

# PENSION STRATEGIES OF WORKERS FROM THE COUNTRY GETTING OLD BEFORE GETTING RICH

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## **Abstract:**

This paper is devoted to strategies working Poles undertake in order to maintain decent living conditions as retirees, in particular: saving practices and labour market activity. We make use of *Pension awareness of Poles* survey data (N=1006) and employ quantitative methods: logistic modelling, principal component analysis and descriptive statistics with corresponding tests. The results clearly show that there is poor relationship between knowledge, plans and behaviour. Moreover, the knowledge itself is limited. Even though awareness of the worsening conditions is increasing, little is being done to counteract it. Among various demographic and socio-economic variables income and education play an important role in distinguishing patterns. The type of labour contract is rarely a significant descriptor. Finally, assuming that future income levels are insufficient, three strategies of making ends meet were distinguished; own responsibility, external support, rebellion. These results are a valuable diagnosis for economic and social policy. Firstly, individuals rarely know how to maintain sufficient living conditions. Secondly, their expectations cannot be met with the actions they undertake. Finally, communicating the fact of insufficiency increases the willingness to ask for external help and anarchistic behaviour rather than preparedness.

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**Keywords:** pension system, population ageing, supplementary saving, labour force

30 Even though population ageing is a common challenge for developed countries, none have  
31 been hit as hard as Central and Eastern European (CEE) countries in recent decades. The  
32 demographic shift, which took place in the 1980s and 1990s, included a significant  
33 improvement in life expectancy, and a huge drop in fertility rates to levels around the lowest-  
34 low fertility. No circumstances herald a reversal in any of these trends. The representatives of  
35 the late 1940s/1950s post-war baby-boom are exiting labour markets on a massive scale, and  
36 the burden of prolonged economically inactive lives has to be borne. Favourable age structure  
37 can no longer fuel pension systems. Their long-term sustainability is threatened, unless the  
38 system is ageing-proof (i.e. automatically adjusting to changes in demographic structures).

39 Such an universal ageing-proof pension system has been introduced in Poland in 1999. Its  
40 implementation resulted from the 1993 ruling of the Constitutional Tribunal calling for a  
41 systemic reform aimed at creating a financially sustainable pension system. Similar calls were  
42 issued by international bodies worldwide [OECD 1996; World Bank 1994]. Despite several  
43 cases of misuse for current political goals and ad hoc tweaks, the main principles of the Polish  
44 pension system have remained unchanged since 20 years. These include: strong emphasis  
45 on income allocation over the life course, transparency, and 1:1 link between contributions and  
46 benefits, fulfilled within joint non-financial and financial defined contribution (NDC and FDC,  
47 respectively) scheme (cf. [Góra & Palmer 2004]). Contributions are collected on the individual  
48 accounts, and the amount of benefit (in the form of an annuity) is calculated by dividing account  
49 value by unisex life expectancy at the age of retirement for the individual's cohort. Apart from  
50 the obligatory part, individuals have three tools for supplementary pension saving [Buchholtz,  
51 Chłoń-Domińczak, Góra 2018].

52 From the perspective of a retiree-to-be, this design has clear consequences. Increasing  
53 individual old-age pension may happen threefold: by raising the sum of contributions, by  
54 increasing contributing period, by shortening the period of receiving benefits (i.e. delaying  
55 retirement). Extraordinarily high rates of return are omitted, as impossible to generate for the  
56 whole economy. The amount of benefit may be increased by supplementary pensions.  
57 Individual account statements including estimated future benefits are sent regularly to the  
58 system participants. All in all, the key message for an individual is that the responsibility for  
59 own pension is passed on the him/herself. Individuals who do not contribute much or do it  
60 infrequently should expect low benefit levels. This in particular refers to the cases of low labour  
61 participation, interruptions in working careers, fixed-term contracts (only recently and partly

62 covered by contributions) and work in the shadow economy – all of which occur in Poland  
63 [Buchholtz, Chłoń-Domińczak, Góra 2018].

64 When the amount received is the result of the actions undertaken for over forty years, the  
65 range of possible decisions is wide, the environment - dynamic, and responsibility is borne  
66 individually, the role of rational management increases. Rational management is a complex  
67 issue, though. This is a combination of actions over the whole period of participation in the  
68 pension system, preceded by plans, formulated on the basis of best knowledge and logical  
69 preferences. In consequence, errors, preferences not reflecting own interest, as well as short-  
70 term perspective and avoiding necessary actions exacerbate the individual's financial  
71 standing.

72 There is also an additional historical background to be mentioned. The twentieth century hit  
73 the CEE countries hard economically, and Poland was not an exception here. First, the world  
74 wars destroyed fixed capital and decimated the working-age populations. Second, the  
75 subsequent period of socialist economy successfully undermined the incentives for long-term  
76 saving due to property nationalisation programmes, periods of high inflation and inefficient  
77 governance. The three decades that have passed since the fall of Iron Curtain have not  
78 changed this view dramatically. Even though the economy has grown at a decent rate annually,  
79 and the financial crisis did not affect it much, doubtlessly Poland is the case of a country which  
80 will get old before getting rich. There is no prospect of an extensive support for impoverished  
81 elder individuals with negative demographic dividend, and keeping in mind the  
82 intergenerational solidarity tested by increasing contribution rates and increased burden  
83 resulting from need to finance the last generation of pensioners from previous traditional  
84 system. In consequence, several actions may be undertaken to maintain decent living  
85 standards in the last stage of life: investment in long employability, increased savings and  
86 raising caring children. Each of them is a form of income allocation over the lifecycle.

87 **The objective** of this paper is to examine the strategies of maintaining consumption in the last  
88 stage of life by Polish workers. Keeping in mind the historical context, we consider strategies  
89 regarding optimal and suboptimal conditions. In addition, we identify the determinants of  
90 actions taken, and perform strategy segmentation with regard to their demographic and socio-  
91 economic characteristics. To our knowledge, such analysis has not been performed for CEE  
92 country yet, mainly because of the lack of adequate datasets. In particular, such study has not  
93 been conducted for countries with NDC+FDC pension schemes.

94 **The remainder** of the paper is organized as follows: Section 2 reviews the literature regarding  
95 individual retirement decision-making process. Section 3 is devoted to the description of the  
96 methodological issues and the analytical strategy. Section 4 presents the results of the  
97 empirical analysis, distinguishing extensive context, first-best and second-best solutions.  
98 Section 5 discusses the results in the context of population ageing, social purposes of the  
99 pension system and future social policy. Section 6 conclude with several recommendations.

## 100 LITERATURE REVIEW

### 101 RATIONAL RETIREMENT STRATEGY AND REASONS FOR IRRATIONALITY

102 The journey leading individuals to optimal retirement savings decisions is quite long. First of  
103 all, one needs to be informed about the possible options on retirement savings, needs to know  
104 future replacement rates and how savings work. In that context, financial literacy is important  
105 in shaping retirement decisions. Second step is to decide on particular behaviour and to create  
106 savings plan towards future retirement. Thirdly, they need to stick to this plan and indeed save  
107 the planned amount regularly. Only after this step, the retirement behaviour is complete and  
108 affects the welfare of a given individual [Hershey et al. 2010]. As we show further, empirical  
109 behaviour is far from perfect, which leads to inefficiencies.

110 The catalogue of behavioural reasons for the difficulty of retirement planning is quite wide and  
111 involves the following problems [Knoll 2011]:

- 112 • the existence of statutory retirement age and contributions in most countries provide  
113 an *anchor* for retirees i.e. some specific strategies that serve as default. Diverting from  
114 these strategies requires effort and therefore suboptimal behaviour may be chosen  
115 [Tversky & Kahneman 1974];
- 116 • *loss aversion* linked to the reference point may also shape people's decision –  
117 individuals are very reluctant to sacrifice what they have already earned, even though  
118 in the long term that may be beneficial;
- 119 • *affective forecasting* which can be broadly described as a tendency to inaccurate  
120 predict future mental states after a certain event. In case of retirement, people tend to  
121 overestimate the happiness resulting from additional leisure time [Gilbert & Wilson  
122 2007]. Moreover, *impact bias* leads them to perceive the change as more influential  
123 than it actually is. On the other hand, they do not take into account the need to  
124 accommodate negative events (such as prolonging work) [Gilbert & Wilson 2003];

- 125 • *hyperbolic discounting* which implies time-inconsistent preferences and higher discount  
126 rate while approaching the statutory retirement age [Bidewell et al. 2006];
- 127 • *planning fallacy* – as people tend to underestimate the time needed to complete a given  
128 task, they start saving for retirement too late and too little to accrue sufficient retirement  
129 capital. Moreover, future retirees tend to overestimate the return rates on their savings  
130 [Armor & Taylor 2002];

131 The abovementioned behavioural problems are further supplemented by multidimensionality  
132 of factors affecting the retirement decision, making it one of the most complex and difficult  
133 financial undertaking over the entire course of life.

