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Contents

- Adam Barembruch, Kamila Bielawska, *Employee Capital Plans performance through the lens of the participant — how to (better) measure and inform about the returns* 7
- Iwona Olejnik, Magdalena Stefańska, *Perception of old age versus saving in Employee Capital Plans* 19
- Julitta Koćwin, *The losing streak of Employee Capital Plans in the pension fund market* 33
- Wioletta Nowak, *Elderly employment in the European Union: Active aging or overcoming poverty* 53
- Dawid Banaś, *Assessment of the performance persistence of Employee Capital Plans* 69
- Mariusz Dybał, *The design thinking method as an example of social innovation in action based on the case study of ProPoLab* 87

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Employee Capital Plans performance through the lens of the participant — how to (better) measure and inform about the returns

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Abstract

In recent decades, an increased effort to increase private retirement savings can be observed, especially in countries where public pensions have been the main source of livelihood during retirement. To increase participation in occupational as well as individual pension plans, states often use financial incentives (personal income tax reductions, preferential tax rates, subsidies). However, experience from studies in various countries shows that these incentives may not be efficient and/or attract mainly high earners. Mobilizing Poles to save for retirement in light of the paradigm shift in pension security in Poland caused by the 1999 reform has proven to be a major challenge. Given the mediocre development of the private pension plan market, a new type of workplace pension plans based on automatic enrollment called Employee Capital Plans (ECP) began to be implemented in 2019. However, despite the plan's favorable funding mechanism, especially from the perspective of low- and middle-income earners, participation remains low. In the article, we argue that a change in the manner in which program participants are being reported their earned rates of return could increase interest in ECP participation. Following the investment performance of 60 FZDs, operating within the framework of ECP in Poland, we show that the total returns presented by the managers

of FZDs and Polish FSA are lower than the returns measured from the perspective of participant contributions using the IRR method. Significantly higher results are also achieved by those with low earnings, who can make reduced contributions to ECP. Thus, we recommend the introduction of a standard for the presentation of ECP investment results from the participant's point of view, taking into account the ECP financing mechanism.

Introduction

Population aging is a global challenge that requires systemic action. One of the main consequences of this process is the need to ensure adequate income for retirement. Responsibility for securing retirement income is increasingly being shifted to individuals. In line with the recommendations of international organizations (World Bank, 1994; Hinz and Holzmann, 2005; European Commission, 2012), this is being done by promoting private pension plans offered at the workplace or individual pension plans often supported by financial incentives (OECD, 2007, 2018). This was also the idea behind the paradigmatic Polish pension reform of 1999 — both through the operation of Open Pension Funds (OFE) and Occupational Pension Plans (PPE), the intention was to introduce a culture of saving for retirement (Chłoń, Góra and Rutkowski, 1999). However, this goal has not been achieved, and the significant changes introduced in the operation of Open Pension Funds (Bielawska, Chłoń-Domińczak and Stańko, 2015) have undermined Poles' trust in the state and pension plans (Mentor S.A., Uniwersytet Gdański, Uniwersytet Ekonomiczny w Poznaniu and Business Centre Club, 2021; Bielawska, Shen and Turner 2022; Bielawska and Turner, 2023).

Nevertheless, after unsuccessful attempts to popularize supplementary pension plans in Poland, initially in the form of Occupational Pension Plans (PPE) and then individual plans (IKE, IKZE), a new form of plans organized by employers in the form of Employee Capital Plans (ECP; Pracownicze Plany Kapitałowe or PPK in Polish) was introduced in 2019. The principles and mechanism of PPK are based mainly on the experience of British pension workplace plans with automatic enrollment. In 2017, with most workers having been auto-enrolled by their employers, the overall opt-out rate in the UK was 9% (Department for Work & Pensions, 2017). In Poland, the opt-out rate accounts for 89% (Mentor S.A. et al., 2021).

The financial mechanism of ECP (see Part 1 for more details) is the most favorable for participants among all pension savings plans in Poland. While the issue of distrust in the state in the context of the OFE experience is unquestionable, we aim to verify that participants are properly informed about the investment outcomes with employer and state subsidies. We claim that the total rates of return on defined-date funds reported by the Polish FSA (KNF, 23.12.2022) or managers themselves understate the benefits received by participants in ECP. Secondly, we argue that inadequate performance information for the participant particularly affects low-income people. Thirdly, we argue that a measure of the market perfor-

mance of funds that is inadequate for the program design may discourage participation in ECP. To verify the research hypotheses, an analysis of the investment performance (the subject of the analysis) of 60 defined-date funds (the object of the analysis) managed by 10 financial institutions — whose quotations were available on stooq.pl as of January 5, 2023 — was conducted. The analysis covers the period between January 2020 and December 2022 and is based on various measures of investment efficiency (TRR, IRR) presented from the market and investor perspective. The methodology of the study is explained using the example of contributions made to the ECP on different salary levels (average and low-earners) and with the usage of different measures of performance of defined-date funds.

1. Theoretical framework of the research

Population aging is a visible process in all developed countries. This demographic change is affecting the countries of Central and Eastern Europe (including Poland) to a significant degree. As a result of this, public authorities should adapt the policies they implement to this challenge, in particular in the field of pensions, healthcare and long-term care systems, among others. Poland is a country that implemented structural pension reform in 1999 to cope with the long-term fiscal sustainability of public pensions (Chłoń, Góra and Rutkowski, 1999). At the same time, the transition from the DB to DC formula meant that it was necessary to support the development of supplementary pension plans, as the public system could not provide adequate benefits in the long term with a fixed level of pension contribution. Initially (in 1999), a framework was created for the operation of occupational pension plans (PPE), then, in view of their mediocre development, individual forms of pension security were introduced with the usage of tax preferences, i.e. IKE in 2004 and IKZE in 2012. Both individual types of pension saving mechanisms offered tax preferences: IKE — the TEE regime and IKZE — the EEpT regime (see more: Rutecka, Bielawska, Petru, Pieńkowska-Kamieniecka, Szczepański and Żukowski, 2014), however, they mostly attracted high-earners (Rutecka et al., 2014).

The development of supplementary pension plans depends on many factors, the most common of which in the literature are as follows: the level of benefits from public schemes, the income of the household, financial literacy and retirement awareness (evidence for Poland: see e.g.: Kolasa and Liberda, 2014; Pieńkowska-Kamieniecka, Walczak and Bera, 2019; Solarz, 2020; Buchholtz, Gaska and Góra, 2021). Employer involvement in building retirement savings also matters to employees (Pieńkowska-Kamieniecka, Rutecka-Góra, Kowalczyk-Rończyńska and Hadryan, 2021). In Poland, a culture of co-creation of pension security by employers doesn't exist. Attempts were made to initiate this process in 1999, but they ultimately failed. However, in several empirical studies (Czapiński and Góra, 2016; Olejnik, 2016; Mentor S.A. et al., 2021), Poles have declared that their pre-

ferred model for creating retirement savings is the participation of all stakeholders, that is: themselves, employers and the state.

The issue of state intervention within private pension plans has been widely discussed in the literature. The state's main rationale for supporting private pension plans is generally mobilizing long-term savings, which can support economic growth, develop markets for long-term financial instruments or reduce poverty among future retirees through increased investment. The forms of such incentives cover tax and non-tax stimuli (i.e. matching contributions or one-off or regular subsidies).

However, studies conducted in countries with a long tradition of fiscal support for retirement-oriented savings were not reassuring. Studies of pension plans in the US, Ireland and Poland (IKE, IKZE) have found that the tax incentives are used primarily by high-income earners and often lead to the reallocation of existing savings rather than the creation of new ones (Collins and Hughes, 2017; Ayuso, Jimeno and Villanueva, 2019; Dundure and Sloka, 2020; for Poland see Rutecka et al., 2014).

With all of the aforementioned limitations and expectations on participation in pension plans in mind, another attempt has been made in Poland to create attractive pension savings plans. This time it was modelled on plans with automatic enrollment, which have been successfully operating in the UK since 2012. Employee Capital Plans went into force in 2019. The ECP are DC funded plans based on auto-enrollment, co-financed by employers who are generally obliged to establish such a plan, and supported by state subsidies. So the ECP are voluntary to participants but mandatory to most employers. Despite the favorable financial arrangements found in ECP, aimed especially at low- and middle-income earners, participation in ECP is relatively low (Szczepański and Kołodziejczyk, 2020, 2021). As of the end of Q3 2022, the opt-out rate was 82%. This means that only 18% of those eligible participate in the scheme. ECP automatically cover employees aged 18–55 (with opt-out possibility) and those of age 55–70 may join ECP upon request. In all types of supplementary pension plans in Poland, assets are managed by licensed financial institutions. In the case of ECP, these are approved financial institutions which meet strict criteria (investment fund companies and life insurers). Within ECP, approved financial institutions must offer at least five defined-date funds (in Polish: fundusze zdefiniowanej daty, hereinafter FZD), with investment strategies relevant to the age of the participant. Financial inflows to ECP come from participants, employers and subsidies from the state (upon fulfilment of specified conditions).

The employer and employee make monthly payments to the ECP. The basic contribution rate for employers accounts for 1.5% of wages, and the basic contribution rate for employees accounts for 2.0% of wages (since 2023, the limit of yearly inflow is 50,000 USD). However, low-income earners (with monthly wages lower than 1.2 times the minimum wage in the economy) may decide to

pay only 0.5% of the wage without losing the full contribution of the employer. Both the employer and the employee may additionally contribute up to 2.5% (employer's contribution) and 2.0% of the wage (employee's contribution) to the ECP.

ECP are the first private pension program in Poland in which participants who meet criteria set by the law get subsidies from the state: a one-off welcome payment and a yearly subsidy. The welcome payment of PLN 250 is received by employees who will be ECP participants for at least 3 full calendar months and for 3 months the basic contributions will be financed by them. It will be credited to their ECP account within 30 days after the end of the quarter in which the employee met the conditions indicated in the ECP Act (PFR, 2021). An annual subsidy of PLN 240 is granted to ECP participants whose basic and additional contributions in a given year (financed by the employee and the employer) account for at least 3.5% of the 6-fold of the minimum wage applicable in the year for which the surcharge is due. Participants with the reduced rate of contribution (between 0.5% and 2.0% of their wage) must accumulate at least 25% of the above amount.

Matching contributions (the part of the contribution paid by the employer) and direct subsidies in ECP can be treated as a combination of traditional economic incentives to save with additional pension schemes and incentives based on behavioral economics, including negative ones, such as loss aversion (Szczepański, Ratajczak, Bielawska, Rutecka-Góra and Pieńkowska Kamieniecka, 2022). Fear of losing funds in ECP due to poor market conditions or actions of a political nature (such as changes to the Open Pension Funds) is probably a strong impetus inhibiting participation in this program. According to the regret theory, "the grief caused by making a wrong choice is more intense than the joy that comes from experiencing pride" (Czerwonka and Gorlewski, 2012). The program has also clearly defined private ownership of accumulated funds (Gumola, 2019), however, in case of unjustified (other than by law) premature use of money, there are financial consequences. ECP operate in a TEE tax regime, which means that the participant pays personal income tax on contributions to ECP (both made by employer and employee). It is also worth noting that the costs associated with investing in ECP are limited and in fact lowest among existing forms of merit plans. This issue is important in light of previous experience with management costs in, for example, open-end pension funds.

The Polish FSA, under the ECP Act, publishes quarterly information on ECP, which includes the number of participants, the value of FZD assets, the value of contributions, and FZD return rates for 12 and 24 months (see e.g. KNF, 23.12.2022). Return rates represent the total rate of return, which is dedicated to the evaluation of market performance (or fund manager performance). The same method is used by PFR, which is obliged to publish rates of return of FZD for the purpose of the success fee. In the empirical part of the paper, we show the differences in the evaluation of these returns using different (market and investor) perspectives.

2. Research methodology

The objects of the analysis were 60 FZDs, quotations from which were available on stoq.pl as of January 5, 2023, managed by the following institutions:

- ESALIENS Towarzystwo Funduszy Inwestycyjnych SA,
- Compensa Towarzystwo Ubezpieczeń na Życie S.A. Vienna Insurance Group,
- NN Investment Partners TFI S.A.,
- PKO Towarzystwo Funduszy Inwestycyjnych S.A.,
- Skarbiec Towarzystwo Funduszy Inwestycyjnych S.A.,
- Towarzystwo Funduszy Inwestycyjnych Allianz Polska S.A.,
- Towarzystwo Funduszy Inwestycyjnych PZU S.A.

The basic period of analysis was adopted as 1.01.2020–30.12.2022. The choice of funds was dictated by the availability of data, while the period of analysis was dictated by the completeness of data (not all funds began operations by 1.01.2020).

The calculation is based on the following assumptions:

1. Employee contributions of 2% or 0.5% (low earners) of the base occur at regular (monthly) intervals;
2. The number of FZD units purchased results from dividing the total contributions for a given day by unit value. If there was no FZD valuation for a given day (e.g., a day off), the rate for the nearest business day following that day was adopted;
3. Employer contribution constitutes 1.5% of the base;
4. For simplicity's sake, it was assumed that the welcome subsidy (PLN 250) occurs in the 4th month of regular savings, while the annual subsidy comes in in April of each year, provided that the statutory criteria for minimum contributions are met, that is: in the preceding year, the basic and additional contributions to the ECP financed by the employee and the employer accounted for at least 3.5% of 6 times the minimum salary in effect in the year for which the surcharge is due or 25% of this amount in the case of a reduced contribution;
5. The analysis ignores personal income tax paid by the participant on the base contribution (own and employer) due to the significant changes introduced in 2022.

Based on these assumptions, 36 cash flows were determined for each FZD (the sum of payments to the FZD in each month) and the number of units purchased in each month. According to the effect characteristic of the dollar cost averaging (DCA) strategy, which involves systematically investing equal amounts of money at regular intervals, regardless of the price of a unit, the number of units purchased increased as the price decreased, and vice versa (Barembruch, 2014). The final valuation was made on December 30, 2022. This data made it possible to calculate the profitability measures indicated above, including the internal rate of return (IRR).

3. Results and discussion

The analysis was conducted with two salary options: 5,000 and 3,000 PLN (low-earner meeting criteria in the whole period of analysis). Various measures of profitability were determined for the selected period of 2020–2022 (Table 1).

Table 1. Example income measures (absolute and relative) for the sample FZD 2055

Specification	Parameter	Value
Data	Initial price	50.43 PLN
	Final price	47.98 PLN
	Number of observations	36
	Total contributions of the employee	3600.00 PLN
	Sum of employer's contributions	2700.00 PLN
	Total contributions of the state	730.00 PLN
	Number of units purchased	141.71
	Valuation at the end	6799.25 PLN
Market performance	Total rate of return	-4.86%
	[Valuation / total payments]-1	-3.28%
	Annual IRR	-2.12%
Investor return (participant perspective)	[Valuation / employee contributions]-1	88.87%
	Employee's annual IRR	45.95%

Source: own calculations.

The data presented in Table 1 shows that the total return on the fund was negative (-4.86%). Investment yield, from a market perspective, taking into account all contributions to the fund, was negative both when measured by the ratio of the account value at the end of the investment to total contributions (-3.28%) and when measured by the IRR per year (-2.12%).

The investment yield, from the employee's perspective, is significantly higher.

The ratio of the value of the account at the end of the investment to the employee's contributions is 89%, which means that the employee making regular contributions over 3 years for a total of 3,600 PLN nominally gained (excluding taxation) 88.87% ($3600 \times 1.8877 = 6799$).

If we measure the profitability of the investment from the employee's perspective based on the internal rate of return on the investment, it was 45.95% per year or 3.20% per month. This means, according to the annuity account, that by contributing 100 PLN regularly for 36 months, he will accumulate a final account of 6,799 PLN.

Based on the measurement of profitability for a single fund, it is difficult to assess whether the relationships between the indicated rates of return show consistent regularity (i.e. whether, for example, any of the rates over- or underestimate the profitability of an investment).

However, based on the assessment, it can be concluded that the returns from the market perspective (most often published) that take into account all contributions to the funds do not reflect the real benefits of participation in the fund from the employee's perspective. To verify the above conjecture, the basic investment parameters for FZD groups were determined, and the results are shown in the table below (Table 2).

Table 2. Average profitability of FZD groups from the perspective of the market and the employee (assessment base of PLN 5,000, employee contribution of 2%)

FZD Group	Market performance			Investor return (participant perspective)	
	Total rate of return	[Valuation / total payments]-1	Annual IRR	[Valuation / employee contributions]-1	Employee's annual IRR
2025	-2.18	-3.84	-2.49	87.79	45.48
2030	1.92	-2.05	-1.32	91.28	46.97
2035	5.77	-0.23	-0.16	94.82	48.44
2040	6.17	-0.27	-0.18	94.75	48.41
2045	8.05	1.04	0.65	97.31	49.46
2050	8.37	1.1	0.69	97.43	49.51
2055	8.92	1.6	1	98.41	49.91
2060	9.92	1.58	1	98.36	49.9
Average	5.86	-0.13	-0.1	95.02	48.51

Source: own calculations.

Of the groups of FZDs indicated in Table 2, the low-risk investments are found in FZD 2025 (for those with the shortest period to retirement), moderate risk is found in 2030 funds, while the medium risk is found in FZD 2035 and 2040. The riskiest portfolio is found in 2045, 2050, 2055 and 2060 funds (for the youngest participants with a long period to retirement).

FZDs' diversified investment policy is reflected in the obtained results. The best results are achieved by the riskiest funds (aimed at the youngest participants, e.g. FZD 2060), while the worst results are achieved by those aimed at the oldest ones (e.g. FZD 2025). The above relationship is confirmed in all the measures of profitability used.

It is also clear that the profitability measures from the market perspective (total rate of return, [valuation / total payments]-1, annual IRR) are significantly lower than the profitability measures from the participant perspective ([valuation / employee contributions]-1, annual employee IRR).

This difference stems from the fact that profitability measures from the market's perspective only reflect the FZD's investment performance, while profitability from the participant's perspective is based on the FZD's investment policy

and subsidies — which, treated as profit, significantly increase the attractiveness of the investment.

Table 3. Average profitability of FZD groups from the perspective of the market and the employee (assessment base of PLN 3,000, employee contribution of 0.5%)

FZD Group	Market performance			Investor return (participant perspective)	
	Total rate of return	[Valuation / total payments]-1	Annual IRR	[Valuation / employee contributions]-1	Employee's annual IRR
2025	-2.18	-3.66	-2.33	415.58	142.04
2030	1.92	-1.7	-1.07	426.1	144.34
2035	5.77	0.3	0.18	436.8	146.63
2040	6.17	0.27	0.16	436.65	146.6
2045	8.05	1.75	1.07	444.55	148.27
2050	8.37	1.82	1.12	444.92	148.35
2055	8.92	2.34	1.44	447.72	148.94
2060	9.92	2.3	1.42	447.49	148.91
Average	5.86	0.43	0.25	437.49	146.76

Source: own calculations.

The variation in measures of profitability of ECP participation from the participant's perspective is even more pronounced in the case of low-income individuals who can pay a reduced contribution (IRR on average of 146.76%).

The results presented indicate that the assessment of the financial benefits of ECP participation from the participant's perspective significantly deviates from the measures used by market participants and the regulator. This allows for the positive verification of hypotheses 1 and 2. To the best of our knowledge, only one study based on a similar approach to ours has been published so far study (Instytut Emerytalny, 2022). In addition, a similar IRR-based approach was used to analyze the effectiveness of IKE and IKZE (Rutecka-Góra, Bielawska, Hadryan, Kowalczyk-Rólczyńska and Pieńkowska-Kamieniecka, 2020).

However, it is not universal in nature and presumably meant for pension market experts.

Conclusions

ECP are a particularly favorable financial solution for participants compared to other retirement savings plans in Poland. This is due to a financing mechanism that includes employer contributions and subsidies from the state.

Measures reflecting the effectiveness of ECP from the participant's perspective should consider only participant-funded contributions in relation to the re-

sults obtained from all cash flows (employer, state and, of course, the participant). Widely published measures viewed from the market's perspective do not report the significant benefits of joining the program. The mechanism of co-funding ECP by the employers and subsidies from the state during the period under review more than allowed to “cushion” losses related to the situation in the financial markets. It is an important message from the perspective of regret theory. The study also indicates that there are significant benefits of participation in ECP for people with low earnings. It would be worthwhile to highlight this aspect, since indigent people are more concerned about financial losses from investing. In conclusion, we recommend the creation of a standard for the presentation of FZD investment results from the participant's perspective, which would take into account the elements indicated in the study, and would be published by the Polish FSA and on the mojpepk.pl website, which is a great source of knowledge about PPK. Perhaps this approach to evaluating participation in PPK will increase interest in the program.

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Perception of old age versus saving in Employee Capital Plans

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Abstract

Consumer attitudes and behaviors aimed at financial security at old age are determined by many factors. They include the perception of old age and expectations towards this period of life. The research and considerations presented in this paper were inspired by the introduction of Employee Capital Plans in 2019. They are a new institution on the Polish pension market allowing employees to save to achieve financial security at an old age.

The purpose of the paper is to identify whether and how the perception of old age affects behavior related to additional saving in Employee Capital Plans (ECP). The paper presents the results of own quantitative research conducted with the use of the CAWI method in 2021. The survey was performed among 148 employees of Poznań University of Economics and Business (PUEB). The conducted research shows that the hypothesis about the influence of the perception of old age on decisions regarding saving in employee capital plans should be rejected.

Introduction

Research on old age has been conducted for centuries in many fields including medicine, psychology and sociology, as well as philosophy and economics. Their interest is focused on biological, mental or social changes that are influenced by

age, their causes and effects, as well as the recognition of ways to influence the process of aging. Old age is often associated with negative connotations i.e., deteriorating physical and mental health, as well as the loss of autonomy and resulting dependence on other members of society. In the past, care for the elderly rested on children (e.g. in France, the regulation that children take care of aging parents was introduced in the 17th century) or benefits received after reaching retirement age (they were first introduced in Germany in the 19th century for people aged over 70, with the average life expectancy of 46 years). Social, cultural and economic changes in the 20th century meant that the traditionally understood responsibility of children for older parents was not always possible due to e.g. childlessness, emigration of younger generations, armed conflicts, financial difficulties of carers and a number of other reasons. On the other hand, benefits received in retirement did not always satisfy their beneficiaries because of a significant difference in amount in relation to the salaries they received in the period of economic activity.

As a result, the conclusion arises that everyone is increasingly responsible for preparing themselves to live their old age life in a “decent” way and on the desired physical, mental and social level of “well-being.” The purpose of the paper is therefore to determine whether and how the perception of old age affects behavior related to additional saving for this period of life, in particular through Employee Capital Plans (ECP). Based on the considerations contained in the literature on the subject, a hypothesis was formulated that the perception of old age is an important determinant of attitudes and behaviors related to additional savings for old age security.

1. Theoretical framework of the research

Taking into account the defined purpose of considerations, the review of the literature covers two main areas, i.e. the ways in which the perception of old age is studied and the relationship between this perception and saving strategies aimed at securing the future.

1.1. Perception of old age as a field of scientific research

For centuries until today, old age has been perceived in one of two ways. In more positive approaches, it is assumed that it is a time of well-earned rest after a lifetime of work, when one takes advantage of life’s achievements, when the elderly are paid respect and wield power and prestige. In the saying “life begins after...” (a certain age) the number given nowadays is getting higher and higher. On the other hand, old age is associated with many negative features: a decrease in vitality, deterioration of mental abilities, distrust, or the general attitude that “God has failed when designing old age.” The literature emphasizes that the perception of prospective old age can correlate with many decisions, e.g. related to the labor market, roles performed in the family, physical activity, taking care of health or

managing the household budget, expectations towards the lifestyle in retirement, and even mental and physical aging of a given person (Chopik, Bremner, Johnson and Giasson, 2018; Kleinspehn-Ammerlahn, Kotter-Gruhn and Smith, 2008).

