

## Work longer or just save more? Retirement strategies of NDC pension system participants

### Dłużej pracować czy więcej oszczędzać? Strategie emerytalne uczestników systemu emerytalnego NDC

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**Summary:** *Increasing life expectancy requires the accumulation of pension wealth to maintain a decent old-age living standard. Under a nonfinancial defined contribution (NDC) pension system, it means working longer or saving more (or both) – otherwise leading to old-age poverty. In this paper, based on the representative sample, we distinguish strategies Polish working individuals undertake to counteract old-age poverty (labour-intensive, capital-intensive, mixed) as a contrast to inactivity driven by free-riding or myopia. Inactivity applies to almost half of the examined population (with myopia being almost twice as common as free-riding), particularly low-income household members, farmers, and low educated. With multinomial logistic regression, we identify the determinants of each category. Higher income is predictive of choosing a mixed or capital-intensive strategy while thinking about the future is associated with choosing mixed strategies. Free riding occurs more often among occupational pension scheme participants and people with individualistic attitudes. In addition, myopia is predicted by low financial literacy. These results suggest that the current policy will not efficiently maintain adequate living standards, leading to increasing disparities. Alternatively, ageing voters will force politicians to provide subsidies, posing a risk of unsustainable budgets.*

**Key words:** *old-age benefit, retirement, economic activity, old-age saving, free-rider effect, myopia*

**Streszczenie:** *Wydłużające się średnie trwanie życia wymaga odpowiedniego przygotowania na okres starości, w tym zgromadzenia „kapitału” emerytalnego w celu utrzymania przyzwoitego standardu życia. W niefinansowym systemie emerytalnym o zdefiniowanej składce (NDC) oznacza to dłuższą pracę lub większe oszczędności (lub jedno i drugie), w przeciwnym razie prowadzi to do ubóstwa na starość. W artykule, na podstawie reprezentatywnej próby, rozróżniono strategie podejmowane przez pracujących Polaków w celu przeciwdziałania ubóstwu na starość (pracochłonne, kapitałochłonne, mieszane) jako przeciwieństwo bierności, wynikającej z postawy „jazdy na gapi” lub krótkowzroczności. Bierność dotyczy prawie połowy badanej populacji (przy czym krótkowzroczność jest prawie dwukrotnie częstsza niż*

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*postawa „gapowicza”), w szczególności członków gospodarstw domowych o niskich dochodach, rolników i osób o niższym wykształceniu. Za pomocą wielomianowej regresji logistycznej zidentyfikowano determinanty każdej kategorii. Wyższy dochód jest predyktorem wyboru strategii mieszanej lub kapitałochłonnej, podczas gdy myślenie o przyszłości wiąże się z wyborem strategii mieszanej. „Jazda na gapę” występuje częściej wśród uczestników pracowniczych systemów emerytalnych i osób o indywidualistycznym nastawieniu. Ponadto krótkowzroczność wiąże się z niskim poziomem wiedzy finansowej. Wyniki te sugerują, że obecna polityka nie będzie skutecznie wspierała utrzymania odpowiedniego standardu życia na emeryturze, prowadząc do rosnących dysproporcji. Alternatywnie, starzejący się wyborcy zmuszą polityków do zapewnienia transferów, stwarzając ryzyko niezrównoważonych budżetów.*

*Słowa kluczowe: świadczenie emerytalne, emerytura, aktywność zawodowa, oszczędzanie emerytalne, efekt gapowicza, krótkowzroczność*

## Introduction

While increasing life expectancy is undoubtedly an outstanding human achievement, it challenges the stability and sustainability of European pension systems. People live longer than before, but no corresponding working life extension is observed. Along with the declining fertility rate, this has apparent consequences for aging societies. Depending on the pension scheme, individuals will face an increased risk of old-age poverty or the unsustainable burden of various age-related expenditures on state budgets. When considering the increasing age of median voters, politicians will be tempted to favour the older population at the expense of the well-being of younger cohorts. Otherwise, societies will become segmented into the foreseeing (wealthier) individuals and others.

The only sustainable solution is to convince citizens to take care of their pension through work or saving (or both). Despite many efforts, the effective retirement age in Europe is below the statutory one, and the latter can be as low as 60 years with the option of even earlier exits. Pension schemes may disincentivise choosing late-career jobs, and occupational schemes lure with extremely low pensionable age, subsidised by the state. A higher household savings rate does not necessarily balance early withdrawal.

Poland is one of the countries characterised by low statutory and effective retirement age (male 65/female 60 and 64.9/60.6, respectively in 2022<sup>1</sup>), and one of the lowest household savings rates in Europe (2015–2019 average: 2.9%, compared to 11.7% in EU-27<sup>2</sup>). At the same time, over 20 years ago, it introduced a pension system in which primary responsibility for results falls on individuals. The European Commission estimates that the replacement rate will fall below 40% in the early 2030s<sup>3</sup>. With the fast pace of population ageing, the quality of life of current and future pensioners is under threat.

In this study, we analyse individual strategies by exploring a dataset on pension awareness of the Polish working population. We assess the scale of myopia and free-riding compared to individuals with capital- or labour-intensive pension strategies. This paper contributes to the literature by analysing the phenomenon of myopia in the pension context and identifying determinants of selecting various pension strategies. It is also a practical case study of attitudes almost 20 years after the introduction of the system.

The remainder of the paper is organised as follows. In section 2 we present the literature review. Section 3 describes the methodology – data used and analytical strategy chosen. Section 4 analyses the results of the quantita-

<sup>1</sup> *Ważniejsze informacje z zakresu ubezpieczeń społecznych 2022 r.* (Warszawa: ZUS), <https://www.zus.pl/documents/10182/167633/Wa%C5%BCniejsze+Informacje+z+zakresu+ubezpiecze%C5%84+spo%C5%84+spo%C5%82ecznych+2022.pdf>.