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#### 134 EMPIRICS OF FINANCIAL LITERACY

135 Financial literacy is distinguished as a necessary precondition of various financial decisions,  
136 including those related to pensions. Financial savvy is perceived as necessary in long-term  
137 decisions, as it helps in assessing relative profitability and portfolio risks. Sound pension wealth  
138 requires some insight in survival probabilities, investment rates, expected values, opportunity  
139 cost, as well as compound interest, risk diversification, real rate of return, etc. By contrast,  
140 financial illiteracy is characterized by diminished probability of planning for retirement,  
141 increased propensity to excessive consumption, lower saving rate, suboptimal portfolio,  
142 overpaying for financial services, making more errors, and higher probability of abuse. Not  
143 surprisingly, financial illiteracy often leads to premature retirement [Klapper et al. 2012]. As  
144 Fornero & Lo Prete [2017] show on a sample of 21 European countries in previous 20 years,  
145 insufficient financial knowledge also increases the electoral costs, which are borne by whole  
146 societies.

147 There is a consensus when it comes to individual-level characteristics correlated with high and  
148 low financial literacy levels. In general, most knowledgeable are prime-agers (however, age  
149 and cohort effects are significant), men (especially married ones), individuals with better  
150 educational background, and urban dwellers (for an overview see [Lusardi & Mitchell 2014]).  
151 Making numerous financial transactions does not automatically lead to increased literacy. As  
152 shown by Lusardi and Mitchell [2011] frequent users may do it blindfold, using erroneous  
153 heuristics, with excessive self-confidence. Additionally, there are country effects resulting from  
154 historical experiences of inflation (deflation), crises, or habits formed in planned economies  
155 [Atkinson & Messy 2012; Lusardi & Mitchell 2011]. Even in developed economies financial  
156 literacy is a skill far from obvious. Furthermore, it can be expected that increasing complexity

157 of financial instruments will lead to further discrepancies within societies, not to mention welfare  
158 losses [Fornero & Monticone 2011].

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159 EMPIRICS OF PREFERENCES REGARDING PENSIONS

160 Individual views on pension system and preferences regarding the social security system may  
161 dependent on many factors and change in time. Although financial incentives are a strong  
162 determinant of individual retirement decisions [Gruber & Wise 2005], there is quite a wide  
163 spectrum of other factors affecting retirement behaviour, starting from individual characteristics  
164 (such as health, type of job etc.), through psychological factors such as bounded rationality  
165 towards institutions and social norms [van Erp et al. 2014].

166 Preferences regarding the pension system are, to some extent, shaped by social norms. As  
167 Fehr and Gächter [2000] pointed out, individual decisions depend on the belief on how one  
168 ought to behave and, thus, may change over time. For instance, Ljunge [2011] shows that  
169 older generations were hesitant to claim early benefits to avoid social stigma, while youths got  
170 used to the welfare state and do not have such considerations. As social norms are not uniform  
171 across the society, they may differ between groups and be related to their political preferences  
172 [Krauth 2006]. Nevertheless, the results in that area are inconclusive – for instance, field  
173 experiment by Bauer and colleagues [2017] shows that social norms can be easily overridden  
174 by financial incentives.

175 Apart from the pension system itself, institutions may also affect the retirement behaviour. For  
176 example, constraints on hours worked or high employment protection increase exit rates from  
177 the labour market, because the rigidity of regulations forces employees to reduce employment  
178 in case of a productivity shock [Hek & Vuuren 2011; Klaauw & Wolpin 2008]. Kopczuk and  
179 Song [2008] show that workers retire significantly more often in January and around their  
180 birthdays, which can be linked to earnings tests in US Social Security system. Lack of flexible  
181 retirement age can also be a significant obstacle in fully optimal retirement behaviour [van  
182 Vuuren 2013]. Moreover, there is a strand of literature arguing that imperfect financial markets  
183 and lack of possibility to lend against pension benefit may shape the retirement decision [de  
184 Hek & van Erp 2009; French 2005].

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185 EMPIRICS OF RETIREMENT PLANNING

186 Retirement planning is a strong predictor of wealth, especially for younger workers [Lusardi &  
187 Mitchell 2011; 2007a]. Almenberg and Säve-Söderbergh [2011] report similar results for  
188 Sweden, Fornero and Monticone [2011] for Italy and Bucher-Koenen and Lusardi [2011] for

189 Germany. In another study Lusardi & Mitchell [2007b] show that wealthier households plan  
190 more and therefore are better prepared for retirement. Ameriks and colleagues [2003]  
191 conclude that financially literate households exhibit higher propensity to save and therefore  
192 have higher probability of saving for retirement. French [2005] constructed a life-cycle model  
193 to determine how the shape of social security system affects the retirement behaviour.

194 The reasons for difficulties in converting knowledge into retirement planning are various and  
195 complex. For instance, van Rooij and others [2007] argue that even though risk aversion in  
196 pension domain is very high, most participants consider themselves as financially illiterate and  
197 do not fully understand the details of the pension programme. They also show that individuals  
198 in general lack financial knowledge to manage their own pension portfolio and prefer to  
199 delegate management of their assets to pension funds. Chan and Stevens [2008] prove that  
200 individuals respond to the information they have and while some with correct pension  
201 information behave rationally, those misinformed respond to their perceived, not actual,  
202 pension information. Therefore, information about the pension system is almost as important  
203 as incentives as such. Moreover, a study by van Solinge and Henkens [2009] shows that self-  
204 perceived life expectancy has an important impact on retirement plans, but little influence on  
205 actual behaviour.

206 Moreover, even if financial knowledge is present, there are other obstacles in creating the  
207 retirement savings plan. Benartzi and Thaler [2007] challenge the assumptions of standard  
208 economic models that individuals are able to optimize their behaviour to achieve maximum  
209 welfare. Instead, they typically use heuristics and rules-of-thumb in planning their retirement  
210 behaviour. Moreover, retirement planning is affected by the inevitable inertia and laziness –  
211 therefore, it is optimal to design a plan in such a way that participants need to opt-out instead  
212 of opt-in. Simplifying enrolment process should also be useful to achieve this goal (cf. [Choi et  
213 al. 2005]).

214 Nevertheless, the problem with automatic or default enrolment plans is that they provide very  
215 low savings rates as well as relatively safe (and therefore not profitable) forms of investment.  
216 Despite the fact that many participants are aware that their savings rates are too low, they  
217 spend little time to decide on their levels. For instance, Hewitt Associates [2002] shows that  
218 when employees are allowed to decide how much to save, they often choose multiples of 5%  
219 or minimal (maximal) rates allowed by the plan. Furthermore, asset diversification strategies  
220 are either absent or very naïve. The experiment by Read and Loewenstein [1995] proves that  
221 when facing simultaneous choice between several kinds of assets, individuals tend to divide  
222 their assets into equal parts and diversify between full portfolio. This leads to bias in investment

223 portfolios towards options which are better represented in the pool from which the choice is  
224 made. However, such strategies are applied when the investment choice is limited. When they  
225 face full choice spectrum of investment products, as is in the case of Poland, simple strategies  
226 prevail. An example of such strategy is when individuals choose one item from each category  
227 and then direct the equal part of assets to each of investment vehicle or divide the pool  
228 according to arithmetically simple division [Huberman & Jiang 2006]. The third important  
229 observation is that future retirees tend to ask their spouses or friends for financial advice  
230 instead of seeking professional help. Duflo and Saez [2002] show the importance of peer effect  
231 in the study of American university staff, where the colleagues' choice from the same  
232 department was a strong determinant of the savings level. The potential solution to overcome  
233 the problem of designing retirement strategy is to force workers to investment in professionally  
234 managed assets (as was the case of Open Pension Funds in Poland). Finally, there are also  
235 few studies (cf. [Cronqvist & Thaler 2004], [Benartzi & Thaler 2002]), proving that portfolios of  
236 professionally managed funds outperform portfolios of individual investors, even if those who  
237 chose individual investing were financially savvy.

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#### 238 EMPIRICS OF ACTUAL RETIREMENT BEHAVIOUR

239 Even if a sound retirement plan is present, the link between retirement intentions and actual  
240 behaviour is often not sufficiently strong. An early study by Hurd and colleagues [2004] claims  
241 that although most workers retire as early as possible, there is a small impact of pro-retirement  
242 savings patterns and the apparent conflict between actual and optimal behaviour of pensioners  
243 is also subject of interest for behavioural economics. In general, the reasons for too low  
244 retirement savings are believed to be: lack of self-control and bounded rationality. Thaler and  
245 Sherfrin [1981] proposed the model in which the lack of self-control is framed as principal-  
246 agent problem and showed how to design a system, that would make individuals save more  
247 for their retirement using their natural tendency to postpone savings. Conversion of retirement  
248 plans into actual behaviour is a very important policy issue, which needs to be addressed to  
249 assure sufficient replacement rates.