Identification of perceptions and methodological problems of measuring attitudes towards old age are an increasingly frequent subject of discussion in the literature. For example, in an interesting cross-cultural study, Löckenhoff et al. (2009) distinguished three research areas in this regard: “(a) perceived declines in social views of aging, physical attractiveness, the ability to perform everyday tasks, and new learning; (b) perceived increases in wisdom, knowledge, and received respect; and (c) ensured stability in family authority and life satisfaction.” The results of these studies show (among other things) that the perception of old age is affected by cross-cultural differences, and thus social views on aging and the perception of related socio-emotional changes differentiate them to a greater extent than the perception of physical and cognitive changes.

The way of approaching old age, in the sense of perceiving it from different perspectives, i.e. the perspective of one’s own future old age (or the old age of relatives) and expectations towards this period of life, or the perception of old age of other people, is also an important issue in the discussion (Gamrowska and Gałkowska-Bachanek, 2014; Westerhof, Miche, Brothers, Barrett, Diehl, Montepare, Wahl and Wurm, 2014). Furthermore, the considerations often also concern the criteria for assessing the quality of life in retirement, including objective and subjective measures of successful aging (Martinson and Berridge, 2015; Phelan, Anderson, LaCroix and Larson, 2014).

A multitude of research tools used in the studies on the perception of old age results from the diversity of the discussed issue. A number of tools for measuring attitudes are used in this regard. The most popular include the Anxiety about Aging Scale, the Fact on Aging Quiz questionnaire, the Aging Semantic Differential Scale, the Fraboni Scale of Ageism, the Kogan Attitudes Towards Older People Scale, the McCusker’s Attitude Toward Care Instrument, the Jefferson Scale of Physician Empathy and the Medical Condition Regard Scale. These tools are more thoroughly discussed in the paper by Strugała, Zelińska, Dymek-Skoczyńska and Czyżewska-Torba (2013). It is worth mentioning that the vast majority of the above tools use the Likert scale. Their common feature is their sensitivity and good internal consistency, which determines the reliability of the assessment. However, these scales are criticized for the use of negative superstitions and stereotypes concerning old age and elderly people, as well as outdated vocabulary.

1.2. Saving for security at old age and the perception of old age

Workers’ attitudes and behavior towards saving for their retirement period have been the subject of many studies (Asebedo, Wilmarth, Seay, Archuleta, Brase and MacDonald, 2017; Pascual-Saez, Cantarero-Prieto and Manso, 2020; Bongini

and Cucinelli, 2019; Gough and Sozou, 2005; Livanos and Nuñez, 2017). In this respect, determinants that shape saving attitudes and behaviors are among other important research areas. They include not only demographic and social aspects (Kumar, Tomar and Verma, 2019; García Mata, 2021; Amari, Salhi and Jarboui, 2020), behavioral and psychological aspects (Ruefenacht, Schlager, Maas and Puustinen, 2015; Eckel, Johnson and Montmarquette, 2005; Goyal, Kumar, Xiao and Colombage, 2022), but also the shape of the fiscal system (Khan, 2017; Morgan, 2006; Weyman, Klassen and Schröder, 2017), the level of social care and healthcare and many others (Olejnik, 2016). It seems that psychographic factors including thinking about old age, its perception or own expectations regarding the quality of life at this stage are also important.

The relationship between the perception of old age and saving aimed at financial security at this stage of the lifecycle has also been the subject of many studies. For example, Ersner-Hershfield, Garton, Ballard, Samanez-Larkin and Knutson (2009) as well as James, Price and Buffel (2020) prove that in order to convince people to save more for old age security, they must first be persuaded to think about this period of life. In their opinion, thinking about old age primarily means thinking about something distant, uncertain, and above all — not very pleasant (Gilleard and Higgs, 2013). As a consequence, the negative perception of aging means that decisions regarding saving in general, and taken during the working life, concern saving for old age and the possibility of meeting own needs in this period only to a limited extent. Working people tend to focus on current consumption, or possibly on saving determined by short- and medium-term goals (e.g. buying a car, going on holiday). In addition, the lack of thought about old age, and consequently not saving for this purpose, may result from the dynamic changes taking place in the retirement process, and associated with e.g. the extension of working life, more and more frequent changes of the workplace and unpredictability of professional career development, but also inflation and changes in value of money and investments (James, Price and Buffel, 2020).

As mentioned before, workers' attitudes and the level of accumulated pension capital may be affected by the expected lifestyle during retirement, especially by the so-called life expectancy in retirement. For example, Grace, Weaven and Ross (2010, 174–188) indicate that the more optimistic expectations regarding the number of years of life after retirement individuals have, the more positive their attitudes are and the more often they accumulate additional assets intended to secure old age.

The research conducted on the Polish market also shows that positive attitudes towards life in retirement are accompanied by a greater likelihood of saving in preparation for this stage of life (Olejnik, 2016, 171). However, there are no studies identifying this relationship for the Employee Capital Plans (ECP), which in Poland are the latest, but also quite different in essence, form of saving for retirement.

Summing up, it is undeniable that maintaining a decent quality of life in retirement will increasingly require additional financial resources (Olejnik, 2021).

They may take the form of savings accumulated in the period of professional activity, they may come from investments, as well as from continuing professional activity after reaching the retirement age. Many factors can have an impact on which decisions are made with regard to an early start of saving for old age security. They may also include psychographic aspects, including attitudes towards old age. This leads to the formulation of the following hypothesis:

H1: There is a relationship between the attitude towards old age and the propensity to save in Employee Capital Plans.

2. Research methodology

The paper presents the results of own survey conducted among people working at the Poznań University of Economics and Business (PUEB), who decided either to join or not to join ECP. The study was conducted in the second half of 2021, a few months after the launch of Employee Capital Plans at this university. The CAWI technique was used in the research process.

The selection of the sample group was purposeful — as mentioned before, the respondents were the employees of PUEB. A total of 148 people took part in the survey (i.e., 17% of all employees). When analyzing the structure of the obtained sample, it is worth noting that employees who were not university lecturers accounted for 41% of all respondents, while research and didactic employees for 59%. On the other hand, considering the membership in ECP, in the surveyed sample 55% of employees decided to join this plan (compared to 58% in the total population). It can therefore be concluded that, in terms of the type of work performed at the university and the fact of joining or not joining ECP, the distributions obtained in the sample are consistent with the distributions in the total population. Hence, taking into account both these characteristics, the study can be considered representative.

In addition, taking into account the age of the respondents, 33.8% of the participants represented the 40 and younger age group, 41.2% were people aged 41–49, and 25.0% of them belonged to the 50 and older age group (the average age of the respondents participating in the study was 44), whereas the average period of work at PUEB was 15 years. It should also be indicated that 74.0% of the people participating in the research do not have any living grandparent.

In the data analysis, measures of descriptive statistics and statistical tests were used. Calculations were made with the PS IMAGO PRO (SPSS) v.26 software.

3. Research results

This part of the paper first presents the results of research on the perception of old age. In general, various methods of measuring attitudes towards the elderly and

old age were used in the conducted research.¹ However, this paper uses extreme interpretations of attitudes towards old age expressed by two ancient philosophers and thinkers: Plato and Aristotle (Minois, 1995, 67–72). For this purpose, a 10-point scale was developed, where poles were described from 1 — old age is beautiful, it is a blessing, a wonderful period in life, a period of benefitting from the achievements of the whole life, i.e. Plato's view, to 10 — old age is a curse, a period of diseases and time of thinking about death, a period of poverty and sadness, i.e. Aristotle's approach.

In the next section, the considerations concern the interest and reasons for choosing Employee Capital Plans, as well as the relationship between the attitude towards old age and the decisions regarding ECP.

3.1. Perception of old age

The conducted research confirms quite considerable differences in the perception of old age (the coefficient of variation of responses is 42%, see Figure 1). The arithmetic mean is 5.77 points (out of a maximum of 10; the median is 6.0 and the dominant is 5.0), which means that old age is perceived rather negatively.

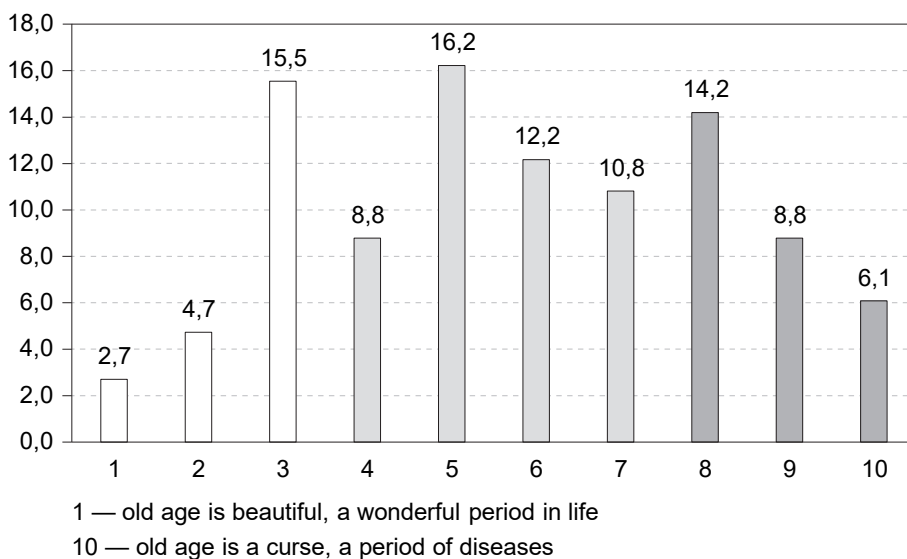


Figure 1. Perception of old age (in %)

Source: own research

¹ In the cited studies, the second method of studying attitudes and opinions towards old age was the use of 21 statements expressed on the Likert scale. They concerned stereotypes towards old age, as well as the perception of older people as employees on the labor market, among others. Due to volume limitations, this paper presents the results for the first approach discussed above.

It should be added that, as the research shows, the perception of old age is the more negative the older the respondent is. In the group of people trending toward Aristotle's approach, women predominate more often than men, as well as people without children, or those having only one child (in the case of having children, the relationship is statistically significant, Pearson's chi-square is 10.250, at $p = 0.036$; 37% of people without children or with one child and 17% of people with two or more children perceive old age in a definitely negative way). The obtained results also indicate that having living grandparents is also a factor in the perception of old age: the lack elderly family members results in assessing old age more negatively (in comparison to people who have at least one grandparent in the family).

3.2. Saving in Employee Capital Plans

As mentioned before, 55% of eligible employees of PUEB decided to join ECPs and pay contributions for the retirement plan. Characteristics of people who decided to save in this form (and who participated in the study) are presented in Table 1.

Table 1. Belonging to ECP by characteristics

Characteristics		The members' rate
Sex	Woman	53.5
	Man	57.1
Age	Aged 40 and younger	60.0
	Aged between 41 and 49	52.5
	Aged 50 and older	51.4
Marital status	Married	58.9
	Others	41.1
Number of children	No children	50.0
	1 child	50.0
	2 and more children	62.1
Having living grandparents	No grandparents	54.1
	At least 1 grandparent	56.4
Period of work at PUEB	Up to 9 years	59.6
	Between 10 and 20 years	56.0
	21 years and longer	47.8
Performed work	Administrative employee	58.3
	Research and didactic employee	52.3

Source: own research

Analyzing the profile of employees who decided to join ECPs, it can be noticed that they are more often men, married, and have 2 or more children. It is interesting that ECP were firstly joined by younger people, and thus predominantly those with shorter work experience. Administrative employees were also more likely to join ECPs than research and didactic employees.

It should be noted that the decisions made by employees of PUEB regarding saving in ECP were not affected by the perception of old age. There are no statistically significant differences between people with a positive, neutral and negative perception of old age in terms of membership or resignation from saving in ECP. Therefore, the previously formulated research hypothesis cannot be confirmed. Saving for retirement in ECP does not depend on the attitude towards this period of life.

However, it is worth analyzing whether there is a relationship between the factors that influenced the respondents' decision to join ECP and the perception of old age. Possible determinants can include:

- acceptance of the fact that any form of saving for old age is good,
- no previous accumulation of savings for old age,
- awareness of the difficulties in accumulating additional savings for retirement on their own, and perceiving ECP as a good opportunity to do so,
- encouragement from department/institute colleagues,
- convincing information obtained during meetings with ECP managers,
- lack of information on the possibility of opting out of ECP,
- encouragement in the form of additional subsidies from the employer,
- encouragement in the form of an annual subsidy from the state.

The conducted research shows that among the factors encouraging saving in ECP, the employees indicated additional payments from the employer in the first place. At the same time, it should be emphasized that, above all, they share the opinion that any form of saving for retirement plan is good (Figure 2).

The annual payment to the bank account by the state was the second most important determinant. The annual payment from the state is also the only determinant the perception of which depends in a statistically significant way on the perception of old age. It should be added that it was especially important for people with an optimistic view of old age.

It is also interesting to note that the, based on the analysis of reasons for abstaining from joining ECP presented in Figure 3, individual reasons do not seem to depend on the perception of old age. The observed minor differences are not statistically significant.

The presented research results confirm the ambiguity of the perception of old age. Nevertheless, it may seem that this will be a factor determining the tendency towards behavior aimed at financial security in this period of life in the form of saving in ECP. However, the conducted comparative analysis and an attempt to verify this assumption did not confirm the impact of different attitudes on saving behaviour.

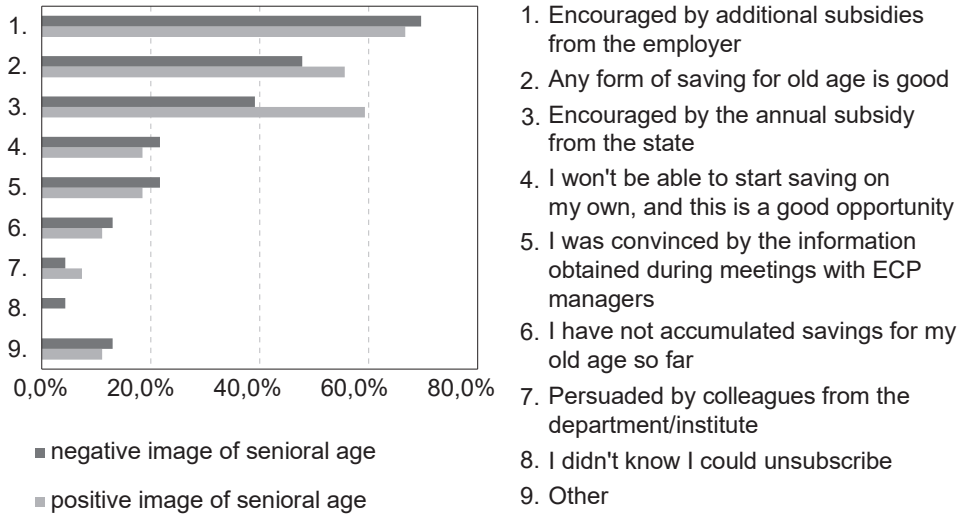


Figure 2. Reasons for saving in ECP

Source: own research

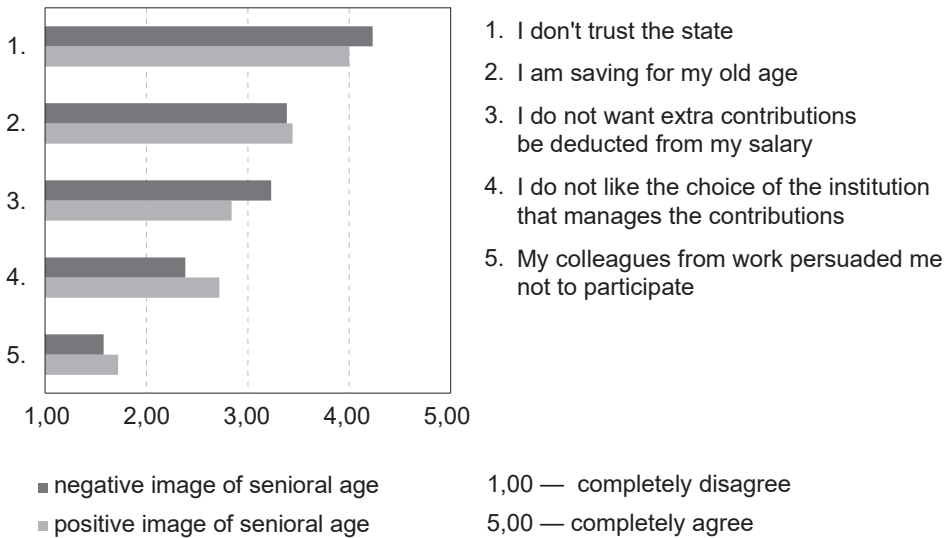


Figure 3. Reasons for resigning from saving in ECP and the perception of old age

Source: own research

Conclusions

Retirement is a time of major changes in the lives of people who have been professionally active before. It is one of the groundbreaking events which, depending on a person's attitude towards the future, as well as their health, mental and economic capabilities, can bring about a satisfying quality of life and the expected well-being. However, this requires discipline in the period leading up to retirement and accepting lower expenses now, for the benefit of future ones.

It seems that the planned lifestyle in retirement may influence attitudes and accumulation of additional retirement savings. Therefore, promoting various positive life activities in the post-productive period, and thus the positive aspects of old age, may be a good way to encourage people to save for their retirement period.

At the basis of the conducted considerations, it was assumed that the attitude towards old age may determine attitudes and behavior towards additional savings to provide security at an old age. However, the presented research results do not allow to confirm the hypothesis that there is a relationship between the attitude towards old age and the tendency to save in ECP.

The question arises why, despite the rather diverse perception of old age, this perception does not in any way affect decisions regarding saving in ECP. One of the hypotheses that can be formulated in an attempt to answer this question is that reflection about retirement savings emerges among employees at a relatively late stage, on average at the age of about 40–45 (Rickwood and White, 2009, 145–153; Olejnik, 2016). This is not yet the age at which a working person would feel considerable anxiety about their financial future. Therefore, it is not the attitude towards old age and its vision that encourages saving in ECP.

The results concerning the reasons of saving in ECP also somehow clarify the context. It is not the perception of old age as such but the fact of receiving subsidies from the state and the general sense of having a certain security, together with a lack of trust in the state as the institution organizing the retirement security system that seem to encourage saving funds in ECP. At the same time, it should be noted that the respondents indicated that they do save, but in a different way — without the participation of the state. This means that they have limited trust in the state, and, at the same time, they take measures by themselves to reduce the risk of economic problems in retirement.

There is one more issue that may be important for the interpretation of the obtained results. The research was conducted among employees of a public sector entity. In addition, it is an educational institution with an economic profile. Taking into account the fact that, compared to other economic universities in Poland, this one stands out positively with the participation of employees in ECP compared to other universities in Poland and other organizations in general, the obtained results could have been affected by other factors that were not taken into account in the study. It is worth noting, however, that the specificity of the dis-

cussed topic makes it difficult to find studies that would allow a comparison of the respondents' attitudes towards old age and, at the same time, their willingness to save in the public sector.

In addition, it seems that the lack of correlation between the attitude towards old age and saving in ECP is the result of the specific features of this pension product. In particular, this concerns the automatic enrollment of each employee working in a given enterprise into the ECP, the effort necessary to resign from this product, as well as financial incentives in the form of annual state subsidies and monthly employer contributions for deposited contributions.

Finally, it might be interesting to find out whether the lack of the studied relationship may result from the way of studying the perception of old age. When deciding to use the scale presented above, the authors of this paper were inspired by the idea of a simple and verified scale used in customer loyalty research (Reichheld, 2003). It was assumed that the 10-point scale can replace long, complicated and often criticized measurements based on the Likert scale. However, the analysis of the relationships between attitudes towards old age (expressed in the form of the aforementioned 21 statements about old age and assessed on the Likert scale by the employees of PUEB but not presented in this article due to volume limitations) and saving in ECP also did not show statistically significant relationships.

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The losing streak of Employee Capital Plans in the pension fund market

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Abstract

The purpose of the article was to present the basic reasons for the lack of interest in the government pension scheme — the Employee Capital Plans, and to draw attention to the question of its profitability for future pensioners. The article sought to answer the question of what is the public's familiarity with the assumptions of this program and why is there so little interest in participating in it. To this end, attention was paid to the main obstacles undermining confidence in this program.

1. Introduction

There are currently 6 pension schemes in Poland: the state-run ZUS (Social Insurance Institution), the semi-state-run OFE (Open Pension Funds), the private IKE (Individual Retirement Account) and IKZE (Individual Retirement Security Account), the voluntary, workplace-based PPE (Employee Pension Plans) and the recently introduced private and universal PPK (Employee Capital Plans). None of the optional pension programs are very popular, despite the fact that the media has been reporting on the prospect of low pensions in the future for years. The biggest problem, however, will arise in 20–30 years, when the first people who have worked their entire professional lives in the new system will retire, according to the principle of “how much you save for old age, so much you will have.”

The average pension in March 2022 was PLN 2545 gross (Kropiwicki, 1.06.2022). This amounts to around 41% of the average salary in Poland. The

“replacement rate” is roughly half of the last salary. In a few years, it will be about 30% of the last salary, and perhaps as little as 20–25%. Future pensions will be lower, because in 1999 the government abandoned the principle according to which the amount of a pension did not depend on paid contributions, worked years or the sum of earnings accumulated during the entire working life. The introduction of the “how much you collect, so much you will have” principle might not have lowered pensions if the Open Pension Fund program had succeeded. It was supposed to be supported by revenues from the privatization of state-owned enterprises. As of today, the state ensures that if, after 20 years (for women) and 25 years (for men) of working and putting aside contributions to ZUS, a pensioner lacks the capital to receive the minimum pension, the state will make up the difference (Sudak, 6.05.2019), so that one can receive a benefit of PLN 1338.44 gross (Ministerstwo Rodziny i Polityki Społecznej, 18.10.2022), while the current minimum pension, as of March 2023 PLN, amounts to 1588.44 (ZUS, 2022). The minimum pension may be out of reach for many people.

This means that in order to receive a decent pension in the future, it is necessary to save 10–15% of one’s salary in addition to the ZUS contribution. In turn, the investment of this salary is an individual matter. Statistics show that the public has no confidence in state programs, and as such many people choose to invest money in a bank, or in real estate, land or gold.

An Expander analysis shows that saving in PPK will not ensure a decent pension. The also study shows that men around the age of 35 need three times as much savings to get a pension equal to their final salary. Women, on the other hand, need nine times their current amount of savings. According to Expander’s calculations, “a woman joining PPK at the age of 35 will save about PLN 105,000 in the scheme, assuming that she earns PLN 3,000 net and had basic contributions in the program. A man in the same situation will put aside 147,000” (KRO, 26.09.2019). According to Jarosław Sadowski, chief analyst at Expander, people retiring in 20–30 years will receive a ZUS benefit of 20–30% of their final salary. Maintaining the current pension system requires a large increase in ZUS contributions, otherwise the benefits paid will be very low. If future retirees want to maintain their current standard of living, they must start putting aside savings every month. However, for this to make sense, the savings must be “many times higher” than the money set aside in PPK. Sadowski believes that: “if a woman aged 35, earning a net income of 3,000 złotych, wanted to receive a pension of the same amount, she would have to save 969 thousand złotych by the age of 60. This is effectively nine times the amount she will save in PPK. A man in the same case should accumulate 488,000 złotych (three times more than in PPK) (KRO, 26.09.2019).”

The calculations of Expander’s experts are based on the assumption that a person has not yet put aside anything in private retirement savings (not including ZUS and OFE contributions). It also assumes that salaries and pensions will grow by 2.8% each year, and that people will retire as soon as they reach retirement age

(60 or 65). It was assumed that the money set aside would yield interest at a gross rate of 3.5% (including tax), and that upon reaching retirement age the interest rate would drop to 2.75%, and, in addition, that the ZUS pension will account for 40% of the last salary and will grow by 2.8% per year (KRO, 26.09.2019).