<sup>2</sup> Eurostat, Database – Eurostat, <https://ec.europa.eu/eurostat/data/database>.

<sup>3</sup> European Commission, *Pension Adequacy Report: current and future income adequacy in old age in the EU. Volume 2, Country profiles* (Brussels: European Commission, 2021), <https://data.europa.eu/doi/10.2767/765944>.

tive analysis. Section 5 discusses the results obtained. Section 6 concludes.

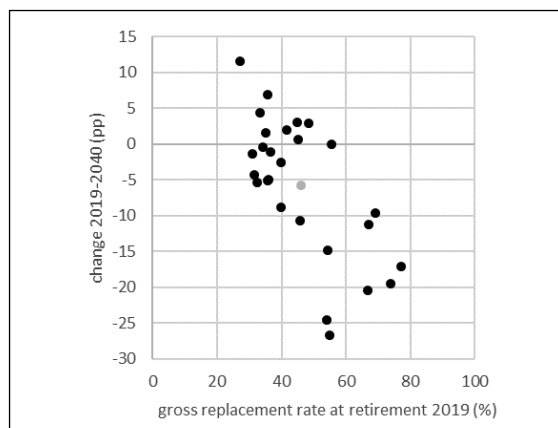
## State-of-the-art

### Adequacy of pensions

Adequacy is perceived as one of six desired features of the pension system<sup>4,5</sup>. Intuitively, it is the ability to support a basic acceptable standard of living typical for the community<sup>6</sup>. As such, adequate pensions (1) prevent and mitigate the risk of poverty in old age, (2) are capable of replacing income earned before retirement and (3) allow for spending a reasonable share of life in retirement<sup>7</sup>. Adequacy requires institutional design ensuring efficient sharing and risk diversification as well as individual behaviour reflecting preferred time allocation of resources<sup>8</sup>.

In the recent decade in the European Union, no progress has been made concerning poverty protection<sup>9</sup>. Consumption smoothing is still challenged for several groups, income and gender inequalities persist, and the trade-off between adequacy and career lengths is increasingly visible. Prospects vary significantly between EU countries, but the average gross replacement rate in 2019 was below 46.2%. In the 20-year horizon (when half of today's workforce will retire), it is expected to fall further by 5.8 pp. (Figure 1), approaching the ILO safety threshold of 40%<sup>10</sup>. For eight coun-

Figure 1. *Gross replacement rate at retirement in EU countries 2019–2040*



Source: Authors' elaboration based on European Commission, *Pension Adequacy Report*. Note: the grey dot denotes the EU average.

tries, the decrease will exceed 10 pp. (for Italy, Poland, and Latvia<sup>11</sup> – over 20 pp.). Further decoupling between wage and old-age pension benefit growth will reduce retirees' purchasing power, affecting poverty thresholds and their ability to smooth consumption and meet their specific needs.

ILO's threshold may serve as a valuable proxy for global minimum, but for developed countries, the replacement rate of 70–100% is considered adequate empirically (as shown in recent studies). For the US net replacement rate was 66%<sup>12</sup>, 70%<sup>13</sup>, 80%<sup>14</sup> (precisely: 45–95% depending on income decile), or between 70 and 100%<sup>15</sup>. For Germany, the estimates were

<sup>4</sup> The remaining five are affordability, sustainability, equity, predictability, and robustness.

<sup>5</sup> Robert Holzmann, Richard Hinz, Mark Dorfman, "Pension systems and reform conceptual framework", *Social Protection & Labor Discussion Paper* 824 (2008), <https://documents1.worldbank.org/curated/en/716871468156888545/pdf/461750NWP0Box334081B01PUBLIC10SP00824.pdf>.

<sup>6</sup> Peter Saunders, Melissa Wong, "Pension Adequacy and the Pension Review", *The Economic and Labour Relations Review* 3 (2011): 7–26, <https://doi.org/10.1177/103530461102200302>.

<sup>7</sup> European Commission, *Pension Adequacy Report*.

<sup>8</sup> Elsa Fornero, Annamaria Lusardi, Chiara Monticone, "Adequacy of savings for old age in Europe", in: *Ageing, health and pensions in Europe*, eds. L. Bovenberg, A. van Soest, A. Zaidi (London: Palgrave Macmillan, 2010), 13–41.

<sup>9</sup> European Commission, *Pension Adequacy Report*.

<sup>10</sup> ILO. *C102 – Social Security (Minimum Standards) Convention*, 1952 (No. 102), retrieved May 10, 2020, from [https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100\\_ILO\\_CODE:C102](https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C102).

<sup>11</sup> However, these are the countries that have introduced the unfunded defined contribution (NDC) pension pillar.

<sup>12</sup> John Karl Scholz, Ananth Seshadri, Surachi Khitatrakun, "Are Americans saving "optimally" for retirement?", *Journal of Political Economy* 4 (2006): 607–643.

<sup>13</sup> Robert Haveman, Karen Holden, Andrei Romanov, Barbara Wolfe, "Assessing the Maintenance of Savings Sufficiency over the First Decade of Retirement", *International Tax and Public Finance* 4 (2007): 481–502, <https://doi.org/10.1007/s10797-007-9027-y>.

<sup>14</sup> Johannes Binswanger, Daniel Schunk, "What Is an Adequate Standard of Living during Retirement?", *Journal of Pension Economics and Finance* 2 (2011): 203–222, <https://doi.org/10.1017/s1474747211000618>.