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#### 250 THE POLISH CONTEXT

251 Given the rapidly ageing Polish population, examining retirement strategies and financial  
252 knowledge should become the first step in addressing the gaps by policies. There are few  
253 hurdles on the way to build individual retirement strategies. First, individuals need to be  
254 correctly informed about the mechanics of the pension system and on the projected  
255 replacement rates levels. Second, they need to react properly to these incentives, by planning



256 their retirement – in particular by shaping their saving behaviour and increasing life-long  
 257 employability. Saving behaviour is especially important in Poland, where (contrary to the US)  
 258 saving plans are still not popular and no significant incentives to participate in private plans  
 259 appear. As most studies are based on the US case, there is a gap in the literature regarding  
 260 retirement behaviour in European institutional context. Third, the abovementioned plans need  
 261 to be implemented and converted into actual behaviour. In this paper, we will address the first  
 262 and second issues – therefore, we will show how much individuals know about their future  
 263 retirement in the context of Polish pension system and assess how this knowledge translates  
 264 into retirement strategies, declared saving behaviour and future retirement plans.

## METHODOLOGY

### DATASET

267 In this paper we make use of the of the micro-database from the *Pension awareness of Poles*  
 268 survey [Czapiński & Góra 2016]. This computer-assisted personal interview (CAPI) was  
 269 commissioned by Gdansk Institute of Market Economy and conducted by PBS survey  
 270 company in 2016. Its main purpose was to assess the level of pension knowledge and real  
 271 actions undertaken on one’s initiative. To our knowledge, this is the most informative database  
 272 on what Poles expect regarding future pensions and what is the level of preparedness,  
 273 including both saving practice and labour market participation.

274 The survey covered 1006 working individuals, aged 18-67, regardless of their type of contract.  
 275 Multi-stage sampling was applied. Due to weighing, the sample is representative for the Polish  
 276 working population in terms of gender, age, education and place of residence. The sampling  
 277 frame was taken from the Central Statistical Office of Poland. The sample characteristics are  
 278 presented in the Table 1.

279 **Table 1.** Sample characteristics

variable	categories	n	variable (cont.)	categories	n
sex	female	551	labour-market status	open-ended labour-code contract	555
	male	455		fixed-term labour-code contract	279
age group	18-29	183		fixed-term civil-law contract	84
	30-44	492		self-employment	26
	45-59	304		own business	35
	60+	27		own farm	42
education level	primary	15		student	13
	vocational	231	personal net income [in PLN]	0-500	17
	secondary	429		501-1000	26
	tertiary	331		1001-1500	69
place of residence	rural areas	379		1501-2000	216
	urban areas, pop. <50,000	224		2001-2500	194
	urban areas, pop. 50,000-200,000	133	2501-3000	122	
	urban areas, pop. >200,000	270	3001-4000	64	

household size	1	159	4001-5000	18	
	2	316		above 5000	20
	3	274		refusal	260
	4	184	total		
	5+	73			1006

280 Source: authors' own elaboration.

281 Note: 1. pop. - population. 2. 1 PLN  $\approx$  0.23 EUR

282

283 Analysing the working population has obvious rationale. First, workers are a far more  
284 homogenous group than the whole labour force (covering also parental leave users, long-term  
285 unemployed, frictionally unemployed, youth entering the labour market, disability pensioners  
286 etc.). Despite the wide spectrum of contracts and working conditions, restricting the sample to  
287 the working respondents leads to more adequate and precise conclusions. The sample is  
288 sufficient to ensure representativeness of the population. Second, workers should be up-to-  
289 date with the rules and changes implemented in the labour market and pension regulations.  
290 Finally, asking working individuals excludes unnecessary assumptions (how would one  
291 behaved, if he/she performed paid work and earned income). Relationship between preference  
292 and action should not be disturbed neither by lack of resources, nor by additional public  
293 transfers. Due to this assumption, six respondents combining paid work with receiving (old-  
294 age) pension were removed from the sample.

295 It is also worth mentioning that 2016 offered an interesting context for the study, both in political  
296 and economic terms. It was characterised by political climate conducive to interest in public  
297 affairs (diametrically changed political scene as a result of recent parliamentary and  
298 presidential elections, open political conflicts regarding decreasing legal retirement age, the  
299 role of policy for senior citizens etc.). At the same time, it was a year of modest prosperity,  
300 close to a cycle average. The labour force deficits started to be visible and elder individuals  
301 became a low-hanging fruit – especially keeping in mind the mass-scale retirement of post-  
302 war baby-boom cohort. 2016 was the first year in which all working cohorts were covered by  
303 the system introduced in 1999 (apart from certain occupations). Moreover, first benefits from  
304 the new system were paid and their amount was even below 1 PLN [Rzemek, 2018]. Thus, for  
305 elder individuals (55 and above) working and retiring became a real alternative. Moreover, until  
306 2015 contributions have not been paid from civil-law contracts. In consequence, the issue of  
307 individual responsibility was even more tangible.

## 308 QUESTIONNAIRE

309 The questionnaire consists of over 40 questions, predominantly close-ended and ordinal-scale  
310 ones. The topics include: (1) thinking about own future as a retiree, (2) characteristics of current  
311 pension contributions, (3) preference towards their alternative use, (4) preferred retirement age

312 – absolute and relative, (5) expected material conditions in old age, (6) characteristics of  
313 actions undertaken in order to counteract the deterioration in material conditions, (7) strategies  
314 to supplement insufficient income in the last stage of life, (8) preferred characteristics of the  
315 pension system, (9) space for additional long-term savings. The questions on pensions system  
316 are supplemented by a wide range of socio-economic variables including sex, age, education  
317 level, household size and structure, place of residence, region labour market contract, income,  
318 labour market experience etc.

319 The following questions are in the core interest of this study:

- 320 1. What material conditions do you expect as a retiree? (better/similar/worse than current  
321 retirees with similar tenure and occupation, don't know (DK))
- 322 2. Do you undertake any actions in order to avoid significant deterioration in the material  
323 conditions after retiring? (yes, no)
- 324 3. What type of actions do you undertake? (multiple choice with eight categories)
- 325 4. Would you make ends meet if you were an old-age pensioner with minimal benefit  
326 today [in 2016 approx. 880 PLN]? (yes, no)
- 327 5. Assuming not making ends meet, would you consider following actions? (multiple  
328 choice with six categories, none, DK)

329 Additionally, several questions are treated as proxies of pension knowledge:

- 330 • Do you pay a compulsory pension contribution? (yes, no, DK)
- 331 • What is the amount of contributions paid (as % of remuneration)? (open-ended  
332 question; 0-100%)
- 333 • Would postponing the retirement beyond the legal retirement age lead to increased  
334 benefit? (yes, no, DK)
- 335 • How much would working for 5 years after the legal retirement age increase the  
336 benefit? (multiple choice with four categories, DK)

337 Several questions are treated as proxies of preferences regarding the political economy of the  
338 pension system:

- 339 • Would you prefer to increase your net remuneration by amount of the contribution paid  
340 by your employer? (yes, no, DK)
- 341 • How much of the increased remuneration would you spend on pension contributions  
342 by yourself? (multiple choice with 7 answers, DK)
- 343 • What should be the source of pension? (individual account, common source, both, DK)
- 344 • Should the pension system be universal for all occupational groups? (yes, no)
- 345 • Should the supplementary saving be co-financed and by whom? (from general taxes,  
346 by employer, both, none, DK)
- 347 • Should there be a top-up payment for the individuals who saved too little? (yes, no,  
348 DK).

#### 349 ANALYTICAL FRAMEWORK

350 The analytical framework in this paper is based on the observation that providing necessary  
351 consumption level in the last stage of life under the new universal pension system in Poland is  
352 an individual responsibility. Regardless of how poor individual manages with the pension  
353 wealth, he/she has to consume the old age. In consequence, we distinguish two decision steps.  
354 First, we examine actions aimed at providing necessary level of pension wealth (including  
355 compulsory and voluntary savings, no matter whether from dedicated tools or not). This issue  
356 is covered by questions 1-3 from the previous section. Second, we examine actions oriented  
357 at making ends meet, provided insufficient pension benefit levels. In other words, we analyse  
358 what other sources may supplement low pension benefits. This issue is covered by questions  
359 4-5. These two steps are perceived as an approximation of pension strategy. Keeping in mind  
360 the historical context, this framework seems to be far more accurate in describing pension  
361 strategies of the Poles.

#### 362 METHODS

363 In this paper we make use of quantitative methods: binary logistic regression and principal  
364 component analysis (PCA). Their use is described below.