According to senator Marek Borowski, PPK is a “rebranding of the previous OFE system,” and “the size of the PPK pension in the pension calculator created by the government has been — manipulated, really — inflated by as much as six times.” Assuming a net income of PLN 4,000 and contributions of PLN 160 paid over 40 years, the calculator calculates a pension of PLN 2,400. If we add the ZUS projection — PLN 2,000, it turns out that the future retiree will receive a pension higher than the salary he received during his working years. This means that 2% of the employee’s salary plus 1.5% added by the employer and PLN 20 of monthly state support gives a higher pension than ZUS. It follows that 4% of the salary will give more than the 19.5% pension contribution to ZUS. The government’s assumption is for a 3.5% annual return over the entire 40-year working life (which is unrealistic), with part of it invested in stocks and a majority in low-interest bonds, especially under conditions of repeated crises and hyperinflation. When such assumptions are verified in line with market indicators, this pension falls to PLN 1,100 (Lipiński, 20.12.2018).

In 40 years, wages will be at a different level than today. For this reason, comparing the amount of the future pension to today’s salaries does not make sense. The projections of the calculator’s authors indicate that in 40 years, salaries will be three times higher, i.e. they will account for PLN 12,000, not PLN 4,000. PPK offer a PLN 1,100 pension relative to a last salary of PLN 12,000. It is as if in the present day a salary of PLN 4,000 entitled one to receive a PLN 380 pension instead of the claimed PLN 2,400. The scheme, like OFE, promises high pensions and possibilities of travel to exotic countries, which is unrealistic. There is also the possibility that savings from PPK, like those from OFE, will be nationalized by ZUS (Lipiński, 20.12.2018).

The purpose of the presented research is to explain the reasons for the low interest and low participation in the PPK pension program, and to find the main reasons for the failure of this program. Starting from this premise, the article presents the results of research on the following issues:

1. Knowledge of the PPK scheme among the public;
2. Concerns about this scheme and the reasons for non-participation and resignation from PPK;
3. The main reasons for the failure of PPK.

The starting point of the research was to present the current situation of PPK participation and the public’s perception of this program, as well concerns and expectations related to it. At the same time, it has been shown that, in addition to the difficult economic situation, these fears and the negative perception of PPK by citizens are not entirely unfounded.

Resolving these issues required the research to focus on the following problems: the political propaganda accompanying the introduction of PPK, the lack of confidence in government initiatives after the failure of the OFE scheme, as well as the associated political and regulatory risks, and the general lack of confidence in the capital market and the ever-increasing inflation.

2. The theoretical aspect of the research

The introduction of new pension solutions into the practice of social and economic life always requires consideration of their strengths and weaknesses, and should be preceded by a broad survey of public opinion regarding expectations for such a program, as well as factors that would encourage participation in it. Their results would allow appropriate adjustments to be made to the adopted solutions. They would ensure that their implementation would be better received and would not have negative socio-economic consequences.

3. Research methodology

The studies presented here used a qualitative research methodology, which made it possible to formulate theses, as well as general conclusions. The research took into account the economic and political factor affecting the perception of the attractiveness of PPK, while maintaining the objectivity of the research by using available techniques for collecting information. The research used source materials such as analyses of the PPK market, public opinion polls, expert opinions and literature related to the study problem undertaken.

4. Interest in PPK

At the end of August 2018, when submitting the bill on Employee Capital Plans to the Parliament, the Law and Justice government estimated the level of participation in PPK at 75%. In actuality, more than 70% of Poles have unsubscribed from the program (Kostrzewski, 21.12.2020).

According to the assumptions of the scheme's originators, PPK were aimed at 11.4 million employees. This assumption raises quite a few questions, as it is unclear what was the basis for such a claim.

Given the current experience of participation in PPE, which have been in operation for more than 20 years (the participation rate in PPE, calculated as the percentage of employees participating in PPE to the number of eligible employees, and the percentage of PPE participants paying a voluntary additional contribu-

tion), it was hoped that the scheme would be a success. According to data released by the Financial Supervision Commission, the percentage of participation in PPE was 60.8% at the end of 2016, while in previous years it had remained at around 70%. Therefore, the PPE originators' expectation of 75% participation may seem reasonable, if one takes into account that PPK would be based on automatic enrollment of the majority of the employed population (the "auto-enrollment" mechanism), and that the enrolled participant would have to show his own initiative to withdraw from PPK (the "opt-out" mechanism). Optimists claimed that the "opt-out" mechanism, which is a flagship application of the achievements of behavioral economics, would achieve the intended goal, a participation rate of 75% (Instytut Emerytalny, 2017, 38).

What has not been pointed out is that the design of PPK includes a factor that carries the risk of decreasing participation in the the program. This factor is the employee's mandatory basic contribution of a planned 2% of salary, the payment of which determines the ability to participate in PPK, and the receipt of a mandatory basic contribution of 1.5% of the participant's salary, financed by the employer. Such a structure may result in increased PPK churn among the lowest-paid people, for whom every couple of zlotys is pre-determined for the necessary costs of living and who cannot afford to set aside additional resources for retirement. It also failed to take into account the situation that in practice some employers, motivated by the desire to minimize labor costs, will be in favor of opting out of PPK, despite the fact that the prepared draft includes punitive provisions to counteract employers' inducement of employees to opt out of PPK. Also, after what happened with OFE, no consideration was given to how many people will trust the state again, considering that it has so far given little convincing argument for the legitimacy of additional retirement savings (Instytut Emerytalny, 2017, 39).

According to the Act on Employee Capital Plans, this form of savings is open to all who meet the criteria of age, length of service and form of work. As of June 30, 2020, the number of PPK participants accounted for 1,074,847 people, resulting in a participation rate (the ratio of PPK participants to the number of people employed at entities operating PPK) of less than 40%. Since the deadline for the implementation of PPK for medium-sized companies was moved from spring 2020 to autumn 2020, the larger increase in the number of PPK participants was expected to occur in late 2020. Based on data obtained from financial institutions and employers, the number of PPK participants in the fourth quarter of 2020 in companies with 20 to 249 employees totaled about 1.65 million people. Taking into account the number of people eligible to participate in PPK, which the government estimated at about 6.4 million employed people, and the number of people who joined PPK, which the Pension Institute estimated at 1.65 million people, participation in PPK was about 24–26%. PPK participation among employers with 20 to 249 employees, is several percent lower than for larger employers (see Table 1).

Table 1. Number of employed people eligible to save in PPK (in millions of people)

more than 250 employees	more than 50 employees	more than 20 employees	at least 1 employee	public finance sector
3.3	2	1.1	2.9	2.2

Source: Instytut Emerytalny, 2020, 7.

Based on information obtained from employers and financial institutions, it was found that PPK management agreements were entered into by almost all obligated employers, however, in a large number of enterprises, 100% of people opted out of saving in PPK. A noticeable proportion of enterprises (one in five) did not conclude PPK management agreements. It was found that after the launch of PPK in companies with at least 20 employees, the initial level of participation in PPK was around 24–26%. It was also noted that there was no significant variation in the level of participation among the various financial institutions offering PPK.

Taking into account the obtained information, it was concluded that the current level of participation in PPK is unsatisfactory and requires effective measures to increase it (Instytut Emerytalny, 2020, 89).

In the second quarter of 2021, the fourth and final stage of PPK implementation was completed. According to Oskar Sobolewski of the Pension Institute, if all employed people (more than 11 million) are considered, the participation rate is low — at around 21%. The data shows the scale of participation and proves that about 80% of people have opted out of PPK. The legislator's assumption was for a 75% participation rate at the start of the program; in fact, as many people have opted out of PPK as were expected to remain in the program (Krzykowski, 16.06.2021).

A report published by the KNF (the Polish Financial Supervision Authority) at the end of Q2 2022 shows that the number of PPK participants was 2.79 million. This represents an increase of 2.9% q/q and 20.7% y/y. Net assets of PPK defined-date funds accounted for PLN 8.97 billion at the end of Q2 2022 (+2.5% q/q, + 69.2% y/y). Total PPK contributions in Q2 2022 accounted for PLN 1.33 billion (+2.1% q/q, + 25.2% y/y). The number of PPK withdrawals from refunds accounted for 63.3 thousand in Q2 (+ 8.4% q/q, + 125.3% y/y). The value of such disbursements accounted for PLN 139.34 million in Q2 2022 (+ 1.7% q/q, + 165.3% y/y) (KNF, 27.09.2022).

Data from the Polish Development Fund (PFR) shows that at the end of August 2022, the number of PPK participants was 2.44 million. This is comparable with 2.27 million participants in 2021 and 2.16 million as of June 30, 2021. This means that out of about 17 million working people, about 15% have joined PPK. According to the PFR, at the end of August 2022, the funds accumulated in PPK accounted for PLN 9.77 billion. Compared to July, an increase of PLN 177.4 million was recorded. In contrast, the balance as of June 30, 2022 was PLN 9.03 billion. For comparison — 2021 closed with PLN 7.67 billion, and six months earlier it was by PLN 5.33 billion (Leśniak, 27.09.2022).

According to data from the PPK Registry, as of October 31, 2022, the total net asset value (WAN) of defined-date funds (FZD) accounted for PLN 10.19 billion. In the following month, the value of net assets increased by PLN 588.08 million. The number of active RPC accounts accounted for 2.80 million. Exactly 294.18 thousand enterprises allowed their employees to participate in PPK. So far only 2.48 million people have taken the opportunity to save in PPK. Total participation in PPK was 33.9% (PFR Portal PPK, 2022, 3–4, 6).

5. PPK in public opinion

In August 2020 Difference Spółka Komandytowa and PFR TFI conducted a survey entitled *Motivations for saving and participating in PPK* among respondents aged 18–55, working in companies employing more than 250 people, divided into current and former PPK participants. The survey was carried out using the technique of in-depth individual interviews and based on online surveys. The purpose of the survey was to learn about methods of saving for retirement, to discern the advantages and disadvantages of various methods of accumulating and investing funds (including PPK), as well as the motives for deciding whether to remain or unsubscribe from PPK (Difference Spółka Komandytowa, PFR TFI, 2020, 2, 5–7).

The survey found that setting aside additional funds for retirement (in addition to existing ZUS contributions) was declared by 3/4 of the people surveyed. However, despite the widespread conviction that pensions received from ZUS will be low, respondents showed little interest in additional methods of saving, generally choosing well-known but inefficient financial products. PPK as a way to set aside for future retirement was chosen by 24% of people. One in four respondents (26%) relied exclusively on a ZUS pension. See Table 2.

Table 2. Used forms of saving for retirement (in %)

Form of retirement savings	%
I only deduct money from applicable ZUS contributions. [This answer excluded other forms of saving]	26%
I put money in the bank in a savings account or deposit	42%
I put away money within the framework of PPK 24%	24%
I put away money within the framework of a policy or pension insurance	16%
I put away money within the framework of PPE	16%
I contribute within the framework of additional pension programs (IKE, IKZE)	14%
I invest in the future of my children, and I am counting on their financial support	12%
I invest in real estate	10%
I invest in the stock market	8%
I invest in mutual funds	7%
Other	3%

Source: Difference Spółka Komandytowa, PFR TFI, 2020, 13.

The most popular forms of saving for future retirement according to respondents include: banking products (savings account and deposits) — 42%; pension programs (IKE, IKZE, PPK, PPE) — 41%; investments (stock market, real estate, funds) — 19%; pension insurance — 16%. Investing money in the stock market and real estate requires due funds and is less popular. This form of saving is more common among high earners (with incomes above 5,000 net). Those who put aside extra money for retirement do so regularly (Difference Spółka Komandytowa, PFR TFI, 2020, 12–14, 49).

According to respondents, the main advantages of PPK include: (1) automaticity and regularity of drawing funds without the need for one's own involvement; (2) external discipline — funds are deducted from an earlier paycheck, which effectively discourages picking up accumulated funds; (3) low financial burden, as a small amount is deducted from the salary; the employer's and the state's contribution constitutes additional revenue; (4) financial reserve, as funds accumulated in PPK can constitute money for the so-called "black hole" (or "black hour"), they can be withdrawn in a crisis situation (with deductions) and used; (5) flexibility, i.e. the possibility of modifying the amount of the employee's and employer's contributions; (6) transparency, i.e. access to information about the balance of the account and the ability to check contributions and investment earnings, which gives a sense of control over savings.

In contrast, the most frequently cited disadvantages include: (1) dependence on the government and lack of guarantees, as the majority of respondents have low trust in state institutions and fear that the current PPK rules may change (up to and including dismantling PPK altogether) as a result of political decisions; (2) the negative and ongoing experience of the dismantling of OFE as a result of political decisions causes skepticism about the promises of future profits and the inviolability of participants' private funds; (3) dependence on employer contributions, i.e. concerns about whether employers will conscientiously participate in the program and whether the legal mechanism enforcing contributions from them will be effective; (4) conditions for withdrawal of funds before age 60 — the inability to withdraw more than 25% of the funds without deductions in the event of serious illness, or at other unfortunate chance events, such as job loss; and (5) conditions for withdrawal after 60 years — no possibility to withdraw 100% of funds at once without profit tax deduction, the need to withdraw 75% of funds in installments (a minimum of 120 installments). Another problematic and related aspect of the scheme is the question of accumulation of PPK contributions in the event of job loss, as participants have no knowledge of how PPK works in the event of job loss, who will then pay the contributions, and whether they can be withdrawn. Yet another issue is the uncertainty of profits and the lack of confidence that the funds collected will be managed competently, and that possible profits will not be consumed by administrative costs (Difference Spółka Komandytowa, PFR TFI, 2020, 18–19).

The COVID-19 pandemic did not affect savings accumulation behavior in a significant way. The behavior of 87% of respondents did not change (they either

continued or did not begin saving). Only a small number of respondents declared the need for financial security or increased savings. The pandemic motivated 5% of people to save, proving that it is impossible to predict everything and it is necessary to take care of financial security. On the other hand, it discouraged 8%, the drop in income prompted people to reduce spending, including setting aside contributions for retirement (Difference Spółka Komandytowa, PFR TFI, 2020, 24–25).

Familiarity with the PPK program among respondents is very high (89% are familiar with PPK), only one in ten people (11%) have not heard of PPK. Awareness of the program is lower among those aged 18–39 and those with primary and vocational education. They are most likely to be residents of rural areas and cities with a population of up to 20,000, as well as those in a better financial situation, earning more than 5,000 net (Difference Spółka Komandytowa, PFR TFI, 2020, 27–28, 50).

The primary source of information about PPK for the majority of respondents (61%) is most often the workplace and employer (training courses, flyers, posters, emails), information campaigns in the media (TV and radio) and the Internet (financial portals) were also of great importance — (40% and 37% respectively). Knowledge was supplemented by the opinions of trusted people: friends, colleagues, family (27%) (Difference Spółka Komandytowa, PFR TFI, 2020, 29–30). See Table 3.

Table 3. Sources of information about PPK

Source of information	%
Employer	61%
Television, radio	40%
Internet	37%
Press	18%
Co-workers	16%
Family, friends	11%
Advertising, leaflets	6%

Source: Difference Spółka Komandytowa, PFR TFI, 2020, 30.

PPK are treated by respondents more like a savings account or a deposit rather than an investment. Few people expect any profits from the investment of funds by managing institutions. Experience with OFE has made respondents skeptical of the promises of profit (Difference Spółka Komandytowa, PFR TFI, 2020, 31).

Regarding the various assumptions of the PPK, respondents evaluated positively: (1) the idea itself, believing it to be a valid, attractive proposition, even in the opinion of those who have unsubscribed from the program; (2) comprehensibility and transparency; (3) three sources of financing, especially the employer and state participation; (4) automatic enrollment and voluntary participation; (5) inheritance of funds; (6) limited access to funds, which mobilizes savings, also gives the opportunity to use funds in justified situations.

On the other hand, the following were viewed negatively: (1) dependence on political decisions, raising concern about the immutability of the program's rules; (2) limited access to funds before 60, not taking into account many emergency situations such as job loss; (3) taxation of a one-time withdrawal of 100% of funds after 60 is perceived as a restriction on the freedom to use the funds; (4) the low token and insufficient financial contribution from the state; (5) mandatory employer contributions to the PPK raising labor costs raise concern that employers will look for ways to reduce or compensate them; (6) the limited scope of contributions, as the maximum amount of contributions allowed, makes the PPK only an additional, unimportant source of income in retirement (Difference Spółka Komandytowa, PFR TFI, 2020, 36).

Despite high familiarity with the program and its principles, one in two respondents (50%) declared that they are not PPK participants. One in three respondents and one in two people knowingly did not join the program. As few as 5% of respondents had previously participated in PPK, and 30% still do. Only 4% of respondents were not aware of participation in the program (Difference Spółka Komandytowa, PFR TFI, 2020, 38). The level of knowledge about the key mechanisms of PPK is relatively high. There is a good awareness of the method of financing, the voluntariness of participation and the ability to opt out at any time. There is lower awareness of the terms of withdrawals, the availability of the funds collected, their heredity and the exemption of withdrawals from inheritance and gift tax (Difference Spółka Komandytowa, PFR TFI, 2020, 50).

PPK participants are aware of the benefits of participating in the program. The one most frequently mentioned is the lack of formalities that the employer has to undertake. Another advantage is the fact that contributions are levied automatically and regularly. In turn, the respondents were encouraged to participate in the program by the fact that the collected money belongs to the participant and is inherited by the persons indicated by him. Men and people aged 50–55 are more likely to stay in the program in the future.

In contrast, uncertainty about the future of accumulated funds is mainly caused by fears of legislative changes and negative experiences with OFE. See Table 4.

Table 4. Advantages and concerns of participation in PPK

Advantages of participation in PPK	%	Concerns about participation in PPK	%
Formalities are handled by my employer	53%	Risk of money being seized by the state, as in the case of OFE	52%
Money accumulated in PPK is my property	52%	Politicization of the program — PPK is a government program	39%
Regularity — the money is transferred every month	50%	Risk of inflation	35%
Automaticity — the money is put aside “by itself” and you don’t have to do anything with it	48%	Lack of certainty about the amount of profits	34%

Advantages of participation in PPK	%	Concerns about participation in PPK	%
Money accumulated in PPK is inherited	48%	Limited access to money before age 60	31%
Voluntariness — I can resign from the program at any time	45%	Tax on earned profits when withdrawing the money early	27%
Under PPK I receive a surcharge on my savings from my employer and the state	41%	Loss of job, I am not sure how to make contributions if such circumstances arise	21%
Ability to withdraw money at any time	40%	Low rate of return due to low contribution	20%
Ability to survey the balance of accumulated funds and control the deposits made	39%	I have to wait a long time to set aside the right amount and access it	18%
Amount of deposit — a low amount does not burden the household budget too much	35%	Deduction of the deposit from my salary	18%
My monthly contribution is almost doubled by my employer	30%	Terms of withdrawal of money after 60 years of age	16%
The money accumulated is multiplied by specialized financial institutions	28%	Fear that the employer will not pay the contributions	15%
Freedom of choice — I decide the amount of my contribution	23%	Automatic enrollment	9%
Flexibility — you can increase/decrease the amount of additional contribution	23%	Pressure from the employer	6%
		I can't afford to save, every penny counts for me	6%
		I do not understand the assumptions, it is too complicated	4%

Source: Difference Spółka Komandytowa, PFR TFI, 2020, 39–40.

Public confidence in systemic saving initiatives organized by the state has been undermined by the OFE reform, which means that if any attractive formula for saving for retirement were to appear, it would arouse uncertainty. The functioning of the PPK scheme is associated with considerable concerns about the profitability of investments, future inflation, stability of employment, immutability of rules, etc., so the main attitude of respondents towards PPK is that of suspicion (Difference Spółka Komandytowa, PFR TFI, 2020, 41, 51).

The research showed that not all employees were effectively informed about joining the PPK. Every fifth of them (18%) found out about it after they had already been enrolled. However, the vast majority of participants (82%) were aware of joining PPK (Difference Spółka Komandytowa, PFR TFI, 2020, 42).

Participation in the program is limited to making a basic contribution (83% for employee contributions and 81% for employer contributions). Only a few respondents declared additional contributions (14% for employee contributions and 11% for employer contributions) (Difference Spółka Komandytowa, PFR TFI, 2020, 44).

The lack of participation in the scheme is the result of concerns about the security of the investments (savings) made. This applies especially to the possibility of a seizure of funds by the state (as in OFE), and uncertainty about earning future profits (Difference Spółka Komandytowa, PFR TFI, 2020, 51). See Table 5.

Table 5. Reasons for non-participation and withdrawal from PPK

Reason	%
Risk of state seizure of money, as in the case of OFE*	49%
Uncertainty about the amount of profits*	39%
Politicization of the program — PPK is a government program*	32%
Deduction of contributions from my salary*	27%
Low rate of return due to low contribution*	15%
Inflation risk*	14%
I can't afford to save, every penny counts for me*	12%
It takes a long time to set aside the right amount and access it	10%
Tax on the profits earned when withdrawing funds early	10%
Limited access to money before age 60*	10%
Automatic enrollment*	7%
Conditions for withdrawal of money after age 60*	6%
I do not understand the assumptions, it is too complicated	5%
Other	12%
Don't know/difficult to say	7%

*Also indicated as reasons for opting out

Source: Difference Spółka Komandytowa, PFR TFI, 2020, 46.

Those who are not currently participating in the PPK program are also not interested in joining it in the future. See Figure 1.

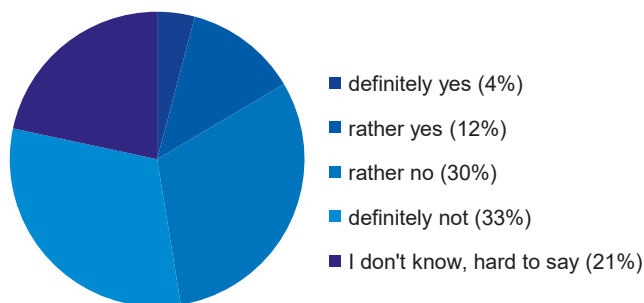


Figure 1. Willingness of non-participants to join PPK in the future

Source: Difference Spółka Komandytowa, PFR TFI, 2020, 47.

Respondents hinge their possible participation in the scheme on difficult to meet or impossible expectations. See Table 6.

Table 6. Respondents' expectations of PPK. Factors that would encourage them to participate

Expectations / encouraging factors	%
Certainty that the money will not be seized by the state, like in OFE	51%
Better job and higher wages	27%
Certainty of investment that the returns will actually be real	26%
No tax on profits on early withdrawal	24%
Possibility of early withdrawal of accumulated savings	21%
Higher welcome and annual surcharge from the state	16%
Higher employer contribution	15%
Job stability (no fear of losing your job)	15%
More favorable conditions for withdrawal of money before age 60	15%
More favorable withdrawal terms after age 60	13%
Operation and supervision by private institutions	8%
Higher employee contribution	6%
I don't know/ It's hard to say	9%
Nothing will convince me	13%

Source: Difference Spółka Komandytowa, PFR TFI, 2020, 47.

In summation, PPK are widely known, but the public still approaches them with great reserve. The idea and mechanisms of PPK are assessed as attractive, transparent and understandable. However, for many people the program's advantages do not offset the concerns associated with it. Negative experiences with OFE make people skeptical about the promises of future profits and the inviolability of accumulated funds. For this reason, a significant portion of eligible employees did not join the program. Those who remained in the program are reassured by the low level of contributions and the possibility to withdraw from the program (Difference Spółka Komandytowa, PFR TFI, 2020, 52).

