal for a major reform of public pensions

A consistent pension reform requires the division of the Czech current 'pension insurance' into two pension pillars: pillar 0 and pillar 1, according to the World Bank classification. Pillar 0, in its starting form a flat-rate pension at 32% of NAE, shall be financed from general taxes. On the other hand, the insurance pension (pillar 1) is to be financed from the social pension contributions, which does not exclude the financing of childcare credits from the state budget.

Significant differences should or could be made in the basic conditions for entitlement to the flat-rate pension and the insurance pension. The vesting period for (insurance) pension entitlement should be no more than 5 years. By contrast, a full flat-rate pension may continue to be subject to paying insurance premiums or, more generally, taxes (or length of stay) for 35 years – as is the case in the UK today.

Modern social pension insurance products include:

- Notional Defined Contribution (NDC) system of individual pension accounts, in which the resulting balance of the account is converted into a lifetime pension according to actuarial principles, including the application of adequate mortality tables. The NDC generic scheme has also built-in stabilization mechanisms in the valorization of individual accounts as well as in the indexation of pensions.
- 'Points system', where for each insurance year the client receives a fraction where the numerator is the client's wage (up to the earnings ceiling) and the denominator is represented by the national average earning (NAE); the client accumulates the points until the old-age pension is granted, the law and the government set a point value (e.g. EUR 31.03) for each year, thus providing the actual amount of the pension paid.
- (Austrian) pension accounts system, where pension entitlements are credited every year, calculated according to the pension formula e.g. 1.78% * annual wage of the insured, with the valorization of pension accounts using the wage index (amount of granted yearly old-age pension = final balance of the pension account), with indexation of paid pensions according to the law.

In 2003, World Bank expertise for the Czech Ministry of Labor and Social Affairs (Chłoń-Domińczak 2003) recommended us to move to the NDC system. Two options were recommended here as a solidarity pillar: flat-rate or minimum pension. On my recommendation, the Czech Social Democratic Party subscribed to the transition to this system. However, a simulation of the NDC system in the first Bezděk's Pension Commission was accompanied by putting a ceiling on the pensionable age at 65 years, which suggested that NDC pensions would be very low at the end of the century. Until recently, Bezděk was claiming on the basis of this 'analysis' that the NDC system is not suitable for Czechia because pensions would be low (Mediafax.cz 2010). The lesson learned is trivial: any pension system can be 'destroyed' by bad parameters.

All three products, which fit into a modern social pension insurance system, are transparent and understandable. After learning the relatively new Austrian

pension accounts system, I am in favor of its introduction in Czechia. It is a defined benefit system and its novelty consists in the fact that the insurance pension for the given year is definitively calculated after the end of this calendar year – see table 1. The Czech allowance would be calculated according to the formula 0.39% * annual assessment basis, which includes not only earnings, but also the basis for calculating sickness and other benefits, as well as e.g. valuation of childcare. Such care can be valued, for example, by the average national wage – just like, for example, in the German points system. The annual calculation of pension entitlement (account balance after the end of the year) would be an important contribution to the comprehensibility of Czech social pension insurance.

Table 1. Austrian pension accounts (example)

Year	Annual assessment basis	Annual increment (1.78% * annual assessment basis)	Account after the year (valorization of account after previous year + increment)
2005	30,000	534.00	534.00
2006	31,000	551.80	1 096.48
2007	32,000	569.60	1 688.01
…			
2047	72,000	1 281.60	57 365.13
2048	73,000	1 299.40	59 811.83
2049	74,000	1 317.20	62 325.27

Source: SVS (2020).

The preparation of the major pension reform bill would take 1 to 2 years and we might implement the pension accounts system in waves, as it was done in Austria: to start with new insureds, continue with e.g. 10 following years of birth and only in the further wave extend the system to the remaining clients incl. persons of pre-pensionable age.

The major reform of public pensions will also include a reform of disability and survivor pensions. The existing Czech disability pensions use the 'pension-type' concept of disability pensions: their construction is parallel to the construction of old-age pensions (Browne et al. 2018); disability is conceived as a kind of premature aging, or loss of ability to work. An alternative, more modern is the 'sickness' concept of disability benefits, conceiving disability primarily as a prolonged illness, until resuming work (if possible). Disability benefits/ compensations are part of the sickness benefit system under this concept. Norway is one of the countries which apply the sickness benefit concept of disability pensions. Since 2015, the disability pension has been provided as 66% of the final wage (average wage in the best three of the last five years before disability; earnings ceiling), with a minimum disability pension at 40-50% of NAE, applying even to persons without previous employment. The minimum degree of disability is 50% (Støve et al. 2015). Since 2011, Norway has introduced an NDC-type old-age pension system, supplemented by the 'guarantee pension'. Pensions and other social security benefits are subject to income tax. We also recommend reforming

the Czech disability pensions (and all sickness insurance benefits) in the same manner, including the cancellation of bend points.

The old-age pension system with a predominance of a flat-rate pension is best paired with a flat-rate orphan pension, in our country up to 25% of NAE. The flat-rate orphan pension (for orphans aged 10 and over) is of similar amount in the Netherlands, where the individual's flat-rate old-age pension is equal to about 30% of NAE. Such an orphan pension may be classified as a family benefit. It is not only from the perspective of Czech pensioners that universal child benefits should replace the current refundable child tax credit), which cannot be claimed by not only low-income families but also by non-earning pensioners, because they are not subject to the personal income tax. The decisive argument for the transition from universal child benefits to child tax allowances in our country was an effort to compel 'non-adaptable' citizens living on social assistance benefits to take up employment. Apparently, advocates of these views did not even try to make a simple example to confirm their ideas; the fact is that in the universal child benefit scheme, only the final social assistance benefit (subsistence benefit) is (substantially) reduced: by child benefits paid. The very discrimination against Czech pensioners as regards the tax credit for children may, of course, be eliminated by introducing taxation of old-age and disability pensions; but this is not foreseen in the framework of the major pension reform: we are postponing the solution of this problem for the future.

The importance of widow pensions has long been declining in the western countries, also as a result of the unification of social insurance systems. The trend is to move to a 'bridging' widow/widower pension, paid for 6 to 12 months after the spouse's death – so that the surviving spouse can adapt to the new situation. (Widely conceived costs of raising orphans should be concentrated in the amount of orphan pension.) Modern systems of social old-age pension allow for the sharing of pension entitlements of couples. In any case, it is advisable to introduce into Czech law the sharing of pension entitlements of divorced couples, unless there is another agreement reached during the divorce proceedings.

The key content of the proposed major pension reform is the reform of old-age pensions: the transition to a flat-rate pension, funded by general taxes, and the transition to a modern social old-age insurance system. In the interest of this transition to the two-pillar system in a relatively short period of time, it may be advisable to postpone the solution of some other issues that we mentioned in this section of the paper.

4. Reform of personal pensions

The introduction of the 'supplementary pension insurance with state contribution' in 1994 was a relatively positive step towards the development of financial services not only in the area of pension savings – new distribution networks were established and developed. The state contribution played an important role in kick-starting the pension pillar 3. With the rapid growth in the number of 'supplementary pension insurance' contracts, a strong pension lobby was created, which led to a strengthening of the sector's fiscal stimulus. The lobby

of insurance companies was also partially successful. The result was the emergence of a segmented system of the pension pillar 3, which is unprecedented in the world. The number of the supplementary pension insurance contracts at the end of 2012 exceeded 5 million. In addition, there were 3.5 million 'private life insurance' contracts, of which about 1.5 million contracts drew deduction from the income tax base.

The major pension reform of 2013 increased the transparency of supplementary pension insurance and introduced cost limits for the pension companies, but it did not affect private life insurance, tax deductions and non-payment of income tax and social and health insurance premiums in the case of employer contributions to supplementary pension insurance or private life insurance. The indirect state support for employer contributions is highest in the world, accounting for 65% of the employer contribution. State support for citizens' contributions is 'only' above average in an international comparison (OECD 2018), since this comparison assumes contributions of 5% of wage (the products compared in other countries are occupational pensions where the situation is significantly different!). The calculation also reflects the low rate (15%) of the Czech personal income tax. The Czech state support of supplementary pension savings in the form of employer contribution is 2,4 times higher than the support of the same product in the form of a participant's contribution (if 5% of wage are to be saved). All state regulation of the state-supported pillar 3 should be – by its very nature – uniform.

The main purpose of taking out Czech supplementary pension insurance is not individual protection in old age, let alone in a form of an annuity. The main purpose is the tax optimization and getting rid of excess liquidity. The construction of the product taken out till the end of 2012 was of fundamental importance for its high penetration: it was essentially a simple savings product, with high explicit state support in the form of a state contribution, with a guarantee of a non-negative nominal yield. Fiscal illusion, based on the assumption that the state support is for free, also played an important role. All of this explains the unusually high number of participants. 'Personal pensions have relatively wide take-up in only a few Member States (over 60% coverage in the Czech Republic, over 30% in … Germany) while in most Member States take-up is moderate and fragmented, and in some, nearly non-existent' (EC 2017). In general, ' the third pillar is not really a pension scheme. It is akin to a tax-advantaged savings account. The system should not be presented to the public as a source of meaningful future replacement income' (WB 2017). If we think this through to all its consequences, we come to the conclusion that: 'Pillar 3 (voluntary retirement savings) should not receive tax subsidies, which are regressive and, in any case, have not been shown to have any significant effect on private saving' (Willmore 2000). Therefore, the persistently repeated ideas of some Czech party experts that the impact of the ageing population can be solved by pension savings in the third pillar are completely unrealistic. The standard pension pillar 3 is of no practical importance to most of the population anywhere in the world.

The parallel existence of several Czech systems of generous fiscal support (state contribution, tax deductions, exemption of employer contributions from income tax and from payment of social and health insurance premiums), even for one single product (supplementary pension savings), is unconstitutional, because it significantly distorts the (oligopolistic) market and it is also a manifestation of clientelism and illiteracy. Last year, public spending (including tax expenditures) on these subsidies for supplementary pension savings and private life insurance amounted to approximately CZK 22 billion. Real investment returns for clients are increasingly negative. Due to the extreme state support and the consequent very high number of participants, this (hypertrophic and chaotic) 'system' can be included in the rank of 'soft compulsion'. According to the World Bank's classification of pension pillars, this is essentially pillar 2, not pillar 3. It is a chaotic variant of the neoliberal model of private pensions/savings. More efficient systems of this kind use auto-enrolment, opt-out, auto-escalation of contributions, matching contributions, mostly in the pillar of occupational pensions.

Top managers of the pension companies (Poklop, Homolka) recommend the introduction of compulsory employer contributions, boosting of state support and auto-enrolment of citizens or employees; they like the new 2019 Polish system, which is essentially a copy of British workplace pensions. It is a neoliberal pension concept that has nothing to do with the typical pillar 3. It must be noted that even specialized pension (joint stock) companies do not belong to the third pillar. This is a Czech specificity, which arose only because public servants in 1993 did not want the new business (supplementary pension insurance with state contribution) to fall into the lap of the then almost monopoly Czech Insurance Co. (the reason were two increases in premiums for motor liability insurance – in a short time interval). The existence of special pension companies is completely unnecessary; moreover, almost all these companies outsource most of their activities to affiliated companies within their respective financial groups.