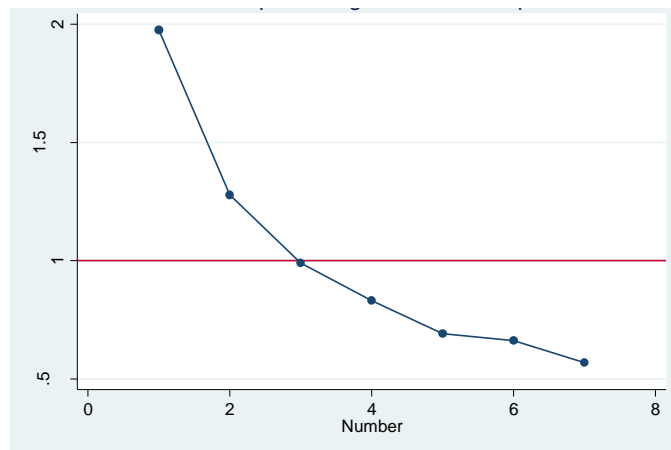
365 *Binary logistic regression* measures the impact of an incremental change in an independent  
366 variable on the odds of an event or a state measured by the dependent variable. In this case,  
367 we measure the impact of wide spectrum of demographic and socio-economic variables on  
368 undertaking the voluntary actions to counteract the deterioration in material conditions as a

369 retiree. Individuals who declared doing so, were assigned as 1, and 0 otherwise. The  
370 descriptors included: sex (female, male), age (4 age groups: 18-29, 30-44, 45-59, 60-67),  
371 education level (primary, vocational, secondary, tertiary), place of residence (rural areas and  
372 3 urban areas depending on the population size), household size (1, 2, 3, 4, 5 and over),  
373 personal net income (5 categories and refusals), labour market status (6 categories). We run  
374 5 models with same set of descriptors and 1 simplified model omitting the descriptor of labour-  
375 market status. 5 models were tested on various subsamples: whole sample, individuals who  
376 declared paying compulsory contributions (as a most general act of pension awareness),  
377 individuals expecting no better material conditions, individuals expecting worse or similar  
378 material conditions, individuals expecting worse material conditions (an educated guess is that  
379 the propensity to supplementary saving should vary among them). A simplified model was run  
380 on the complete sample.

381 Some additional methodological note is required here. Initially, we intended to present the  
382 results of PCA describing various segments of savers, covering by the analysis both patterns  
383 of compulsory and supplementary saving practice. However, due to sample characteristics  
384 (virtually all respondents transfer compulsory contributions due to their labour market status,  
385 but the share of supplementary savers is meagre), PCA distinguished only two segments:  
386 saving and non-saving individuals. Thus, we decided to use binary logistic regression instead.

387 *Principal component analysis* (PCA) is a technique used to reduce various strategy  
388 combinations to a few, easy to interpret dimensions. Even though this method was  
389 unsuccessful in distinguishing savers, it turned out to be useful for second-best analysis,  
390 namely – to identify the general groups of actions provided insufficient levels of income in the  
391 last stage of life. The screeplot of eigenvalues identified 3 components (Figure 1). In order to  
392 make the interpretation clearer we additionally implement VARIMAX rotation procedure and  
393 restrict the values displayed to those above 0.3 or below -0.3 (rule-of-thumb). Quality of  
394 sampling adequacy was examined (successfully) with Kaiser-Meyer-Olkin test (0.6504).

**Figure 1.** Scree plot of eigenvalues after PCA



Source: authors' own estimations.

395

396 The abovementioned methods were supplemented with descriptive statistics with chi-square

397 test, where necessary (the test refers to the unweighted values). We assume  $\alpha=0.05$ .

398 Quantitative analysis was conducted with STATA 14 software.

## 399 EMPIRICAL FINDINGS

### 400 CONTEXTUAL ANALYSIS

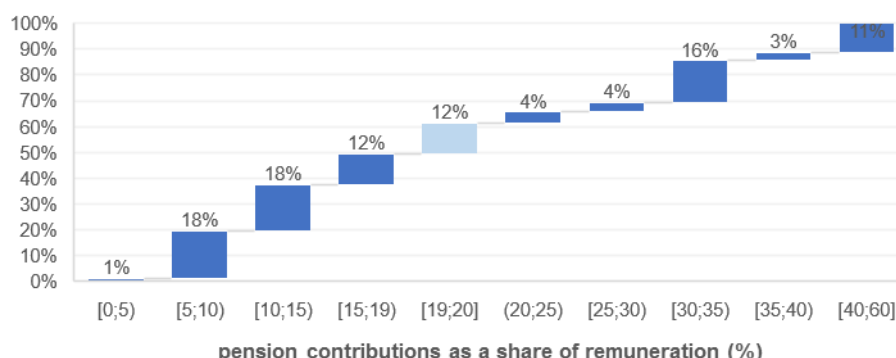
#### 401 PENSION LITERACY

402 Virtually all respondents confirm the pension contributions are paid. Verification of this  
 403 declaration may be performed only for several types of contracts (labour-code contracts, self-  
 404 employed, running own business, farmers). Except for the latter group, approx. 4% of  
 405 respondents declare not paying contributions or no awareness of doing it. By contrast, all  
 406 farmers (covered by other dedicated insurance institution) confirmed paying. The most  
 407 complicated situation refers to the fixed-term civil-law contract holders. Only 60% of them  
 408 confirmed paying, 31% denied, and 9% did not know, which was quite possible when referring  
 409 to the 2015 conditions.

410 For those covered by universal pension scheme and paying contributions (80% of the sample),  
 411 approx. 75% refused answering the questions on the amount. Remaining 25% declared values  
 412 ranging from 3% to 60% (Figure 2). The interval closest to real value (19.52%) for respondents  
 413 with labour-code contract was indicated by 12% of respondents, while half of this subsample  
 414 underestimated their contribution. For fixed-term civil-law contract holders the issue is more  
 415 complicated, as for many years only the first contract was subject to contributions, which  
 416 created a space for abuse. Nowadays the pension contributions are covering income to the

417 value of minimal pay. In both cases the share of contributions would be lower compared to the  
 418 regular labour-code contract.

**Figure 2.** Perceived amount of pension contributions as a share of remuneration



Source: authors' own elaboration.

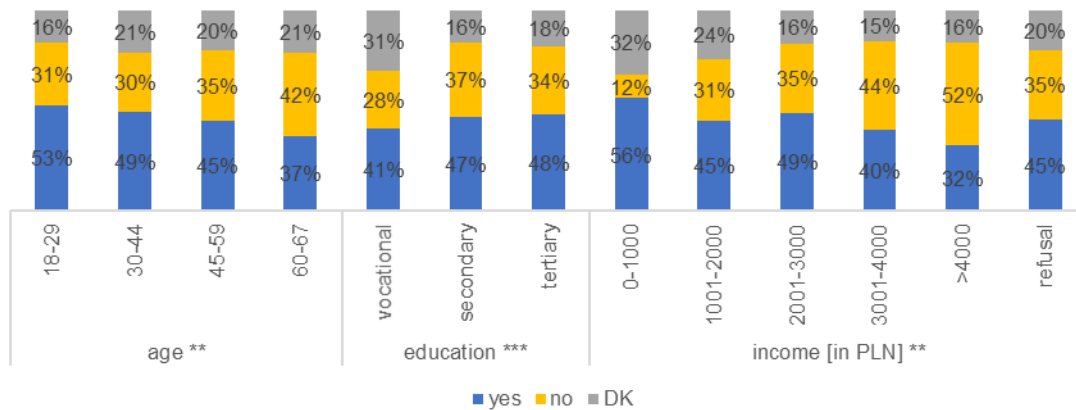
419  
 420 Another misleading heuristic is the one suggesting no trade-off between working beyond the  
 421 legal pension age and benefit level. For 49% of respondents working longer does not translate  
 422 into higher benefits. The statistically significant differences between answers are observed for  
 423 work as a farmer, education level, labour-code contract holders, sex and age groups (for each  
 424 p-value slightly above 0.05). Out of these 49% respondents, one in four cannot estimate how  
 425 much postponing retirement will increase the old-age pension benefit. One in three estimates  
 426 that between 6% and 10%, 17% less than 5%. 20% indicate the 11-20% interval. In this case  
 427 respondents' answers varied with income in a statistically significant manner.

---

#### PREFERENCES REGARDING POLITICAL ECONOMICS OF PENSION SYSTEM

429 When it comes to potential substitutability between transferring compulsory contributions and  
 430 increasing employee's net remuneration, decisions vary across the working population. 45%  
 431 of respondents would prefer doing so, and 20% is not sure. Statistically significant differences  
 432 are observed for various age, income and education groups (Figure 3), as well as among  
 433 individuals running own businesses comparing to others – this category is suffering from small  
 434 sample, though. When analysing how much of this increased net remuneration would be saved  
 435 for retirement, only 7% declared nothing, but 48% between 1% and 30% of the additional net  
 436 income. 15% would allocate the whole sum for contributions and 13% could not estimate the  
 437 share.

**Figure 3.** Preference for replacing compulsory contributions with higher net remuneration – by statistically significant cross-sections



Source: authors' own elaboration.

Note: Category of primary education omitted due to small number of observations.

438

439 No clear preference is observed regarding the source old-age pensions should be financed  
 440 from. For 48% it should be co-financed by individuals and some common source – all other  
 441 categories (including DK) accounted for 16-18% each. Again, statistical significance is  
 442 observable for age, income and education, as well as for individuals running their own  
 443 companies. Greater agreement prevails when asked about the support for those who saved  
 444 too little. At least minimal form of support was mentioned by 71% of respondents. Within this  
 445 group, for 35% respondent the threshold should be related to minimal pension, for 23.6%  
 446 should even exceed this level. One in ten individuals is against any form of support. Preference  
 447 regarding this issue varies among income and sex. Quite symmetrical is the case of additional  
 448 co-financing for supplementary savers, where slightly above 10% is against, 20% does not  
 449 have opinion, while remaining 70% is divided into those who would prefer co-financing from  
 450 general budget and by employer (36%), 14-18% who prefer one of these options. In this case  
 451 socio-economic and demographic characteristics largely affect the decisions – statistical  
 452 significance at typical levels is observed for sex, education and income, as well as among self-  
 453 employed and company owners.