Another survey was conducted on behalf of PFR Portal PPK on savings preferences and interest in PPK. The survey found that more than half of the respondents have some savings, while 47% do not put money aside. Among those with savings, 73% put aside money for current or retirement security. Respondents mainly use safe forms of saving, i.e. current accounts and deposits. Investing in real estate, stocks and bonds is also quite widespread. Saving in PPK is almost 10% more popular among those who already have previous savings. The willingness to join PPK was declared by one in six respondents. The greatest interest in PPK was noted among those aged 30 to 40 (34.7%) and 20 to 30 (29.7%). PPK are popular among employees of the largest companies (over 250 employees) —

28.7% and large companies (50–249 employees) — 24.8%. Interest in PPK is shown primarily by those with a master's degree (35.6%) and a high school education (38.6%). The largest number of PPK supporters lives in the Mazowieckie (22.8%) and Silesian (17.8%) provinces. According to the survey, almost half of Poles do not save and do not think about securing for the future (PFR Portal PPK, 5.01.2021).

6. Reasons for the failure of PPK

The PPK program failed, which was essentially quite predictable. PPK was launched immediately before the COVID-19 epidemic, but it was not the epidemic that brought about its failure. It was doomed to fail because of its political underpinnings. The main reasons include:

— The use of PPK by Deputy Prime Minister and later Prime Minister Mateusz Morawiecki as a tool of political propaganda. PPK should have been promoted by authorities in the field of economics and other people who enjoy general trust, and not by politicians who do not exactly inspire confidence. It is also hypocritical for the ruling party to convince entrepreneurs to pay high PPK contributions for their employees, while Law and Justice MPs themselves did not intend to pay these contributions for the clerks working in their offices, as they found a loophole in the law favorable to them and passed a provision in the Act that employees of their MPs' offices cannot enroll in PPK. With such a provision in place, MPs will save a lot, as the employer's base contribution is 1.5% of the employee's salary, while the additional contribution can be up to 2.5% of the salary (Kostrzewski, 19.01.2021).

— The lingering memory of the OFE debacle. The Civic Platform has badly damaged trust in the state and private pensions with its OFE reform. In 2014, Donald Tusk's government took away more than half of OFE assets. At the time, each OFE participant lost 51.5% of the value of his or her open pension fund account (Prusik, 9.03.2021). The dismantling of the OFE system destroyed public confidence in long-term forms of savings and promises made by the state. The reason for the lack of trust in PPK is that it is a government program, just as OFE was, from which the government took the money of future retirees.

— The loss of trust in government initiatives is also a problem, especially after the failure of the OFE scheme, after half of the funds from it were seized by the state budget. Only a portion of this money appeared in the form of entries in ZUS accounts, when the money collected in OFE was supposed to belong to the program's participants. Therefore, the seizure of this money was treated as an abuse. The funds in PPK are very modest compared to OFE. According to PFR, at the end of August 2022, the funds accumulated in PPK were PLN 9.77 billion. By comparison, at the time that half of the funds from OFE were taken over, there

was about PLN 300 billion accumulated there (Leśniak, 27.09.2022). PPK are not as popular as the government assumed. After three phases of implementation, about 30% of employees remained in the program. The main reason people are opting out of PPK is a lack of trust in the state. Over the past 30 years, there have been a great many changes in pension systems. This limited trust resulted from the dismantling of OFE, which resulted in a loss of wealth. In addition, the current economic situation is difficult. Looking through the lens of the ongoing crisis, both workers and employers that are struggling to survive will be reluctant to reduce their salaries. The political narrative attached to the scheme, both by the government and the opposition, might also hinder PPK. The Law and Justice government's brandishing of yet another "pension revolution" is discouraging some citizens. Criticism from the other side of the political spectrum may reinforce this message (Ciszak, 9.01.2021).

— Treating employers as a source of PPK funding. Adherence to the PPK scheme also largely depends on employers. Workplaces in which employers encouraged employees to save produce higher shares of PPK participation. However, PPK is a heavy burden on companies, so there is no reason for employers to encourage employees to participate in PPK when the state treats it as the main source of funding for the program. The employer pays contributions, while the government takes credit by telling the public how significantly the state subsidizes the program. If companies received some tax breaks, or other benefits for employees' participation in PPK, they would have an interest in supporting PPK. In the current situation, they do not have any incentive to do so (Samcik, 15.12.2020). The employer has the right to differentiate the voluntary contribution, tying it to, for example, the period of employment, and can also waive it. Therefore PPK increase the cost of operating companies (Iwuć, 1.10.2019).

— Lack of confidence in the capital market. For the past 20 years, saving has not made sense due to nationalization, hyperinflation, currency change, and now war. The capital market in Poland is underdeveloped. The state does not support savings investment or investing dividends. For a long time, investment funds were unsupervised, allowing them to charge exorbitant commissions. It was the same with insurance companies offering unfavorable policies with insurance capital funds (UFK). If the government does not have a policy to develop the capital market, there is no reason for the public to suddenly take an interest in the market just because Prime Minister Morawiecki came up with a new retirement savings scheme, especially since he could have developed the existing PPE, IKE and IKZE instead (Samcik, 15.12.2020).

— The real value of financial assets accumulated in PPK will also decrease as a result of inflation. According to CSO calculations, inflation in August 2022 accounted for 16.1%. Inflation is an unfavorable phenomenon for all savers, especially for those depositing funds in PPK, which diminishes their purchasing power. In the event of a slump lasting several months (or even weeks) PPK automati-

cally achieve worse results (Karpiuk, 20.08.2022). Unlike ZUS pensions, the PPK benefit is not subject to any valorization. Even a slight inflation occurring over the long term is capable of reducing savings invested in financial assets, especially government bonds. ZUS pensions are paid for life and are subject to statutory valorization. Private pensions from the financial market do not share those boons.

— Political and regulatory risk related to the maintenance of the principle of an annual surcharge of PLN 240 over the next few decades, as well as the exemption of earned profit from capital gains tax. Private ownership of accumulated savings in PPK does not mean that the legislature cannot change the rules on financial incentives and taxation of accumulated capital (Matejuk, 7.02.2019).

— The size of PPK savings depends on: (1) the amount of contributions on the part of the employee and the employer (from 3% to 8%, except for the lowest earners), (2) the amount of gross salary and its growth during the time of saving in PPK, (3) the length of the employment history during which PPK contributions were paid, (4) the number of annual subsidies received from the state, and (5) the real growth rates achieved by the defined-date fund managed by the financial institution. While the employee can only set aside contributions, he or she has no influence on the other factors, especially the achievable rates of return on the financial market.

— It is also important to answer the question: what is the realistic achievable annual rate of return on the invested capital? In this case, we can only determine the factors that will positively or negatively affect the achievable return. We can only predict it on the basis of the projected real GDP growth rate and the level of interest rates in Poland and EU or OECD countries in the long term, as well as the condition of the financial market in Poland and the law on PPK defining the investment policy of defined date funds. Since part of the capital is invested in foreign markets, the amount of profits from investing savings in PPK also depends on the condition of the economies there and the global financial markets (Matejuk, 7.02.2019).

— Stock market downturns and fluctuations cause money to run out. PPK is actually not a pension program, but a commercial savings program, money accumulated in which can be used after the age of 60. A ZUS pension is paid for life, while in the case of PPK the payment period is 10 years (a shorter period means loss of benefits received from the state). PPK as such bear no responsibility for the amount of the future pension benefit, and as such, it is unpredictable. Companies dealing with money from contributions do not give any guarantee regarding the effect.

— Education related on the inner workings of the PPK program is given little attention in TV programs. Most of easily accessible information on it comes from commercials encouraging participation in PPK. If a TV program on PPK does appear, it almost exclusively features representatives of the government or the banks, insurance companies and other institutions or organizations interested in not revealing the true assessment of PPK. That's the main reason why the opinions

displayed in TV commercials are exclusively favorable, as the advertisements were commissioned by government institutions.

— Positive opinions about PPK come from “experts” paid by insurance companies and banks, i.e. one-sided experts. The money will be pumped into the global financial market through the Polish financial market, which arouses the worst associations, i.e. with the state’s taking of savings from the Open Pension Funds, the GetBack and SKOK scandals. The money that goes into PPK is invested in and by the same market. If PPK is managed like OFE, future retirees will be left without any money. The monthly premium put aside will be pumped into an uncertain financial market, which is managed by incompetent, malfunctioning institutions. In addition, the insurance market in Poland offers insurance that is expensive, poor and uncertain. The Polish government has introduced a product designed to resemble the British solution. PPK, however, will be managed by the Polish financial market, which is in a very poor state (DobryRuch, 1.07.2022).

7. Conclusion.

In a few decades, ZUS pensions will be historically low. Estimates by the European Commission point to the so-called replacement rate, i.e. the ratio of the first pension to the last salary, being as low as 25% in Poland in 2070. In 2016, it accounted for 55%. The current state of Poland’s public pension system is the result of a reform carried out in 1999 supported by international financial institutions. At the time, rules that reduced ZUS pensions by more than half were introduced. The purpose of the reform was to make room for OFE and other forms of private pensions. It was decided to reduce public pensions in order to transfer part of the pension contributions to the financial market. Initially, ZUS pensions were drastically reduced, and then low pensions were given as an justification for privatizing pensions. However, it is naive to believe that financial institutions will take care of future pensions in a way public institutions would, as their main purpose is generate income.

According to Act on Employee Capital Plans, upon reaching age 60, a quarter of the funds are to be paid out to the contributor at once, and the other 75% should be over the next 10 years, which means that PPK payments will end when the pensioner is 70. There is also no guarantee of future payouts; as they depend on the economy. What is more, calculations showing how the so-called replacement rate can increase thanks to PPK are unreasonably optimistic. Such promises are reminiscent of those from the days of OFE. Putting contributions into a risky financial market game for an extended period of time is dangerous. There is no guarantee that this money will not be lost in part, or even in whole. The institutions operating in the financial market and the economic and political elites associated with them are the biggest beneficiaries of PPK. For them, they are a source of profit, since

thanks to PPK, a huge (PLN 10–15 billion), stream of money from workers' salaries and public funds will enter the financial market every year (Dybiczy, 20.04.2018).

Pensions derived from investments in the financial market do not provide any security in old age. It is a lottery from which only one party benefits, while the other party, i.e. the future pensioner, will bear the costs and losses.

Currently, the effect of the downturn in the financial markets is causing declines in the accounts of PPK participants. War, inflation, rising interest rates and high uncertainty are affecting discounts in financial markets. Stocks and bonds are losing value, which means worse results for various types of financial investments, and especially for PPK participants.

PPK investments were supposed to be subject solely to economics, and it turns out that politics has come on top yet again. In theory, the capital market is a place where the rules of the game are clear and fair and obeyed by everyone — which is ensured by trading participants, financial supervision and the state. If someone breaks them, they face the consequences. In practice, it is quite different. Many market participants (e.g. stock exchanges) exploit weaknesses in the law and problems with its enforcement for their own benefit. In contrast, the public is told what a wonderful thing the market is while being assured that the stock market means, among other things, transparency, verifiable data and documents, and equal access to information and potential profits.

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Elderly employment in the European Union: Active aging or overcoming poverty?

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Abstract

The aim of the paper is to identify scale of and trends in elderly employment in the twenty seven European Union countries and to show determinants of employment in the context of active aging and overcoming poverty. The paper is based on the analysis of empirical data and a critical review of literature. Empirical data for the study are the secondary data retrieved from Eurostat, ILOSTAT and national statistics. The employment rate of people 65 years of age and older has tended to increase in the EU-27 over the period from 2011 to 2021. However, the elderly's income situation has worsened. In a few countries that recorded a rapid growth of elderly employment, older workers continue to work in order to increase their current income. People 65+ were generally continuing to work based on a voluntary choice than a necessity to earn additional income in most of the richest EU-27 countries. Older European workers are more likely to be employees and own-account workers. At the aggregate EU-27 level, agriculture, forestry and fishing stopped to be the largest employer of people aged 65 years and more in 2021. Older EU workers have been more frequently engaged in human health and social work activities.

1. Introduction

In recent decades, all across Europe there has been a shift towards society predominated by older cohorts. The share of the population aged 65 years and more (hereafter also abbreviated as 65+) in the total population of the EU grew from 16% in 2001 to 21% in 2021 (World Bank, 2023). Population aging presents

a huge challenge to each and every country and demands significant adjustments to health systems and to many aspects of social and economic policies. National governments, international institutions and organizations have long been looking for ways to solve the problem of population aging. Significant attention is also paid to active aging.

There is no one definition of active aging in the literature. For instance, the OECD defines active aging as the capacity of people after a certain age threshold to lead economically and socially productive lives. In result, the elderly “can make flexible choices on the way they spend time over life — in learning, in working, in leisure and in care-giving” (Perek-Białaś, Ruzik and Vidovićová, 2008, 559). The World Health Organization in turn puts emphasis on the quality of life of older people and defines active aging as “the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age” (WHO, 2002, 12). For the European Commission (EC) the most important marker is the inclusion of older people into the labor market. In 2010, the EC announced that 2012 will be designated as the European Year for Active Aging and Solidarity between Generations. This initiative was supposed to help “create better job opportunities and working conditions for the growing number of older people in Europe, help them take an active role in society and encourage healthy aging” (European Commission, 2010). It is worth noting that, apart from the increased participation of women in the labor market, a raising participation of the elderly in employment is the most important change in the composition of the European labor force that occurred over the last century (Walker and Maltby, 2012, S118).

In 2021, there were 5.2 million people 65+ employed across the EU-27 (Eurostat, 2022a). However, there are differences in the chief motivations for people beyond the usual age of retirement to work. Very often they want to increase their pension entitlement by working more years or/and to supplement household income by earnings from employment (European Commission, 2016, 29). Older workers may continue to work for non-financial reasons, too. Hence the question arises: do older workers in the EU-27 continue to work in order to increase their current income voluntarily, or as a necessity to earn additional income because of their meagre pensions?

2. Theoretical framework of the research

In the literature population aging is analyzed from different perspectives. Papers and reports focus on independent, healthy and secure living of elderly people (WHO, 2015) and their opportunities to participate in society (Foster and Walker, 2013, 2015; Eurostat, 2020). They also present results of the analysis of engagements of the elderly in productive activities and relationships, and their capac-

ity to actively age (WHO, 2002; UNECE, 2019; European Commission, 2021; Zannella, Principi, Lucantoni, Barbarella, Di Rosa, Domínguez-Rodríguez and Soggi, 2021; Vilhelmson, Thulin and Eldér, 2022). Other paper focus on older workers returning to paid employment and their opportunities to participate in the labor market (Eurofound, 2012; Hardy, Kielczewska, Lewandowski and Magda, 2016; Kudins, 2021).

This paper focuses on a narrow economic perspective of active aging. It provides an overview of trends in terms of labor market participation of people 65 years of age and older in the EU-27 in the years 2011–2021. The aim of the paper is to identify scale of and trends in elderly employment in the twenty seven European Union countries and to show determinants of employment in the context of active aging and overcoming poverty.

The article contributes to the literature by investigating components of growth rates of elderly employment and reasons for the increase in number of older workers in the EU-27.

3. Research methodology

The paper is based on the analysis of empirical data and a critical review of literature. The empirical basis for the study are the secondary data retrieved from Eurostat, ILOSTAT and national statistics. To identify factors that contribute the most to the growth rate of elderly employment in the EU-27, the decomposition of the growth rate due to the status in employment was used. In this way the contribution of each segment of employment i.e. employees, employers, own-account workers, and contributing family workers to the average annual growth rate of employed people 65+ was analyzed.

For simplicity's sake, the decomposition of the growth rate of variable which is a sum of two variables X and Y is calculated in the following way

$$g_{X+Y} = \frac{X_0}{X_0 + Y_0} g_X + \frac{Y_0}{X_0 + Y_0} g_Y$$

where X_0 and Y_0 are values of X and Y at the beginning of the analyzed period, g_X and g_Y represent respectively growth rates of X and Y in the analyzed period. The decomposition shows that the contribution of a given component, for instance X , to the growth rate g_{X+Y} , depends not only on its growth rate but also on its (percentage) share in $X + Y$.

Moreover, six economic activities with the highest numbers of older workers were distinguished in the paper to identify the largest employers of people aged 65 and more. Additionally, mean equalized annual disposable income and risk of poverty and social exclusion were applied to estimate the elderly's income situation in the EU-27.

4. The scale of and trends in elderly employment in the EU-27

Between 2011 and 2021, the EU-27 employment rate for people 65+ increased by 1.4 percentage points. The proportion of men 65+ in the workforce rose from 6.3% to 8.1% while the corresponding rate for women increased from 2.8% to 3.9% (Figure 1).

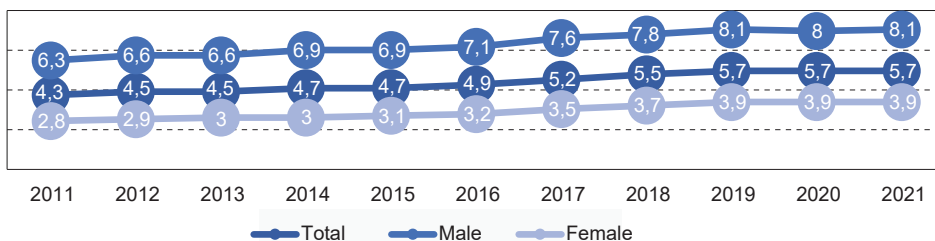


Figure 1. Employment rate of people aged 65 years and more by sex, the EU-27, 2011–2021 (in %)

Source: Eurostat (2022a).

Across the EU-27, the highest employment rate of people aged 65 years and more in 2021 was recorded in Estonia (14.5%). This rate was also high in Sweden (13.6%), Ireland (13.4%), Latvia (12.3%), Lithuania (10.6%), and Cyprus (10.4%). The lowest proportion of people 65+ worked in Romania (2.4%), Belgium (2.7%), Spain (3.1%), and Croatia (3.2%). The employment rate for older men ranged from 20.2% in Ireland to 3.6% in Romania while the same rate for women ranged from 12.9% in Estonia to 1.6% in Romania and Belgium (Figure 2).

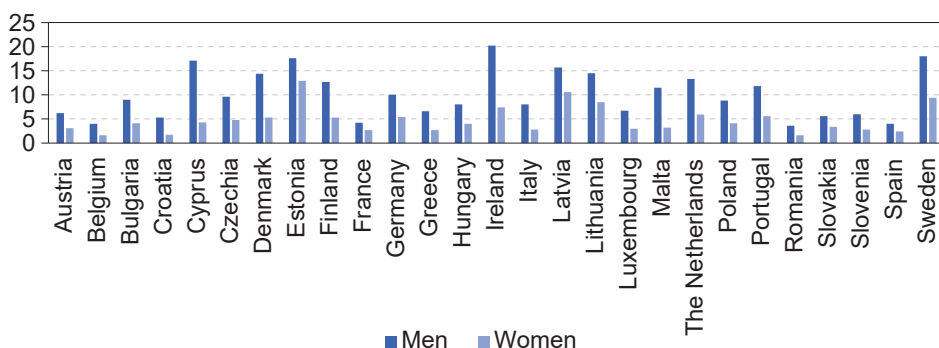


Figure 2. Employment rate of people aged 65 years and more by sex in EU countries, 2021 (in %)

Source: Eurostat (2022a).

The number of employed people 65+ in the EU-27 increased from 3.32 million in 2011 to 5.21 million in 2021, i.e. by 57% (Figure 3). The employment of older people has tripled in Slovakia, Hungary, and Malta. It more than doubled in Bulgaria, France, Finland, Latvia, the Netherlands, Lithuania, Ireland, and Sweden. On the other hand, four countries recorded a decline in the number of employed people 65+. In Romania the employment of older people decreased by over 77%, in Portugal by 33%, in Croatia by 30%, and in Slovenia by almost 19%. In the remaining EU countries, a rise of elderly employment ranged from 5.8% in Austria to 93% in Czechia.

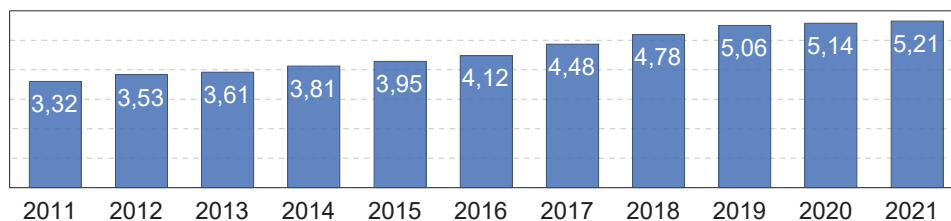


Figure 3. Number of employed people aged 65 years and more in the EU-27, 2011–2021 (in millions)

Source: own calculations based on ILOSTAT (2022).

Over the period from 2011 to 2021, the share of elderly employment in total employment in the EU-27 increased by 0.9 percentage points. In 2021 people aged 65 years and more accounted for 2.6% of the total workforce (Figure 4).

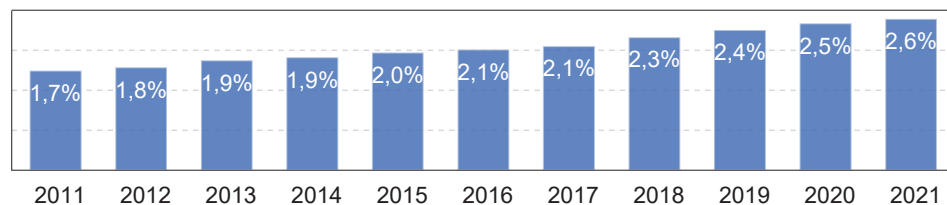


Figure 4. Share of employed people aged 65 years and more in total employment in the EU-27, 2011–2021 (in %)

Source: own calculations based on ILOSTAT (2022).

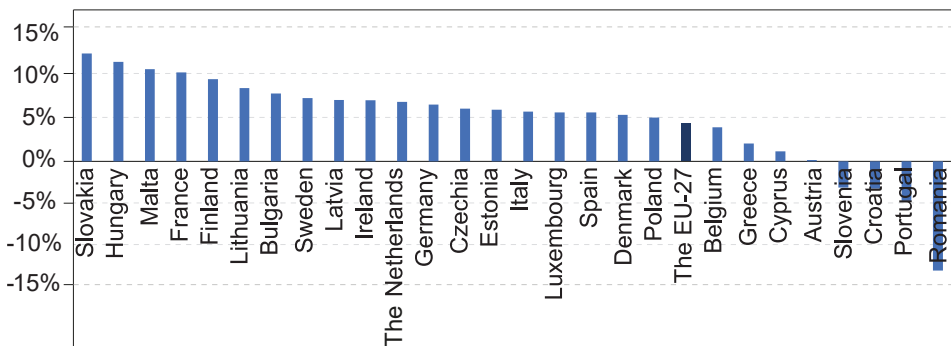
The greatest increase in the share was recorded in Latvia, Sweden, Estonia, Finland, and Lithuania. Contrarily, the share of employed people 65+ in total employment decreased in Romania, Portugal, Croatia, and Slovenia. From 2011 to 2021, the share remained almost stable in Austria, Luxembourg, Belgium, and Cyprus. In 2021, the share of the employed people 65+ in total employment higher than 5% was observed in Estonia, Latvia, and Sweden. A relatively large share was recorded in Lithuania, Ireland, Finland, Denmark and Portugal. On the other hand, elderly employment accounted about 1% of total employment in Romania, Belgium, and Luxembourg (Table 1).

Table 1. The share of elderly employment in total employment and its change in the European countries

Country	Share (in %), 2021	Change in share (in % pts), 2011–2021	Country	Share (in %), 2021	Change in share (in % pts), 2011–2021
Austria	1.7	0.0	Italy	3.1	1.4
Belgium	1.2	0.4	Latvia	5.5	3.0
Bulgaria	2.9	1.6	Lithuania	4.3	2.1
Croatia	1.7	-0.8	Luxembourg	1.3	0.3
Cyprus	3.4	0.4	Malta	2.5	1.1
Czechia	2.8	1.3	The Netherlands	3.3	1.6
Denmark	3.9	1.2	Poland	2.5	0.9
Estonia	5.8	2.2	Portugal	3.9	-2.1
Finland	4.0	2.2	Romania	1.1	-3.4
France	1.6	0.9	Slovakia	1.5	1.0
Germany	3.2	1.3	Slovenia	1.8	-0.5
Greece	2.7	0.8	Spain	1.4	0.6
Hungary	2.3	1.4	Sweden	5.2	2.5
Ireland	4.2	1.7			

Source: own calculations based on ILOSTAT (2022).