A fundamental reform of the supplementary pension insurance, supplementary pension savings and private life insurance is indispensable and, in general, we have several options for the 'public choice'. From a technical point of view, liberal policy is the simplest solution: abolishing all fiscal support for financial products and reducing taxes. Social democratic policy could have a broader scope: the abolition of fiscal support for financial products could be linked to an increase in pensions or other social expenditure – for example based on the argument that the relative amount of old-age pensions in our country (slightly) lags behind the OECD or EU ('pension gap'). A conservative (Christian Democratic) policy can be described as the transition to exclusive tax deductions, with the pay-out of pension savings being fully burdened by a personal income tax (EET tax regime). This is the most common practice in the world, which is especially beneficial for higher income groups, due to the usual existence of progressive income tax rates. Under the conditions of a flat-rate income tax rate (as in Czechia), this system is equivalent to the TEE tax regime, where savings

or investments are made from taxed income and the state support has the form of an exemption of capital income from taxation. In Czechia, the TEE tax regime applies to mutual and investment funds. The TEE tax regime has been increasingly recommended around the world over the last decade, at the expense of the EET regime, as it is significantly simpler and more equitable (equal approach to all income groups); notwithstanding the fact that when applying the EET regime, there is a significant risk that tax rates will be different in the future (when, for example, entire pension savings are taxed). Thus, the TEE tax regime can be unambiguously recommended for Czechia.

5. Future parametric pension reforms

The current Czech pension 'system' requires the above-mentioned fundamental reforms to introduce some order/system into it and at the same time to get rid of a lobbyist weed that eats up a considerable part of the pension 'cake' or the national income as such. It would not be surprising if, for example, the social pension insurance is to be strengthened at the expense of the flat-rate state pension in the coming period – we are not so different from the neighboring nations so that the flat-rate old-age pension would have to dominate in our country.

However, due to the ageing of the population, there will be no need for (further) paradigmatic pension reform, despite many experts (and institutions) trying to give an impression that it would. The ineffective 'second' pension pillar in any form will not become effective or at least economically acceptable due to ageing of the population. I leave aside the issue of occupational pensions, which are basically already past their prime in Western countries. Especially when trade unions in our country are too weak in most private sectors to negotiate pensions or savings of this kind. (Nevertheless, I recommend lifting the de facto Czech ban on occupational pensions.) Pension savings are not even a partial solution to the problem of population ageing, even if investment yields should return to the 1990s levels. In the upshot, if a miracle were to become and investment returns could be an argument for their large-scale use in the pension system, it would have to be advantageous to gradually replace taxes as such by those. But this will not happen, because the globalized world is full of savings that are difficult to utilize. And many governments prefer to borrow from elites instead of taxing them (Streeck 2014).

Retirement age is one of the essential parameters of pension systems. Flat-rate pension generally includes a different concept of the basic pension age than that in the social insurance pension. In the solidarity pillar, the statutory pension age should be fixed, and in the insurance pillar, the retirement age might be flexible. With regard to the now largely prevailing retirement just after reaching the current statutory pensionable age, it can be recommended that the pensionable age for the basic pension remains fixed (inflexible), preferably at the level of the current basic retirement age for men (including its increasing in accordance with the current law); raising of the pensionable age of women with children could be accelerated. Conversely, in the case of the insurance pension, we can afford – to begin with – to set a (minimum) pensionable age at 60-61 years – while concurrently the

'premature' retirement would be eliminated; the system simplifies. At present 80% of Czechs could work without problems until the age of 65.

A family policy reform can contribute to reducing the pace of demographic ageing: in particular, the integration of parental allowance into the basic maternity benefit, the payment of a new single parental benefit for up to 100 weeks (up to 150 weeks for twins) from the sickness insurance system, in the amount of the gross wage of the mother/father (however, at least 50% of NAE, at most 200% of NAE), after deduction of income tax (including the current insurance premiums). It is also necessary to introduce the right to a place for all children from one year of age in full-day preschool facilities at an affordable price or even free of charge of charge (Vostatek 2019). 'It is also advisable to shorten the inefficiently long periods of formal study' (Münich 2019). 'The current setting of labor taxation, along with parental leave setting and low availability of creches and kindergartens contributes to the highest drop in employment of Czech mothers with young children across the EU' (Šatava 2016). This has a considerable impact also on the state budget, incl. the pension system.

6. Conclusions

The 1996 Pension Insurance Act has added a small basic amount of all pensions to the system of 'percentage amounts' of individual pensions, heavily levelled by bend points and reduction coefficients; 'Beveridge' prevailed over 'Bismarck' but he left the massive pension insurance premiums live. Substantial conceptual contradictions were not removed by later pension reforms. The main problem is the lack of transparency and comprehensibility of the system not only for its regular clients. With regard to the unpreparedness of the overall reform of public pensions, and also of the forthcoming parliamentary elections, we recommend dividing this reform into two steps: a small reform and a major reform. Small pension reform shall focus on simple but fundamental rationalization of the basic and percentage amounts of the old-age pensions. The new basic amount of these pensions should be at the level of 32% of the national average earnings; for the percentage amount, the valuation of one year of insurance cover shall be reduced from 1.5% to 0.39%.

The major pension reform might be a paradigm reform of old-age, disability and survivor pensions. The basic amount of old-age pension will be transformed into a separate flat-rate pension, with an independent system of retirement age, minimum residence or economic activity (35 years) in Czechia and valorization. The percentage amount of the old-age pension will become an independent pension pillar of social insurance, optimally with the construction of the Austrian pension accounts, with a separate retirement age and valorization system and with a minimum insurance period of 3-5 years. Disability pensions can be newly designed as social insurance and incorporated into the sickness insurance. Orphan pensions may be redefined as a universal, flat-rate benefit. The significance of widow and widower pensions may decrease, given the introduction of a flat-rate old-age pension and the assumed increase in the (average) orphan pension.

All these proposals are based on the pension development trends in the OECD countries.

Only social pension insurance is to be financed by insurance premiums on a model basis, which would allow for a substantial reduction in the Czech pension insurance premium rate. However, the general economic approach favors the cancellation of health insurance premiums – regarding the existing system of Czech public health care and due to the absurd conception and structure of health insurance premiums and their collection by all seven health insurance companies. Anyway, we can simply reduce insurance premiums only by integrating employee premiums (11% of gross wage) into the personal income tax – which is desirable also in view of the low capital income taxation (when compared to the western countries and the OECD average). When reforming the personal income tax, we get rid of the super gross wage taxation. This reform of personal income tax is also important in the interest of reforming pension (and building) savings: for political reasons, we need to compensate for the reduction in state support for these products by increasing the basic tax credit. An increase in this tax credit is also needed in order to increase the progressivity of income taxation.

The extremely complicated system of state support for 'personal pensions' is almost entirely the result of lobbying by the completely superfluous 'pension companies' that have a monopoly on the provision of supplementary pension savings. The rate of state support for employer contributions to these savings is 65%, which is by far the highest one in the world. State support for participant contributions is lower. More than half of the population is involved in the system, but its role in protection is as low as in other countries. The main purpose of 'pension savings' (and 'building savings') is tax optimization, coupled with the fiscal illusion that the state support is a free lunch. State support essentially ends in the overhead and profit of the providers. In accordance with the relevant social models, we recommend either a complete cancellation of state support for all financial products or the transition to a uniform TEE regime (exemption of returns from income tax) – optimally in the form of British Individual Savings Accounts (ISA) or Canadian Tax-Free Savings Accounts (TFSA), where annual deposits are limited and withdrawals are unlimited. Not only in our country the (previous) housing investments are far more important for (future) pensioners than any third pension pillar.

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THE GLIDE-PATH MECHANISM IN EMPLOYEE CAPITAL PLANS

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1. Introduction

The regulatory landscape of pension funds in Poland continues to become ever more complex. One of the most significant changes in the Polish pension market is the introduction of Employee Capital Plans (ECP). This new form of occupational pension plan is featured by auto-enrolment and investment policy based on the glide-path mechanism (Kolek et al. 2020).

Auto-enrolment, which is designed to cover people having no access to any occupational pension programme, is bringing millions of workers into a private pension plan based on capital funding, many for the first time (Szczepański 2017; Kolek and Sobolewski 2019).

This puts a special burden on the ECP system – to invest capital of individual ECP participants in the most responsible way. Adoption of the glide-path mechanism in the investment policy of the ECP funds is one of the ways of fulfilling this duty.

The glide-path represents the fund's changing mix of investments. Over the years, the ECP fund adjusts allocations to the equity portion and the debt portion. When ECP participants are young, the asset mix is more growth oriented. This means the dominance of the equity portion. When ECP participants get older and their retirement date nears, the ECP fund's investment portfolio "glides down" to a more conservative mix of investments. This means the dominance of the debt portion. This fairly new concept has not been fully analysed in the literature. There are a limited number of publications mentioning this new way of conducting investment policy (Ge 2019; Sołdek and Stachnio 2018; Melicherčík et al. 2015; Krawiec 2014, 2015). But the glide-path mechanism in ECP funds has never been analysed. Moreover, there are a very limited number of publications on ECP system, both in local literature (Jedynak 2019; Fijałkowska et al. 2019; Wrzesiński 2019; Kolek and Sobolewski 2019; Wojewódka 2019; Jakubowski and Prusik 2019) and in the international literature (Ociepa-Kicińska and Dawidowicz 2018; Naczyk 2019; Pobłocka and Dybał 2019;). It is because the ECP system is quite new. It began operation on July 1st, 2019 and it is still at the stage of introduction. The system will be fully implemented in 2022. Thus, there is need to describe and analyse the new concept of the glide-path mechanism and the way it has been implemented in the new ECP system.

The purpose of this research is to analyse the regulatory landscape for the glide-path mechanism implemented in the ECP system. To achieve this research objective the method of critical legal dogmatics and the economic analysis of law method were employed.

2. Debt portion and equity portion of an ECP fund's portfolio

The investment policy of an ECP fund is determined by all levels of regulations. The most important and the most universal regulation for the ECP fund's investment policy is to be found in the act of 27 May, 2004 on investment funds and alternative investment fund management (the IF Act 2004). In principle, an ECP fund follows the investment limits for open-end investment funds (art. 42 para. 1 of the ECP Act). The specific provisions that bind only the ECP funds are set in the act of 4 October, 2018 on Employee Capital Plans (the ECP Act 2018) One of the most important regulations, specific only for ECP funds, is a division of their portfolio into an equity portion and a debt portion (art. 2 para. 1 point 1 and 2 of the ECP Act).

2.1. The debt portion of the investment portfolio

The debt portion of the ECP fund's portfolio may be invested in:
- money market instruments,
- bonds, treasury bills, mortgage bonds, deposit certificates,
- other transferable securities incorporating debts,
- bank deposits,
- vanilla derivatives,
- selected non-standardised derivatives (providing underlying asset is an aforementioned debt instrument),
- units of investment funds (providing half of their portfolio is invested in aforementioned debt instruments) (art. 2 para. 1 point 1 of the ECP Act).

Pursuant to art. 37 para. 11 of the ECP Act the debt portion of ECP fund's investment portfolio is divided into two parts. At least 70% of the debt portion must be invested in securities issued or guaranteed by the Polish Treasury, the National Bank of Poland or a local government unit. This part of the debt portion may be also invested in securities issued or guaranteed by central governments or central banks of EU states, the European Central Bank, the European Union or the European Investment Bank. Also, securities issued or guaranteed by selected international organisations (the European Economic Community, the International Monetary Fund or the Bank for International Settlements) (Marcinkowska 2009, p. 234) might be included in the debt portion of ECP fund's investment portfolio, providing these instruments have an investment-rating provided by one of the biggest rating agencies (S&P, Fitch, Moody's or DBRS). In order to maintain liquidity, an ECP fund is also allowed to hold cash deposits in banks or credit institutions. The cash deposits are also included in the 70% part of the debt portion.