454 An even more widespread consensus is recorded when considering whether the universal  
 455 pension system should incorporate all occupational groups. Such preference was declared by  
 456 over 86% of working Poles. Remaining 14% listed few exceptions, mainly those whose  
 457 workplaces are especially risky. Statistical differences are observed among sexes, as well as  
 458 for representatives of labour-code contract holders (towards unification) and farmers (already  
 459 under a separate occupational scheme, and against unification).

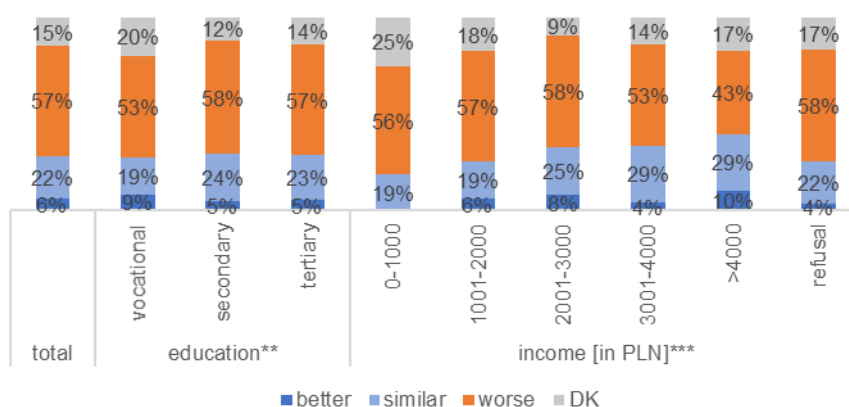
460 EXPECTATIONS OF FUTURE LIVING STANDARDS



461 Approximately 57% of respondents expect worsening living conditions compared to today's  
 462 old-age pensioners with similar occupation and tenure. This share is quite similar for the  
 463 majority of analysed cross-sections, except for income and education (Figure 4). The higher  
 464 the income, the better the prospects. In general, individuals representing the lowest levels of  
 465 income are least prone to optimism - but at the same time, they most often declare not  
 466 expecting anything. By contrast, individuals with vocational education are more optimistic or  
 467 simple do not know what to expect, comparing to counterparts with secondary or tertiary  
 468 education.

469 Future living standard does not transfer easily to replacement rate. For 38% of respondents it  
 470 is impossible to estimate the expected replacement rate. The remaining part declares almost  
 471 equally 0-30%, 30-50% and over 50% (20-21%). This picture looks completely different when  
 472 cross-sectioned by assessment of future conditions. The shares of DKs are high, and the better  
 473 conditions are expected, the more individuals refuse to predict their replacement rates (despite  
 474 large intervals). Moreover, those who are not able to describe their expectations either cannot  
 475 translate them into values (69%) or wild-guess (31%). Significant confounders included also  
 476 education, income and type of labour contract (fixed-term civil-law contract, running own  
 477 company). When analysing education, as its level increases, so does the share of answers  
 478 below 50% and the share of DK answers decreases. For income the relationship is more  
 479 complex. Individuals with lowest income frequently indicate DK, so are those who do not want  
 480 to disclose their income. Most sure about low replacement rates (below 50%) are individuals  
 481 with highest income.

**Figure 4.** Expectations of future living standard as a pensioner, comparing to today's old-age pensioners with similar tenure and occupation – by statistically significant cross-sections

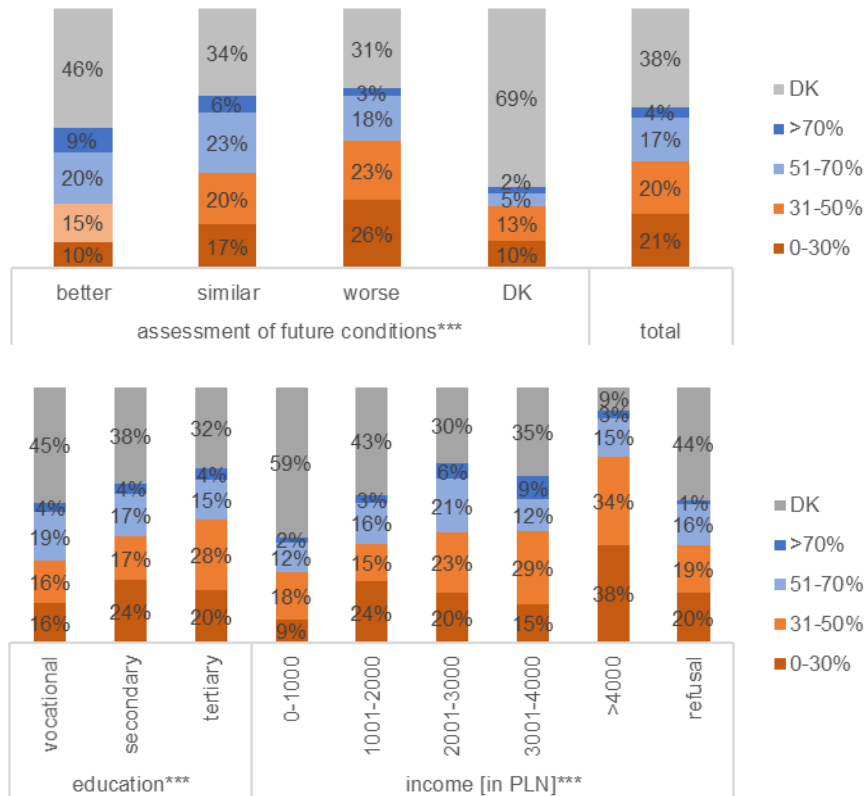


Source: authors' own elaboration.

Note: Category of primary education omitted due to small number of observations.

482

**Figure 5.** Expected replacement rate – by statistically significant cross-sections: categories of assessment of future conditions (top panel) and by education and income (bottom panel)



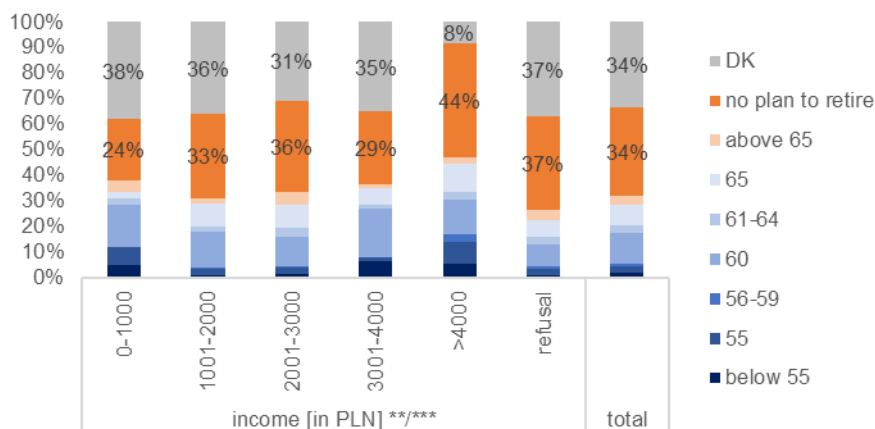
Source: authors' own elaboration.

Note: replacement rate as a share of current remuneration – age not significant.

483

484 Even though the replacement rates are either unknown or lower than contemporary ones, there  
 485 is an option to raise it by postponing the retirement age, in particular – by postponing the  
 486 moment one starts receiving old-age pension. The whole population can be divided into three  
 487 almost equal parts: those who indicate a specific retirement age, those who have no plan to  
 488 retire (it may not mean the same as *work as long as possible*, though), and those who do not  
 489 know yet (Figure 6). When performing cross-section of this variable by socio-economic  
 490 characteristics, only income was significant, however, for highest typical levels of significance.  
 491 Individuals with lowest declared personal income were most prone to declare specific, low  
 492 retirement age. By contrast, respondents with highest income were most frequently indicating  
 493 no plans to retire. When choosing the specific retirement age levels, they also declared higher  
 494 ones.

**Figure 6.** Preferred retirement age – by statistically significant cross-sections

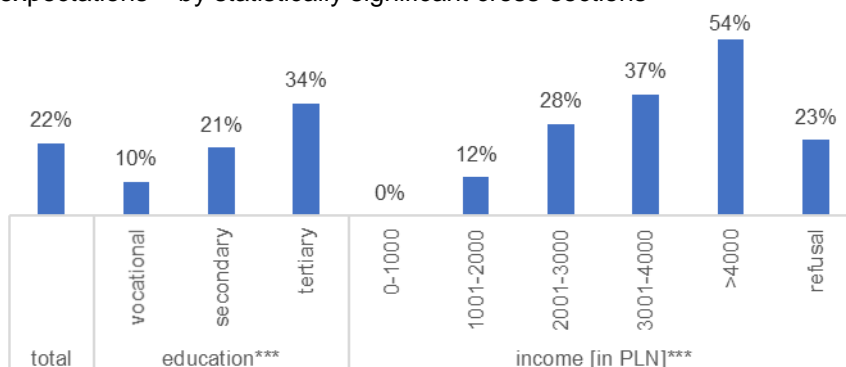


Source: authors' own elaboration.