In the years 2011–2021, elderly employment in the EU-27 was growing at 4.5% annually. It is worth noting that nineteen EU countries had average annual growth rates of employed people 65+ of more than 5% (Figure 5). The highest growth rates were observed in Slovakia (12.8%), Hungary (11.8%), Malta (11.0%), and France (10.6%), while in Romania elderly employment was decreasing annually by 13.0%, in Portugal by 4.7%, Croatia by 3.2%, and in Slovenia by 3.1%.

**Figure 5.** Average growth rate of employed people aged 65 years and more in the EU-27, 2011–2021

Source: own calculations based on ILOSTAT (2022).

The growth rate of employed people 65+ depends on shares of older employees, employers, own-account workers, and contributing family workers in total elderly employment, and on their growth rates. At the aggregate EU-27 level, older workers are more likely to be employees and own-account workers. In the years 2011–2021, among employed people 65 years of age and older, 47% were employees, while 35% were own-account workers, 12% employers, and remaining 6% were contributing family workers. The number of older employees was growing at 9.2% annually. The average annual growth rate of employers was 5.2%, while the number of older own-account workers increased on average at 0.5%. In the analyzed period, the number of contributing family workers in EU-27 was declining at about 4% annually. Due to decomposition, employees had the largest contribution to the growth rate of elderly employment in the years 2011–2021 (Table 2).

Table 2. Decomposition of the annual growth rate of elderly employment in EU-27, 2011–2021

Components	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Employees (% pts)	3.0	4.5	2.9	3.8	3.9	4.1	6.4	4.6	5.9	1.6	3.1
Employers (% pts)	0.4	1.0	0.6	0.8	0.9	0.3	0.8	0.5	0.7	0.0	0.9
Own-account workers (% pts)	0.2	1.5	-0.3	1.0	-0.3	0.4	1.6	1.5	-0.4	0.2	-2.7
Contributing family workers (% pts)	0.0	-0.7	-0.6	0.0	-0.9	-0.4	0.1	0.0	-0.3	-0.3	0.1
Growth rate (%)	3.6	6.3	2.5	5.6	3.6	4.5	8.8	6.6	5.9	1.5	1.4

Note: A sum of components in a few years is slightly different from the growth rate due to rounding to the first decimal place.

Source: own calculations based on ILOSTAT (2022).

The status of elderly employment varies greatly among EU countries. Between 2011 and 2021, employees accounted on average for more than 85% of employed people 65+ in the Baltic countries, above 70% in Slovakia and Bulgaria and nearly 70% in Denmark. Employees accounted for more than half of employed people 65+ in Czechia, Germany, Sweden, Malta, France, Hungary and Poland. Employees accounted over 40% of elderly employment in the Netherlands, Spain and Finland. In all of these 16 countries the second most important group were own-account workers. It is worth noting that in the Netherlands and Finland own-account workers accounted for more than 40% of employed people 65+. In terms of employment status, a group of own-account workers predominated in Portugal (66.0% of elderly employment), Romania (65.2%), Greece (51.2%), Croatia (49.8%), Belgium (48.1%), Ireland (46.5%), Italy (45.6%), and Cyprus (41.2%).

Slovenia is the only European Union member in which contributing family workers constituted more than 40% of elderly employment. The status of elderly employment was the most diversified in Austria. To sum up, employees predominated in 16 out of 18 countries¹ in which the growth rate of elderly employment was higher than the average one in the EU-27. Own-account workers were the second most substantial group in these countries. Italy and Ireland were the only countries in which own-account workers (followed by employees) predominated in the group of employed people 65+. In the countries that recorded a negative growth rate of elderly employment, own-account workers or contributing family workers constituted the majority of employed people 65+.

All analyzed countries recorded positive growth rates of older employees. In Romania, Slovakia, Croatia, Italy, France, Hungary, Malta, Finland and Poland the number of employees grew on average at above 10%. Numbers of own-account workers increased in all countries in which the growth rate of elderly employment was higher than the average one in the EU-27. Moreover, Belgium, Austria, and Greece experienced a positive growth rate of older own-account workers. On the other hand, the number of own-account workers decreased in five EU countries. The number of own-account workers contracted by more than 12% annually in Romania, Croatia and Portugal, by 9% in Slovenia and by 0.5% in Cyprus, while the percentage of older employers increased in all countries except Belgium and Cyprus. The growth rate of employers above 10% was observed in Slovakia, Malta, Hungary, Bulgaria, Estonia, France and the Netherlands. The percentage of contributing family workers have shrunk significantly in Romania, Poland, Slovenia, and Greece. A negative growth rate of contributing family workers was also recorded in Croatia, Austria, Cyprus, Germany, Czechia, and Spain. On the other hand, numbers of contributing family older workers grew rapidly in Hungary, Ireland, Sweden, and Denmark.

Employees had the largest contribution to the growth rate of elderly employment in Slovakia (during 8 out of 11 years of the analyzed period), Hungary (6 years since 2016), Malta (6 years), France (9 years), Lithuania (8 years), Bulgaria (7 years in 2013–2019), Sweden (7 years), Latvia (10 years), the Netherlands (6 years), Germany (10 years in 2011–2020), Czechia (8 years), Estonia (9 years), Italy (8 years), Denmark (8 years), and Poland (9 years). Employees followed by own-account workers generated the growth rate of elderly employment in Spain (5 and 4 years respectively) while own-account workers followed by employees played an important role in Finland (5 years both) and Ireland (6 and 5 years respectively).

There is no clear trend in the group of countries which had a growth rate of elderly employment lower than the average one in the EU-27. Employees followed by own-account workers generated the growth rate of elderly employment

¹ Due to a lack of detailed data Luxembourg was excluded from the analysis.

in Belgium (6 and 5 years respectively) and Austria (3 and 4 years). In Greece and Cyprus employees contributed the most to the growth rate of elderly employment for 6 years.

A sharp decline in the number of older own-account workers for 9 years in Croatia and Romania and for 8 years in Portugal and negative growth rates of contributing family workers for 6 years and own-account workers for 8 years in Slovenia were the main causes of negative growth rates of elderly employment in these countries.

Between 2011 and 2021, agriculture, forestry and fishing as well as wholesale and retail trade were the main activities for people aged 65 years and more in the EU-27. These sectors employed respectively 19.2% and 12.5% of the workforce for this age group. However, agriculture has been steadily losing its importance as a major employer. In 2021, human health and social work activities followed by wholesale and retail trade were the largest employers of people 65+. They employed respectively for 12.9% and 12.3% of the older workers. The employment situation for the six economic activities with the highest numbers of older workers is shown in Figure 6.

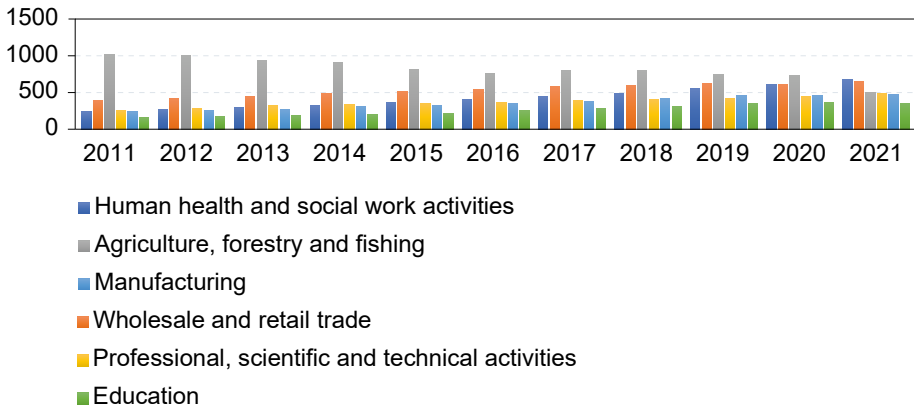


Figure 6. Employment of people aged 65 and more in the EU-27, by selected economic activities, 2011–2021 (tens of thousands)

Source: own calculations based on Eurostat (2022b).

In the years 2011–2021, agriculture, forestry and fishing were the principal employers of older people in Croatia, Romania and Slovenia. Agriculture followed by wholesale and retail trade were the key activities for older workers in Austria, Cyprus, Greece, Ireland, and Portugal. Agriculture was also a major employer of people aged 65 years and more in Finland and Poland. In Finland the next largest portion of the workforce in this age group was composed of people who performed professional, scientific and technical activities, while in Poland by workers in the manufacturing sector. In Belgium, Denmark, Germany, the Netherlands,

and Spain older workers were primarily employed in wholesale and retail trade or they performed human health and social work activities. Wholesale and retail trade was also the main activity for older persons in Bulgaria, Hungary, and Italy. However, the second most common activity varies in those countries. In Bulgaria it was agriculture, while in Italy — professional, scientific and technical work and in Hungary — manufacturing. In France, Slovakia and Sweden the highest number of older workers were engaged in human health and social work activities. The second most important employer in these countries was respectively wholesale and retail trade, professional, scientific and technical activities and education. The education sector employed the highest number of older workers in the Baltic countries. In Lithuania the second sector was agriculture, while in Latvia that spot went to human health and social work activities, and in Estonia — manufacturing. In Czechia people aged 65 years and more were principally employed in the manufacturing sector or they did professional, scientific and technical work.²

5. Active aging or overcoming poverty?

The retirement age in the EU was raised over the second decade of the 21st century. In 2011, it ranged from 60 years in France to 65 in Austria, Belgium, Cyprus, Denmark, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovenia, Spain, and Sweden for men. The state pension age for women ranged from about 59 in Romania to 65 years in Belgium, Cyprus, Denmark, Germany, Ireland, Luxembourg, the Netherlands, Portugal, Spain, and Sweden. In 2022, the retirement age for men in the EU ranged from about 63 to 67 years and for women from 60 to 67 (Table 3). Additionally, in Sweden people have the right to work until they are 68 and they can only work for longer if their employers agree on this. The pensionable age in EU countries varies depending on the person's date of birth, gender, number of children, contribution periods and the changes in life expectancy at age 65. In several countries the age has been changing until it reached 65–67 years.

Table 3. Statutory pension age in the EU-27 (as of 2022)

Country	Men	Women
Austria	65 years	60 years
Belgium ^a	65 years	65 years
Bulgaria ^b	66 years 10 months	66 years 10 months
Croatia	65 years	63 years
Cyprus	65 years	65 years
Czechia ^c	63 years 10 months	63 years 10 months
Denmark	67 years	67 years

² Due to a lack of detailed data Luxembourg and Malta were excluded from the analysis.

Country	Men	Women
Estonia ^d	64 years 3 months	64 years 3 months
Finland ^e	64 years	64 years
France	66 years 7 months	66 years 7 months
Germany ^f	65 years 8 months	65 years 8 months
Greece	67 years	67 years
Hungary	65 years	65 years
Ireland	66 years	66 years
Italy	67 years	67 years
Latvia ^g	64 years 3 months	64 years 3 months
Lithuania ^h	63 years 9 months	63 years 9 months
Luxembourg	65 years	65 years
Malta ⁱ	63 years	63 years
The Netherlands ^j	66 years 4 months	66 years 4 months
Poland	65 years	60 years
Portugal	66 years 7 months	66 years 7 months
Romania ^k	65 years	61 years 9 months
Slovakia ^l	62 years 10 months	62 years 10 months
Slovenia	65 years	65 years
Spain	65–66 years 2 months	65–66 years 2 months
Sweden	65 years	65 years

Note: ^a for those retiring on or before 31.01.2025, ^b for those who have a period of social insurance cover of at least 15 years, ^c in Czechia the retirement age depends on the person's date of birth, gender and number of children, ^d the age is gradually changing until it reaches 65 years by 2026, ^e the retirement age is raised by 3 months annually until reaching 65 years in 2027, ^f for anyone born after 01.01.1964, the basic age threshold will be 67, ^g the retirement age will be 65 by 2025, ^h 65 years by 2026, ⁱ 65 years by 2027, ^j 67 years in 2024, ^k for women 63 years by 2030, ^l in Slovakia the retirement age depends on the person's date of birth, gender and number of children, a maximum retirement age 64 years.

Source: own compilation based on Eurostat (2022c) and European Commission (2022).

Between 2011 and 2021, the elderly's income situation in the EU-27 has worsened. At the beginning of the analyzed period, people aged 65 years and more had on average 2.3% less disposable income per household member than the total population, while at the end their income was 7% lower. In 2021, only in Luxembourg, Italy, Spain, Greece, and Portugal people 65+ had more disposable income higher than the total population. In Luxembourg it was 15% higher on average while 7.5% in Italy, 3.2% in Spain, 1.3% in Greece,³ and 0.2% in Portugal. Disposable income per household member higher than the average in the EU-27 was also recorded in Austria and France. The worst income situation of people 65+ was noted in Lithuania (29.8% lower than in the total population), Estonia (27.3%), Latvia (26.2%), Bulgaria (24.2%), Malta (23.1%) and Croatia (21.1%) (Figure 7).

³ It is worth noting that the improvement in Greece was caused by a slower decline in average disposable income of people 65+ than in the income of the total population.

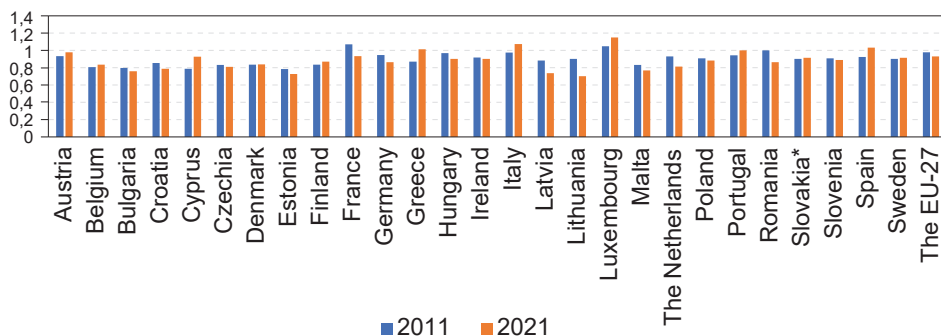


Figure 7. The percentage share of disposable income of people 65+ in the disposable income of the total population, 2011 and 2021

Note: * The share in Slovakia for 2011 and 2020.

Source: own calculations based on Eurostat (2022d).

In the analyzed period, the elderly's income in the EU-27 grew at 1.7% annually, while the disposable income of the total population was growing at 2.2%. Only in eleven EU countries older workers experienced a growth of their income larger than in the total population. Disposable income of people aged 65 and more has been steadily shrinking in France and Greece (Table 4).

Table 4. Average growth rate of disposable income, 2011–2021

Country	Average growth rate of disposable income (%)	
	All age groups	People 65+
Austria	2.3	2.8
Belgium	2.5	2.9
Bulgaria	7.0	6.5
Croatia	3.6	2.8
Cyprus	0.01	1.7
Czechia	3.6	3.3
Denmark	1.99	2.03
Estonia	8.0	7.2
Finland	1.7	2.1
France	0.8	-0.5
Germany	3.0	2.1
Greece	-2.4	-0.8
Hungary	3.8	3.1
Ireland	3.4	3.2
Italy	1.1	2.1
Latvia	8.2	6.3
Lithuania	10.2	7.5
Luxembourg	2.8	3.7

Country	Average growth rate of disposable income (%)	
	All age groups	People 65+
Malta	5.1	4.3
The Netherlands	3.1	1.7
Poland	4.7	4.4
Portugal	2.3	3.0
Romania	8.5	7.0
Slovakia*	2.9	3.0
Slovenia	2.6	2.4
Spain	1.1	2.2
Sweden	1.9	2.0
The EU-27	2.2	1.7

Note: * The growth rate in Slovakia for 2011–2020.

Source: own calculations based on Eurostat (2022d).

In 2020, 19.4% of people aged 65 and more in the EU-27 were at risk of poverty or social exclusion. The situation was most dire in Bulgaria, where half of people 65+ lived in households experiencing at least one of the three poverty and social exclusion risks.⁴ Moreover, more than 40% people 65+ in the Baltic countries and about 30% in Croatia and Romania lived at risk of poverty or social exclusion. On the other hand, only 7.3% of people 65+ were at risk of poverty in Luxembourg (Figure 8).

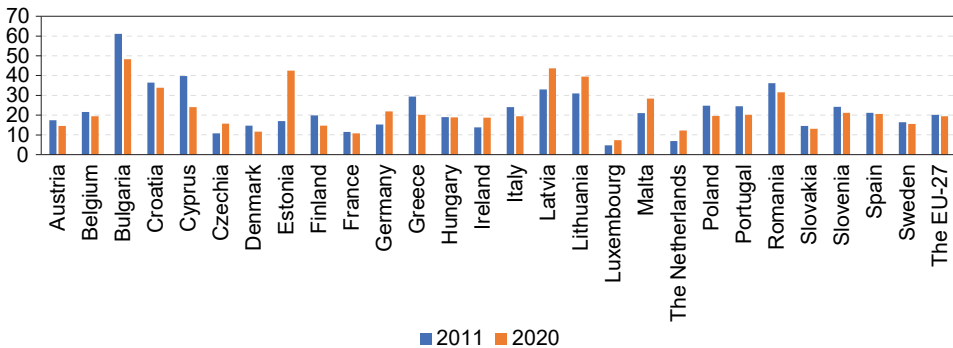


Figure 8. Persons 65 years and more at risk of poverty or social exclusion (in %), 2011 and 2020

Source: own compilation based on Eurostat (2022e).

It can be assumed that older workers in Bulgaria, Latvia, Estonia, Lithuania, Croatia, Romania, and Malta continue to work primarily to supplement their household income. In these countries there is high proportion of people aged 65 and more at risk of poverty or social exclusion and a significant gap in disposable

⁴ Risk of poverty, severe material and social deprivation and/or living in a household with very low work intensity.

income between people 65+ and the total population. Despite a rapid growth of elderly employment, a gap in disposable income between people 65+ and the total population has been increasing in the Baltic countries, Bulgaria and Malta. It may be due to low average wages in the most popular sectors among employed people 65+ in these countries. It is worth noting that the proportion of people continuing to work despite receiving a pension for financial reasons in these countries was also very high at the beginning of the analyzed period. For instance, in 2012, 98.4% of respondents aged 65–69 in Romania declared that they worked for financial reasons. The proportion of such people was about 90% in Estonia and Latvia, 86.7% in Lithuania and 84.1% in Bulgaria (European Commission, 2016, 30).

On the other hand, it is quite likely that people 65+ in Luxembourg, France, Denmark, the Netherlands, Slovakia, Austria, and Finland were continuing to work as more of a voluntary choice than a necessity to earn additional income. In these countries the proportion of people aged 65 and more at risk of poverty or social exclusion sits at below 15%. It is worth noting that in 2012 the proportion of people aged 65–69 continuing to work for non-financial reasons was above 70% in Luxembourg, Denmark, the Netherlands, Austria, and Finland. Only in France and Slovakia more than a half of respondents declared that they continued to work for financial reasons (European Commission, 2016, 30).

6. Conclusion

Between 2011 and 2021, a low but growing share of the EU-27 population aged 65 years and more continued to work. Employment rates in this age group rose in all EU countries except Austria, Croatia, Cyprus, Portugal, Romania, and Slovenia. The employment rates increased the most in Latvia, Sweden, Lithuania, and Estonia. Across the EU-27, the gender gap in employment rates increased by 0.7 percentage points. In the considered period, the number of employed men aged 65 years and more in the EU-27 increased by 1.15 million while 0.74 million more older women worked in 2021 compared to 2011. Generally, the importance of older generations in the labor market slightly rose in all EU-27 countries except Croatia, Portugal, Romania, and Slovenia.

European older workers are more likely to be employees and own-account workers. It is worth noting that employees had the largest contribution to the growth rate of elderly employment in the 2011–2021 period. At the aggregate EU-27 level, agriculture, forestry and fishing stopped being the largest employers of people aged 65 years and more in 2021. This sector decreased its share in elderly employment by 21 percentage points during the analyzed eleven years. European older workers were more and more frequently engaged in human health and social work activities. There are of course differences between EU members in the occupations in which older workers are employed.

The number of employees and own-account workers increased in all countries in which the growth rate of elderly employment was higher than the average level in the EU-27. Employees and own-account workers also had the largest contribution to the growth rate of the employment of people 65+ in those countries. Older workers in countries which had the highest growth rate of elderly employment primarily performed human health and social work activities or were employed in wholesale and retail trade.

Employment among older people in the group of countries which had a growth rate of elderly employment lower than the average one in the EU-27 was concentrated primarily in agriculture, forestry and fishing. In addition, the number of own-account workers and/or contributing family workers overcame that of employed people 65+ in these countries. A decline in older own-account workers and contributing family workers resulted in a negative growth rate of elderly employment in four European countries.

Across the EU-27, the elderly's disposable income decreased between 2011 and 2021. Only in five EU countries people 65+ had disposable income higher than the total population. It seems that in the few countries that recorded a rapid growth of elderly employment over the 2011–2021 period, older workers continue to work in order to increase their current income. Only in the richest of EU-27 countries people 65+ were continuing to work as more of a voluntary choice than a necessity to earn additional income.

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Assessment of the performance persistence of Employee Capital Plans

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Abstract

Estimating the future return rates is virtually impossible. However, it is possible to verify whether financial institutions that invest entrusted funds are able to maintain high rates of return for a long time. This phenomenon is referred to as performance persistence, and has become the object of interest of the author of this article in relation to Employee Capital Plans (ECP). A research hypothesis was adopted that performance persistence in ECP does occur. It was verified using contingency tables that were created for defined date funds that operate in ECP, using monthly rates of return and the Sharpe index. The results obtained by the author allowed concluding that the performance persistence of rates of return in the case of ECP occurs for a maximum of half of the research period.

1. Introduction

The literature on the subject emphasizes that there is no guarantee of repeating investment results. However, many studies, both Polish and foreign, indicate the occurrence of the phenomenon of repeatability of results, otherwise known as performance persistence. Knowing about its existence can be useful for people who want to increase their savings. The vast majority of research on the subject relates to mutual funds as well as hedge funds. There are relatively few studies on pension funds. In their case, the deposited funds remain under the management of one entity for a long time. The phenomenon of competitive capital supply is much less common in them than, for example, in the case of investment funds. This can

lead to full sustainability of the achieved results. The intended role of Employee Capital Plans (ECP) in providing additional income after the age of 60 justifies careful examination of the results achieved by funds of a defined date.

The ECP that operate in Poland are quasi-obligatory instruments for long-term saving, which can be classified as being on the border between the 2nd and 3rd pillars. They allow the accumulation of funds in accordance with the life-cycle hypothesis, because depending on the age of the participant, the share structure between the equity and debt parts changes depending on the defined-date fund. Undoubtedly, the use of mechanisms recognized in behavioural economics was helpful in the case of ECP, evidenced by the fact that as of October 31, 2022, 2.48 million people used them (PFR Portal PPK, 2022, 3). In the case of other forms, i.e. the Individual Retirement Account, the Individual Retirement Security Account and Employee Pension Schemes, it was respectively: 797,100 people (as of June 30, 2022), 463,200 people (as of June 30, 2022) and 641,400 people (as of December 31, 2021) (KNF, 2022a, 2022b, 2022c).

This article fills the research gap by referring to the rates of return achieved by institutions offering ECP. The main purpose of the article is to verify the occurrence of performance persistence of rates of return in ECP. Based on the study of the literature, the author adopted an a priori research hypothesis that performance persistence in ECP does occur. This is mainly because they are relatively young institutions that have been operating on the financial market for a relatively short time (the first stage was initiated in July 2019). The author was additionally encouraged to adopt the hypothesis by the fact that one of the factors conducive to persistence is the differentiation of fees for the management of entrusted funds.¹ An auxiliary hypothesis was also adopted that the performance persistence is influenced by the structure of assets, which is differentiated in the funds of a defined date. The author's study is primarily of applicational importance, because the answer to the question of whether and for how long the institutions offering ECP are able to maintain the level of rates of return, based on the obtained results, may support the decisions of potential participants regarding saving in ECP. This issue is extremely important, especially from the point of view of people between 18 and 50 years of age who are not ECP participants, who will be subject to the auto-enrollment procedure starting in 2023.