<sup>15</sup> David Love, Paul Smith, Lucy McNair, "A New Look at the Wealth Adequacy of Older U.S. Households", *Review of Income and Wealth* 4 (2008): 616–42, <https://doi.org/10.1111/j.1475-4991.2008.00292.x>.

between 86 and 111% depending on the method employed, and most rates exceeded 90%<sup>16</sup>. Based on panel data from Germany, its level was estimated at 87%<sup>17</sup>. In the Netherlands, 60–75% was considered adequate<sup>18</sup>. The expectation of future retirees for perfect consumption smoothing is the case. In order to reach this level, the average Pole should save voluntarily approx. 15–25% of their income during economic activity<sup>19</sup>. Pension adequacy measured with replacement rates is not the only method applied, though<sup>20</sup>, and even under replacement rates, the differences in assumptions lead to significant differences in outcomes.

Moreover, individuals tend to overestimate their pension wealth<sup>21</sup>. They struggle with answering how much is needed and whether the current level of saving is sufficient. Financial literacy improves estimates by increasing awareness of needs, comparing alternatives, and enforcing implementation while reducing biases<sup>22</sup>.

### Saving and working preferences

Retirement planning assumes clarifying goals, making expectations more realistic, preparing

to maintain a sufficient living standard and adjusting to retirement<sup>23</sup>. Under existing pension systems, these preparations typically mean working (contributing) long enough to become eligible for old-age benefits or accumulating household savings. Long-term saving is a re-discovered phenomenon in countries behind the former Iron Curtain (including Poland). Nationalisation and hyperinflation have been discouraging people from long-term saving for so long<sup>24</sup>. Even now, Poland's pension system changes are considered a threat to ownership and one of the main barriers to saving with publicly managed instruments<sup>25</sup>.

Higher engagement in private saving for retirement (i.e. saving decisions, ownership of retirement account, retirement plans participation, contributions, retirement assets) is observed for older people, men, married, educated, urban residents, saving, investing, risk-positive, wealthy, home-owners, and people with good health<sup>26</sup>. Sometimes the type of labour contract or household size may be statistically significant. Similar determinants were confirmed regarding household savings in general<sup>27</sup>. Surprisingly, saving behaviour may vary between

- <sup>16</sup> Julian Schmied, Christian Dudel, "How Much Retirement Income is Needed to Maintain the Living Standard?", PAA 2018 Annual Meeting.
- <sup>17</sup> Christian Dudel, Notburga Ott, Martin Werding, "Maintaining One's Living Standard at Old Age: What Does That Mean?", *Empirical Economics* 3 (2016): 1261–79, <https://doi.org/10.1007/s00181-015-1042-8>.
- <sup>18</sup> Johannes Binswanger, Daniel Schunk, *What Is...*
- <sup>19</sup> Tomasz Jedynek, "The role of supplementary retirement savings in reducing the pension gap in Poland", *Economic and Environmental Studies* 1 (2017): 95–113.
- <sup>20</sup> Filip Chybalski, Edyta Marcinkiewicz, "The Replacement Rate: An Imperfect Indicator of Pension Adequacy in Cross-Country Analyses", *Social Indicators Research* 1 (2015): 99–117, <https://doi.org/10.1007/s11205-015-0892-y>.
- <sup>21</sup> Massimo Baldini, Carla Mazzaferro, Paolo Onofri, "Pension Expectations, Reforms and Macroeconomic Downturn in Italy. What Can Microdata Tell Us?", *Applied Economics* 13 (2018): 1396–1410, <https://doi.org/10.1080/00036846.2018.1527453>.
- <sup>22</sup> Annamaria Lusardi, Olivia Mitchell, "Financial Literacy and Planning: Implications for Retirement Wellbeing", *National Bureau of Economic Research Working Paper 17078* (Cambridge: National Bureau of Economic Research, 2011); Hayley James, Debora Price, Tine Buffel, "How Do People Think about Later Life When Making Workplace Pension Saving Decisions?", *Journal of Aging Studies* 54 (2020): 100869, <https://doi.org/10.1016/j.jaging.2020.100869>.
- <sup>23</sup> Mary Anne Taylor, D. Doverspike, "Retirement planning and preparation", in: *Retirement: Reasons, processes, and results*, eds. G.A. Adams, T.A. Beehr (New York: Springer Publishing Company, 2003), 53–82.
- <sup>24</sup> Sonia Buchholtz, Jan Gąska, Marek Góra, "Myopic Savings Behaviour of Future Polish Pensioners", *Risks* 2 (2021): 36, <https://doi.org/10.3390/risks9020036>.
- <sup>25</sup> Barbara Błaszczuk, "The story of the open pension funds and the employee capital plans in Poland: Will it succeed this time?", *CASE Working Papers* 13 (2020).
- <sup>26</sup> Lucia Rey-Ares, Sara Fernández-López, Milagros Vivel-Búa, "The determinants of privately saving for retirement: the cases of Portugal and Spain", *European Journal of Applied Business and Management* 1 (2015), <https://doi.org/10.58869/EJABM>.

extensive and intensive margins. In other words, what affects saving in general positively, may, at the same time, lead to a lower saving rate<sup>28</sup>.

Unfortunately, it is also widely proven that public savings (via pension system) crowd out private (voluntary individual) pension contributions. What changes is the final effect. Alessie, Angelini, and van Semten found that 1 EUR of pension wealth leads to a decline in non-pension discretionary wealth by 47–61%<sup>29</sup>. Myck and Lachowska found that 1 PLN of pension wealth in Poland increases household savings by 0.3 PLN, but for highly educated people, the ratio can reach 1<sup>30</sup>.