Note: \*\* refers to the distinguishing between no plan to retire, \*\*\* to age categories

495  
 496 However, expecting worse conditions does not necessarily mean counteracting it. When  
 497 individuals expecting deterioration in material conditions were asked about such actions, only  
 498 about 1 in 5 persons declares doing so (Figure 7). Once again, the actions are statistically  
 499 significant when using cross-sections with education and personal income, as well as for self-  
 500 employed and running own business (for the latter two cases low samples should be  
 501 mentioned). The situation does not improve much when we extend the sample by individuals  
 502 expecting similar conditions or with no expectations. By contrast, only education is a  
 503 statistically distinctive variable in describing propensity to take precautionary matters among  
 504 individuals who expect improvement.

**Figure 7.** Actions undertaken to counteract deterioration in material conditions in old age, providing deterioration expectations – by statistically significant cross-sections



Source: authors' own elaboration.

Note: Category of primary education omitted due to small number of observations.

505  
 506 The Polish pension system provides three dedicated tools for additional long-term saving: IKE,  
 507 IKZE, PPE (individual retirement accounts, individual retirement protection accounts,  
 508 employee pension schemes). There are also endless forms of saving and investment available  
 509 on the financial markets and in alternative forms. As one can see, they are not especially

510 popular. In the whole sample additional long-term saving was declared by approx. 20% of  
 511 respondents, and most popular tool is a saving account or cash (13.3%). Second place is taken  
 512 by tangible investments (especially real estate) and third – apart from *other* category – is  
 513 raising a caring child (3.1% and 2.7%, respectively). Dedicated instruments were mentioned  
 514 even less often: IKE by 1.4% and IKZE and PPE by 0.1% each. The *Other* category included  
 515 a wide range of actions: from side jobs, through investment in own employability, to obtaining  
 516 a gun licence. Saving using more than one tool is almost non-existent. Moreover, for those  
 517 using saving account or saving in cash no other instrument is used (Table 2).

518 **Table 2.** Spearman's correlation of the use of additional saving instruments

	saving account/ in cash	raising caring children	tangible investment	IKE	IKZE	PPE	insurance-based investment product	other
saving account/ in cash	1							
raising caring children	-0.1137	1						
tangible investment	-0.1673*	0.1320	1					
IKE	-0.3242*	-0.0558	-0.1203	1				
IKZE	-0.1310	-0.0359	-0.0398	-0.0284	1			
PPE	-0.1609*	-0.0441	0.0641	0.1121	-0.0115	1		
insurance-based investment product	-0.3058*	0.0102	-0.0554	-0.0712	0.0982	-0.0488	1	
other	-0.3175*	0.0756	-0.0547	-0.0773	-0.0256	-0.0314	-0.1083	1

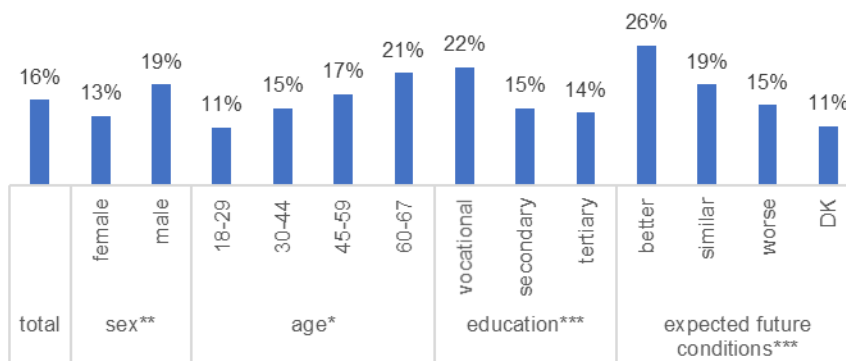
519 Source: author's own estimations.

520 Note: n=215 (individuals who declared at least one method of additional saving), \* for significance at  
 521 0.05 level

522

523 Keeping in mind the fact that replacement rates of Polish pensioners are decreasing and will  
 524 fall to 40% in 2030, expecting benefit levels close to current minimal pensions [880 PLN] is a  
 525 good enough guess. When asked whether they would be able to make ends meet with this  
 526 amount each month, 16% of respondents confirmed, and almost 84% denied (Figure 8). The  
 527 statistically significant differences were recorded for sex, education, and – to lesser extent –  
 528 also age, as well as for farmers comparing to other labour market groups.

**Figure 7.** Share of individuals declaring ability to make ends meet with minimal old-age pension [approx. 880 PLN]



Source: authors' own elaboration.

Note: Category of primary education omitted due to small number of observations.

529

530 PENSION STRATEGIES

531 FIRST-BEST SOLUTION

532 As we mentioned earlier, we intended to present in this section the results of principal  
 533 component analysis, describing various segments of savers. As this strategy turned out to be  
 534 unsuccessful, we decided to use binary logistic regression instead. We have run 6 binary  
 535 logistic regressions in order to identify the determinants of supplementary saving. The  
 536 regressions differ mainly in terms of sample covered. We assume drivers to supplementary  
 537 saving should increase if one expects material deterioration in the last stage of life. This  
 538 landscape is, however, much more complex. The results are presented in the Table 3.

539 Regardless of specification and sample, several conclusions can be drawn. Firstly, only few  
 540 categories are statistically significant for typical levels of significance. The higher the education  
 541 level, the higher the odds of supplementary saving. Similarly, personal income is a statistically  
 542 significant descriptor (with exception of *refusal* category). Generally, higher levels declared are  
 543 associated with higher odds of saving. The monotonical pattern is observed for whole sample,  
 544 and among payers of compulsory contributions, but not among those who are pessimistic  
 545 about their future material conditions. In this group maximum odds are observed for  
 546 respondents declaring income between 3,000-4,000 PLN. Some statistical regularities can be  
 547 drawn for various household sizes. In general, large households tend to save more than single  
 548 households, while medium-sized ones always save less than the reference category. When  
 549 analysing age groups, youngest category represents the lowest propensity to save – except  
 550 for those who expect deteriorating material conditions, where the eldest represent almost twice  
 551 as high odds of saving than the prime-age group. Last but not least, labour market status was  
 552 analysed. As individuals are able to work on the basis of more than one type of contract, we  
 553 could distinguish the impact of each category. However, this practice emphasized only a clear,

554 statistically significant impact for the self-employed, who save systematically more often than  
555 other categories (however, we should keep in mind the small sample in this case).

---

556 SECOND-BEST SOLUTION

557 As we mentioned earlier, 84% of respondents denied being able to make ends meet with  
558 minimum old-age pension. Keeping in mind the fact that most of them expect worsening  
559 material conditions, and the dominant expected replacement rate was well below 50%, logical  
560 question to raise is what are the alternative sources that would enable financing the  
561 consumption in the last stage of life. The most popular option was having a paid job (58.7%).  
562 Less popular alternatives include support from acquaintances (28.2%), and social assistance  
563 (24.4%). Protesting was mentioned by 12.5% of respondents expecting insufficient income in  
564 the future. By contrast, only 4.2% indicated that would use none of them.

565 In the next step we analysed how these second-best actions interact with each other and  
566 translate into strategies. The screeplot of eigenvalues identified 3 components (Table 4).  
567 Component 1 included support of social assistance, charity and acquaintances. Component 2  
568 included a paid job and no action. Component 3 included protesting and breaking the law.  
569 Thus, it would seem that available strategies concentrate around 3 types of actions: managing  
570 with the insufficient income on one's own (with particular focus on paid job), asking for external  
571 support, and rebelling.