To achieve the adopted goal, tables of conditional numbers were used for subsequent months from July 2020 to October 2022. The analysis used monthly rates of return, as well as Sharpe ratios, calculated for 8 funds of a defined date (2025–2060), which were offered by 19 institutions. The analyses included BPS TFI, which was removed from the register of institutions managing ECP

¹ The maximum amount of fee that can be charged by institution managing the ECP is 0.5% and an additional 0.1% for the result, for up to 75% of institutions (art. 49 of the Act of November 4, 2018 on Employee Capital Plans, Journal of Laws of 2018 item 2215, hereinafter referred to as the ECP Act).

while PFR TFI began managing the accumulated funds (MojePPK, 2022). The results achieved by Aviva before the merger with Allianz were also analyzed. This decision allowed to avoid survivorship bias in the analysis. In addition, among the research methods used by the author, one can point to a critical analysis of the literature on the subject, as well as measures of descriptive statistics. To calculate the risk-free rate of return, profits from three-month treasury bonds were used.

The article, apart from the introduction, consists of three parts and a summary. The first part presents a review of research on performance persistence, including research on pension funds. Then, the methodology of own research was discussed. The third part presents the results of own research.

2. Performance persistence in literature

We are not able to obtain a full guarantee that the investment results from the past will be repeated on the financial market in the future. That is why it is so important to take performance persistence into consideration. The repeatability of the rates of return achieved by various types of funds has been of interest to researchers since the 1960s (Sharpe, 1966; Jensen, 1968; Carlson, 1970). They initiated a research process that continues to this day around the world and applies to virtually all types of funds that are offered on the financial market.

Already in the 1990s Grinblatt and Titman observed, based on the analysis of data from the turn of the 1970s and 1980s, that historical results that are officially published provide investors with many useful information. They allow them to make appropriate investment decisions which translate into capital allocation processes (Grinblatt and Titman, 1992). Hendricks, Patel, and Zeckhauser presented a theory relating to the retention of results by American funds, which allowed them to maintain their appropriate positions in the rankings, using sports terminology. They proposed that high-performing funds be called *hot hands*, while those at the bottom of the charts were called *icy hands*. The use of such a division allowed them to present two key conclusions. First, it is easier for investors to identify funds that performed worse based on historical data and to assume that they will be at the end of the lists in the future. The second conclusion is that it is more difficult to identify funds that were among the best and will continue this trend in the future (Hendricks, Patel and Zeckhauser, 1993).

The possibility of identifying funds that maintain their performance both above and below the average achieved by the entire surveyed population is also possible if short research periods are chosen. Goetzmann and Ibbotson (1994) showed that using a one-month period makes it possible to determine with great accuracy which fund will be able to repeat its performance in the future.

Performance persistence is not permanent in financial markets. There are studies from various parts of the world whose authors showed that the rates of

return did not persist in the periods they analyzed. An example of such research on Asian markets are the publications of Sehgal and Jhanwar (2008) as well as Lai and Lau (2010). On the other hand, studies relating to European financial markets include, among others: Babalos, Caporale, Kostakis and Philippas (2008), as well as Patena and Żołyński (2008). Perez (2012) and Aspadarec (2019) conducted research on performance persistence in Polish funds (among others). The latter proposed an original measure to determine the performance persistence of returns — the Absolute Return Index (ARI) (Aspadarec, 2019). Kołodziejczyk states that performance persistence in the rates of return achieved could be observed before the pandemic. In her opinion, however, during the COVID-19 pandemic, i.e. after March 12, 2022, the behaviour of the market reversed (Kołodziejczyk, 2022, 127).

Research on performance persistence is also carried out within pension funds, although there are significantly fewer studies of this kind. Researchers' interest in this area of the financial market has been noticeable since the second half of the 1980s (Ippolito and Turner, 1987; Lakonishok, Shleifer, Vishny, Hart, and Perry, 1992; Coggin, Fabozzi and Rahman, 1993). Most of the obtained results allowed the researchers to conclude that performance persistence occurs in short periods. One can point to the research carried out by Martí-Ballester (2009), who analyzed pension plans in Spain. Similar conclusions were obtained by Berggrun and Jaramillo (2011) who dealt with the rates of return achieved in Colombia. In their analysis of domestic investments made by American pension funds, Bauer, Cremers and Frehen (2010) showed that small funds are able to achieve better results. Andonov, Bauer and Cremers (2012) also analyzed US pension funds. In their opinion, asset allocation, market timing, and selection of securities influence achieving better-than-market results. Gerritsen (2016) showed that the size of the pension fund matters. In his opinion, larger institutions are able to achieve higher rates of return than smaller institutions that compete with them.

The abovementioned study by Lakonishok et al. (1992) found US pension fund stock investments to be inferior to the S&P 500 index. Huang and Mahieu (2012) — though they concluded that larger pension funds performed better — indicated with the z-score indicator that Dutch pension funds are not able to achieve better results than the adopted benchmarks. Among the Polish studies concerning pension funds, the results obtained by Marcinkiewicz (2013) are worth pointing out. She analyzed the performance persistence in Open Pension Funds for the period of 2000–2012. The results indicate that this phenomenon occurred incidentally.

3. Research methodology

To verify the adopted research hypothesis that performance persistence occurs in Employee Capital Plans, the author of the publication used tables of conditional numbers. To create them, funds were divided into 8 funds of a defined date (2025,

2030, 2035, 2040, 2045, 2050, 2055, 2060), which were offered by 19 managing entities. The use of such a division results from the fact that, depending on the participant's age, the shares in the debt and equity parts change (art. 40 of the ECP Act). The adoption of BPS PPK, which was taken over by PFR TFI (MojePPK, 2022), and Aviva, which merged with Allianz, allowed the author to avoid the survivorship bias in the analyses.

In the first stage of the research process, monthly rates of return were determined, calculated as the difference in the value of a participation unit on the last day of a given month to the value on the first day of the month, divided by the value on the first day of the month. In the absence of data, they were supplemented with values from the next day.

$$r = \frac{JR_t - JR_{t-1}}{JR_{t-1}}$$

where

r — monthly rate of return,

JR_t — value of the fund's participation unit at the end of the period,

JR_{t-1} — value of the fund's participation unit at the beginning of the period.

This was done based on data obtained from the website *Analizy.pl*, which was used to rank the analyzed funds in descending order for each month and divided into "winners" — "W" and "losers" — "L". The dividing point was the average rate of return in a given month. Institutions with above-average returns were counted among the winners. The rest were considered losers. In the next step, the situation of individual funds was compared in the following month, whether they managed to maintain the position from the previous month (WW or LL situation), or whether they changed their position due to the achieved rate of return (WL or LW situation).

A similar procedure was carried out concerning the Sharpe ratio to include the risk aspect in the analysis. The author adopted three-month treasury bonds for analysis, as they are considered a safe instrument. This was done since the cost of their purchase is relatively low (PLN 100) and that they offer a fixed interest rate. This ratio was calculated as the quotient of the difference between the achieved rate of return and the rate of return on a risk-free investment about the standard deviation of the rate of return (Dybał, 2008, 74).

$$S_h = \frac{R - RF}{s}$$

where

S_h — Sharpe ratio,

R — rate of return achieved by the fund in the analyzed period,

RF — the rate of return achieved by the risk-free investment in the analyzed period,

s — standard deviation of the rate of return.

The time range covers the analysis from July 2020 to October 2022. The choice of starting date of the research is largely based on the provisions of the Act. From July 1, 2019, it applies to enterprises employing at least 250 people (art. 134 of the ECP Act). At the same time, the legislator gave entities offering ECP a period of 12 months from the date of registration of the fund to adjust the structure of the investment portfolio (art. 42 of the ECP Act). An additional argument for adopting such a research scope is also the fact that due to the COVID-19 pandemic, the period of application of ECP in enterprises employing at least 50 people was equalized with enterprises employing at least 20 people.

The obtained status (WW, LL, WL or LW) of individual funds in the following periods enabled the author to determine the CPR indicator. It allows us to determine whether the performance persistence of rates of return occurs in the analyzed period. A value above 1 allows us to conclude that the analyzed phenomenon has occurred. On the other hand, a value below 1 makes it possible to conclude that there is no repeatability of the results of returns.

$$CPR = \frac{WW * LL}{LW * WL}$$

where

WW — the number of funds that have been successful in two successive periods,

LL — the number of funds that failed in two successive periods,

LW — the number of funds that changed their result for a better one in two consecutive periods,

WL — the number of funds that changed their result for the worse in two consecutive periods.

At a later stage, the test statistic z was introduced. Its positive values, exceeding the critical value (1.96 for the confidence interval of 5%) allow us to conclude that performance persistence occurs. However, in the case of negative values, below the critical value, it can be concluded that there are changes in the ranking positions (from winner to loser and vice versa).

$$z = \frac{\ln CPR}{\sigma_{\ln CPR}} \sim N(0;1)$$

$$\sigma_{\ln CPR} = \sqrt{\frac{1}{WW} + \frac{1}{WL} + \frac{1}{LW} + \frac{1}{LL}}$$

The second test that enables the statistical verification of CPR is the χ^2 test of independence. It is used to compare the observed distribution with the expected one. Variable χ^2 is characterized by an asymptotic distribution with one degree of freedom. Its positive value, which reaches a value higher than the critical value (for the confidence interval equal to 5%, it is 3.841) means the rejection of the null hypothesis in favor of the alternative hypothesis, which speaks about the statistically significant performance persistence. It is calculated as follows:

$$\chi^2 = \frac{(WW - D1)^2}{D1} + \frac{(WL - D2)^2}{D2} + \frac{(LW - D3)^2}{D3} + \frac{(LL - D4)^2}{D4}$$

Where

$$D1 = \frac{(WW + WL)(WL + LW)}{N}$$

$$D2 = \frac{(WW + WL)(WL + LL)}{N}$$

$$D3 = \frac{(LW + LL)(WW + LW)}{N}$$

$$D4 = \frac{(LW + LL)(WL + LL)}{N}$$

4. Determining the occurrence of performance persistence in ECP — results of own research

While analyzing performance persistence, an analysis of contingency tables for funds of a defined date was carried out (see: Tables 1–8). Both in the case of monthly rates of return and the Sharpe ratio, based on the CPR ratio, it can be concluded that performance persistence occurs for a maximum of half of the research period. In the case of the Sharpe index, it can be stated that the performance persistence defined by the CPR index is more persistent. The conducted test statistics: z and χ^2 allow us to conclude with a 5% confidence interval about the occurrence of persistence much less often than in the case of the CPR indicator. However, differences between the monthly rates of return and the Sharpe index can also be observed here. As in the case of the latter index, the test statistics more often allowed to confirm the hypothesis and the occurrence of the performance persistence.

When analyzing funds of a defined date, it can be observed that persistence verified by the CPR indicator about monthly rates of return was more frequent in the case of funds 2025 and 2040, and the shortest (only 7 times) in the case of funds 2035, 2045, and 2060. However, in the case of the Sharpe ratio, the variation in the frequency of persistence is not that large — 13 times (with a deviation of 1 in the case of funds 2045 and 2050). The exception are the 2060 funds, for which the phenomenon was observed 9 times.

Comparing the z and χ^2 test statistics for defined date funds, it can be observed that the χ^2 statistic more often allows identifying the occurrence of performance persistence than the z statistic with a 5% confidence interval. Concerning monthly rates of return, it occurs most often in the 2035 funds. However, in the case of the Sharpe ratio, the χ^2 statistic allows us to assume the hypothesis of the existence

of persistence in 5 periods, in the 2030 and 2055 funds. On the other hand, the z statistic occurs only in 2 periods, in the 2025 and 2045 funds.

When analyzing the results of the 2025 funds (Table 1), i.e. those investing the most in the debt part, it can be observed that although in the case of monthly rates of return the CPR was above 1 in more than half of the cases, these results were statistically significant only in two months. A similar situation occurred in the case of the Sharpe index.

Table 1. Persistence tests for funds with a defined date of 2025

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2020	3	3	7	6	0.21	2.55	-1.56	5	6	5	3	2.00	0.54	0.73
IX 2020	5	3	6	5	0.50	0.54	-0.73	3	6	3	7	0.86	0.02	-0.16
X 2020	6	6	3	4	3.00	1.35	1.15	3	7	6	3	1.17	0.02	0.16
XI 2020	4	3	7	5	0.34	1.27	-1.11	4	4	6	5	0.53	0.46	-0.68
XII 2020	9	6	2	2	13.50	6.13	2.30	7	7	2	3	8.17	4.34	1.99
I 2021	4	3	5	7	0.34	1.27	-1.11	4	5	5	5	0.80	0.06	-0.24
II 2021	4	5	5	5	0.80	0.06	-0.24	7	5	5	2	3.50	1.57	1.23
III 2021	4	5	5	5	0.80	0.06	-0.24	3	3	4	9	0.25	1.96	-1.37
IV 2021	6	7	3	3	4.67	2.55	1.56	5	7	5	2	3.50	1.57	1.23
V 2021	7	5	5	2	3.50	1.57	1.23	7	7	2	3	8.17	4.34	1.99
VI 2021	6	3	4	6	0.75	0.09	-0.30	0	5	5	9	0.00	6.11	0.00
VII 2021	5	4	5	5	0.80	0.06	-0.24	3	11	3	2	5.50	2.54	1.52
VIII 2021	5	4	5	5	0.80	0.06	-0.24	1	7	6	5	0.23	1.53	-1.18
IX 2021	6	5	4	4	1.88	0.46	0.68	4	5	7	3	0.95	0.00	-0.05
X 2021	5	3	6	5	0.50	0.54	-0.73	8	5	3	3	4.44	2.36	1.50
XI 2021	7	5	3	4	2.92	1.27	1.11	9	4	4	2	4.50	2.17	1.43
XII 2021	7	5	4	3	2.92	1.27	1.11	6	2	4	7	0.43	0.69	-0.82
I 2022	5	5	3	6	1.39	0.12	0.35	5	4	5	5	0.80	0.06	-0.24
II 2022	7	8	3	1	18.67	6.74	2.31	7	4	3	3	3.11	1.25	1.10
III 2022	6	5	4	4	1.88	0.46	0.68	6	4	3	6	1.33	0.09	0.30
IV 2022	7	6	3	3	4.67	2.55	1.56	1	2	8	8	0.03	9.02	-2.62
V 2022	6	5	4	4	1.88	0.46	0.68	5	5	5	4	1.25	0.06	0.24
VI 2022	5	4	5	5	0.80	0.06	-0.24	5	4	5	5	0.80	0.06	-0.24
VII 2022	6	4	5	4	1.20	0.04	0.20	5	4	5	5	0.80	0.06	-0.24
VIII 2022	3	1	7	8	0.05	6.74	-2.31	4	5	4	6	0.83	0.04	-0.20
IX 2022	6	4	5	3	1.60	0.23	0.48	4	7	3	4	2.33	0.75	0.86
X 2022	6	3	4	4	1.13	0.01	0.12	4	6	5	2	2.40	0.70	0.83
VII 2020	3	3	7	6	0.21	2.55	-1.56	3	6	3	7	0.86	0.02	-0.16

Note: Values in bold indicate performance persistence.

Source: own study based on data from Analizy.pl (2.11.2022).

In the case of 2030 funds (Table 2), i.e. those intended for people investing their savings who have slightly more time until reaching the age of 60, and at the same time may have a larger share of the equity part, it can be observed that performance persistence was more often observed using the Sharpe index. However, this did not translate into statistical significance, which also allows us to conclude that the analyzed phenomenon is not constant in the case of ECP.

Table 2. Persistence tests for funds with a defined date of 2030

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2020	4	4	6	5	0.53	0.46	-0.68	3	7	6	3	1.17	0.02	0.16
IX 2020	4	4	5	6	0.53	0.46	-0.68	3	4	6	6	0.33	1.35	-1.15
X 2020	5	7	3	4	2.92	1.27	1.11	5	6	4	4	1.88	0.46	0.68
XI 2020	2	4	7	6	0.19	2.77	-1.61	3	5	5	6	0.50	0.54	-0.73
XII 2020	6	6	4	3	3.00	1.35	1.15	5	5	6	2	2.08	0.51	0.71
I 2021	4	5	4	6	0.83	0.04	-0.20	6	6	2	5	3.60	1.66	1.26
II 2021	5	8	3	3	4.44	2.36	1.50	5	6	5	2	3.00	1.17	1.06
III 2021	5	7	4	3	2.92	1.27	1.11	4	5	4	6	0.83	0.04	-0.20
IV 2021	5	6	4	4	1.88	0.46	0.68	3	5	6	5	0.50	0.54	-0.73
V 2021	8	6	4	1	12.00	4.87	2.00	6	8	2	3	8.00	4.23	1.96
VI 2021	5	3	4	7	0.54	0.42	-0.65	0	6	5	8	0.00	4.94	0.00
VII 2021	3	6	4	6	0.75	0.09	-0.30	3	10	4	2	3.75	1.56	1.22
VIII 2021	3	4	8	4	0.38	1.03	-1.00	3	6	6	4	0.75	0.09	-0.30
IX 2021	7	4	4	4	1.75	0.35	0.59	3	2	8	6	0.13	4.23	-1.96
X 2021	4	4	4	7	0.57	0.35	-0.59	4	4	4	7	0.57	0.35	-0.59
XI 2021	5	4	7	3	0.95	0.00	-0.05	6	6	5	2	3.60	1.66	1.26
XII 2021	6	2	5	6	0.40	0.83	-0.90	5	4	4	6	0.83	0.04	-0.20
I 2022	5	4	4	6	0.83	0.04	-0.20	5	3	7	4	0.54	0.42	-0.65
II 2022	5	5	5	4	1.25	0.06	0.24	8	5	2	4	5.00	2.57	1.55
III 2022	3	4	5	7	0.34	1.27	-1.11	4	6	3	6	1.33	0.09	0.30
IV 2022	6	7	4	2	5.25	2.77	1.61	3	9	3	4	2.25	0.65	0.80
V 2022	4	4	5	6	0.53	0.46	-0.68	3	10	3	3	3.33	1.38	1.15
VI 2022	4	3	7	5	0.34	1.27	-1.11	2	13	0	4	0.00	4.84	0.00
VII 2022	6	3	5	5	0.72	0.12	-0.35	1	9	8	1	1.13	0.01	0.08
VIII 2022	3	2	6	8	0.13	4.23	-1.96	1	5	5	8	0.13	3.32	-1.68
IX 2022	5	5	5	3	1.67	0.28	0.53	3	12	0	3	0.00	7.20	0.00
X 2022	7	3	4	3	1.75	0.30	0.54	2	11	3	1	7.33	2.44	1.44
VII 2020	4	4	6	5	0.53	0.46	-0.68	3	4	6	6	0.33	1.35	-1.15

Note: Values in bold indicate performance persistence.

Source: own study based on data from Analizy.pl (2.11.2022).

Increasing the share in equity part does not affect the occurrence of persistence. This is confirmed by the results for subsequent funds. For example, the 2035 funds (Table 3) also maintained performance more often when the Sharpe ratio was used as a measure, but this was not confirmed by statistical testing.

Table 3. Persistence tests for funds with a defined date of 2035

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2020	4	4	6	5	0.53	0.46	-0.68	4	8	5	2	3.20	1.31	1.12
IX 2020	3	4	5	7	0.34	1.27	-1.11	3	4	6	6	0.33	1.35	-1.15
X 2020	3	7	4	5	1.05	0.00	0.05	5	6	4	4	1.88	0.46	0.68
XI 2020	2	3	9	5	0.13	3.91	-1.88	4	5	5	5	0.80	0.06	-0.24
XII 2020	7	6	2	4	5.25	2.77	1.61	6	5	5	3	2.00	0.54	0.73
I 2021	5	7	3	4	2.92	1.27	1.11	5	6	2	6	2.50	0.83	0.90
II 2021	3	6	5	5	0.72	0.12	-0.35	4	7	5	3	1.87	0.42	0.65

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
III 2021	5	6	5	3	2.00	0.54	0.73	3	5	5	6	0.50	0.54	-0.73
IV 2021	4	3	6	6	0.33	1.35	-1.15	3	5	6	5	0.50	0.54	-0.73
V 2021	9	7	2	1	31.50	8.93	2.60	7	9	1	2	31.50	8.93	2.60
VI 2021	3	4	4	8	0.38	1.03	-1.00	2	7	4	6	0.58	0.28	-0.52
VII 2021	2	8	4	5	0.80	0.05	-0.22	4	9	4	2	4.50	2.17	1.43
VIII 2021	2	5	8	4	0.31	1.31	-1.12	4	4	7	4	0.57	0.35	-0.59
IX 2021	4	3	6	6	0.33	1.35	-1.15	4	3	5	7	0.34	1.27	-1.11
X 2021	3	4	5	7	0.34	1.27	-1.11	4	4	6	5	0.53	0.46	-0.68
XI 2021	4	4	7	4	0.57	0.35	-0.59	7	5	4	3	2.92	1.27	1.11
XII 2021	3	2	6	8	0.13	4.23	-1.96	5	3	5	6	0.50	0.54	-0.73
I 2022	4	4	6	5	0.53	0.46	-0.68	4	3	6	6	0.33	1.35	-1.15
II 2022	7	6	3	3	4.67	2.55	1.56	7	5	4	3	2.92	1.27	1.11
III 2022	4	1	8	6	0.08	4.87	-2.00	4	4	4	7	0.57	0.35	-0.59
IV 2022	4	2	5	8	0.20	2.57	-1.55	3	9	2	5	2.70	0.89	0.93
V 2022	4	2	8	5	0.20	2.57	-1.55	3	8	6	2	2.00	0.43	0.65
VI 2022	4	2	5	8	0.20	2.57	-1.55	3	8	2	6	2.00	0.43	0.65
VII 2022	4	3	7	5	0.34	1.27	-1.11	3	7	7	2	1.50	0.15	0.38
VIII 2022	2	2	6	9	0.07	6.13	-2.30	4	5	4	6	0.83	0.04	-0.20
IX 2022	6	8	3	1	16.00	5.84	2.17	4	10	0	4	0.00	6.43	0.00
X 2022	4	3	5	5	0.48	0.55	-0.74	3	10	3	1	10.00	3.61	1.73
VII 2020	4	4	6	5	0.53	0.46	-0.68	3	4	6	6	0.33	1.35	-1.15

Note: Values in bold indicate performance persistence.

Source: own study based on data from Analizy.pl (2.11.2022).

Only in the case of 2040 funds (Table 4) it can be observed that persistence measured both by monthly rates of return and the Sharpe ratio occurred equally often. However, the achieved results cannot be considered statistically significant, because in the case of monthly rates of return there was no confirmation of the occurrence of the phenomenon in any of the analyzed months. In the case of using Sharpe's index, statistical significance occurred only once.