The remaining 30% of the debt portion can be invested in other debt instruments (art. 37 para. 11 point 2 of the ECP Act). This means that no more than one-third of debt portion might be invested in money market instruments, corporate bonds, mortgage bonds, deposit certificates, other transferable debt securities, other debt derivatives or other units of investment funds, providing these instruments have an investment-rating from one of the biggest rating agencies. Debt instruments without an investment-rating can constitute no more than 10% of the debt portion of the ECP fund's investment portfolio.

There is very small group of scholars raising doubts as to whether the ECP capital should be used to fund the public debt (Oręziak 2016, 2019; Hrynkiewicz and Szukalski 2018; Kalina-Prasznic 2019). They argue that ECP funds shouldn't be allowed to invest in Polish Treasury Bills in the same way as Open-end Pension Funds are forbidden to. The majority of scholars point out that the Polish debt market is too shallow to exclude Treasury Bills from the investment portfolios of ECP funds (Dybał 2017; Jedynak 2018; Jakubowski 2019; Szczepański 2013, 2015, 2019; Kolek and Sobolewski 2019; Wojewódka 2019; Jakubowski and Prusik 2019; Chybalski 2018; Chybalski and Marcinkiewicz 2018).

2.2. The equity portion of the investment portfolio

The equity portion of the ECP fund's portfolio may be invested in:
- shares,
- pre-emptive rights,
- allotment certificates,
- subscription warrants,
- depositary receipts,
- other transferable securities incorporating property rights,
- vanilla derivatives,
- selected non-standardised derivatives (providing the underlying asset is the aforementioned equity instrument),
- units of investment funds (providing half of their portfolio is invested in aforementioned equity instruments) (art. 2 para. 1 point 2 of the ECP act).

Pursuant to art. 37 para. 13 of the ECP Act the equity portion of ECP fund's investment portfolio is divided into several parts. At least 40% of the equity portion must be invested in blue-chip stocks. To be more precise, shares, pre-emptive rights, allotment certificates and other equity instruments issued by the biggest companies quoted on Warsaw Stock Exchange (WSE) and which are quoted on the Warszawski Indeks Giełdowy 20 (WIG20). Art. 37 para. 13 point 1 of the ECP Act also includes derivatives on these instruments and derivatives on the WIG20 index.

Pursuant to 37 para. 13 point 4 of the ECP Act, at least 20% of equity portion must be invested in foreign equity instruments (shares, pre-emptive rights, allotment certificates, derivatives, etc.) quoted on stock exchanges located in OECD countries. Both the 40% and 20% limits are minimum limits. It means that up to 80% of the equity portion may be invested in the equity instruments issued by the 20 biggest

companies quoted on the WSE or derivatives of these instruments. On the other hand, up to 60% of the equity portion may be invested in equity instruments quoted on stock exchanges located in the OECD countries. Together, just these two classes of assets may constitute 100% of the equity portion.

But ECP fund is also allowed to invest in medium-sized and small-sized companies quoted on the WSE. Pursuant to art. 37 para. 13 point 2 of the ECP Act, an ECP fund is allowed to invest in shares, pre-emptive rights, allotment certificates and other equity instruments issued by the medium-sized companies quoted on the WSE and included in the Warsaw Stock Exchange Index of 40 medium-sized companies (mWIG40). This limit also includes derivatives of these instruments and mWIG40 index. The limit for these equity instruments is no more than 20% of the equity portion. As opposed to the limits to the WIG20 equity instruments and foreign investments, this is the maximum limit. The ECP fund is not allowed to buy more shares of medium-sized companies.

The ECP fund is also allowed to buy shares of small-sized companies quoted, or soon-to-be quoted, on the WSE . Pursuant to 37 para. 13 point 3 of the ECP Act, the ECP fund is allowed to invest no more than 10% of the equity portion in shares, pre-emptive rights, allotment certificates and other equity instruments issued by small-sized companies in Poland. Just like the limit on medium-sized companies, this is also the maximum limit. The ECP fund is not allowed to buy more shares of small-sized companies.

Regulations shaping the equity-portion are much more controversial than the regulations shaping the debt-portion. First, the ECP fund investments on the local bourse are strongly directed towards the blue-chips included in the WIG20 index. This index is dominated by state-controlled enterprises as defined by Bałtowski and Kozarzewski (2016). Only 8 joint-stock companies included in the WIG20 are not under control of the state. These are LPP S.A., Santander Bank Polska S.A., NG2 S.A. (former CCC Obuwie S.A.), CD Projekt S.A., Cyfrowy Polsat S.A., mBank S.A., Orange Polska S.A., Play Communications S.A. The remaining 12 companies are state-owned or state-controlled enterprises. According to the official information from December 31st 2019 – the State Treasury holds 29.43% of PKO BP S.A. shares, 27.52% of Polski Koncern Naftowy ORLEN S.A. shares, 34.19% of PZU S.A. shares, 32.8% of Pekao S.A. shares , 31.79% of KGHM Polska Miedź S.A. shares, 71.88 % of PGNiG S.A. shares, 31.94% of Alior S.A. shares , 55.16% of Jastrzębska Spółka Węglowa S.A. shares, 53.19% of LOTOS S.A. shares, 40.45% of TAURON S.A. , 51.52% of ENERGA S.A. shares. Together these companies comprise more than 70% of the average weight of the WIG20 index. Thus, forcing an ECP fund to invest 40% and more of the equity portion into WIG20 companies should be considered as directing ECP capital into state-controlled enterprises. In this way, the ECP system is used to increase the state's impact on the Polish economy and to expand economic nationalism in Poland (Flores-Macias and Musacchio 2009; Kozarzewski et al. 2019). The declared objective of this is to enhance, in the long run, the Polish State's economic capacity, international importance and even reindustrialisation (The Strategy for Responsible Development 2017). Thus, the role of local equity

investments of ECP capital is significant, especially in recapitalizing of the so-called "national champions" – the biggest and the most valuable state-controlled enterprises. In this respect, the state itself is the indirect beneficiary of ECP capital accumulation and local equity investments of ECP funds.

The regulations concerning foreign equity investments also raise some doubts. According to statutory provisions, foreign investments into equity instruments are not limited by the size of a company at all. In consequence, the ECP fund has no barriers for financial support of foreign small-sized companies. This is a stark difference to the harsh limits on investments in Polish small-sized companies. This loop-hole in regulations on foreign equity investments allows the mechanism of the purposeful placing of initial public offerings (IPOs) on the most liberal stock exchanges located in the OECD countries and transferring ECP capital to small-sized companies owned by selected people (e.g. friends and acolytes of the governing party). This creates the conditions for the proliferation of cronyism (Hellman et al. 2003; Jasiecki 2013; Kozarzewski and Bałtowski 2019). Economic entities from the outside of the public sector may benefit from facilitated access to ECP capital at the expense of local companies and local financial institutions. This means a higher investment risk for ECP participants and lower chances of development for local financial markets.

The threats of economic nationalism and cronyism are additionally magnified by the domination of state-controlled financial institutions (ECP providers) on the ECP market. On December 31st, 2019, after half a year of functioning of the ECP market, the total value of assets accumulated in ECP funds reached 84.7 mm zł. 48.3% of these assets were gathered by state-controlled financial institutions (Kolek 2020). PKO TFI gathered 28.7 mm zł, PZU TFI gathered 9 mm zł, Pekao TFI gathered 3.1 mm zł, Pocztylion-Arka PTE gathered 60,000 zł, PFR TFI gathered 1,500 zł. The dominance of the state controlled ECP providers is another major threat for the proper functioning of the ECP market.

Non-state controlled ECP providers that failed to gather a sufficient number of ECP participants are likely to quit the market. ECP providers driven exclusively by profits are discouraged by the high administrative costs of functioning on the ECP market (Wojewódka 2020). High economic barriers to enter this market will push away potential new entrants and petrify low competition between ECP providers. A similar process took place in the Open-end Pension Funds market in the noughties and teens of 21st century (Banaszczak-Soroka and Jakubowski 2011).

In the near future we will probably see that domination of state controlled ECP providers creates a feedback mechanism. In this scenario, state-controlled ECP providers may direct a growing amount of ECP capital into state-controlled companies and even into private entities that have connections inside the governing party.

3. The Glide-path mechanism

The ECP fund has a target-date that roughly (+- 5 years) coincides with the year of the participant's anticipated end of their professional career and their retirement. In order to provide target-date funds to all generations of ECP participants, ECP providers must manage at least 8 target-date funds. Right now, these are: target-date 2025 fund, target-date 2030 fund, target-date 2035 fund, target-date 2040 fund, target-date 2045 fund, target-date 2050 fund, target-date 2055 fund and target-date 2060 fund. Some of the ECP providers also created a target-date 2020 fund and a target-date 2065 fund. The target-date in the ECP fund is the approximate date an investor reaches 60 years of age and acquires the right to benefits from an Employee Capital Plan.

The ECP fund investment policy is based on the glide-path mechanism. The glide-path represents the fund's changing mix of investments. Over the years, the ECP fund's managing company (ECP provider) adjust allocations to the equity portion and the debt portion. When participants are young and further from retirement, the asset mix is more growth-oriented (domination of the equity portion). As the participant's target retirement date nears, the ECP fund "glides down" to a more conservative mix of investments and reduces the amount of equity over time in its portfolio (dominance of the debt portion). This is due to the changes in the risk tolerance of ECP participants.

The three key decisions in building the glide-path are: the percentage for the equity portion of the portfolio, the final equity portion landing point, and the rate at which the equity portion declines in a portfolio. The glide-path also needs to take into consideration the participants' need for future growth and their tolerance for volatility during their retirement.

Table 1. Equity portion, debt portion and room for the discretionary investment policy – % of ECP fund's assets

Age of ECP participant	Equity portion	Debt portion	Room for the discretionary investment policy
18 to 40 years old	from 60% to 80%	from 20% to 40%	20%
41 to 50 years old	from 40% to 70%	from 30% to 60%	30%
51 to 55 years old	from 25% to 50%	from 50% to 75%	25%
56 to 60 years old	from 10% to 30%	from 70% to 30%	20%
60 and more years old	from 0% to 15%	from 85% to 100%	15%

Source: art. 40 para. 1 of the ECP Act.

Pursuant to art. 40 para. 1 of the ECP Act, for the first 22 years, ECP funds' glide-path provides between 60% and 80% equity exposure (equity portion of the portfolio). The rest is typically invested in debt instruments (debt portion of the portfolio). This changes when the target-date is 20 years away. The next stage lasts only 10 years and equity exposure is from 40% to 70%. This changes when the target date is 10 years away and equity exposure is lowered to between 25%

and 50%. For the last 5 years before the target date, the equity exposure is from 10% to 30%. At the target date, the equity exposure is lowered to between 0% and 15% and remains stable for the rest of the ECP fund existence.

This shape of the glide-path leaves some room for a discretionary investment policy. During the first 22 years, 20% of the ECP portfolio can be invested either in equity or debt instruments. From 10 to 20 years to the target-date, the latitude for discretionary investment policy is the widest at 30% of the ECP portfolio. In the following decades, it systematically declines. Between 5 and 10 years to the target-date, the freedom for a discretionary investment policy is still wide at 25% of the ECP portfolio. In the last 5 years before the target date, the room for a discretionary investment policy is lowered to 20% and at the target date, it falls to just 15% of the ECP portfolio.

Thanks to the wide freedom for a discretionary investment policy, ECP funds can function either as to-target-date funds or through-target-date funds. To-target-date funds maintain a static asset allocation once a participant reaches the target date (he or she is 60 years old). This approach is useful for the ECP participants that want to cash out the accumulated capital as soon as they reach the age of 60.