Among post-communist countries, only Poland has a pension system with a 1:1 relation between contributions and benefits<sup>31</sup>, which promotes working beyond retirement. On the individual level, working beyond retirement age is determined by:

- higher education<sup>32</sup>,
- having a high-skilled job<sup>33</sup>, being a manager or professional – but also non-skilled manual workers<sup>34</sup>,
- being self-employed<sup>35</sup>,
- poor financial situation<sup>36</sup>, but also high income<sup>37</sup>;
- good physical health<sup>38</sup>;
- good working environment<sup>39</sup>;

<sup>27</sup> Mark Harris, Joanne Loundes, Elizabeth Webster, “Determinants of Household Saving in Australia”, *Economic Record* 241 (2002): 207–23, <https://doi.org/10.1111/1475-4932.00024>. Dimitry Kulikov, Annika Paabut, Karsten Staehr, “A microeconomic analysis of household saving in Estonia: income, wealth and financial exposure”, *Bank of Estonia Working Papers* 8 (2007), wp2007-8, <https://www.eestipank.ee/en/publications/working-papers/2007/82007-dmitry-kulikov-annika-paabut-and-karsten-staehr-microeconomic-analysis-household-saving>. Maria Semenova, “Save or borrow: what determines Russian households' financial strategies?”, *BOFIT Discussion Papers* 28 (2011). Christina Kolerus, Isabell Koske, Felix Hüfner, “Selected Aspects of Household Savings in Germany: Evidence from Micro-Data”, *OECD Economics Department Working Papers* 999 (2012), <https://www.oecd-ilibrary.org/docserver/5k8zpt6w2k7h-en.pdf?expires=1689851853&id=id&accname=guest&checksum=13B609F585D00DF0538A3FD90B9F203A>. A. Jonubi, S. Abad, “The impact of financial literacy on individual saving: An exploratory study in the Malaysian context”, *Transformations in Business & Economics* 1 (2013): 28. Ioannis Kostakis, “The Determinants of Households Savings During Recession: Evidence from Greece”, *SSRN Electronic Journal*, 2013, <https://doi.org/10.2139/ssrn.2323559>. Julia LeBlanc, Alessandro Porpiglia, Federica Teppa, Junyi Zhu, Michael Ziegelmeier, “Household saving behavior in the Euro area”, *International Journal of Central Banking*, 44. Thanh Hua, Guida Erreygers, “Applying Quantile Regression to Determine the Effects of Household Characteristics on Household Saving Rates in Vietnam”, *Journal of Asian Business and Economic Studies* 2 (2019): 175–93, <https://doi.org/10.1108/jabes-06-2019-0053>.

<sup>28</sup> Christoph Metzger, “Who Is Saving Privately for Retirement and How Much? New Evidence for Germany”, *International Review of Applied Economics* 6 (2017): 811–31, <https://doi.org/10.1080/02692171.2017.1338676>.

<sup>29</sup> Rob Alessie, Viola Angelini, Peter van Santen, “Pension Wealth and Household Savings in Europe: Evidence from SHARELIFE”, *European Economic Review* 63 (2013): 308–28, <https://doi.org/10.1016/j.eurocorev.2013.04.009>.

<sup>30</sup> Marta Lachowska, Michał Myck, “The Effect of Public Pension Wealth on Saving and Expenditure”, *American Economic Journal: Economic Policy* 3 (2018): 284–308, <https://doi.org/10.1257/pol.20150154>.

<sup>31</sup> Sonia Buchholtz, Agnieszka Chłoń-Domińczak, Marek Góra, “Implementing nonfinancial defined contribution pensions in Poland”, in: *Progress and Challenges of Nonfinancial Defined Pension Schemes*, Eds. R. Holzmann, E. Palmer, R. Palacios, S. Sacchi (Washington, DC: World Bank, 2019), 91–117.

<sup>32</sup> Dirk Hofäcker, Elias Naumann, “The Emerging Trend of Work beyond Retirement Age in Germany”, *Zeitschrift für Gerontologie und Geriatrie* 5 (2015): 473–79, <https://doi.org/10.1007/s00391-014-0669-y>. Dominique Anxo, Thomas Ericson, Anna Herbert, “Beyond Retirement: Who Stays at Work after the Standard Age of Retirement?”, *International Journal of Manpower* 5 (2019): 917–38, <https://doi.org/10.1108/ijm-09-2017-0243>. Patric Pilipec, Wim Groot, Milena Pavlova, “The Analysis of Predictors of Retirement Preferences over Time”, *Journal of Population Ageing* 2 (2020): 425–52, <https://doi.org/10.1007/s12062-020-09305-3>.

<sup>33</sup> Dominique Anxo et al., *Beyond Retirement*.

<sup>34</sup> Marianna Virtanen, Tuula Oksanen, Joana Pentti, Jenni Ervasti, Jenny Head, Sari Stenholm, Jussi Vahtera, Mika Kivimäki, “Occupational Class and Working beyond the Retirement Age: A Cohort Study”, *Scandinavian Journal of Work, Environment & Health* 5 (2017): 426–35, <https://doi.org/10.5271/sjweh.3645>.

<sup>35</sup> Dominique Anxo et al., *Beyond Retirement*.

<sup>36</sup> Astrid de Wind, Suzan van der Pas, Brigitte Blatter, Allard van der Beek, “A Life Course Perspective on Working beyond Retirement – Results from a Longitudinal Study in the Netherlands”. *BMC Public Health* 1 (2016), <https://doi.org/10.1186/s12889-016-3174-y>.

<sup>37</sup> Patric Pilipec et al., *The Analysis*.

<sup>38</sup> Astrid de Wind et al., *A Life Course Perspective*.

<sup>39</sup> Dominique Anxo et al., *Beyond Retirement*.

- high job satisfaction<sup>40</sup>;
- high working engagement<sup>41</sup>.

The institutional setting can explain international differences. The state pension and mandatory retirement age are anchors<sup>42</sup>.