Table 4. Persistence tests for funds with a defined date of 2040

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2020	3	5	6	5	0.50	0.54	-0.73	4	8	5	2	3.20	1.31	1.12
IX 2020	2	4	6	7	0.19	2.77	-1.61	3	4	6	6	0.33	1.35	-1.15
X 2020	3	8	3	5	1.60	0.22	0.47	5	6	4	4	1.88	0.46	0.68
XI 2020	1	5	8	5	0.13	3.32	-1.68	4	5	5	5	0.80	0.06	-0.24
XII 2020	6	6	4	3	3.00	1.35	1.15	6	5	5	3	2.00	0.54	0.73
I 2021	5	7	2	5	3.50	1.57	1.23	5	6	2	6	2.50	0.83	0.90
II 2021	3	7	5	4	1.05	0.00	0.05	4	7	5	3	1.87	0.42	0.65
III 2021	5	7	4	3	2.92	1.27	1.11	3	5	5	6	0.50	0.54	-0.73
IV 2021	4	7	3	5	1.87	0.42	0.65	3	5	6	5	0.50	0.54	-0.73
V 2021	6	5	7	1	4.29	1.53	1.18	7	9	1	2	31.50	8.93	2.60
VI 2021	5	3	3	8	0.63	0.22	-0.47	2	7	4	6	0.58	0.28	-0.52
VII 2021	4	7	4	4	1.75	0.35	0.59	4	9	4	2	4.50	2.17	1.43

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2021	4	6	5	4	1.20	0.04	0.20	4	4	7	4	0.57	0.35	-0.59
IX 2021	4	6	4	5	1.20	0.04	0.20	4	3	5	7	0.34	1.27	-1.11
X 2021	3	6	5	5	0.72	0.12	-0.35	4	4	6	5	0.53	0.46	-0.68
XI 2021	5	4	7	3	0.95	0.00	-0.05	7	5	4	3	2.92	1.27	1.11
XII 2021	6	2	5	6	0.40	0.83	-0.90	5	3	5	6	0.50	0.54	-0.73
I 2022	6	2	6	5	0.40	0.83	-0.90	4	3	6	6	0.33	1.35	-1.15
II 2022	8	4	3	4	2.67	1.03	1.00	7	5	4	3	2.92	1.27	1.11
III 2022	2	3	5	9	0.13	3.91	-1.88	4	4	4	7	0.57	0.35	-0.59
IV 2022	2	6	6	5	0.40	0.83	-0.90	3	9	2	5	2.70	0.89	0.93
V 2022	3	4	7	5	0.34	1.27	-1.11	3	8	6	2	2.00	0.43	0.65
VI 2022	4	2	7	6	0.19	2.77	-1.61	3	8	2	6	2.00	0.43	0.65
VII 2022	5	2	6	6	0.28	1.66	-1.26	3	7	7	2	1.50	0.15	0.38
VIII 2022	2	3	5	9	0.13	3.91	-1.88	4	5	4	6	0.83	0.04	-0.20
IX 2022	4	8	4	2	4.00	1.80	1.31	4	10	0	4	0.00	6.43	0.00
X 2022	4	5	4	4	1.25	0.05	0.23	3	10	3	1	10.00	3.61	1.73
VII 2020	3	5	6	5	0.50	0.54	-0.73	3	4	6	6	0.33	1.35	-1.15

Note: Values in bold indicate performance persistence.

Source: own study based on data from Analityz.pl (2.11.2022).

The analysis of the 2045 funds (Table 5) showed that performance persistence occurred most often — as many as 15 times — when the Sharpe index was used for the calculations. However, the tests (χ^2 and z) confirm the statistical significance of the phenomenon only twice. When using monthly rates of return, it can be observed that persistence occurred less often, but in no given month was it statistically significant.

Table 5. Persistence tests for funds with a defined date of 2045

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2020	2	6	7	4	0.43	0.69	-0.82	4	8	5	2	3.20	1.31	1.12
IX 2020	2	4	6	7	0.19	2.77	-1.61	3	4	6	6	0.33	1.35	-1.15
X 2020	4	9	2	4	4.50	2.17	1.43	5	6	4	4	1.88	0.46	0.68
XI 2020	0	3	10	6	0.00	9.74	0.00	3	6	4	6	0.75	0.09	-0.30
XII 2020	6	7	2	4	5.25	2.77	1.61	6	8	4	1	12.00	4.87	2.00
I 2021	5	8	3	3	4.44	2.36	1.50	5	7	2	5	3.50	1.57	1.23
II 2021	4	6	5	4	1.20	0.04	0.20	3	6	6	4	0.75	0.09	-0.30
III 2021	5	5	5	4	1.25	0.06	0.24	4	6	4	5	1.20	0.04	0.20
IV 2021	4	4	5	6	0.53	0.46	-0.68	4	4	7	4	0.57	0.35	-0.59
V 2021	6	6	4	3	3.00	1.35	1.15	7	4	4	4	1.75	0.35	0.59
VI 2021	4	5	4	6	0.83	0.04	-0.20	2	4	4	9	0.22	2.17	-1.43
VII 2021	3	5	6	5	0.50	0.54	-0.73	3	9	4	3	2.25	0.65	0.80
VIII 2021	6	3	7	3	0.86	0.02	-0.16	3	6	6	4	0.75	0.09	-0.30
IX 2021	4	2	4	9	0.22	2.17	-1.43	3	5	5	6	0.50	0.54	-0.73
X 2021	4	5	6	4	0.83	0.04	-0.20	4	5	6	4	0.83	0.04	-0.20
XI 2021	5	4	5	5	0.80	0.06	-0.24	7	5	4	3	2.92	1.27	1.11
XII 2021	5	3	6	5	0.50	0.54	-0.73	5	3	5	6	0.50	0.54	-0.73

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
I 2022	4	3	5	7	0.34	1.27	-1.11	3	2	7	7	0.12	4.34	-1.99
II 2022	5	5	5	4	1.25	0.06	0.24	7	7	2	3	8.17	4.34	1.99
III 2022	4	3	6	6	0.33	1.35	-1.15	3	4	6	6	0.33	1.35	-1.15
IV 2022	3	4	5	7	0.34	1.27	-1.11	2	8	2	7	1.14	0.01	0.12
V 2022	3	2	9	5	0.13	3.91	-1.88	2	10	5	2	2.00	0.38	0.61
VI 2022	5	2	5	7	0.29	1.57	-1.23	2	10	2	5	2.00	0.38	0.61
VII 2022	5	2	7	5	0.29	1.57	-1.23	2	9	6	2	1.50	0.13	0.36
VIII 2022	2	3	4	10	0.15	3.35	-1.74	3	8	3	5	1.60	0.22	0.47
IX 2022	5	8	5	0	0.00	5.54	0.00	3	12	0	3	0.00	7.20	0.00
X 2022	3	2	5	7	0.17	2.84	-1.63	2	10	1	4	5.00	1.57	1.18
VII 2020	2	6	7	4	0.43	0.69	-0.82	3	4	6	6	0.33	1.35	-1.15

Note: Values in bold indicate performance persistence.

Source: own study based on data from Anality.pl (2.11.2022).

The 2050 funds (Table 6), similarly to other ECP defined date funds, are not characterized by a high occurrence of persistence. While using monthly rates of return, it was observed in less than every third observation. It could be demonstrated more often using the Sharpe index, but the statistical tests carried out allow us to talk about the significance of persistence only in December 2020 (while using the Sharpe index).

Table 6. Persistence tests for funds with a defined date of 2050

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2020	2	7	6	4	0.58	0.28	-0.52	4	8	5	2	3.20	1.31	1.12
IX 2020	3	4	7	5	0.34	1.27	-1.11	3	3	7	6	0.21	2.55	-1.56
X 2020	5	7	2	5	3.50	1.57	1.23	6	5	4	4	1.88	0.46	0.68
XI 2020	1	3	9	6	0.06	6.54	-2.28	3	3	6	7	0.21	2.55	-1.56
XII 2020	6	7	2	4	5.25	2.77	1.61	7	7	3	2	8.17	4.34	1.99
I 2021	5	8	3	3	4.44	2.36	1.50	6	7	2	4	5.25	2.77	1.61
II 2021	4	5	6	4	0.83	0.04	-0.20	3	7	4	5	1.05	0.00	0.05
III 2021	4	5	4	6	0.83	0.04	-0.20	3	7	5	4	1.05	0.00	0.05
IV 2021	3	7	4	5	1.05	0.00	0.05	4	4	7	4	0.57	0.35	-0.59
V 2021	3	5	7	4	0.54	0.42	-0.65	7	4	4	4	1.75	0.35	0.59
VI 2021	4	5	4	6	0.83	0.04	-0.20	2	3	5	9	0.13	3.91	-1.88
VII 2021	5	7	4	3	2.92	1.27	1.11	3	7	5	4	1.05	0.00	0.05
VIII 2021	3	4	6	6	0.33	1.35	-1.15	3	5	6	5	0.50	0.54	-0.73
IX 2021	4	6	4	5	1.20	0.04	0.20	3	4	6	6	0.33	1.35	-1.15
X 2021	4	6	5	4	1.20	0.04	0.20	3	4	6	6	0.33	1.35	-1.15
XI 2021	4	3	7	5	0.34	1.27	-1.11	6	5	5	3	2.00	0.54	0.73
XII 2021	5	3	5	6	0.50	0.54	-0.73	5	3	5	6	0.50	0.54	-0.73
I 2022	4	4	5	6	0.53	0.46	-0.68	3	2	7	7	0.12	4.34	-1.99
II 2022	4	5	5	5	0.80	0.06	-0.24	6	7	2	4	5.25	2.77	1.61
III 2022	3	3	7	6	0.21	2.55	-1.56	2	5	6	6	0.28	1.66	-1.26
IV 2022	3	3	6	7	0.21	2.55	-1.56	3	9	2	5	2.70	0.89	0.93

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
V 2022	4	3	7	5	0.34	1.27	-1.11	0	14	0	5	0.00	0.00	0.00
VI 2022	4	3	5	7	0.34	1.27	-1.11	0	16	3	0	0.00	0.00	0.00
VII 2022	4	3	7	5	0.34	1.27	-1.11	2	9	7	1	2.57	0.53	0.71
VIII 2022	3	3	5	8	0.23	2.36	-1.50	2	8	2	7	1.14	0.01	0.12
IX 2022	5	7	4	2	4.38	2.10	1.41	2	14	0	2	0.00	7.88	0.00
X 2022	4	2	6	5	0.27	1.63	-1.25	2	11	4	0	0.00	4.16	0.00
VII 2020	2	7	6	4	0.58	0.28	-0.52	3	3	7	6	0.21	2.55	-1.56

Note: Values in bold indicate performance persistence.

Source: own study based on data from Anazyzy.pl (2.11.2022).

Although the 2055 funds (Table 7) have one of the greatest possibilities of investing funds in assets from the equity part, in their case there are no significant differences in terms of the occurrence of performance persistence compared to other funds of a defined date. It is important that in the case of monthly returns, there is no confirmation in statistical tests. While using the Sharpe index, both tests confirmed the phenomenon of persistence only in January 2021.

Table 7. Persistence tests for funds with a defined date of 2055

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2020	1	7	7	4	0.25	1.36	-1.12	5	8	4	2	5.00	2.57	1.55
IX 2020	3	5	6	5	0.50	0.54	-0.73	3	4	6	6	0.33	1.35	-1.15
X 2020	5	8	2	4	5.00	2.57	1.55	5	5	5	4	1.25	0.06	0.24
XI 2020	1	3	9	6	0.06	6.54	-2.28	3	2	7	7	0.12	4.34	-1.99
XII 2020	6	7	2	4	5.25	2.77	1.61	7	5	4	3	2.92	1.27	1.11
I 2021	5	8	3	3	4.44	2.36	1.50	7	7	1	4	12.25	4.97	2.02
II 2021	4	6	5	4	1.20	0.04	0.20	3	5	6	5	0.50	0.54	-0.73
III 2021	3	6	4	6	0.75	0.09	-0.30	4	6	4	5	1.20	0.04	0.20
IV 2021	3	6	6	4	0.75	0.09	-0.30	4	4	7	4	0.57	0.35	-0.59
V 2021	6	5	5	3	2.00	0.54	0.73	7	4	4	4	1.75	0.35	0.59
VI 2021	5	4	4	6	0.83	0.04	-0.20	3	4	4	8	0.38	1.03	-1.00
VII 2021	5	4	4	6	0.83	0.04	-0.20	4	8	4	3	2.67	1.03	1.00
VIII 2021	5	5	6	3	1.39	0.12	0.35	4	4	7	4	0.57	0.35	-0.59
IX 2021	4	4	4	7	0.57	0.35	-0.59	3	2	6	8	0.13	4.23	-1.96
X 2021	4	6	5	4	1.20	0.04	0.20	3	4	6	6	0.33	1.35	-1.15
XI 2021	4	4	6	5	0.53	0.46	-0.68	6	6	4	3	3.00	1.35	1.15
XII 2021	5	3	6	5	0.50	0.54	-0.73	5	4	5	5	0.80	0.06	-0.24
I 2022	5	3	5	6	0.50	0.54	-0.73	3	2	7	7	0.12	4.34	-1.99
II 2022	4	6	3	6	1.33	0.09	0.30	6	7	2	4	5.25	2.77	1.61
III 2022	3	5	7	4	0.54	0.42	-0.65	3	4	7	5	0.34	1.27	-1.11
IV 2022	3	3	6	7	0.21	2.55	-1.56	4	8	1	6	5.33	2.04	1.35
V 2022	3	2	8	6	0.13	4.23	-1.96	3	8	6	2	2.00	0.43	0.65
VI 2022	5	3	5	6	0.50	0.54	-0.73	2	9	1	7	2.57	0.53	0.71
VII 2022	5	3	6	5	0.50	0.54	-0.73	2	10	6	1	3.33	0.88	0.91
VIII 2022	3	3	5	8	0.23	2.36	-1.50	2	9	2	6	1.50	0.13	0.36

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
IX 2022	4	6	5	3	1.60	0.23	0.48	2	14	0	2	0.00	7.88	0.00
X 2022	2	4	6	5	0.27	1.63	-1.25	2	11	4	0	0.00	4.16	0.00
VII 2020	1	7	7	4	0.25	1.36	-1.12	3	4	6	6	0.33	1.35	-1.15

Note: Values in bold indicate performance persistence.

Source: own study based on data from Analizy.pl (2.11.2022).

Although the last defined date fund under analysis, 2060 (Table 8), has the greatest possibility of investing funds in the shared part (between 60 and 80%), maintaining the results achieved in individual months does not differ significantly from other funds. Here, too, the performance persistence occurred more often when Sharpe's index was used. However, it should be noted that statistical significance was not confirmed in any case after the tests were applied.

Table 8. Persistence tests for funds with a defined date of 2060

	Monthly rates of return							Sharpe ratio						
	WW	LL	LW	WL	CPR	χ^2	z	WW	LL	LW	WL	CPR	χ^2	z
VIII 2020	1	6	7	5	0.17	2.33	-1.44	5	8	4	2	5.00	2.57	1.55
IX 2020	3	4	7	5	0.34	1.27	-1.11	3	3	7	6	0.21	2.55	-1.56
X 2020	5	7	2	5	3.50	1.57	1.23	5	5	4	5	1.25	0.06	0.24
XI 2020	2	3	9	5	0.13	3.91	-1.88	1	3	7	8	0.05	6.74	-2.31
XII 2020	7	6	2	4	5.25	2.77	1.61	4	5	6	4	0.83	0.04	-0.20
I 2021	5	7	3	4	2.92	1.27	1.11	6	6	3	4	3.00	1.35	1.15
II 2021	4	4	7	4	0.57	0.35	-0.59	4	4	6	5	0.53	0.46	-0.68
III 2021	5	4	4	6	0.83	0.04	-0.20	4	4	5	6	0.53	0.46	-0.68
IV 2021	5	7	3	4	2.92	1.27	1.11	4	4	6	5	0.53	0.46	-0.68
V 2021	7	5	6	1	5.83	2.33	1.44	7	6	3	3	4.67	2.55	1.56
VI 2021	6	3	3	7	0.86	0.02	-0.16	4	4	5	6	0.53	0.46	-0.68
VII 2021	4	6	4	5	1.20	0.04	0.20	4	7	3	5	1.87	0.42	0.65
VIII 2021	5	5	6	3	1.39	0.12	0.35	4	2	10	3	0.27	1.56	-1.22
IX 2021	4	4	4	7	0.57	0.35	-0.59	5	1	4	9	0.14	2.90	-1.58
X 2021	4	6	5	4	1.20	0.04	0.20	3	4	6	6	0.33	1.35	-1.15
XI 2021	3	4	6	6	0.33	1.35	-1.15	6	5	5	3	2.00	0.54	0.73
XII 2021	4	5	5	5	0.80	0.06	-0.24	7	5	3	4	2.92	1.27	1.11
I 2022	3	4	6	6	0.33	1.35	-1.15	3	2	7	7	0.12	4.34	-1.99
II 2022	4	6	4	5	1.20	0.04	0.20	5	7	2	5	3.50	1.57	1.23
III 2022	4	5	6	4	0.83	0.04	-0.20	3	6	6	4	0.75	0.09	-0.30
IV 2022	2	3	6	8	0.13	4.23	-1.96	4	8	2	5	3.20	1.31	1.12
V 2022	3	3	8	5	0.23	2.36	-1.50	2	7	6	4	0.58	0.28	-0.52
VI 2022	5	3	5	6	0.50	0.54	-0.73	2	11	0	6	0.00	3.07	0.00
VII 2022	5	2	7	5	0.29	1.57	-1.23	2	11	6	0	0.00	3.07	0.00
VIII 2022	3	1	6	9	0.06	6.54	-2.28	2	9	2	6	1.50	0.13	0.36
IX 2022	5	5	5	3	1.67	0.28	0.53	2	14	0	2	0.00	7.88	0.00
X 2022	4	2	6	5	0.27	1.63	-1.25	2	11	4	0	0.00	4.16	0.00
VII 2020	1	6	7	5	0.17	2.33	-1.44	3	3	7	6	0.21	2.55	-1.56

Note: Values in bold indicate performance persistence.

Source: own study based on data from Analizy.pl (2.11.2022).

The obtained results indicate that performance persistence in the case of ECP occurs sporadically. The use of statistical tests (χ^2 and z) means that they should be considered statistically insignificant in the vast majority. The division into funds of a defined date — which differ in investment limits — also does not translate into maintaining the achieved results.

5. Conclusions

The a priori research hypothesis, which was adopted based on a critical analysis of the literature on the subject, postulated that performance persistence would occur in ECP. The results obtained in this study lead to the conclusion that it should be rejected. Performance persistence occurred for a maximum of half of the analyzed period, using the CPR ratio, for funds 2025 and 2040 in the case of monthly rates of return. Using the Sharpe ratio to analyze the CPR ratio, it can be concluded that persistence occurs in half of the analyzed cases, with the 2060 funds being the exception. It is also worth noting that the diversification of the structure of assets that occurs in funds of a defined date (different structures in the equity part and the debt part) does not affect performance persistence when analyzing the Sharpe ratio. A greater impact is observable in the context in monthly rates of return, as persistence occurred more often in the case of 2025, 2040, and 2030 funds.

Although the CPR indicator indicated the occurrence of performance persistence, it is worth bearing in mind that in the vast majority of cases the use of the test statistics z and χ^2 does not allow for the assumption that this phenomenon occurs. The applied test statistics with a confidence interval of 5% allow to determine the presence of persistence more often when taking into account the Sharpe index (except for funds 2035). In further studies of ECP performance persistence, it is worth considering the use of other risk-based indicators or models that allow determining the occurrence of persistence, e.g. Fama's model.

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The design thinking method as an example of social innovation in action based on the case study of ProPoLab

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Abstract

The aim of the paper is to explain and to understand the processes of public services delivery from the perspective of social innovation. Concepts of co-creation and social innovation were elaborated on the basis of one of ProPoLab's milestones: Design Thinking Workshops. Hence the research object are the residents (mostly seniors) of the district of Popowice, while the quality of life of seniors is its subject. The main research goals were firstly to identify needs of residents in relations to public services, and secondly to design a socially innovative solution that will increase the quality of life of seniors. To achieve these goals, the following research tasks have been set: (a) identifying the needs of seniors, (b) identifying which of those needs are being met locally and which are not, (c) to identify what are the relations between neighbors and the attitude towards cooperation, (d) identifying how the needs of seniors could be met. The research mainly covers the period of 2018–2019. Following research methods have been used: analysis of scientific literature and normative documents, design thinking methodology, comparative analysis and statistical analysis. Utilizing design thinking methodology helped to reveal that the problem of communication between residents can be solved by creating a small, accessibly located community/activity center in their housing estate. This place should meet the needs of activity and self-fulfillment, exchange of information and intergenerational exchange. Time availability is very important, and the space intended for seniors should function in an hourly timeframe similar to daycare centers. Residents should be included in drafting a program to better identify and respond to their needs. Seniors would likely be happy to provide volunteer work in such a place. The facility should be located in the middle of the housing estate so that all residents have easy access to it, optimally in pleasant natural surroundings (i.e. near vegetation), as well as in close proximity to playgrounds for children.

Introduction

The paper presents findings from the Design Thinking Workshops that took place in November 2018–March 2019. The workshops in Wrocław, Poland were organized as part of the inauguration of the Popowice Laboratory [Laboratorium Popowice]. These events were some of the first of a planned series of meetings and workshops with the inhabitants of the district of Popowice as part of the Popowice Laboratory, or ProPoLab. Figure 1 presents a detailed roadmap of ProPoLab, as well as the list of project milestones (to the right).

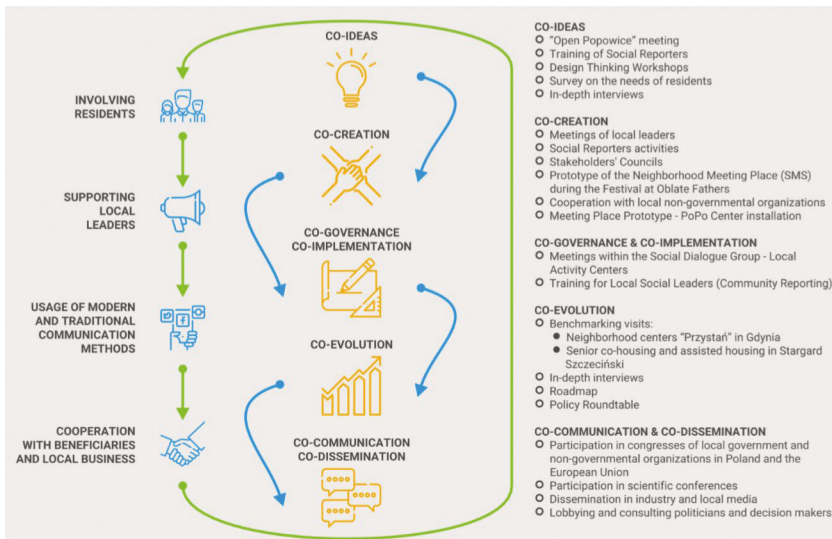


Figure 1. The roadmap of ProPoLab

Source: Wiktorska-Święcka, Dybał, Janus, Miśniakiewicz and Timler, 2020, 186.

ProPoLab is a part of pilot program called Co-housing of Seniors. The pilot's aim is to implement the concept of senior co-housing using the tools developed in the co-creation model. The experiment is taking place in Popowice, where we (the project implementers) want to develop a space to implement joint plans and meet the diagnosed needs with an active involvement of the local stakeholders (ProPoLab 2018a, 6).

The final shape and form of the laboratory will be determined by the stakeholders involved in the project (the residents, the municipality, the housing cooperative, social and church organizations, developers, among others). As the project implementers, we encourage the main stakeholders to develop their own definitions, tools and model of this novel, joint public services facility, which will be a huge step towards changing public awareness in Poland, especially regarding the perceptions of public services and social innovations. As presented in Figure 1,

this joint public services creation consists of: co-ideas, co-creation, co-governance and co-implementation, co-evolution, co-communication and co-dissemination.

Given the above we may say that project is therefore a combination of theory and practice. The University of Wrocław provides theoretical tools and diagnoses, while the Active Senior Foundation [Fundacja Aktywny Senior], a local non-government organization, is responsible implementing them in the local community. The goal of the project is to help seniors to identify and meet their needs.

Co-housing of Seniors, along with other eight individual (but interlinked) pilots make up the 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 (2017–2021), the partners involved will test and develop the diverse methods of co-creation in the field of public services (Sakellariou 2018, 8).