Through-date-funds continue to gradually ease back on equity exposure through the first ten- or twenty-years post target-date. This approach is useful for the ECP participants that want to slowly decumulate ECP capital. This aims to address the needs of ECP participants who are exposed to longevity risk. The assumption behind target-date funds with a "through" glide path is that ECP participants should adopt a consistent long-term strategy that adjusts asset allocation well into retirement (International Labour Organisation 2019). Increasing life expectancy forces many ECP participants to maintain earnings potential from significant equity exposure – in order to avoid the prospect that an ECP participant might outlive his or her savings (Bielawska 2019).

The rationale for equity exposure even after reaching the target date is the high long-term earnings potential. On average, equities have historically generated stronger investment returns than debt instruments over the long term, albeit with higher volatility (Bielawska 2017). While it's not unusual for equities to underperform compared to debt instruments or other assets for relatively short periods, equities have a historical record of outperforming them over time. This is especially important for those ECP participants who reached their target date (60 years of age) and are being paid out their money for the next 10 years in monthly instalments (Jakubowski 2020).

It's worth noting that the glide path statutory regulations are so well designed that the majority of ECP providers just duplicate these stipulations. Only Nationale-Nederlanden ECP refined these regulations and introduced a smooth glide path that changes on a quarterly basis (Nationale-Nederlanden 2019). The further analysis of Key Investor Information Documents (KIID) issued by ECP funds leads to the conclusion that ECP providers don't use the full potential of the ECP investment policy. All ECP providers miss the opportunity to emphasise socially responsible investments and green investments. It is inadvisable to create narrow

and detailed statutory regulations that promote these types of investments. The statutory regulations should be general enough to leave some room for a discretionary investment policy. It is the ECP providers who should grasp the opportunity and use the lowers rank regulations (statues of individual ECP funds) to direct ECP capital into green and socially responsible investments. In more developed and mature pension markets, these types of investments are a meaningful incentive for the accumulation of pension capital and an important factor during the selection of a pension plan (Dopierała et al. 2020).

3. Conclusion

The Glide-path mechanism makes an ECP fund a single and easy-to-use investment vehicle for participants who lack financial literacy and need professional management of their retirement assets. But the target-date fund approach in the ECP system also creates possibilities for financially experienced ECP participants. They have a chance to manage their ECP capital in a more personalised way. Art. 45 of the ECP Act provides ECP participants with the right to conversion of target-date funds' units. This means that ECP participants can transfer their ECP capital from one target-date fund to another – providing these funds are managed by the same ECP provider and the minimum transfer is not less than 10% of ECP participant's capital. In consequence, ECP participants can change and even spread their ECP capital among 10 different ECP funds. The right to transfer ECP capital to another target-date fund would be one of the biggest advantages of participation in the ECP system, providing it was also accompanied by the right to change the ECP provider. Denying this right to financially experienced ECP participants, who accumulate capital in state controlled ECPs, is a major disincentive. In consequence ECP participation among financially experienced workers is low (Instytut Emerytalny 2019).

In conclusion, it should be stated that in the era of incoming technological singularity (Kurzweil 2005), it is impossible to outline the pattern of growth for the global economy in the next 50 years. This means a universal formula for the glide-path mechanism for ECP funds does not exist. Thus, it's of great importance that statutory provisions leave room for discretionary investment policy. The regulations of the ECP Act do that quite well.

At the same time the glide-path mechanism implemented in the ECP funds strongly protects the interests of financially illiterate participants of the ECP. Increasing the share of the debt portion in ECP fund's portfolio lowers the investment risk and protects the accumulated capital of ECP participants. For financially experienced ECP participants the glide-path mechanism is not problematic. They are aware of their rights and they know how to transfer their ECP capital to other ECP funds. It is the regulation of investment limits that is flawed and needs to be liberalised.

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EMPLOYEE CAPITAL PLANS – PUBLIC POLICY ANALYSIS

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1. Introduction

The universal, mandatory social security system introduced in 1999 is based on a defined contribution. The funds registered on the insured's account constitute the basis for determining the amount of the old-age pension and divided by the average life expectancy allow determining the amount of the monthly benefit. This way of determining the amount of the old-age pension is accompanied by a significant reduction. The benefits that will be paid by the Social Insurance Institution in the next decades will be only a fraction of the insured person's last salary.

According to forecasts, the average pension from ZUS in 2040 will be around 35% of the average salary, and in 2050 even 25% of the average salary. Therefore, it has been assumed since the 1999 reform that additional savings would be created. The so-called Third-pillar voluntary forms of saving. However, over the past twenty years, additional forms of saving have not become common in Poland (Jedynak 2016). The insufficient level of retirement savings of Poles met with the reaction of public authorities, which from 2019 obliged all employers to create a group form of long-term saving.

The purpose of this article is to determine on which axiological foundation the system of Employee Capital Plans (EPC) is based and to answer the questions:
- how do the authorities want to achieve universal participation in EPC?
- what obligations have been imposed on employers, and what are the expected benefits for enterprises?
- will investing in EPC funds support the development of the Polish economy?

In order to be able to answer the above questions, the first part of the study presents a method of analyzing public policy. Further, the work contains characteristics of behavioral economics mechanisms on which the main ECP institutions were based. Then the Author presents the obligations of employing entities and possible benefits to be achieved by entrepreneurs. In turn, the third part of this article presents the possible benefits for employees.

2. Metodology and theory – public policy analysis

Public policy analysis is a form of reflection that allows juxtaposing various aspects of political decisions. Assuming the functioning of the social security system under a democratic state of law together with the strong key role of legal regulations to which citizens and public institutions comply. Based on the principle of legalism, where citizens can do anything that is not prohibited by law, and state institutions operate within the limits and on the basis of law. When conducting public policy analysis, the researcher's interest should focus on identifying the interests of parties involved in shaping public policy, and if possible also be based on evidence or justifications of the legislators. In this case, it is not the most important issue of policy impact, i.e. the outflow of implemented activities assessed ex post, or the area related to the acquisition of power – politics. In contrast, the area of policy analysis focuses on issues such as the role and participation of various actors in shaping legal regulations, or the assessment of assumptions and forecasts presented by intervention project promoters (Kraft and Furlog 2007).

Based on Dunn's concept, public policy analysis should be based on a review of activities undertaken in the course of designing and implementing regulations (Dunn 1981). In turn, W. Parsons claims that the format of expert analyzes carried out as part of public policy analysis should refer to the problem identified, the goals set by the authorities, possible alternative scenarios, the options chosen for implementation, and the results obtained as a result of intervention. Therefore, public choice theory may be appropriate to explain public policy analysis (Parsons 2005).

Public choice theory assumes that people are only motivated by their own interests to make choices. Although they sometimes act in a way for the good of other people, their main interests are their own interests. This theory equally applies to the choices of an employee, employer or consumer (Buchanan 2000).

Drawing attention to the above issues, the subject of public policy analysis in the area of introducing Employee Capital Plans in Poland is the analysis of the reasons for the introduction of ECP, as well as the relationships of various entities at the stage of designing a new institution, as well as the planned obligations and rights during its functioning.

The research method of institutional analysis adopted in this article, adopting the assumptions of new institutionalism, allows to explore the nature and genesis of the institution of social life, which are employee capital plans. The analysis allows defining and characterizing the reasons for which the institutions are established and the functions they perform. The achievements of new institutionalism also make it possible to ask questions about the very nature of the relationship between individuals and the new institution (Kolek 2016).

3. Employee Capital Plans as a behavioral public intervention

The concept of Employee Capital Plans proposed by public authorities, which entered into force on January 1, 2019, is based on the achievements of behavioral economics (ECP act 2018).
In response to the identified public problem, which was the low level of retirement savings for Poles, it was pointed out that additional forms of saving for retirement organized by employers (intended for over 60 years of age) were indicated. Based on the assumption that the key to effective public intervention is to change the behavior of individuals, or collectivity, to date, it was found that, while maintaining freedom and freedom to dispose of private property, employees should be encouraged to save. To this end, ECP was introduced.

The authors of the ECP concept assumed that people are inherently inclined to act and are afraid of risk. What's more, people do not behave rationally, but make decisions under the influence of emotions, views, habits, as well as mental errors and taking actions based on such premises as:

– unwillingness to lose – in a situation where an individual feels that he or she is threatening to lose something that they had before, they are ready to take action to prevent loss,
– tendency to maintain the status quo – expressed as fear of change and new (Kolek and Wojewódka 2017).

Therefore, the mechanisms contained in the regulations shaping Employee Capital Plans deliberately affect the elements of the long-term saving system.

4. Employee Capital Plans duties for employers

The fundamental mechanism of ECP is to relieve the employee of any administrative duties. The legislator has introduced that the employer is responsible for enrolling employees in the long-term saving program. Pursuant to the provisions of the Act of October 4, 2018 on employee capital plans, the obligation to create ECP lies with the employing entity, which will have to choose a financial institution in the appropriate period depending on the number of employees, and then implement ECP in its company. Employees aged 18-55 whose employment period at the employing entity is at least 3 months will be automatically enrolled in the ECP. On their behalf, the employer concludes a ECP contract to which the ECP participant and the financial institution will be parties. In turn, people aged 55-70 will be able to join ECP at their request submitted to the employer. This treatment is aimed at creating an informed choice for people who are closest to retirement so that they can decide for themselves what will be the best form of saving for them. It should be emphasized that an important group of people who will be able to participate in ECP has been defined more broadly than just employees and those who have been obliged to save in ECP were also covered by mandatory social insurance of the contractor, persons performing outwork, members of agricultural production cooperatives, and members of the supervisory board contributory remuneration for his work.

Another mechanism to facilitate savings in ECP is the employer's obligation to calculate, collect and transfer payments to a financial institution. Ensuring

regular savings and the lack of obligations on the part of the participants themselves is to relieve employees of administrative obligations.

In addition, the introduction of a savings co-financing mechanism in which the ECP participant discharges 2.0% of his remuneration, the employing entity adding 1.5% of remuneration. Additionally, from public funds, by financing the welcome payment – PLN 250 and the annual surcharge – PLN 240, it is expected to contribute to a real increase in the accumulated funds. The legislator also allowed the possibility of larger payments to ECP by introducing an additional payment of a participant – up to 2.0%, as well as an additional payment of the entity employing up to 2.5% of remuneration.

An important mechanism from the perspective of participation in ECP is the possibility of reducing the basic payment made by the participant of the capital plan. If the gross remuneration of a ECP participant does not exceed an amount equal to 1.2 times the minimum remuneration. The saving person will have the right to make a declaration on reducing the payment to 0.5%, provided that his remuneration does not exceed PLN 3,120 gross in 2020. The employing entity is responsible for verifying the achievement of the 1.2-fold limit, however, if the ECP participant exercises this right despite exceeding the limit – incurs a penalty in the form of no annual surcharge – PLN 240 from the labor fund (ECP act 2018). The provisions of the Act of October 4, 2018 on employee capital plans also contain a catalog of sanctions for non-compliance with obligations, as well as non-implementation of statutory assumptions. One of the basic regulations is the ban on imposing savings on ECP. The legislator has indicated that the employing entity or persons acting on its behalf discouraging participation in ECP are exposed to a sanction of 1.5% of the remuneration fund for the previous financial year. This sanction will be granted in the form of a fine imposed by the National Labor Inspectorate (ECP act 2018).

From the employers' perspective, an important aspect of introducing ECP is to increase labor costs. Basic employer's payments amounting to 1.5% of the salary, as well as the costs of implementing and servicing ECP constitute real expenses for companies. It is true that these expenses are tax deductible costs, but the economic effect in the form of an increase in labor costs has not been compensated in any way.