**Table 3.** Determinants of supplementary saving – binary logistic modelling

variable		whole sample					whole sample					individuals paying compulsory contributions				
		OR	SE	p-value	95% CI		OR	SE	p-value	95% CI		OR	SE	p-value	95% CI	
sex	male	ref.					ref.					ref.				
	female	0.948	0.164	0.759	0.676	1.330	0.981	0.172	0.915	0.697	1.383	1.010	0.182	0.955	0.709	1.439
age	18-29	0.460	0.122	0.003	0.273	0.773	0.432	0.120	0.003	0.251	0.745	0.402	0.117	0.002	0.227	0.711
	30-44	ref.														
	45-59	0.997	0.217	0.989	0.650	1.528	0.954	0.211	0.830	0.618	1.471	0.895	0.204	0.627	0.572	1.399
	60-67	1.283	0.309	0.301	0.800	2.056	1.295	0.316	0.290	0.802	2.089	1.327	0.331	0.256	0.814	2.164
education	primary	empty					empty					empty				
	vocational	0.505	0.127	0.006	0.309	0.826	0.510	0.129	0.008	0.310	0.839	0.501	0.131	0.008	0.301	0.835
	secondary	ref.														
	tertiary	1.966	0.382	<0.001	1.344	2.877	1.867	0.369	0.002	1.267	2.751	1.815	0.371	0.004	1.215	2.711
place of residence	rural areas	0.766	0.196	0.298	0.464	1.265	0.833	0.218	0.486	0.499	1.392	0.796	0.215	0.400	0.468	1.353
	urban areas, pop. <50,000	1.025	0.280	0.927	0.601	1.750	1.032	0.287	0.911	0.598	1.779	1.058	0.303	0.844	0.603	1.856
	urban areas, pop. 50,000-200,000	ref.					ref.					ref.				
	urban areas, pop. >200,000	0.880	0.229	0.621	0.529	1.464	0.926	0.245	0.772	0.551	1.557	0.976	0.268	0.930	0.570	1.673
household size	1	ref.														
	2	0.737	0.183	0.220	0.453	1.200	0.783	0.199	0.336	0.477	1.288	0.763	0.202	0.306	0.455	1.281
	3	0.546	0.143	0.021	0.327	0.911	0.560	0.149	0.029	0.333	0.944	0.514	0.144	0.017	0.298	0.889
	4	0.527	0.157	0.031	0.294	0.943	0.536	0.164	0.041	0.295	0.975	0.511	0.162	0.034	0.275	0.951
	5+	1.789	0.617	0.091	0.910	3.516	1.831	0.639	0.083	0.924	3.627	1.894	0.683	0.076	0.935	3.840
personal net income [in PLN]	0-1000	0.545	0.364	0.363	0.147	2.018	0.502	0.349	0.321	0.129	1.957	0.392	0.313	0.241	0.082	1.873
	1001-2000	ref.					ref.					ref.				
	2001-3000	1.963	0.476	0.005	1.220	3.157	1.949	0.477	0.006	1.206	3.149	2.121	0.537	0.003	1.292	3.482
	3001-4000	4.283	1.486	<0.001	2.170	8.454	3.884	1.363	<0.001	1.953	7.725	4.183	1.576	<0.001	1.999	8.753
	>4000	3.800	1.581	0.001	1.682	8.587	2.864	1.300	0.020	1.176	6.971	3.336	1.632	0.014	1.279	8.700
	refusal	1.516	0.384	0.100	0.923	2.489	1.455	0.373	0.144	0.880	2.405	1.519	0.402	0.114	0.904	2.552
labour market status [yes]	labour-code contract						1.878	1.530	0.440	0.380	9.278	1.980	1.644	0.411	0.389	10.080
	fixed-term civil-law contract						1.574	1.328	0.591	0.301	8.225	1.486	1.302	0.651	0.267	8.278
	self-employment						6.140	5.077	0.028	1.214	31.046	5.603	4.711	0.040	1.079	29.110
	own business						2.283	2.010	0.349	0.406	12.826	1.928	1.738	0.466	0.330	11.277
	own farm						1.359	1.283	0.746	0.214	8.644	1.417	1.364	0.717	0.215	9.344
	student						3.760	2.956	0.092	0.806	17.550	5.485	5.149	0.070	0.871	34.535
constant		0.2512	0.0928	<0.001	0.1218	0.5184	0.124	0.110	0.019	0.022	0.706	0.124	0.112	0.021	0.021	0.729
N		985					985					917				
correct predictions		78.0%					79.0%					79.0%				

**Table 3. Determinants of supplementary saving – binary logistic modelling (cont.)**

variable		individuals expecting no better material conditions					individuals expecting worse or similar material conditions					individuals expecting worse material conditions				
		OR	SE	p-value	95% CI		OR	SE	p-value	95% CI		OR	SE	p-value	95% CI	
sex	male	ref.					ref.					ref.				
	female	0.946	0.170	0.757	0.665	1.346	0.957	0.183	0.820	0.658	1.393	0.877	0.205	0.574	0.554	1.386
age	18-29	0.443	0.127	0.004	0.253	0.775	0.573	0.171	0.062	0.319	1.028	0.575	0.207	0.124	0.283	1.165
	30-44	ref.														
	45-59	0.930	0.212	0.751	0.595	1.455	0.957	0.234	0.858	0.593	1.545	0.865	0.262	0.633	0.478	1.567
	60-67	1.343	0.336	0.239	0.822	2.192	1.418	0.377	0.189	0.842	2.386	1.875	0.632	0.062	0.969	3.629
education	primary	empty					empty					empty				
	vocational	0.483	0.128	0.006	0.287	0.810	0.503	0.143	0.016	0.288	0.880	0.357	0.130	0.005	0.174	0.730
	secondary	ref.														
	tertiary	1.777	0.361	0.005	1.194	2.645	1.972	0.425	0.002	1.292	3.010	1.866	0.498	0.019	1.106	3.148
place of residence	rural areas	1.016	0.279	0.953	0.593	1.741	1.099	0.322	0.747	0.619	1.952	1.444	0.560	0.344	0.675	3.089
	urban areas, pop. <50,000	1.071	0.312	0.814	0.605	1.896	1.145	0.357	0.665	0.621	2.109	1.420	0.576	0.387	0.641	3.145
	urban areas, pop. 50,000-200,000	ref.					ref.					ref.				
household size	urban areas, pop. >200,000	0.988	0.274	0.965	0.574	1.702	0.921	0.273	0.782	0.516	1.646	1.328	0.503	0.453	0.633	2.789
	1	ref.														
	2	0.742	0.195	0.256	0.444	1.241	0.712	0.199	0.223	0.412	1.230	0.676	0.229	0.248	0.348	1.313
	3	0.551	0.151	0.030	0.322	0.944	0.559	0.165	0.049	0.313	0.998	0.493	0.176	0.048	0.245	0.992
	4	0.501	0.158	0.028	0.271	0.929	0.454	0.154	0.020	0.234	0.884	0.639	0.256	0.264	0.292	1.402
personal net income [in PLN]	5+	1.689	0.609	0.146	0.833	3.424	1.496	0.568	0.288	0.711	3.147	0.912	0.430	0.845	0.362	2.300
	0-1000	0.519	0.361	0.346	0.133	2.030	0.630	0.452	0.520	0.154	2.571	empty				
	1001-2000	ref.					ref.					ref.				
	2001-3000	2.085	0.528	0.004	1.268	3.426	2.134	0.575	0.005	1.259	3.617	2.441	0.797	0.006	1.287	4.630
	3001-4000	4.213	1.519	<0.001	2.078	8.542	4.559	1.752	<0.001	2.146	9.683	3.107	1.540	0.022	1.176	8.206
	>4000	2.798	1.348	0.033	1.088	7.193	3.640	1.984	0.018	1.251	10.596	4.188	2.830	0.034	1.114	15.749
labour market status [yes]	refusal	1.456	0.386	0.156	0.867	2.447	1.466	0.419	0.181	0.837	2.568	1.547	0.535	0.207	0.785	3.048
	labour-code contract	1.758	1.455	0.495	0.347	8.904	2.027	1.895	0.450	0.324	12.665	0.925	1.023	0.944	0.106	8.074
	fixed-term civil-law contract	1.352	1.156	0.724	0.253	7.219	1.754	1.675	0.556	0.270	11.397	1.036	1.178	0.975	0.111	9.633
	self-employment	7.814	6.617	0.015	1.486	41.084	12.878	12.921	0.011	1.802	92.014	10.524	12.939	0.056	0.946	117.134
	own business	2.195	1.965	0.380	0.380	12.689	2.047	2.045	0.473	0.289	14.501	1.006	1.196	0.996	0.098	10.341
	own farm	1.163	1.105	0.874	0.180	7.493	1.515	1.588	0.691	0.194	11.810	0.684	0.821	0.752	0.065	7.201
constant	student	3.899	3.085	0.085	0.827	18.387	3.512	2.937	0.133	0.682	18.091	1.708	2.003	0.648	0.171	17.007
		0.130	0.118	0.024	0.022	0.769	0.109	0.111	0.030	0.015	0.808	0.186	0.230	0.175	0.016	2.113
N		921					779					538				
correct predictions		79.0%					79.0%					79.0%				

575 Source: author's own estimation.



576 **Table 4.** Principal component analysis of the actions undertaken provided insufficient old-age pension  
 577 levels

variable	before rotation			after VARIMAX rotation			unexplained
	comp 1	comp 2	comp 3	comp 1	comp 2	comp 3	
social assistance support	0.4611	0.1555	-0.4186	<b>0.6224</b>	-0.0827	0.1335	0.3754
charity support	0.5016	0.1820	-0.2397	<b>0.5780</b>	-0.0770	0.0464	0.4038
acquaintances support	0.4084	-0.2118	-0.2154	<b>0.4191</b>	0.2809	-0.0590	0.5672
paid job	0.0789	-0.7120	0.1018	-0.0999	<b>0.7159</b>	-0.0332	0.3292
protest	0.4723	0.1154	0.2979	0.2891	0.0427	<b>0.4897</b>	0.4543
breaking the law	0.2989	0.1888	0.7844	-0.0772	-0.0143	<b>0.8569</b>	0.1682
none	-0.2244	0.5847	-0.0803	-0.0578	<b>-0.6276</b>	-0.0386	0.4570

578 Source: author's own elaboration.

579 Note: n=837 (individuals who declared no possibility to make ends meet with minimal old-age  
 580 pension), comp – component, bolded: levels above |0.3|

581

## 582 DISCUSSION & CONCLUSIONS

583 The primary objective of this article was to analyse strategies working Poles undertake in order  
 584 to maintain decent living conditions as retirees. By *pension strategy* we mean a sequence of  
 585 actions aimed at providing the necessary level of consumption at the last stage of life, in  
 586 particular saving practices and labour market activity. Our interest is strongly associated with  
 587 the fact that the Polish pension system introduced in 1999 has the following basic features: (1)  
 588 the system is the tool of intertemporal consumption smoothing over the life cycle; (2) pension  
 589 system helps in distribution of GDP between working and non-working generations – no  
 590 intended redistribution occurs; (3) system is a tool of distribution and owns only negligible  
 591 assets. For the future retiree it means that the more is saved, the more can be received in old  
 592 age. Moreover, the earlier the economic activity starts, the longer the period that has to be  
 593 financed from this pension wealth. Finally, the expectations regarding future material  
 594 conditions can be adjusted, as system is transparent: key parameters are publicly known, and  
 595 key variables communicated to the future retiree.