Theoretical framework of the research

The main stakeholders of ProPoLab are seniors from Popowice. However, although the project is implement locally, it also has wider implications related to the aging population in general. The main causes of population aging can be narrowed down to 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. (OECD, 2015, 8). This issue is viable to pose considerable economic, societal and political challenges. They are seen as serious and imminent enough that the European Commission has announced 2012 as the European Year for Active Ageing and Solidarity between Generations. Various studies on the subject have already been published, outlining it from various points of view, both local and general.

Economists are — naturally — most interested in economic changes or in creating a functional pension system. See 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) and Chłoń-Domińczak (2016).

Financiers have examined fiscal costs linked to pensions, healthcare and long-term care; the trade-off between adequacy and sustainability, as well as investment efficiency and the rate of return of pension funds: Queisser (1999); Davis (2001); Ambachtsheerm and Ezra (2001); Yermo (2002); Stańko (2003); Willmore (2004); Dybał (2008); Chybalski (2012); Bielawska (2015); Szczepański (2016); Makarski, Hagemajer and Tyrowicz (2017); Rutecka-Góra (2017); European Commission (2018); Marcinkiewicz (2018).

Sociologists on the other hand debate on, among other issues, the quality of life of seniors: see Nussbaum and Sen (1993); Golini (1997); Długosz and Kurek (2006); Gałuszka (2006); Daszkowska (2007); Kurek, Kwiatek-Sołtys and Długosz (2011); Miłkowska (2012); Mollon and Gil (2014); Błądowski (2014) and Janiszewska (2015).

In this paper the author is especially devoted to co-housing, co-creation and design thinking theories. Co-housing is an example of co-creation, which might 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 a social housing policy for elderly people, which is an issue at the heart of the Popowice Laboratory. Here one can recall the works of Osborne (2006); Kim (2006); Durrett (2009); Zaniewska (2011); Zralek (2012); Alves (2013); Voorberg, Bekkers and Tummers (2014); Killock (2014); Sundberg (2014); Labus (2015); Osborne (2018); Brandsen, Steen and Verschuere (2018); Wiktorska-Święcka (2018), Dybał (2021), as well as reports including the three HAPPI Reports by the Housing and Communities Agency (2009) as well as Best and Porteus (2012, 2016), or one conducted by Co-EldeRly (2013).

Design thinking has long been a topic of research and education, both in the field of architectural design process studies (Lawson, 1980; Rowe, 1987; Cross, 1990; Goldschmidt, 1994; Cross, Christiaans and Dorst, 1996; Dorst, 2010) and outside it (Kelley and Littman, 2001). The architectural design process presented problem solving strategies, methods, tools and techniques that can be used by teams of architects and urban planners. Rowe's methodology became popular in the business world when the importance of services in the global economy rapidly increased (Rochacka, 2011), and it received attention in other fields as well (Brown, 2009; Brown and Wyatt, 2010). In the meantime, the design thinking method has successfully entered many areas of commercial activity, such as industry, trade, services, medicine, sport, business media and social organizations.

Since social innovations such as co-housing, co-creation and design thinking are not widely discussed in the Polish literature, this paper could be seen as an attempt to shed some light on these concepts.

Research methodology

The lack of satisfaction with the existing public service options prompts public organizations to look for new arrangements. One of them is co-creation — a model in which citizens actively participate in delivering and designing the services they receive. This collaborative, participatory aspect can be introduced in various stages of the process: co-initiating and co-designing, co-deciding, and then co-governance and co-implementing of public services. Overall it seems to be the

most effective means to answer to the need for new social innovations and the growing demand for personalized services.

The focus in of this paper is on the delivery of local public services at the urban level in Poland through a co-creative approach towards public services delivery with the focus on one particular case study — ProPoLab, implemented in Wrocław. The aim of the article is to better understand and explain the processes from the perspective of social innovation. The concepts of co-creation and social innovation are elaborated upon using one of ProPoLab's milestones, Design Thinking Workshops, as a case study.

The basis of design thinking is the adoption of an iterative model of the design process in which the sequential nature of the various stages of design organizes the thought process and thus leads to innovative solutions — the so-called problem-solving process (Cross, 2019). This process has been transformed by the Institute of Design at Stanford University into the current design thinking model, consisting of five steps: empathy, definition, generating ideas, prototyping and testing (Ratcliffe, 1.08.2009). However, the pilot program is based on a concept introduced by the British Design Council, who proposed a model of a double diamond, systematizing the process in relation to time (Design Council, 2007).

To sum up, the research object are the residents (mostly seniors) of Popowice, the research subject — the quality of life of seniors, and the research aim — firstly identifying the needs of residents in relations to public services, and secondly designing a socially innovative solution that will increase the quality of life of seniors. To achieve these goal, the following research tasks have been set: (a) identifying the needs of seniors, (b) identifying which of those needs are being met locally and which are not, (c) identifying what are the relations between neighbors and the attitude towards cooperation, (d) identifying how the needs of seniors could be met. The main focus of the research is on the 2018–2019 period. The following research methods have been used: analysis of scientific literature and normative documents, design thinking methodology, comparative analysis and statistical analysis.

Design Thinking Workshops findings

The Design Thinking Workshops were a series of events that followed the Open Popowice Meeting and Community Reporter Workshops as part of the EU project ProPoLab. The project's previous stages have given some insight into problematic issues and the needs of seniors in relation to life at the estate (ProPoLab, 2018d). Two topics that require a more in-depth study were selected, and they happen to be the most urgent issues related to residents — the issue of communication and information at the housing estate and the location of a neigh-

borhood meeting place. Both of them were singled out for further workshop studies. The workshops were attended by a group of local senior leaders (with a 8–15 person turnout) and the meetings were held at weekly intervals at the Tęcza club in Popowice. During the first meeting, the most pressing problem was precisely identified as the lack of communication and interpersonal integration in the estate. Hence, the workshop concerned communication between the residents themselves, as well as between them and institutions in the estate. The use of the design thinking method allowed the participants to define the problem. The next stages of the workshop consisted of a joint discussion and filling in the prepared charts. It started with defining the problem and determining the user value and awareness of design challenges. This led to creating a profile of the average project participant. This activity also helped them define their own personal characteristics and formulate their deep-seated needs. The personas created by the workshop participants represented a group of lonely seniors (65–70 years of age). The characters (in spite of the fact that they represented an active group) were characterized by numerous problems and concerns — mainly related to interpersonal interactions (see Table 1) (ProPoLab, 18.11.2018).

Table 1. ProPoLab’s user values

Needs	<ul style="list-style-type: none"> — calm — health — conversations with neighbors — places to meet with friends and neighbors — bringing the library closer — access to information about the work being done on the estate (e.g. from the housing cooperative) — more efficient cooperative care — access to home visits by certain service providers (hairdressers, doctors)
Benefits (what they want the service to provide)	<ul style="list-style-type: none"> — going to the sea for the first time — the feeling of safety — the feeling of being needed — the ability to realize oneself — finding companionship and friendship — finding calm — being treated in a respectful manner
Expectations (relative to the service)	<ul style="list-style-type: none"> — home health care — love and warmth from loved ones — quick “fulfillment” of needs that one cannot meet on their own (i.e. cleaning the carpet) — greater (more visible) involvement of the housing cooperative and the city (maintenance of roads and pavements) — financial support, monitoring at the estate

<p>Work to be done (needs and values met by the service)</p>	<ul style="list-style-type: none"> — creating a community that will support its own — being able to open oneself to others — developing assertiveness — working up the will to do things — the will to meet one another — observing the effects of activities undertaken by certain entities (cooperatives, NGOs, authorities) — this is highly motivating
<p>Emotions (before, after and while using the service)</p>	<ul style="list-style-type: none"> — frustration, but also happiness because of having relatives — anger — friendliness towards neighbors — lack of safety — satisfaction because the estate is green and it has walking spaces
<p>Concerns (related to the service)</p>	<ul style="list-style-type: none"> — poor quality of service or a misdiagnosis of the actual needs — not being able to integrate with the group even if a meeting place exists — no one will have the competence to judge if the service is adequate or not — the service will not be personalized

Source: Miśniakiewicz, 2021.

The preliminary probe contributed to formulating the objectives of ProPoLab: creating a system of neighborhood communication and achieving greater degree of activation of (and between) neighbors. This approach was further refined by prioritizing activities aimed at achieving the intended goal, which were as follows: creating a bottom-up neighborhood communication and a separate information system, giving the people a reason to spend more time outside of their homes, making the people feel noticed, giving them opportunities to share their experiences, expanding their awareness, opening them up to others, helping them overcome their fear of face-to-face contact. The participants prepared a list of people and institutions (stakeholders) that they think should be involved in the process of creating a solution to their problem. Awareness of the risks associated with the project was also important. These include the passivity of people and institutions, general discouragement, as well as the fear of being misunderstood and judged by others (ProPoLab, 2018d).

During the second Design Thinking Workshop, participants engaged in the development of a solution for the communication system between the residents of the estate, as well as between them and the institutions operating in the estate. In the first part of the meeting, a selection of inspiring solutions for neighborhood communication from other cities (in Poland and abroad) was presented. Following that, the workshop participants pondered on how this problem can be solved in Popowice.

The problem of interpersonal communication was addressed with various ideas on integrating residents on the whole or establishing closer bonds and con-

tacts with the closest neighbors. As per the need for a functioning informational policy, traditional media — such as advertising columns, information boards or newspapers — were pointed to as potential means of keeping the resident “in the loop.” Seniors were also favorable towards modern solutions such as a website, app, multimedia notice boards and text message notifications. A significant part of the seniors’ proposals for improving the flow of information revolved around social gatherings. In support of these ideas, the workshop participants recalled how, in the first decades of the estate’s existence (the 1970s/1980s), despite no one having access to the Internet, telephones being rare, and there being no local community center to speak of, obtaining relevant information on the comings and goings of the neighborhood was not an issue, since everyone in the estate knew each other (ProPoLab, 26.11.2018).

The next stage of the workshop involved coming up with solutions using creative methods, mainly brainstorming techniques and games. The numerous ideas from many service areas were then passed through a filter, a “funnel,” which allowed groups to focus on a single, selected idea. This “filtration process” was used to match the proposed ideas to the project assumptions developed at an earlier stage of the workshop. Individual ideas were later refined in groups, and then sketched in the form of the so-called storyboards.

Table 2. First 38 ideas

Ideas for the information system	<ul style="list-style-type: none"> — monitors in lifts — creating a website — creating a bulletin (print form, 2–4 pages long) — neighborhood aid board — transfer of information from all entities operating in the estate — electronic advertising pole in the center of the estate — constitution of Popowice — phone app for positive and motivational notes — phone app for the exchange of information (who, what, where) — Ikea garden — neighboring cabinets and refridertors for exchanging items and information — multimedia information boards in 6–10 places in the estate
Ideas for estate integration	<ul style="list-style-type: none"> — an outdoor meeting every month — joint exercises at the community outdoor gym — joint walks “with sticks” — sharing ideas and tips — common outings to events — common tours — common cultivation of the garden — going out to the neighborhood club — an intergenerational festival co-hosted by schools

Ideas for getting in touch with the closest neighbors	<ul style="list-style-type: none"> — phonecalls, text messages — neighborly help with shopping — sharing pastries — as a “getting-to-know” measure — invitation to shared walks — helping each other in cooking endeavors — help with childcare — inviting someone to show them the website — e-mail invitations to meetings at the Tęcza club — invitations to shared dog walks — talking to neighbors — walks — phonecalls, text messages, e-mails to neighbors — joint shopping — assisting others in getting to a doctor — saying “good morning” to people known only by sight (as an introductory courtesy that could lead to getting acquainted) — shopping for people in need — conversations with friends about the needs of other neighbors
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Source: ProPoLab, 2018c.

At first, a set of 38 were proposed (Table 2), later followed by 74 associations and finally another 70 ideas developed during a brainstorm (Table 3).

Table 3. Another 70 ideas developed during a brainstorm

Ideas for the information system	<ul style="list-style-type: none"> — request help from space — illuminated announcements in front of entrances to supermarkets and shops — leaflets placed behind windshield wipers — announcements broadcast by megaphone — bulletin board in the neighborhood library — bulletin boards in lifts — reporting demands and issues on a bulletin board — illuminated bulletin boards — people wearing informational placards: “human bulletin boards” — people dressed as some kind of creatures acting as “neighborhood criers” — electronic information sources in lifts — bulletin boards placed outside buildings — announcement in lifts or stairwells — information projectors on the front walls of buildings — tablets in lifts — lighted display cabinets in front of entrances to schools and kindergartens — daily information newsletter by phone — “I will introduce a notebook recording the neighborhood’s needs in one of the apartment blocks” — estate-wide newsletter — website — announcements — a newspaper with a frequent publishing schedule — informational written in chalk on the neighborhood sidewalks — a monthly print newsletter — light information in the lift — an advertising column used for announcements — notice boards in front of entrances to the apartment blocks
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Ideas for estate integration	<ul style="list-style-type: none"> — interest groups in schools: intergenerational exchange of knowledge and experience — neighborhood volunteering — more events — meeting places in apartment blocks (e.g. in laundry rooms) — monthly intergenerational outdoor meetings — interest groups — meeting the needs of teenagers — recreation — seeking people willing to work together — “generational meetings” (of people in the same age group) — frequent neighborhood meetings in the housing estate office or clubs in the estate — neighborhood meetings — field festival in the estate — active use of the neighborhood library — “invisible hand” auctions with children — communal gardening — gardens on every floor — attracting youth interest in the problems of the estate through social education lessons — joint cleaning of the estate — establishing a club that would meet the previously researched needs of residents — a neighborhood dance — meetings — meetings held on cushions placed in the stairwells — information on festivities held in the estate
Ideas for getting in touch with the closest neighbors	<ul style="list-style-type: none"> — saying “good day” to neighborhood acquaintances — informing each other about your respective needs and offering to help — inviting residents for joint excersises on the equipment available at the estate — volunteer aid shifts for helping the persons most in need — locating the persons most in need — responding to needs — growing one’s network of contacts — conversations on other neighbors’ suggestions — networking; responding to the problems of others — getting acquainted with passers-by, exchanging conversations — calling people from balconies for integration meetings — informing passers-by on current events — transportation of people to doctor’s appointments, managing fees and other matters — “everyone has a phone and thus the means to get in touch with neighbors” — contact via telephone — caring for other neighbors’ plants when they are away on vacation — sharing ideas on ways to decorate the estate — skillsharing — cultivating and sharing neighborhood history — improving the aesthetics of the estate

Source: ProPoLab, 2018c.

During the third Design Thinking Workshop, participants were assigned the difficult task of choosing the best solution that meets their needs regarding communication on the estate. Their ranking can be found below (Table 4). The idea of creating a neighborhood meeting place decisively won first place.

Bearing in mind the issues that they identified as requiring the most immediate attention — communication on the estate — the participants indicated creating a neighborhood meeting place as the best solution. The idea was then developed and refined.

Table 4. Ranking of ideas

Ideas	Points
Neighborhood wardrobes and refrigerators	17
“The heart of the estate” — a mini-club where the neighbors can exchange items and food, where you can meet other people at any time	
Meetings at Polana Popowicka next to the allotment gardens — sharing vegetables and fruit from gardens for the purpose of preparing snacks.	
Meeting place inside the apartment blocks (e.g. laundries). Unused laundries could be adapted for for mini-clubs where the locals could do things together	16
A neighborhood club placed in the center of the estate in order to support the community	15
Common meeting place on the estate — a club of approximately 150 m ² — used for meetings, drinking tea, cooking and eating together; it should come with a small health food shop, a shop with dietary supplements or a grocery selling locally-grown produce from the surrounding allotment plots	
Round advertising column	14
A place of management, a community center, providing leisure and social aid, cooking classes, care — the Sadyba	13
Neighborhood emergency services for people in need of care — concrete actions for the benefit of other people	12
Electronic notice poles in the top 3 most frequented places	10
Saying “good morning” to friends and strangers from the estate. Everyone should greet the person they come across, offer help them in carrying heavy grocery bags, inform them about the current events on the estate, or offer sharing a walk	9

Source: ProPoLab, 4.12.2018.

The seniors first listed the amenities that they feel the meeting place should have, then outlined the activities that should take place there (Table 5). The priority, as previously stated, is for it to play the role of an information center that is tailor-made for their needs. They also signalled their willingness to participate in its daily functioning by way of informing other seniors about their possibilities and rights, carrying out information duties or disseminating knowledge about events, training courses and discounts meant for seniors. The issue of the neighborhood aid and how it was organized came up not just during the Design Thinking Workshops, but during all of the meetings held as part of the project (e.g. help with shopping, paying bills, reaching clinics, sharing meals, childcare, taking care of neighbors’ plants while they were away, improving computer skills).

Table 5. Specifics of the neighborhood meeting place

What should it consist of and where should it be?	<ul style="list-style-type: none"> — the container-based Local Community Center “Popowiczusz” — a kitchen with equipment and dining room — a porch — glazed walls — a place with couches, living room, library — a pergola with a fountain and bench — a shop on the mezzanine — a micro-storage of own crops and produce — a signboard with a logo that is clearly visible from all sides — it should be built at the site of the old factory — it should be near the playground for children
What amenities should it have?	<ul style="list-style-type: none"> — food exchange refrigerator — cabinets for the exchange of items — fitness equipment — tables and chairs — computer station — awnings over the windows — RTV equipment — benches for chatting — loungers, hammocks, a beach — water cooler with the local Popowiczanka mineral water brand — a dinner table — the constitution of Popowice — a telephone — pleasant, green surroundings — a colorful interior — shopping melex — an external toilet open 24/7
What will take place there?	<ul style="list-style-type: none"> — management by existing local NGOs — listening to music and singing together, concerts — information on various locations akin to a visitor center — raising awareness of people over 75 about relief programs — organization of the grocery market in “Polana Popowicka” — book exchange — board games, chess, bridge — dances — gymnastics classes

Source: ProPoLab, 4.12.2018.

A space between apartment blocks was then proposed as a convenient and accessible location for a small pavilion or container facility which would house the meeting place. The workshop participants agreed that ideal surroundings of the meeting place should allow for to outdoor activities, including spacious areas (both roofed and unroofed, preferably in sunlit spots) that would enable visitors to sit and lie down. Various other amenities were proposed, among them

a pergola, a fountain, a water cooler, as well as a space housing the constitution of Popowice. All of the would not only serve their respective practical goals, but were enable and even induce guests to get acquainted with each other and this new, universally accesible space created with their specific needs in mind. The architecture of the meeting place should be both aesthetically attractive and harmoniously fitting into the surrounding terrain, all the while remaining cozy and neat .

During the subsequent Design Thinking Workshop, held on March 1st, 2019 participants shared their ideas about the layout and specifics of the meeting place itself. The plan we (as ProPoLab and Social Reporters) developed would allow for supplementing the resources and manpower at out disposal with a collaborative involvement of other local actors and institutions in all stages of the project, i.e., the development, maintenance and day-to-day operations of the entity. A plan was also developed for enabling the pursuit of activities that the residents may be interested in, and which are currently not available in the area. They were defined on the basis of the previously designated main recipients — users, who are primarily seniors, children and adolescents. It was decided that the Neighborhood Meeting Place (NMP) should activate seniors by including them in the creation of both the animation program and the space itself. There were several ideas for creating information channels informing about the NMP. Among the many benefits that the implementation of the meeting place would bring is the not unlikely possibility that it would act as a motivational stepping stone to further activities, broadening the scope of current operational concept. Other, more tangible and immediate benefits for the residents include the possibility of making new friends and acquaintances, access to a welcoming and stimulating space for relaxation and enjoyment, developing and sharing their passions, education, broadening their horizons, joint physical activities and many, many more. All of which were listed by the residents themselves on the board titled “How are we going to implement our idea” developed during the workshop (Table 6).

Table 6. Neighborhood meeting place — How we are going to complete our idea?

Partners — Who is our partner?	<ul style="list-style-type: none"> — the municipality and city of Wrocław — the housing cooperative — NGOs (the Active Senior Foundation, the Health and Life Foundation, Moje Popo) — the local parish — Vantage Development — estate clubs — the library — schools/kindergartens — shops, service points, restaurants — the grocery market — banks — universities
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<p>Activities — What actions are going to take place there?</p>	<ul style="list-style-type: none"> — training courses, workshops (Social Reporters, healthy eating, culinary classes, art workshops, handicrafts, restoring old things) — training on security (conducted by the police), first aid, social aid (MOPS), ecology (garbage disposal), information (the management board of the cooperative) — cultural activities (film screenings, open-air cinema, book exchange, concerts, reading poems, reading to children, card games, theater school) — sport (gymnastics, team sports, activities conducted by students of AWF as part of internships) — theme clubs (lectures, talks on various topics, inviting special guests) — grocery market (stalls for gardeners, item exchange) — street food (field kitchen, food trucks) — graffiti jam
<p>Package/bundle of benefits — What do users gain from our solution?</p>	<ul style="list-style-type: none"> — having a good time — relaxation — making friends — knowledge; discovering new things — sharing your passions and discovering new ones — joint physical activity — learning, broadening horizons — gaining awareness of the possibility of change, improvement and impact — learning to act in a group — possibility of childcare — possibility to help the disabled
<p>Users segment — Who is our user?</p>	<ul style="list-style-type: none"> — seniors — children — parents with children — youth — inhabitants of Popowice — inhabitants of Wrocław
<p>Relations with users — What is the nature of our relations? What do we focus on?</p>	<ul style="list-style-type: none"> — deep relationships between seniors — inclusion in the running of the meeting place — activating — seniors as co-creators change the vision of the place — a special offer of invitations — information — relationships with other users, mainly on weekends

Distribution channels — How do we reach our users?	<ul style="list-style-type: none"> — Grapevine — newspaper inserts — website, social media — estate clubs — plaques at estate gates and stairwells — additional initiative (e.g. pavements and stairs marked with the “Popowicjusz” logo, information broadcast by megaphone, mascots: costumes, performances by actors from the theater school)
Resources — What do we use for you to reap the benefits?	<ul style="list-style-type: none"> — ProPoLab team — concept, design — contacts, good relations — involvement — human capital — experience, knowledge, skills

Source: ProPoLab, 2.03.2019.

In the final phase of the Design Thinking Workshops a proposition was put forward that the neighborhood meeting place take the shape of a small pavilion or container facility in the space between apartment blocks (Figure 2). The surroundings of the place that were the participants of the workshops should be conducive to outdoor activities, there should be numerous places to sit and lie, both roofed and located in sunny places. Moreover, a pergola, a fountain, the constitution of Popowice and a water cooler were proposed, which are to serve all residents and encourage them to get to know this universal place. The architecture of such an object should be attractive and integrated into the surroundings, being at the same time a cozy, well-kept and homely place (ProPoLab, 2021b).

Conclusion

The aim of the paper was to explain and to understand the processes of public services delivery from the perspective of social innovation. Concepts of co-creation and social innovation were elaborated on the basis of one of ProPoLab’s milestones: Design Thinking Workshops. Hence the research object were the residents (mostly seniors) of the district of Popowice, while the quality of life of senior was its subject. Utilizing design thinking methodology helped reveal that problem of communication between residents can be solved by creating a small, accessibly located community/activity center in their housing estate. This place should meet the needs of: activity and self-fulfillment, exchange of information and intergenerational exchange. The working hours of such an institution are very important

(as they place a huge role in making it accessible), and the space intended for seniors should function all day (e.g. at similar hours as daycare centers). Residents should be included in drafting a program to better identify and respond to their needs. Seniors would likely be happy to provide volunteer work in such a place. The facility should be located in the middle of the estate so that all residents have easy access to it, optimally in pleasant natural surroundings (i.e. near vegetation), as well as in close proximity to playgrounds for children. The facility serving as the activity center should be aesthetically and architecturally interesting, colorful and distinctive. Seniors are favorable towards modern solutions such as a website, social media, application, they only need to learn how to use them and a little guidance during their first attempts at using them.



Figure 2. The concept of a neighborhood meeting place developed during the Design Thinking Workshop

Source: ProPoLab, 15.04.2020.

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