5. Employee Capital Plans responsibility of state

It is also worth noting that the voluntary participation in the ECP will have a character that determines the need to renew your declaration of resignation. By introducing ECP, the government, fearing that many people would give up saving, introduced a mechanism of self-saving. Re-enrolled people who have made a declaration of resignation for some reason in the past is a form of cyclical incentive to save. Therefore, the legislator imposed on the employing entity the obligation to re-enroll all employees who had withdrawn from the Plan to ECP. Every 4 years, starting from February 2023, the employer will be required to inform (by the end of February) all those who have resigned from saving and are under 55 years of age that if they do not receive a resignation declaration again,

from April 1, 2023, these persons become participants of ECP – by concluding a ECP contract on their behalf and for their benefit.

The responsibility of the state in the ECP area is related to both launching a long-term saving program, as well as controlling employers whether they perform obligations allowing participants to accumulate funds in ECP. To this end, the legislator has granted inspection rights to both PFR S.A. as well as for the Labor Inspectorate to ensure the correctness of performed duties. In turn, to carry out information and education activities, a special purpose company was established to manage the PFR Portal S.A. In turn, the Financial Supervision Commission watches over the correct way of investing in ECP. All these entities being the emanation of the state are aimed at protecting ECP participants and enforcing the statutory obligations of employers and financial institutions.

However, from the perspective of public authorities who have decided to introduce ECP, the key goal is to achieve universality of savings. After the first stage of implementation, the level of participation in PPK is about 40% (Kolek Wojewódka 2019), which should be assessed as a result significantly below expectations, because at the stage of designing the government the government talked about 75% participation (Impact assessment of the ECP act 2018).

6. Employee Capital Plans – perspective of savers

The use of behavioral economics mechanisms does not mean, however, completely abandoning the tools and motivators used so far. Employee Capital Plans provide for exemption from public levies both at the accumulation stage and after reaching the age of 60. It is worth emphasizing that payments made to ECP are exempted from social security contributions. In addition, funds accumulated in ECP are free from classes and bailiffs' execution (except for maintenance due to maintenance), which is supposed to protect funds. The legislator also decided on the default form of payment of accumulated funds, indicating that no deductions (taxes and contributions) will occur if the participant decides to make a one-off payment of not more than 25% of the accumulated savings, and the remaining 75% will be spread over at least 120 monthly installments. This mechanism is to deter early withdrawal of funds.

At the stage of accumulation of funds to mitigate the so-called "Bad date risk", when an ECP participant just before acquiring the right to benefit invests its assets in risky financial instruments, the legislator decided to introduce a precise framework for investment policy. Each ECP participant will be enrolled in the Defined Date Fund appropriate for his age and date of reaching 60 years of age. Each of the funds will have a specific investment policy appropriate to the age of the participant. This means that by adapting to the age of a ECP participant, the Fund will invest more funds in the debt part – to reduce investment risk. The ECP participant will be able to change the fund in which he accumulates funds, and the instruction should be sent to a financial institution.

In turn, the participant will have the right to use the funds accumulated in ECP both at the stage of accumulation and after 60 years of age, regardless of gender.

Before reaching 60 years of age. The Act on Employee Capital Plans provides for the possibility of payment at the accumulation stage in 4 cases:

- transfer payment – i.e. transferring 100% of accumulated funds to another ECP account or other participant's account related to long-term saving,
- in the event of a serious illness – a ECP participant will have the right to pay up to 25% of the accumulated funds if a participant, his spouse or child of a participant in a specific disease entity is diagnosed or is completely incapable of work or has moderate or severe disability,
- to cover own contribution – in connection with applying for a mortgage for the purchase of real estate, the ECP participant will be able to obtain a loan of up to 100% of the funds accumulated on the ECP account, which will be used to cover the own contribution; it should be remembered, however, that the possibility of using this form of withdrawal will take place only up to the age of 45 of the ECP participant and will be connected with the obligation to transfer funds to the account,
- payback – the ECP participant will be able to withdraw 100% of the funds accumulated in the ECP at any time, however, before receiving the funds, the financial institution will make appropriate deductions from public tributes and transfer funds from the welcome and annual payments to the state Labor Fund (ECP act 2018).

Noting the short-term effect of ECP implementation, the problem of reducing the net salary of an employee appears in the minds of savers. 2.0% of remuneration transferred as savings in ECP means that disposable household income has decreased. The legislator noticed this problem in the case of people earning less than 120% of the minimum wage, but in the case of other groups of employees no mechanism was introduced to compensate for the loss due to saving in ECP.

7. Perspective of financial institutions

Admission of commercial financial institutions by the legislator requires financing for their functioning. It is worth emphasizing that ECPs have the right to create only financial institutions with relevant experience and an appropriate level of equity, and offering funds for a defined date. In addition to organizational costs, the financial institution must pay a fee for registration in the ECP Register for the right to offer ECP.

When adopting the optics of a financial institution, it should be noted that it may receive remuneration for managing the fund on a defined date, in an amount not exceeding 0.5% of the fund's net asset value. In addition, if the financial institution meets the criteria, it will acquire the right to a success fee of 0.1% of the value of the fund's assets. This means that the ECP product is cheap for the participant and low-margin for the financial institution. Therefore, it should be pointed out that launching the ECP product by financial institutions is an investment and involves many obligations and costs of conducted activity. Only achieving economies of scale, gathering hundreds of thousands of participants and assets counted in PLN billion will allow financial institutions to achieve business success (ECP act 2018).

8. Conclusions

In connection with the changes introduced in 2019 in the area of social security, attention should be paid to the need for additional savings by ECP participants. Benefits received from the universal retirement system will be determined by the contributions paid to the system, which means that the replacement rate will drop to as much as 25% in 2050. Therefore, an indispensable action of the authorities was the introduction of an additional source of income from payments paid during the period of professional career. These benefits will supplement the benefit received from the system based on the insurance method – from ZUS.

Answering the research questions indicated in the introduction to this article, it should be stated that the mechanisms of ECP functioning adopted by public authorities are associated with current benefits for employees. The universality of participation in ECP is to be achieved thanks to automatic enrollment to ECP, subsidies from public funds to the accounts of participants and tax preferences when withdrawing funds. The private nature of ECP funds is also important, as well as the possibility of using them before the age of 60.

The analysis of public policy shows that the authorities have shifted the burden of implementing ECP to the employers. Employers bear the economic and organizational cost of ECP, and in the event of failure to comply with statutory tasks they are also required to pay the cost of any penalties. From the capital market perspective, ECP as a relatively cheap product is not of a high margin character and for financial institutions in the first years or even 10 years of operation will be a source of costs, not potential profits.

Thanks to ECP, the capital form of investment financing is gaining importance. By investing in shares of companies listed on the Warsaw Stock Exchange that are in the WIG20 and mWIG40 indexes, investments implemented by these entities have the chance to be financed. From the perspective of government involvement of state-owned companies, the universality of participation in ECP will allow for raising investment-friendly capital.

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SELECTED REMARKS ON EMPLOYEE REPRESENTATION ROLE IN LONG TERM SAVING PLANS IN POLAND – PPE (EMPLOYEE PENSION SCHEMES) AND PPK (EMPLOYEE CAPITAL PLANS)

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1. Introduction

Collecting savings in a way organized by the employer should also include the role of employee representation. Therefore, in the functioning forms of additional saving, which are organized by employers, the legislator envisaged the participation of partners at the stage of implementation as well as program support.

The purpose of this article is to indicate the role and competence of the representation of employees in long-term saving. The study aims to answer research questions:

– what are the rights of people employed in long-term saving programs?
– how can employee representation block the implementation of long-term saving?
– what are the differences in the rights of employee representation in PPE and PPK in Poland?

The research method used in this study is based on the analysis of institutions representing employees. The institution's analysis allows answering the above-mentioned research questions. As a result of the analysis, the competences of the representation of employees will be determined, as well as legal possibilities to block or delay the implementation of PPE or PPK.

2. Introduction to PPE and PPK in Poland

2.1. A legal obligation to set up PPK or PPE

Recent years have been a period of increased activity of the legislator in Poland in many law areas, including individual and collective labor law and social security law. There are more and more acts which, among others, impose certain obligations on employers in relation to the employees they employ, and in particular provide for specific obligations of employers in relation to various employee representatives. One of such areas are pensions and long saving. As of today, in practice almost every employer in Poland has to provide to its employees a defined contribution long term benefit. The employer’s choice is between two solutions. Namely between the newly introduced since 2019 an employee capital plan (PPK) and an employee pension scheme (PPE), that exist in practice in Poland since late 90-ies, but wasn’t widely

distributed and used among employers. In both cases, PPK and PPE, the law imposes on employers' certain obligations in relation to employee representatives and provides those representatives with different powers. Moreover, there are differences that result form the legal form of employee representation, depending whether this is a trade union representation or a representation elected or selected directly among employees.

2.2. Main characteristics of PPK

Employee capital plan (PPK) is a mandatory solution for every employer in Poland, with some exemptions and is a kind of defined contribution long term savings plan with mandatory employer and employee monthly contributions that are rewarded by the State with additional payments into individual participant account within PPK. All contributions are managed externally within defined date funds by investment fund companies according to rigid rules of law. As a rule, payouts from PPK shall take place after the participant reaches age of 60 years. There are some fiscal incentives in place. From a legal point of view a PPK is composed by two agreements signed in practice by employer with the investment fund company. The most important agreement is a PPK management agreement.

2.3. Main characteristics of PPE

While in case of PPE there is only a mandatory employer contribution, with voluntary employee contribution and less rigid than in case of PPK, an investment policy. The time of payout from PPE is similar to this in case of PPK and starts when participant reaches age of 60. There are as well fiscal incentives in place. Establishment of PPE requires to run an administrative procedure of PPE registration. From a legal point of view a PPE is composed by two agreements. The most important agreement is a PPE company pension agreement, that is stipulated between employer and employee representatives.

3. Role of employee representation in PPK

3.1. Legal basis for employee representation in PPK

In the case of employee capital plans (PPK), which are an obligatory element of the system of additional pension security for employers and at the same time voluntary for employees, the legislator granted employees' representatives limited consultative rights. The legal basis in this case is the Act of October 4, 2018 on employee capital plans (PPK Act), which provides for mandatory participation of representatives of employees employed in the creation of PPK. It is, however, a compulsory but non-binding participation. Moreover, in this case, the legislator provided that shall the trade union organizations does not operate in a given workplace, then other representatives of employees must be obligatorily involved in the procedure of selecting a financial institution that will manage PPK in a given workplace. Thus, in practice for every employer that sets up an employee capital plan it is necessary to run a consultation on selection of provider (Wojewódka 2019, p. 35).

3.2. The method of selecting the representation of employees in the PPK

According to the art. 7 item 3 of the PPK Act, the employer is obliged, in consultation with the company trade organization operating in this employing entity, to select the financial institution with which the PPK management contract will be concluded. However, shall the trade union organization does not operate at this employer, the employer shall select the financial institution with which the PPK management contract will be concluded, in consultation with the representation of employees selected in accordance with the procedure adopted in the given employing entity. However, if one month before the expiry of the period within which the employing entity is obliged to conclude a PPK management agreement, no agreement is reached on the selection, the employer independently chooses the financial institution with which the PPK management agreement will be concluded. PPK (Kolek et al. 2019, p. 23). Act states in practice, that it is employer's obligation and right to set up the rule that shall enable the selection of employees representation for PPK purposes. The above results from the fact used in the provisions of the wording "in the manner adopted in a given employing entity", which means that in this respect the legislator leaves individual employers a certain degree of discretion (Jakubowski and Prusik 2019, p. 122). This means that the correct and lawful solution will be the organization by the employer of universal elections among the employees of the employees' representation in question, as well as the reception and appropriate documentation that such representation will be e.g. the employee council or the social commission operating at the employer's office (Kolek and Sobolewski 2019, p. 28). There is no doubt that for the successful selection of the representation it is necessary for the employer to provide employees with the opportunity to articulate their will.