## Data and methods

### Data

Our study is based on the *Pension awareness of Poles* survey (conducted in 2016). Despite the time that passed since its publication, this is – to our best knowledge – still one of the very few representative sources examining attitudes, knowledge and preferences regarding old age and old-age pension benefits of the Polish population. Furthermore, the study was conducted in the short period (2013–2016) when Poland had initially gradually increased the legal retirement age (from 65 for men and 60 for women to 67 for both sexes) and then reversed the decision. Both steps should have made people more aware of the relationship between contributions and benefits.

The survey covered 1006 working respondents aged 18–67 (all old enough to become participants of the reformed pension scheme) with various labour contracts. Statistics Poland provided the sampling frame. Due to the weights applied, the results represent the Polish working population concerning sex, age, education and urbanisation. The sample was adjusted according to the article's purpose: 6 individuals with a pensioner or old-age pensioner status (despite combining it with a paid job) and 14 already eligible for an old-age pension due to their age were removed from the sample. The removal did not apply to respondents free to choose full retirement anytime with already acquired minimum benefit. For pensioners, economic activity will be heavily affected by their health status and legal conditions for combining the benefit with a paid

job and the profitability of such a combination. Removing the 20 observations mentioned above had virtually no impact on the sample statistics (Table 1) – unsurprisingly, the largest (albeit still minor) differences are in the age structure.

### Analytical strategy

Two critical concepts investigated in this study are *pension strategies* and *myopia*. By *pension strategy*, we mean a set of purposeful activities to maintain sufficient income in old age. We identify four strategies:

- *labour-intensive*: respondents declare willingness to extend their professional life in order to increase the benefit;
- *capital-intensive*: respondents declare voluntary saving in order to counteract old-age poverty;
- *mixed*, if both conditions are met;
- *free-riding* if no action is undertaken intentionally.

When no action is undertaken unintentionally, we call it *myopic* behaviour.

We approximate the abovementioned phenomena using the particular items from the survey questionnaire.

#### 1) Labour-intensive strategy:

- a) *Bearing that the old-age pension depends on the number of funds accumulated during economic activity, at what age would you like to retire?* (possible answers: age #, as long as possible, I don't know),
- The strategy is chosen if the respondent declares working as long as possible or mentions the age above the 2016 retirement age.

#### 2) Capital-intensive strategy:

- a) *Are you taking any steps to ensure that your material conditions do not significantly deteriorate after retirement?* (yes, no)
- b) *What kind of steps?* (multiple-choice question with eight options<sup>43</sup>)

<sup>40</sup> Patric Pilipiec et al., *The Analysis*.

<sup>41</sup> Astrid de Wind et al., *A Life Course Perspective*.

<sup>42</sup> Jaag Oude Mulders, Kène Henkens, Jopp Schippers, "European Top Managers' Age-Related Workplace Norms and Their Organizations' Recruitment and Retention Practices Regarding Older Workers", *The Gerontologist* 5 (2017): 857–66, <https://doi.org/10.1093/geront/gnw076>.

<sup>43</sup> 1. I put money in a bank deposit or cash, 2. I try to bring up my children so that they will help me financially when I retire, 3. I invest in various goods that will ensure financial security in old age (e.g. real estate, precious metals, pieces of art), 4. I have an individual retirement account (PL: IKE), 5. I have an individual retirement protection account (PL: IKZE), 6. I have an occupational pension scheme (PL: PPE), 7. I have an insurance-based investment product, 8. I take up other activities.

Table 1. *Sample characteristics*

Variable		Original sample, %	Adjusted sample, %	Gap: original – adjusted, pp.
Sex	male	52.1	52.1	0.0
	female	47.9	47.9	0.0
Age group	18–29	18.2	18.5	-0.3
	30–44	48.3	49.2	-0.9
	45–59	30.6	31.1	-0.5
	60+	2.7	1.2	1.5
Education	tertiary	30.6	30.8	-0.2
	secondary	42.7	42.8	-0.1
	vocational	25.2	25.0	0.2
	primary	1.5	1.4	0.1
Urbanisation (place of residence)	largest city	25.4	25.5	-0.1
	mid-sized city	14.2	14.3	-0.1
	town	21.9	21.9	0.0
	rural areas	38.5	38.4	0.1
Children	yes	67.6	67.6	0.0
	no	32.4	32.4	0.0
Net income per capita (EUR)	0–231	2.9	3.0	-0.1
	231–460	27.6	27.5	0.1
	461–690	31.6	31.8	-0.2
	691–920	6.1	6.1	0.0
	above 920	5.1	5.1	0.0
	refused to answer	26.6	25.6	1.0
Labour market status (non-exclusive)	open-ended labour-code contract	66.2	66.0	0.2
	fixed-term labour-code contract	34.2	34.0	0.2
	civil-law contract	8.0	7.5	0.5
	self-employment	2.6	2.5	0.1
	company owner	4.1	4.2	-0.1
	farm owner	4.4	4.4	0.0
	pensioner	0.4	0.0	0.4
	old-age pensioner	0.2	0.0	0.2
Ever had a position with occupational pension rights	yes	9.5	9.5	0.0
	no	90.5	90.5	0.0
	sample size	1006	986	

Note: It may not sum up to 100% due to rounding.

Source: Authors' elaboration.