596 We used the data from the survey *Pension awareness of Poles* to show how working Poles  
 597 act to maintain decent living conditions in old age, what they plan to do, and what are the  
 598 assumptions underlying these plans and actions. To our best knowledge, this is the only source  
 599 enabling for comparing all these issues. Our most general observation from the qualitative  
 600 analysis is no such pure pension strategy exists, due to huge internal incoherence. Plans does  
 601 not translate into actions, while expected deterioration rarely becomes an incentive to act. The  
 602 knowledge on basic mechanics of pension system is not widespread. In this context some  
 603 plans and actions may be rational, but still unfavourable from the individual perspective.

604 The pension knowledge is generally low. In many cases (amount of pension contributions paid,  
 605 expected replacement rates, preferred retirement age etc.) individuals honestly admit they do  
 606 not know the answers. Furthermore, it does not prevent them from wild-guessing – as in the

607 question on replacement rates. Very even distribution of answers regarding political economy  
608 of pension system confirms our suppositions regarding insufficient knowledge to understand  
609 the consequences of various systemic solutions (sources of financing, redistribution; issues  
610 etc.). It also becomes quite understandable that individuals prefer early labour-market exit,  
611 when half of them is not aware of the existing trade-off relationship between retirement age  
612 and benefit levels. Similar case happens with increasing net remuneration instead of paying  
613 compulsory contributions. The acceptance for this practice is massive (including work in grey  
614 economy) [ZUS & ISP 2016], even though perspectives are already poor, and estimations of  
615 [European Commission 2015] confirm further deterioration. This deep illiteracy leads to  
616 underestimating the power of long-term actions and to favouring consumption today.  
617 Moreover, the empirical literature such as Lusardi and Mitchell [2011] gives us strong grounds  
618 to believe that retirement knowledge of the non-working population (youths, long-term  
619 unemployed or economically inactive), not covered in our study, would be even worse.

620 In this context, one should be aware of the fact that the questions asked referred mainly to  
621 basic mechanics of the system that should be easily observable or experienced by a working  
622 individual. These questions were selected and formulated in order to avoid pure theory or up-  
623 to-date legal requirements. Such approach was chosen in the report prepared for the Social  
624 Insurance Institution [ZUS & ISP 2016]. A survey based on a questionnaire including over a  
625 dozen technical issues led to conclusion that no-one can call oneself an expert in this field and  
626 the sufficient knowledge is also virtually non-existent.

627 Very strong orientation towards low retirement age requires some additional comment. With  
628 low retirement knowledge, legal retirement age became a parameter warming the public  
629 opinion up to red, which is reflected both in the previous and recent surveys [CBOS 2016;  
630 2008; 2005]. Even though for an ageing-proof pension system this parameter is a secondary  
631 issue, political debate concentrated mainly on it, and electoral promise to reverse its increase  
632 was fulfilled promptly.

633 As shown in the literature review, it cannot be excluded that illiteracy is not the only factor that  
634 affects the individual decisions. The presented results may also be interpreted in other ways.  
635 First, they may be based on general mistrust towards pension system as a permanent social  
636 contract. This would not be very surprising keeping in mind that the current universal pension  
637 system has been implemented 19 years ago and in the meantime many elements have been  
638 dismantled (not affecting the general concept, though). If one does not trust in the pension  
639 system, immediate consumption seems to be a rational decision. Second, there is also a  
640 possibility that individuals have not internalized the features of new pension system and

641 ascribe some features from previous system. Since in the pre-1999 system the relation  
642 between contributions and benefits was subject to many changes and in general was not very  
643 clear (e.g. based on ten years with highest earnings or latest ten years of tenure, depending  
644 on which value is higher etc.), extrapolation of these patterns on new system would affect  
645 decisions. To some extent it would be understandable, as promotional actions regarding  
646 pension were time-distant, and parts of the system were unevenly promoted.

647 Nevertheless, if not through extended working lives, one can collect pension wealth through  
648 supplementary savings. In fact, long-term saving is not very popular in Poland – as we show,  
649 such practice refers to approximately one in five working individuals. Moreover, if it happens,  
650 it is performed via inadequate instruments, such as saving accounts and cash, which does not  
651 promote long-term character, regularity and is in danger of withdrawal on demand [Rutecka-  
652 Góra 2016]. Our results also confirm the lack of asset diversification, typical for financially  
653 illiterate individuals.

654 Logistic regressions we performed emphasized several interesting patterns regarding the  
655 saving practice. Some of them are in consensus with empirical literature. First, education level  
656 (which is a justified proxy of literacy) doubtlessly leads to higher probabilities of supplementary  
657 long-term saving practice. Second, income – in general the higher, the higher odds of saving,  
658 however, the relationship is not always monotonical. In this context, additional educated guess  
659 arises, that – if reversed causation is holding – respondents refusing answer on their income  
660 largely represent pattern for lower quantiles.

661 Furthermore, atypical behaviour of elder individuals is observed. In the 60-67 age group the  
662 highest odds of saving practice was observed for those who expect deterioration in material  
663 conditions in old age (that is, *soon*). This is not a sign of forward-looking behaviour, it is just  
664 enforced by raising awareness. In addition, this group has not yet experienced the increased  
665 expenses characteristic for oldest-olds. It would seem that saving practice happens wither  
666 when one has sufficient income and knowledge (which, technically, are correlated), or when is  
667 forced by soon-to-be-realized poverty.

668 Slightly different case was observed for various types of labour contracts. Except for the self-  
669 employed (companies with one worker, namely the owner) all categories were characterised  
670 by high p-values and wide confidence intervals. Self-employed are systematically more prone  
671 to long-term saving on their own. The reason for this state of things is quite intuitive – this  
672 category was the only one not forced to pay social contributions. This situation referred to  
673 cleaning persons forced to reduce the labour costs, as well as well-paid experts optimising

674 their incomes. While both groups have different capacities for additional saving, responsibility  
675 is completely transferred on the company.

676 The projections of gloomy and modest lives of future retirees, in combination with their  
677 passiveness, led us to ask, what actions are considered if the level of income will be insufficient  
678 to make ends meet. This level was approximated by today's minimum old-age pension. In  
679 some sense this is a useful, but not very precise example – the amount of 880 PLN was far  
680 above the social minimum (not to mention the subsistence minimum) and the projections of  
681 [European Commission 2015] leave no doubt this level cannot be kept. Nevertheless, only 3  
682 people in 20 believe they would cover all their needs with is amount. It should be mentioned  
683 that as individuals age, their needs are growing, and in the future most of them will have to be  
684 purchased (due to changing demographic structures) while the ability to earn a living will  
685 decrease.

686 As one may see, our question is not groundless. The principal component analysis led us to  
687 conclusion that individuals not meeting their needs would form 3 separate strategies: to rely  
688 on themselves, in particular – search for a paid job; ask for external support (of which most  
689 popular is acquaintances support, and slightly less popular – social assistance support), or  
690 rebelling (including protesting and breaking the law). The latter was considered by approx.  
691 15% of respondents, which is quite a lot.

692 All these results can – and should – be interpreted in the light of public policy. First, the  
693 introduction of the universal pension system in Poland was not preceded by significant  
694 dissemination of financial literacy. Future generations will most likely save more and retire later  
695 on the basis of the experiences of today's generations, but such crash-testing for more  
696 advanced generations was not an intended outcome. In addition, strong polarisation of  
697 knowledge, plans and actions is observed, which leads to unintended redistribution. Second,  
698 keeping in mind financial illiteracy, low saving rates and planned early withdrawals, in times of  
699 demographic ageing, the role of politicians will be even more difficult. Increasing political power  
700 of elder generations will be oriented at shifting the balance of interests between working and  
701 retiring generations. Changing it in reaction to this increasing power is an unsustainable  
702 solution.

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