3.3. Consultative competences of employee representation in PPK

In the case of PPK, the legislator equipped the representation of employees solely with the consultative powers (Jakubowski and Prusik 2019, p.120). It is the employer's obligation to include the representation of employees in the process of selecting a financial institution managing a given PPK, but this obligation only arises in the scope of submitting by the employer a representation of employees of a proposal to select a specific financial institution as the PPK manager in that employing entity (Kolek and Sobolewski 2019, p. 27). Moreover, the abovementioned consultation entitlement on the part of the representation of employees is only temporary. The employer is obliged to attempt to reach an agreement with the representation of employees only up to one month before the final date of the mandatory conclusion of a PPK management contract in this entity. However, after this date, it will be lawful for the employer to completely ignore the employee's representation (Wojewódka 2019, p. 39). Moreover, in the case of PPK, the representation of employees is not a party to any agreement constituting PPK and in practice has no impact on the content of the obligations and rights of PPK participants. The regulations of PPK Act also does not provide for any restrictions on the length of existence of such representation. It can be stated that the employee's representation in PPK has an ad casum character, what means that once in the future there will arise a need to run a new consultation

process on the selection on a new PPK provider it will be necessary to have a new employees representation.

4. Role of employee representation in PPE

4.1. Legal basis for employee representation in PPE

The issues of representation of employees' interests in the case of employee pension schemes are regulated by the Act of 20 April 2004 on employee pension schemes. In this case, the employee pension scheme consists of two agreements a company pension agreement and an agreement with the managing entity. In both cases, the party to these contracts is always the employer, but in the case of a company pension agreement, the employee representation selected for the purposes of PPE is by law a party of this agreement. The legal basis for the existence of employee representation is art. 11 of the PPE Act, which in para. 1 introduces the principle of empowering this representation to be a party of the company pension agreement.

4.2. The method of selecting the representation of employees in the PPE

According to the content of the instruction of art. 11 paragraph 2 of the PPE Act, employee representation is made up of all company trade union organizations operating at a given employer. However, as it is often mentioned the trade unions in Poland were not very supportive to the PPE, even in the light of their established by law supremacy in the area of decision process of setting up a PPE (Szczepański 2010, p 373). However, if within the employer does not operate a company trade union organization, the employer concludes a company pension agreement with employee representation, that should be selected in accordance with the procedure adopted at the given employer. Also, in this case, the legislator did not regulate in any way the rules for selecting the employee representation in question, limiting themselves only to the indication "*in the manner adopted by a given employer*". It must be deduced from the above that it is the employer's responsibility to work out and determine the rules or appropriate regulations for selecting the representation in question and to do so. As it is stressed within a doctrine an employer shall not in this case directly indicate a Work Council or any other existing body without employee's engagement in the decision on selection (Kopeć and Wojewódka 2005, pp. 78-79). By law it is not compulsory or even necessary to agree this mode of selection of with the employees themselves. Employers must, however, remember that the empowerment of employee representation for PPE purposes, and thus also indirectly the correctness of the process of selecting this representation, is subject to examination by the Polish Financial Supervision Authority in the process of PPE registration before this body. The above supervisory power of a state body, which de facto co-decides on the establishment of a given PPE, by issuing an appropriate administrative decision, indicates that employers should exercise due diligence within their duty to select an employee representation for PPE purposes. It should be stressed that some authors provide such employee representation with the ability to represent employees in front

of court in case of potential dispute with employer (Rycak and Derlacz-Wawrowska 2010, p. 131).

4.3. Rights representing employees' representation in PPE

Pursuant to the provisions of the PPE Act, the basic right of each employee representation in PPE, regardless of whether it is a trade union organization or a representative office selected in accordance with the procedure adopted by a given employer, is being a party to the company pension agreement under PPE. (Wojewódka 2015, p. 99). This agreement can be somewhat simplified as a kind of PPE constitution. Being a party to the company pension agreement means the right not only to sign it, but also to have a real impact on its content, e.g. in the form of negotiations with the employer, the amount of the basic contribution obligatorily paid by that employer to the PPE. The competences of employee representation under PPE also include issues related to the change in the content of the agreement (and thus the terms of the PPE), as well as limited possibilities of co-deciding on the existence of PPE as such a solution in a given employing entity. In practice the employer is not able to set up unilaterally a PPE in case when the employees representation refuses to sign a company pension agreement.

4.4. Temporary aspect of non-trade union employee representation in PPE

In the case of provisions on PPE, the legislator applied a new solution, practically unknown in other cases, in the form of a specific term of office of non-union representation of employees. From the content of art. 11 paragraph 3 of the PPE Act shows that the authorization of such representation to take all actions provided for by the Act after 24 months from the date of selection of the representation (Kopeć and Wojewódka 2005, p. 80). However, it will expire sooner if at least half of the employees' representatives cease to be employees of the employer or the employer's trade union organization starts operating at the employer.

5. Comparison of selected areas

5.1. Similarities

The comparison of the representation of employees for the purposes of PPE with the representation of employees for the purposes of PPK indicates both similarities as well as significant differences between these bodies. Certainly, the common feature is the fact that both representative offices can function only if the employer does not have trade union organizations. The second common feature of both representations is the fact that they are selected in the mode adopted autonomously at a given employer, and de facto the employer decides how to select them. However, the list of similarities does not outweighs the list of differences between the two bodies.

5.2. Differences

The most important difference between employee representation in PPE and PPK is the nature of the competences held by the body. While in the case of PPK they are in practice only consultative competences, it is actually the employer, who can independently make all decisions regarding PPK. In the case of PPE, the employee representation has decisive competence and co-decides on the creation of PPE as well as on its individual parameters. In addition, the procedure for selecting an employee representation for PPE purposes is the subject of a supervision of the Polish Financial Supervision Authority, which is not the case for the representation of persons employed for PPK purposes. Another significant difference is the lifetime of the employee representation. In the case of PPK, we are dealing with a body appointed in principle *ad casum*. However, in the case of PPE, the legislator introduced a specific 24-month term of existence to this body. The above list clearly shows that just as you cannot put an equal sign between PPE and PPK, it is also not possible in the case of employee representatives in these solutions for long-term additional saving.

6. Conclusion

In the present paper there were discussed both main similarities as differences between employees' representations in both PPE and PPK, that are forms in place of long-term savings organized by employers for employees.

The research questions set out in this article have been answered using the institutional analysis method. Thanks to legal and organizational analysis of the principles of functioning of the representation of employees, the main rights and possibilities of employees employed in implementing and servicing PPE and PPK were indicated.

The comparison shows clearly that in case on PPE the legal position of employee's representation is much stronger, that the one in case of PPK. However as, due to the recent changes in law a PPE system will not develop substantially in future, in practice the main way to deliver long term savings in Poland will be PPK, where the position of employee representatives is respectively less important.

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EMPLOYEE CAPITAL PLANS IN POLAND – INVESTMENT'S LEGAL FRAMEWORK

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1. Introduction

Employee capital plans are designed to create a long-term saving system for vast majority of employees in Poland. The main aim of the implementation of the PPK is to establish an effective, voluntary funded pension scheme. In political discourse, the PPK is mostly presented as a way of ensuring decent pensions and aims to supplement public pensions with income from pensioner's own savings. In the economic discourse it is perceived as an alternative to existing long-term savings product for retirement purposes which "thanks to the use of innovative solutions derived from behavioral economics—would convince to save voluntarily for retirement and would contribute to a universal system of retirement savings' accumulation" (Jedynak 2019, p. 35). The PPK is addressed to 11,4 million (according to data from 2018) of potential participants. The PPK will be tied with employment legal relations which are obligatory subjected to the public social security with exclusion of self-employed.

The act on employee capital plans[1] entered into force in January 2019 and pursuant to the regulation the private savings of employees are co-financed by employees, employers and at some point, by public funds in the form of welcome (250 PLN) and annual (240 PLN) contribution. By 2021, every employing entity which employs at least one person will be obliged to establish the PPK.

To some extent, the PPK system is inspired by the British occupational scheme's reform. Under Pension Act 2008 British employers are required to enroll their employees in a defined contribution retirement plan. Automatic enrolment has been introduced gradually, starting with the largest employers from 2012 (those with 250 workers or more) and duties applied to employers of all sizes by the end of February 2018 (The Pension Adequacy Report 2018, volume 2, pp. 267). The PPK system pursue similar ideas of additional pension schemes including employers' obligation to establish the scheme, gradual introduction depending on employer's size and automatic enrollment of employees with the right to opt-out (Rudolph 2019, pp. 10-11).

[1] The Act of 4 October 2018 on employee capital plans (Dz.U. z 2018 r. poz. 2215) – hereinafter referred to as "the Act".

Savings collected in the PPK will be invested in completely new investment entities (DDFs) created by private operators (investment companies) in 2019. Their only purpose is to collect and invest savings from the PPK. The PPK investment vehicles are expected to offer long-term investment products based on life cycle investment strategy – "a dynamic asset allocation fund where the asset allocation shifts from riskier investments as the individual ages and gets closer to the target retirement date" (Booth and Chang 2011, p. 55).

Pursuant to the Act, most of the formalities regarding the establishment of the PPK and commencement of the employees' participation shall be handled by employers. The employer will be responsible to choose an investment company and its DDFs. However, such decision should be made in agreement with employees' representation, in case of lack of thereof the employer will choose unilaterally.

From a legal standpoint the employer concludes a management agreement with DDF (or DDFs – depending on the internal structure of the investment product there might be a DDF as a one legal entity with internally separated sub-funds or plural number of DDFs each acting as a separated legal entity) operated by the chosen investment company. The management agreement will set the contractual framework of PPK in his enterprise. Afterward, the employer will enroll employees in the PPK. Enrollment in PPK will take place through the conclusion of a contract between the DDF and each employee although without theirs active role in the process of contract' conclusion. The contract in concluded by the employer acting on behalf of and for the benefit of his employees. As the most of employees will be enrolled automatically[2], the employer will act on their behalf as a statutory representative.

Every employer will be also responsible for the transfer of contributions. Pursuant to the Act, the PPK contributions are calculated and deducted from a remuneration paid by the employer to active participants. In general, the employer will deduct 2% from the remuneration and transfer it to DDF's account. The employer's contribution will be 1.5% of the employee's remuneration. Both sides may raise their financial involvement independently by declaring the voluntary contribution up to 2% in case of employees and 2.5% in case of the employers.

2. The legal framework of the defined-date funds in the PPK

Pursuant to the Act the DDFs may be created and offered in the PPK system by four kinds of investment companies, which are: investment fund companies (TFI), general pension societies (PTE), labor pension societies (PrTE) or insurance companies (ZU). The principle expressed in the Act assumes that each employer may choose only one investment company[3]. The savings are invested respectively in mutual fund

[2] Pursuant to the Act employees between 55 and 70 years old will be enrolled only at their request. Employees between 18 and 55 years old will be enrolled automatically unless they submit to the employer declaration of resignation before the enrollment date.

[3] Although the investment company may create more than one DDF.

(or funds), pension funds or in insurance-based investment product operated by a chosen investment company.

The operational dimension of investment products in the PPK is strictly regulated on two levels of legislation. The first level is the "sectoral legislation" – separate for each of the abovementioned kind of investment companies. Pursuant to each "sectoral legislation" investment companies operate under the authorization of the Polish Financial Supervision Authority.