- The strategy chosen if the respondent is taking at least one of the options, except for raising caring children; the *other* options were recoded – respondents mentioning investment in real estate (significant share of answers) were included as choosing a capital-intensive strategy.
  - 3) Mixed strategy: conditions for both labour- and capital-intensive strategies are met.
  - 4) Free-riding:
    - a) *Would you make ends meet if you were already retired and had a minimum old-age pension benefit?* (yes, no)
    - b) *If not, what would you consider doing?* (multiple-choice question with eight options<sup>44</sup>)
      - An individual is categorised as a free-rider if one would not make ends meet with minimum pension benefit. Under such conditions, one considers asking for external support and rioting but not having a paid job.
  - 5) Individuals with neither a specific pension strategy nor a free ride are classified as myopic.
- We identify the determinants of being myopic compared to other strategies using multinomial logistic regression. The dependent variable is categorical (labour-intensive, capital-intensive, mixed, free-riding, myopia). The set of independent variables describes demographic (sex, age group) and socioeconomic characteristics (income, eligibility for occupational old-age benefit), as well as issues that might define attitude toward old age and the pension system:

<sup>44</sup> 1. asking for social assistance support, 2. asking for charity support, 3. asking for acquaintances' support, 4. having paid job, 5. protesting, 6. breaking the law, 7. none, 8. I don't know.

- 1) Thinking about one's own future – approximated by the question *Do you think about your life as an old-age pensioner?* (often, sometimes, rarely, not at all). We expect that individuals not considering their future should be much less prone to counteract poverty because it is much more difficult for them to define their future needs, to compare them with accumulated pension wealth and – finally – to act appropriately in order to fill this gap;
- 2) level of financial literacy – approximated by the question *Do you think postponing retirement leads to higher benefit?*. For the Polish pension system, this is always true – thus, we expect that individuals choosing yes are more financially savvy and thus, should engage in pension strategies, especially labour-intensive or mixed ones;
- 3) belief in the sustainability of the national pension system provider: *What could be the future consequences of the inefficiency of the pension system in Poland? – insolvency of the Social Insurance Institution* (yes, no). We assume that individuals expecting the collapse of the system should either engage in capital-intensive strategy or free-ride, but will avoid labour-intensive strategy, as it means contributing to the risky project;
- 4) private vs state responsibility for pension provision: *Would you prefer to have your salary increased by the amount of the pension contribution instead of contributing?* (yes, no, I don't know). We assume that individuals wishing to have such an increase believe they could invest their contributions wiser (capital strategy), would prefer to increase their current consumption due to no knowledge about smoothing the consumption (myopia) or expect to have an external top-up payment (free-riding).

## Methods

Multinomial logistic regression (logit) is the econometric method used to identify determinants of a state if the alternative consists of multiple categories – by contrast, a binary logit identifies determinants of a state that can be described in a binary way (yes, no). We

estimate the multinomial logit to check what factors determine being myopic as opposed to the other four segments. The determinants include dummy and categorical variables.

The results are presented as relative risk ratios (RRR), which can be interpreted as odds that a particular outcome occurs for an incremental change in the independent variable – switching from myopia to another segment. Its mathematical representation was described by Lee<sup>45</sup> (nd.). The goodness of fit was verified positively with the LM test and the Hosmer-Lemeshow test.

Descriptive statistics supplement the logistic modelling. When assessing the independence in contingency tables, we use the chi-square test with  $\alpha=0.05$  in unweighted tables.

## Results and discussion

### Prevalence of strategies

When classified as described above, only 52% of the Polish working population has a specific pension strategy: 33% a labour-intensive one, 9% a capital intensive one and 10% a mixed one. Out of the remaining part, approx. 1/3 can be considered free-riding (17%) and 2/3 myopic (31%). The division between segments is statistically significant for multiple variables, including education, income and selected statuses in the labour market (Table 2).

The differences are evident when counting the share of the population employing any strategy. For education and income, the relationship is monotonic – higher status is correlated with a higher share of respondents undertaking a strategy. Self-employed and company owners also exhibit strategies more often. For farmers, the relationship is reversed. Statistical significance was also detected for urbanisation. However, the relation is non-monotonic. No strategy typically leads to an increase both in the prevalence of myopic behaviour and free-riding. Labour-intensive strategy is a predominant strategy for 63% of those undertaking any.

### Determinants of myopic behaviour

The results of the logistic modelling are presented in table 3.

<sup>45</sup> Youjin Lee, *Deriving relative risk from logistic regression*, retrieved March 5, 2020, from <https://cran.r-project.org/web/packages/logisticRR/vignettes/logisticRR.html>.



Table 2. *Segments distinguished*

Variable/segment		Mixed	Labour-intensive	Capital-intensive	Free-riding	Myopic	Segments p-value
Total		10	33	9	17	31	
Education	tertiary	15	33	15	13	25	<0.001
	secondary	7	33	9	19	32	
	vocational	5	35	4	18	38	
	primary*	0	35	0	40	25	
Urbanisation (place of residence)	large city	14	38	9	14	25	0.017
	mid-sized city	9	28	12	21	30	
	town	8	35	12	13	33	
	rural areas	6	31	8	20	35	
Net income per capita (EUR)	0–231	5	37	0	22	35	0.002
	231–460	5	35	7	23	31	
	461–690	10	34	12	15	29	
	691–920	10	25	23	18	24	
	above 920	16	29	14	16	25	
	refused to answer	11	33	8	12	36	
Self-employed	yes*	32	29	18	5	17	<0.001
	no	8	33	9	17	32	
Company owner	yes	14	44	20	3	20	0.012
	no	9	33	9	18	32	
Farm owner	yes	8	24	2	28	40	0.083
	no	9	34	10	16	31	

\* interpret with caution due to the small sample size (below 30).

Note: structure – weighted, p-value – unweighted. Only statistically significant tables of contingency are presented.

Source: Authors' elaboration.