In case of a mutual fund (the specialized open-end investment funds) operated by TFI, as well as a pension fund operated by PTE or PrTE, the "sectoral legislation" provides for separation of legal personality between the fund and the investment company. The distinction between mutual and pension funds has its historical reasons associated with the creation of the second pension pillar over 20 years ago (Maśniak and Lados 2014, pp. 124-127). In practice, both mutual and pension funds have a similar legal design. Insurance form of the PPK is created as an insurance-based investment product and it's not separated from the legal personality of the insurance company.

The establishment and operation of mutual funds or pension funds is also strictly regulated and requires additional permission of the Polish Financial Supervision Authority, however DDFs are excluded from this authorization process. Nevertheless, further operations of DDFs are supervised by the Polish Financial Supervision Authority within the scope of general aims of the supervision of the financial market – i.e. to ensure the proper functioning of this market, its stability, security and transparency, confidence in the financial market, and to ensure that the interests of the market's participants are protected.

The second level of regulation is specified in the Act on employee capital plans. Under the Act investment companies need to fulfil the array of statutory requirements to become involved in the management of funds gathered in PPK. The requirements concern at least 3 years of experience in the management of investment funds, appropriate level of own equity capital and specific investment strategy. The financial institutions may operate in the field of PPK after meeting these requirements and obtaining an entry in the public PPK register. Financial supervision based on the Act is also carried out by the Polish Financial Supervision Authority and is exercised in the scope of compliance with the law and the interest of PPK participants (article 51 par. 2 of the Act). The Act should be seen as a *lex specialis* for sectoral legislation applicable to investment companies. The role of the Act is to introduce detailed regulations, especially in the aspect of investment policy of the DDFs or automatic enrollment of participants.

The regulation of investment policy of the DDFs under the Act is based on several basic assumptions:

– investment strategies based mainly on debt and equity instruments
– differentiation of the level of risk based on the aging;
– standardization of investment mechanism;

– automatic enrollment of participants based on age (with the possibility to switch the funds at the request of the participant);
– minimization of the possibility to differentiate investment strategies.

2.1. Investment strategies based on debt and equity

Pursuant to the Act, investment strategies of defined-date funds are based mainly on investments in debt instruments and equity instruments. For the purposes of the Act the definition of the "debt part" of the assets include such debt instruments as money market instruments, bonds, treasury bills, mortgage bonds, certificates of deposit, bank deposits, derivatives based on debt instruments, participation units of investment funds as well as other transferable securities incorporating property rights corresponding to the debt rights.

The "equity part" of the assets include shares, pre-emptive rights, rights to shares, subscription warrants, derivatives based on equity instruments, participation units of investment funds as well as other transferable securities incorporating rights corresponding to the equity (article 2 par. 1 of the Act).

The division of the DDFs' assets between debt and equity part is not dichotomous. The aim of such division is to shape appropriate risk profile (Zagadnienia prawne 2020, pp. 71-72), therefore debt and equity parts will constitute majority of the DDF's assets. Nonetheless, pursuant to the Act the DDF may invest limited part of the assets in instruments not assigned to either debt or equity part – e.g. currency derivatives or alternative investments (Prusik 2019, pp. 341-342).

2.2. Differentiation of the investment risk based on the aging

The basic assumption of the DDFs' investment policy is the differentiation of the level of investment risk based on the aging. Pursuant to the Act, every DDF will increase the level of debt investments and reduce the level of equity investments along with approaching the defined-date. PPK regulation basically limits the possibilities of choosing an investment strategy only to the life cycle strategy. The Act sets out five levels of equity and debt involvement during the life cycle of the DDF, from its establishment until reaching the defined date (article 40 par. 1 of the Act).

Pursuant to the Act, the establishment of the DDF its equity part should not be less that 60% and may not be more than 80% and with debt part between 20 to 40%. While approaching defined date of the fund its investment policy will gradually decrease the engagement in equities. As from the year in which the fund reaches its defined date, the equity part of its assets may not be more than 15%, and the debt part of its assets may not be less than 85%.

2.3. Standardization of investment mechanism

The important conclusion derived from the Act is that the statutory investment mechanism is implemented in every DDF separately and independently. From the participant's perspective, the cycle of investment policy evolution takes place

within the particular DDF of his choice. Each DDF must fulfill these statutory requirements and adjust its investment policy once it reaches the subsequent level indicated in the Act. Therefore, the differentiation of the investment risk is related rather with the aging of the defined-date fund than with the aging of participants. By the operation of law participants will be enrolled in the DDFs appropriate for their age, nonetheless they are allowed to switch and move their assets and future contributions to other DDF offered by the chosen investment company.

The standardization of the investment mechanism on the level of each DDF requires from the investment company to maintain an appropriate number of such funds. Pursuant to the Act, investment companies are obliged to manage, respectively, investment funds or pension funds in a number corresponding to at least the number of restrictions on the level of investment risk referred to in article 40 par. 1 of the Act. However, the Act specifies elsewhere (article 38 par. 5 of the Act) that the investment company creates a DDFs with defined dates falling every 5 years for the next five age-groups of participants. As it's impossible to establish a fund with more than one defined date, it means the obligation to the investment company to maintain appropriate number of DDFs covering all professionally active age groups of participants.

Each investment company is obliged to manage at least eight DDFs and will create more in every next 5 years. Each DDF will follow the same path in the investment policy evolution as it's set forth in the Act.

The first defined date of such fund is specified in the Act – the 2025 DDF which is dedicated to participants born no later than 1967 (article 136 par. 1 of the Act). Determining the first defined date in the Act is an another mean of standardization. It determines the defined dates of subsequent DDFs in each investment company involved in the PPK system.

The scope of standardization affects even the name of the DDFs. The name must specify the fund's defined date – pursuant to the article 38 par. 4 of the Act.
As a result, each of 20 investment companies entered in the PPK register has a similar investment product for PPK.

2.4. Automatic enrollment of participants based on age (with the possibility to switch funds at the request of the participant)

As it was mentioned before, participants are enrolled in the DDF appropriate for their age. The Act sets out in details how to assign participants by age to a given DDF. According to the definition, set out in the Act, the defined date is the "year in which the age of 60 is reached by participants born in the year constituting the middle of the year range of participants for whom the given defined-date funds is appropriate". Given the abovementioned definition the fund with defined date falling in 2040 is appropriate for participant born between 1978 and 1982 (as participants born in 1980 will reach the age of 60 in 2040).

The participant may invest in one DDF during the whole period. Automatic enrollment to the appropriate DDF would allow to limit the investment risk level along with approaching the age of 60 by participants of the fund.

The important conclusion is that the differentiation of the investment risk is related with the aging of the defined-date fund not with the aging of a specific participant. Therefore, participants are allowed to switch and move assets and future contributions to other fund offered by the chosen investment company and change the life-cycle investment mechanism apply to them. However, participants cannot switch to the funds of different investment company.

2.5. Minimization of the possibility of differentiating investment strategies between the investment companies

The Act introduces detailed requirements regarding the specific investment strategy both in debt as well as the equity part of the assets. As for the equities the Act is referring primarily to investments in companies listed in the Warsaw Stock Exchange (WSE) basic stock indexes. The equity part of the assets – pursuant to the Act – should represent:

– not less than 40% of the value of assets in equity instruments of public companies listed in WIG20 stock index,
– no more than 20% of the value of assets in equity instruments of public companies listed in the mWIG40 stock index,
– no more than 10% of the value of assets in equity instruments issued by other public companies listed on the WSE or companies listed on the organized market in the Republic of Poland.

The Act stipulates also that not less that 20% of the value of assets invested in equity instruments should be invested in foreign organized market in an OECD member countries.

At the debt part of the assets the Act requires to invest majority of the assets in debt securities issued or guaranteed by Polish or UE member states central governments (State Treasury), central banks, local authorities, international organizations, multilateral development banks (not less than 70% of the assets invested in the debt part).

To some extent, the Act requires internationalization of the investment policy. However, such requirement regards only the equity part. The investments in debt instruments may be as well internalized but it's not mandatory.

On the other hand, the Act introduces a limit on foreign exposure, by introducing a limit of assets denominated in foreign currencies – setting the limit at 30% of assets. It is also the minimum threshold that the legislator could introduce in accordance with UE law (see: Directive (EU) 2016/2341).

The foreign investments of the DDFs are limited to the assets denominated in currencies of the UE member states and other OECD members states. Therefore, there is no legal possibility to invest funds in assets denominated in currencies of other countries – such as Russian ruble, Ukrainian hryvnia or Chinese yuan.

The legislator decided to introduce detailed rules regarding the investment strategies of the DDFs, which certainly promotes uniformity on the PPK investments. Such regulation may be considered as another tool of standardization within the legal framework established in the Act.

As a result, the legislation tends to minimalize the possibility of differentiating investment strategies between the investment companies. Pursuant to the Act it's impossible to establish the investment fund investing only in debt instruments (however it's possible situation when the fund will reach its defined date) or only in certain categories of foreign equity instruments. Even though DDFs may differ in detail they basically will follow the same pattern in each investment company.

3. The scope of standardization established in the Act

Standardization is seen in the Act at many different levels, beginning with the standardization of the DDFs' names, its diversity and number, automatic enrollment by age, up to detailed requirements established within the scope of the investment policy.

Since February 2020 each of 20 investment companies that entered in the PPK register has established 8 DDFs with the first defined date falling in 2025 and subsequent falling in five-year intervals up to 2060. Only two investment companies established more than 8 DDFs. The first one established already the DDF with defined date falling in 2065 and the second has established 10 defined-date funds including defined date of 2020 and 2065.

Standardization also applies to investment policy. From the perspective of the statutory requirements, for every 100 PLN of a participant's contributions to a 2055 DDF, at least 24 zlotys will be invested in 20 public companies listed in WIG20 stock index (the equity part of the 2055 fund is to be at least 60% of its value of assets, and at least 40% of the equity part is to be invested in equities of companies listed in WIG20).

It is difficult to determine at this stage how the statutory requirements will affect the differentiation of rates of return between investment companies active on the PPK market. Nevertheless, it clearly affects the unification of the risk categories of the DDFs, as indicated by the SRRI risk and reward profile. Most of the DDFs has been categorized on 3rd or 4th level in the SRRI (synthetic risk and reward indicator) scale, according to information revealed in its Key Investor Information Document (source: https://www.mojeppk.pl).

The area not specified in detail in the Act consists of investments denominated in foreign currencies. It may be expected as a factor enabling a greater diversity of investment approach or rates of return in future.

4. The assessment of the statutory legal framework

Simplicity and clarity are among desired features of additional pension scheme (Jedynak 2016, p. 37). If PPK is perceived in terms of an additional pension scheme, the reason for standardization clearly aims to achieve simplicity of the entire PPK system.

PPK is intended to be a common product for vast majority of the employees. Differentiation of PPK products would increase complexity of the system and in effect discourage participation. It could also increase investment risk. In future it could be a source of political risk in the event of radical differences in profitability, particularly in terms of rates of return or security of the investments. The history of open pension funds indicates that political risk factors are crucial for the sustainability of the long-term investment system.

On the other side, the Act clearly limits the possibility of individual approach to investment strategy and offers the same approach to nearly 12 million of potential participants. In practice, the PPK participants cannot avoid life-cycle investment strategy. The alternative option was to create an existing legal framework as a default option, but enabling participants to choose a different assets allocation strategy and ultimately resign from a life cycle on their own decision. In practice, each investment company could rely on two or three DDFs – focusing respectively on equities, debt instruments and alternative investments. The default option could be established as a system of automatic assets allocation between these DFFs with variable proportions depending on age. Such solution would allow to establish individual allocation. Moreover there would be no necessity to create more DDFs. Such a solution would allow for co-occurrence of passive participants with the default option and active participants taking control in fitting the strategy and the risk for themselves. The PPK system would be more flexible and take greater account of the savings holders` will, however it would increase both complexity and the risk of wrong investment decisions.

The other effect of such standardization is the limitation of the active role of the participants. In the PPK, it is the employer who actually chooses the investment company to entrust participants' savings. Savings holders' have no formal influence on this choice, nor can they force an employer to change the investment company. A participant (or an employee as a potential participant) cannot open a PPK account with an investment company other than the one chosen by his employer. Therefore, the savings holders' decision and freedom of choice within the scope of the Act is limited to simple "yes" or "no" in regard to his active participation. Those who are dissatisfied with this scope of freedom or with the employer's choice will lose the opportunity to receive additional payments from the employer and from public funds.

It also has other potential effect. In the future, the decision of the employer itself may result in mass and sudden "exit" of a large number of participants from single DDF, e.g. as a result of a decision to change the investment company. In such situation, the employer enrolls his employees to a new financial institution and initiates a mechanism of the transfers of their savings to the new financial

institution (although the participant has the opportunity to oppose the transfer of funds, he cannot oppose changing the institution as for future contributions). This situation, depending on the size of the employing entity, may relate to a significant part of the assets of the DDF and may other participants. Unlike the management of individual investors' funds, where the risk of a significant and sudden outflow of assets is associated with massive decision-making by individual investors, the group investment mechanism may lead to one decision taken by the 'organizer' of a given group of investors.

Another issue is the precise definition of the rules for investing in the equity part of the DDF's assets in public companies enlisted in Warsaw Stock Exchange indexes. The introduction of a minimum exposure limit for public companies listed in WIG20 may result in stable and long-term inflow of funds and demand for equities of 20 biggest companies on Warsaw Stock Exchange. Standardization at this level means that DDFs might support each other in their investments. One should also not forget about the need to ensure an adequate level of investment liquidity. On the other hand, however, such an investment requirement may appear to be excessively restrictive, depriving managers of an appropriate level of discretion, for example in the event of an overvaluation of equities prices.

The statutory legal framework aims to achieve simplicity, clarity and standardization within the whole PPK system. Nevertheless, these objectives are attained at the expense of limited freedom of choice of own investment strategy. The Act could create mechanisms that would enable the coexistence of the default option and the possibility of individual asset allocation. Lack of such possibility may weaken the popularity of the PPK as a universal system dedicated to nearly 12 million of potential participants.

5. Legal paternalism

Standardization should also be assessed in terms of the principles of contract law and interference of legal paternalism (Kronman 1983). The Act itself is created on assumptions arising from behavioral economics described as "libertarian paternalism" which insists on preserving choice but favors the proper decisions. It interferes especially with the concept of freedom of contract. The scale of such interference is in question. Some provisions of law "preserve freedom of contract but impose procedural or substantive restrictions on those who seek to move in directions that seem, to the planner, to be contrary to their welfare" (Sunstein and Thaler 2003, p. 27).

The basic principles of private law is the equality of parties and the theory of contract is based on "fundamental premise that a contract is the expression of the free will of two consenting individuals" (Cserne 2012, p. 82). As in Poland, the contract law is based on the intent of contracting parties. A contract is based on parties' intent to create, transform or terminate given legal relationship. From the perspective of Polish legal doctrine, the freedom of contract is understood as a freedom to enter into contract, freedom of choice of parties, freedom of shaping

the content of a contract and freedom to terminate a contract (Machnikowski 2020, pp. 520-521).

To some extent, the reason for paternalistic approach is to enhance the equality between contracting parties or to balance the interests within the legal relations deprived of such balance by its nature.

From the PPK participants' legal perspective their participation in the PPK has a contractual nature. The Act assumes that the contract between the DDF and the employee, by which the participation in the PPK begins, is concluded in absence of one of the parties – the employee. Pursuant to the Act the contract is concluded on behalf of the participant by the employer, acting for majority of employees as a statutory representative. Although each employee may resign from participation before the conclusion of the contract on his/her behalf, the Act does not require the employee to be notified or to be informed before the conclusion of the contract of his rights and legal consequences of assuming his implied intent. The employer "has the right" but no obligation to inform his employees on terms and conditions related with the PPK. The exercise of this right might be weakened by fear of criminal charges for discouraging employees from saving in the PPK. In fact, the first hard obligation to provide information lies with the financial institution after the conclusion of the contract. It should be added that the context of the Act implies inability to terminate the contract during employment period. The participant may resign from active participation and from contributing to the PPK but such declaration does not mean the contract will be terminated.

The conclusion of an explicit contract on behalf of employees as stipulated in the Act underlines the importance of considering the extent to which the behavioral economics' mechanism interfere with the concept of freedom of contract. There is a difference between assuming the implied intent and ignoring the matter of conscious intent in contractual relations.

Therefore, the PPK legislation might be seen as a significant breach of basic principles of private law in Poland, in which the disposition of private property based on contractual relation needs freely undertaken actions by the parties themselves. It might be questioned whether the Act assumes implied intent of the participant or whether ignores his intent in such contractual relation.

In terms of behavioral economics, the automatic enrollment may be seen as useful tool increasing the participation level (Szczepański 2017, p. 44). The automatic enrollment in the PPK system from legal perspective is a bright exception in terms of creating contractual relationships in private law. Even the option of resignation after the conclusion of contract does not mean the contract is terminated. Therefore, the voluntary nature of the PPK after establishing legal relations for the participant is limited to the possibility of unilateral resignation from making further contribution not as a termination of legal relations.

In this context, the standardization may appear as a kind of safeguarding the interests of participants. As entering into contractual relations and even investing the first contribution might happened beyond participants will, the Act specifies in details terms and conditions of such relations and investments. While in general

participants are omitted in the decision process of choosing an investment company and contract conclusion, standardization resulting from the Act reduces the risk associated with the unlimited scope of possible investment strategies that might be applied while investing employees' savings or with wide range of potential terms and conditions that may interfere with employees interests. That might be called a "vicious circle" of paternalistic interference in freedom of contract where the primary interference leads to another.

Not without significance is the fact that the employer is the real decision-maker in the process of choosing an investment company to be entrusted with employee's savings. From the employer's perspective, such a decision carries a significant burden of responsibility towards employees so the standardization may tend to ease it by reducing the risk and differences between possible choices.

6. Excessive complexity and unnecessary formalities deriving from the statutory legal framework

From the perspective of the organization and operation of the DDFs as well as from the employer's perspective, the legal framework established in the Act involves in part excessive complexity and the creation of unnecessary formalities.

6.1. Unnecessary explicit contract

Pursuant to the Act, the establishment of PPK by employers requires two legal steps. First step is related with the choice of an investment company. The step is concluded by the management agreement with DDF (or the DDFs – depending on the internal structure of the investment product) managed by the chosen investment company.

The second step will be the enrollment of the employees which will take place through the conclusion of contracts for them – the agreements for operating PPK with DDF as a second party. The contracts are concluded by the employer acting on behalf and for the benefit of employees. Each employee becomes the participant of the PPK upon signing this agreement unless he/she submits to the employer a declaration of resignation before the contract conclusion.

The introduction of a formal and explicit contracts between DDF and the participants does not contribute much from legal perspective. The essence of the contract in private law is to create or shape a legal relationship between parties. In this case, most of the rights and obligations in the relationship between the participant and the DDF arise either from the Act or from the internal regulations and statutes of the DDF. Mostly, the content of the contract between the participant and the DDF is informative and does not create basic rights and obligations on its own.

Similar legal configurations on the occupational pension schemes assume the existence of an implied contractual relation between an employee and an employer (Sierocka 2010, p. 253). The core legal relation between an investor and a mutual fund exists due to the purchase of participation units and transfer of money.

Participation units represents participant's property rights. Only by holding participation units an investor has a claim towards the mutual fund to repurchase them and receive invested money back together with generated profit.

The Act creates therefore different scope of legal relation between the investment fund and its participants as such contract exists even without purchasing the participation units and with no money transfer. By introducing a new type of contract, the legislator also created a dilemma related to the need to bypass the role of one of the parties.

For employers, concluding formal contracts on behalf of and for the participant involves inconvenient formalities. The employer must set a deadline by which he should conclude the relevant contract, determine whether the employee has previously submitted a resignation declaration. As the contract is concluded for each employee, so this duty is repetitive.

6.2. The problem of the PPK accounts' multiplication

Participation in the PPK is related to a specific employer. In contemporary economic realities, characterized by the mobility of employees, it means the problem of multiplication of the PPK accounts. From a long-term perspective, an employed person may have split his/her savings between several or even several dozen of the PPK accounts at various financial institutions depending on the frequency of employment changes.

Accounts created with a given employer become inactive after termination of employment and there is no possibility of making direct payments from the current place of employment (indirect possibility requires making transfer payments between the accounts held).

With regard to funds accumulated in previous places of employment, the Act provides for a "consolidation" mechanism which takes place when new employment starts. The mechanism is initiated by the employee, however it creates additional obligations for the new employer who should act on behalf of the employee during the transfer procedure. The new employer should inform the employee of his intention to carry out the transfer from previous workplaces unless the employee will raise a written objection to that. The consolidation mechanism seems to be complicated and formalized and as it's initiated by the employee's action it could be ineffective as well.

Multiplying accounts in PPK means complicating the system and multiplying administrative and legal obligations.

The negative effect of such a solution may be the phenomenon of "abandoned accounts". It cannot be ruled out that over the years, part of the population of participants may "forget" about their accounts, and as a result of discontinuing the update of identification data, the financial institution's communication with the participant will be limited.

6.3. The excessive formalities in the operation of DDFs

The assumption adopted by the legislator means that each DDF has a specific lifetime. After obtaining the defined date, no further policy modifications are foreseen. Reaching the defined date by the particular DDF will probably be associated with a successive decrease of assets and, ultimately will lead to a merger with other DDF (or to liquidation). After reaching the defined date, the growing number of participants will be entitled to make withdrawals. As the Act does not prohibits withdrawals in full (although such withdrawal involves taxation by capital gains tax), the ratio of such withdrawals will affect the speed of the decline of assets. It may have a negative impact for the rest of the DDF's participants.

In the long-term, investment companies will be required to gradually create more DDFs (for subsequent groups of participants entering the labor market), which will be a duplication of those previously created and to merge the existing ones.

7. Conclusions

The statutory legal framework of the PPK is based on standardization of investment products and minimalization of the possibility to differentiate investment strategies.

The statutory legal framework aims to achieve simplicity, clarity and standardization within the whole PPK system. Nevertheless, these objectives are attained at the expense of limited freedom of choice of participants own investment strategy. The Act could create mechanisms that would enable the coexistence of the default option and the possibility of individual asset allocation. Lack of such possibility may weaken the popularity of the PPK as a universal system dedicated to nearly 12 million of potential participants.

The PPK participation is based mainly on automatic enrollment. The participation in the PPK has a contractual nature although the enrollment may occur without providing information to potential participants on their rights and legal consequences. The employer "has the right" but no obligation to inform his employees on terms and conditions related with the PPK. The exercise of this right might be weakened by fear of criminal charges for discouraging employees from saving in the PPK. In fact, the first hard obligation to provide information lies with the financial institution after the conclusion of the contract (automatic enrollment) on behalf of an employee.

The conclusion of an explicit contract on behalf of employees as stipulated in the Act underlines the importance of considering the extent to which the behavioral economics' mechanism interfere with the concept of freedom of contract and limits of legal paternalism. There is a difference between assuming the implied intent and ignoring the matter of conscious intent in contractual relations. Therefore, the PPK legislation might be seen as a significant breach of basic principles of freedom of contract.

From the perspective of the organization and operation of the DDFs as well as the employer's perspective, the Act involves excessive complexity and the creation of unnecessary formalities.

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