Table 3. *Determinants of myopic behaviour – estimates of the multinomial logistic regression*

Variable		Relative-risk ratio	Standard error	P-value	95% CI	
Myopia – base outcome						
Mixed strategy						
Gender (ref. Female)	men	<b>0.579</b>	0.164	0.053	0.332	1.008
Age group (ref. 45–59)	18–29	1.524	0.749	0.391	0.582	3.994
	30–44	<b>1.853</b>	0.601	0.057	0.982	3.498
	60+	0.335	0.405	0.365	0.031	3.576
Net income per capita (EUR)	0–231	1.012	1.285	0.993	0.084	12.195
	461–690	<b>2.661</b>	1.071	0.015	1.208	5.858
	691–920	<b>3.281</b>	2.281	0.087	0.840	12.817
	above 920	<b>10.550</b>	6.773	<0.001	2.998	37.126
	refused to answer	2.243	0.928	0.051	0.997	5.048
Thinking about own future (ref. Never)	often	<b>12.777</b>	6.043	<0.001	5.056	32.286
	from time to time	<b>4.807</b>	1.938	<0.001	2.181	10.593
	rarely	<b>2.339</b>	1.118	0.075	0.917	5.969
Individualistic approach (ref. No)	yes	<b>1.850</b>	0.562	0.043	1.020	3.354
	don't know	0.495	0.245	0.156	0.187	1.308
Believes in the collapse of the pension system	yes	1.488	0.451	0.189	0.822	2.694
Ever had a position with occupational pension rights	no	<b>3.578</b>	2.486	0.066	0.917	13.963
Financial literacy (ref. Yes)	no	<b>0.363</b>	0.124	0.003	0.186	0.709
	don't know	<b>0.271</b>	0.121	0.003	0.113	0.650
	_constant	0.013	0.012	<0.001	0.002	0.079
Labour-intensive strategy						
Gender (ref. Female)	men	<b>0.689</b>	0.127	0.044	0.480	0.990
Age group (ref. 45–59)	18–29	<b>2.219</b>	0.635	0.005	1.267	3.887
	30–44	<b>1.820</b>	0.404	0.007	1.179	2.811
	60+	0.484	0.380	0.355	0.104	2.252

Variable		Relative-risk ratio	Standard error	P-value	95% CI	
Net income per capita (EUR)	0–231	1.705	1.069	0.395	0.499	5.826
	461–690	1.010	0.239	0.966	0.635	1.606
	691–920	0.878	0.417	0.784	0.346	2.227
	above 920	1.818	0.895	0.225	0.693	4.770
	refused to answer	0.903	0.216	0.670	0.565	1.444
Thinking about own future (ref. Never)	often	<b>1.806</b>	0.588	0.070	0.953	3.420
	from time to time	0.910	0.214	0.690	0.574	1.443
	rarely	<b>1.584</b>	0.406	0.073	0.958	2.619
Individualistic approach (ref. No)	yes	1.112	0.229	0.605	0.743	1.664
	don't know	0.712	0.181	0.182	0.432	1.173
Believes in the collapse of the pension system	yes	1.307	0.243	0.151	0.907	1.883
Ever had a position with occupational pension rights	no	<b>2.126</b>	0.756	0.034	1.059	4.269
Financial literacy (ref. Yes)	no	<b>0.549</b>	0.113	0.004	0.367	0.822
	don't know	<b>0.343</b>	0.089	<0.001	0.206	0.570
	<b>_constant</b>	0.496	0.244	0.154	0.189	1.300
<b>Capital-intensive strategy</b>						
Gender (ref. Female)	men	<b>0.544</b>	0.144	0.022	0.324	0.915
Age group (ref. 45–59)	18–29	1.711	0.742	0.216	0.731	4.002
	30–44	<b>1.844</b>	0.569	0.047	1.008	3.375
	60+	1.119	1.118	0.910	0.158	7.927
Net income per capita (EUR)	0–231	0.000	0.001	0.986	0.000	.
	461–690	<b>2.234</b>	0.800	0.025	1.107	4.505
	691–920	<b>7.705</b>	4.054	<0.001	2.747	21.607
	above 920	<b>4.558</b>	2.912	0.018	1.303	15.944
	refused to answer	1.341	0.517	0.446	0.630	2.855
Thinking about own future (ref. Never)	often	<b>4.409</b>	2.012	0.001	1.803	10.784
	from time to time	<b>3.906</b>	1.310	<0.001	2.024	7.538
	rarely	1.725	0.717	0.190	0.764	3.898
Individualistic approach (ref. No)	yes	1.470	0.434	0.192	0.824	2.622
	don't know	0.932	0.351	0.851	0.446	1.948
Believes in the collapse of the pension system	yes	<b>2.076</b>	0.603	0.012	1.175	3.669
Ever had a position with occupational pension rights	no	1.826	0.863	0.203	0.723	4.612
Financial literacy (ref. Yes)	no	0.999	0.292	0.996	0.563	1.773
	don't know	0.655	0.247	0.262	0.313	1.372
	<b>_constant</b>	<b>0.027</b>	0.020	<0.001	0.006	0.114
<b>Free-riding</b>						
Gender (ref. Female)	men	0.766	0.170	0.228	0.496	1.182
Age group (ref. 45–59)	18–29	1.503	0.520	0.239	0.763	2.962
	30–44	<b>1.569</b>	0.407	0.083	0.944	2.610
	60+	0.403	0.416	0.379	0.053	3.044
Net income per capita (EUR)	0–231	0.228	0.259	0.194	0.025	2.115
	461–690	0.726	0.196	0.236	0.427	1.233
	691–920	1.124	0.571	0.818	0.415	3.042
	above 920	1.163	0.675	0.795	0.373	3.625
	refused to answer	<b>0.414</b>	0.124	0.003	0.231	0.743
Thinking about own future (ref. Never)	often	<b>2.145</b>	0.799	0.041	1.033	4.452
	from time to time	1.015	0.281	0.957	0.590	1.746
	rarely	1.120	0.357	0.723	0.599	2.092
Individualistic approach (ref. No)	yes	<b>1.744</b>	0.446	0.030	1.057	2.878
	do not know	1.292	0.393	0.399	0.712	2.345
Believes in the collapse of the pension system	yes	1.016	0.225	0.943	0.659	1.567
Ever had a position with occupational pension rights	no	<b>2.605</b>	1.186	0.035	1.067	6.358
Financial literacy (ref. Yes)	no	0.792	0.193	0.338	0.491	1.276
	don't know	<b>0.475</b>	0.150	0.018	0.256	0.880
	<b>_constant</b>	<b>0.225</b>	0.137	0.014	0.068	0.743

Source: Authors' estimations. Bolded values – RRRs of variables with p-value <0.1

The results reveal several regularities with important consequences for public policy. First, if a strategy is defined as a set of purposeful activities, almost half of the working population (48%) has none, most of whom are due to their short-sightedness (31%). According to the literature, this increases the chance of an unsatisfactory outcome – mainly because of refraining from necessary actions and erroneous decisions. This share should be a clear rationale for decision-makers to invest in financial literacy, fine-tune the pensions system based on default options (addressing myopia) and impose additional restrictions in the system to reduce the propensity to free-ride.

The labour-intensive one is a prevailing option for those who do have a strategy. It might be interpreted on the individual (micro) level – Polish households have meagre savings rates, and for many years the trend was a downward one despite robust economic growth. This significantly limits space for capital accumulation. On the macro level, it should be mentioned that Poland is a catching-up economy. Much of the lost savings are used to catch up with the aspirations.

Last but not least, for many individuals, a labour-intensive strategy seems to be the default option when saving is insufficient. From the public policy perspective, the optimal outcome would include a significant share of individuals with mixed strategies, as it diversifies the risk. There were some attempts in 2018 (employee capital plans, PPK), but despite multiple default options, participation is far from satisfactory<sup>46</sup>.

We identified very significant differences in several cross-sections. Some of them are already confirmed in the literature, including education and income<sup>47</sup>. Engaging in pension strategies is significantly more frequent among educated and affluent individuals. While this might be reasonable in terms of consumption

smoothing, it also widens the social gap, which generally increases the chances of social discontent, and free-riding effects and, keeping in mind the demographic trends, pressure on politicians increases. Other categories with outlying results are company owners and self-employed who have pension strategies (particularly capital-intensive ones) more often. This is an expected result, considering the option of reduced contribution. In such a case, whether individual savings are sufficient is an open question. By contrast, farm owners more often have no strategy, despite being eligible for an occupational scheme with low contributions and low benefits<sup>48</sup>.

Econometric modelling turns out to be helpful in identifying the determinants of myopia. In particular, refraining from thinking about own old age is a clear determinant of myopia, and so is low pension literacy. Females tend to be myopic more often than males, and the odds of myopia increase for the youngest and the oldest age groups. This exhibits similarities to patterns of financial literacy extensively examined by Lusardi and Mitchell<sup>49</sup>. This also explains why middle-aged respondents had higher odds of labour-intensive strategies (if no significant capital is accumulated and the future is uncertain).

Higher income leads to choosing mixed and capital-intensive strategies (as people have attractive and well-remunerated jobs). A capital-intensive strategy is chosen by those who believe that the Social Insurance Institution may become insolvent at some point. By contrast, a labour-intensive strategy is chosen by those eligible for occupational pension schemes, which are always more favourable than the universal system. Those interested in receiving higher net remuneration at the cost of reduced pension contributions were either the ones with mixed strategies (preferring to allocate on their own) or free-riders (who

<sup>46</sup> *Informacja o stanie rynku emerytalnego w Polsce na koniec 2020 roku* (Warszawa: KNF, 2021), [https://www.knf.gov.pl/knf/pl/komponenty/img/Informacja\\_o\\_stanie\\_ryнку\\_emerytalnego\\_w\\_Polsce\\_na\\_koniec\\_2020\\_r.pdf](https://www.knf.gov.pl/knf/pl/komponenty/img/Informacja_o_stanie_ryнку_emerytalnego_w_Polsce_na_koniec_2020_r.pdf).

<sup>47</sup> Annamaria Lusardi, Olivia Mitchell, *Financial Literacy and Planning*. Sonia Buchholtz, Jan Gaska, Marek Góra, *Myopic*.

<sup>48</sup> Damian Walczak, *Uwarunkowania funkcjonowania systemu zabezpieczenia społecznego rolników w Polsce* (Toruń: Dom Organizatora TNOiK, 2011).

<sup>49</sup> Annamaria Lusardi, Olivia Mitchell, *Financial Literacy and Planning*.

believe it is possible to increase consumption today with no negative impact on the future).

## Conclusion

This article confirms that reducing the high share of individuals with no pension strategy should become a long-term policy priority. Otherwise, the adequacy of the benefits will be challenged, and the propensity to free-riding will increase.

There seems to be no chance of reaching adequate old-age pension benefits without changing the parameters of the public system that encourage people to choose one of the expected strategies (labour-intensive, capital-intensive or mixed) and realise it throughout their lives. But such changes pose a real political risk for decision-makers, so they are more willing to implement softer versions

like auto-enrolment in supplementary old-age pension schemes, especially those organised and financed (partially at least) by employers. A good example was Employee Pensions Plans (PPK) introduced in Poland in 2019. Their impact on the adequacy of benefits is somewhat limited due to lower than expected coverage rates<sup>50</sup> and the small willingness of both employees and employers to save more than the minimum level set by law. Generally speaking, the adequacy of pension benefits is also threatened by a lack of pay-out options that could protect individuals from longevity risk. Thus, achieving the goal of adequate benefits is undoubtedly a complex process requiring a parallel shift in public policy, widening the offer of pension products and, last but not least, a change in attitudes among savers.

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<sup>50</sup> Informacja o stanie rynku emerytalnego w Polsce...

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