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HOW TO MEASURE FINANCIAL WELL-BEING OF PENSIONERS? VARIETIES OF EU PENSION SYSTEMS BASED ON BENEFITS

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Abstract

Purpose. Pension systems are the basis of old-age security. Comparing them across EU Member States is a complex process due to the differences in benefit calculation methods, taxation of pensioners' income and the role of the private sector. This article aims to present a measure of the financial well-being of pensioners in the EU and to identify similarities between countries in terms of benefits. Five indicators were considered: nominal income, replacement ratio, lack of poverty, public pensions to GDP, and ability to spend on pleasures.

Methodology. Hierarchical cluster analysis using Ward's method was used to identify similarities between countries. An index of retiree financial well-being was developed using the Zero unitarization method.

Findings. The study proposes a broad measure of pensioners' financial well-being. This metric encompasses not only the public pensions, but also private pillars and wealth accumulated outside the pension system. Significant differences in the well-being of pensioners across EU countries has been identified. Hierarchical cluster analysis confirmed a relationship between the different models of capitalism in the EU and the current pension provision. The highest pensions were identified under the pay-as-you-go basis, which casts doubt on the possibility of maintaining their level in the future.

Keywords: pension system, III pension pillar, retirement saving, welfare states

JEL Classification: I38, J18, P51, H55, J32

Introduction

In developed countries, the pension system is the basis for old-age security. Longer lifespan and lower fertility (falling number of people of working age) expose it to higher cost of benefits paid

to broader groups of retirees and insufficient contributions (Goodhart & Pradhan, 2020). Legislators in many EU countries took some unpopular steps to protect the stability of public finances: reduced old-age benefits or raised the retirement age (including setting up a linkage with life expectancy) (European Commission, 2021). Expected continuation of these phenomena requires a rethinking of the consumption-saving decision during an individual's life (for example more people should save in the III pillar) and will probably encourage many researchers to study this topic.

Comparative analysis of the pension systems is a challenge due to different solutions used in them. EU member states use five methods for benefits calculation, establish differentiated retirement ages and impose various tax rates on pensioners' income. Additional aspects of pension systems, like special privileges for particular groups, further complicate a holistic analysis. One of the common measures used in the comparison of pensions is replacement rate at effective (vide European Commission, 2021) or statutory (vide OECD, 2021) retirement age. However, this measure does not consider the age from which the pension is paid (it impacts pension total discounted value) and missed lower taxation of old age income, when presented in gross values. Poverty among pensioners is also ignored (Chybalski & Marcinkiewicz, 2016).

This article presents a "retiree financial well-being index" which is a possible way of ranking financial welfare of average pensioners among countries. Thanks to combining five indicators, it provides more accurate results and enables to consider welfare both in absolute and relative (compared to entire society income) terms. The proposed measure can be used in many ways. Firstly, it can be a starting point for the analysis of pension systems in the EU and the reasons/consequences for the lower/higher generosity of individual solutions. Additionally, assuming that some people make decisions about saving for retirement not based on forecasts of future pensions, but on the amount of current pensions (received by their parents and grandparents), the index values may be used to explain the degree of use of voluntary pension solutions (III pillar). Another way to use the index for further research is to use it as a measure of one of the social protection dimensions while examining the varieties of capitalism in Europe.

The article is organized as follows: section 2 is a literature review, section 3 presents variables used in the study, creation of the index and the methods used. Section 4 describes results and discusses the relationships between the retirees' well-being and the pension system/capitalist model in selected countries, section 5 concludes the research.

1. Literature review

Different variables have been used to classify pension systems. One of the first divisions was made by Esping-Andersen (1990), who researched the share of pensions paid from public and private programs and distinguished three "pension regimes": corporatist, residual and universalist. While the corporatist system rewards selected professional groups (civil service employees in particular), the universalist one covers the entire population. Residual systems are characterized by a significant role of pensions paid from private programs. More than 30 years after this categorisation, some of the criteria have lost their importance because modern pension systems have moved away from privileging special occupational groups, while II and III pillars, have developed since then.

Classification based on variables significant for modern pension systems was carried out by Marcinkiewicz and Chybalski (2019) and included: type of participation (compulsory/voluntary) and a manager (private/public sector). On this basis, they distinguished three groups of countries. In the first one, voluntary pension plans offered by the private sector are important. In the second, compulsory private pensions play a significant role, while in the third, compulsory public pensions dominate. Theoretically, due to the researched variables, it was possible to identify countries with a public voluntary pension system, but in reality solutions do not exist (Marcinkiewicz &

Chybalski, 2019). The cited study can be interpreted as confirmation of the division of pension system into three pillars[1] in the World Bank (2008) classification: I (mandatory public), II (mandatory occupational), and III (voluntary private); with different weights of pillars, determining the functioning of the entire system.

Different pillars in the pension system are also related to different funding methods. While pensions paid by private plans (pillar II and III) are financed by accumulated capital (invested on the capital market), in all EU countries public pensions are financed from contributions paid by current workers (Pay As You Go model)[2]. Depending on the detailed solutions (e.g. investing in foreign assets), the method of financing pensions may affect sensitivity of the pension system to demographic changes, as well as capital accumulation in the economy. However, this impact is ambiguous, and depends most on the specificity of a particular country (Barr, 2002; Barr & Diamond, 2009; Lindbeck & Persson, 2003; OECD, 2005).

The Pension Systems Index published annually by Mercer (2023) takes three dimensions (sub-indexes) into account: adequacy (providing of appropriate benefits), sustainability (ability to function stably in the future), integrity (quality of legal regulations and supervision of pension funds). This allows the authors to assign the pension systems of the 47 countries to one of the seven grades and recommend directions for reforms. The adequacy sub-index measures the amount of currently paid benefits, considering diversified dimensions. Its value depends on 11 variables[3], however, the highest weight is assigned to minimum pension replacement rate (measured in comparison to an average salary – 20% weight in sub-index) and net replacement rate (compared to last salary) for people from different income levels (25%). Although the authors point out that the appropriate replacement rate is higher for low-income earners – to guarantee a decent life – its optimal level was assumed at 70% (for earnings-related pensions) for all income groups (Mercer, 2023). The next 15% weight in sub-index (sum of three components) is assigned to: household saving rate, net household debt and level of home ownership. These indicators reflect the assets owned by future retirees in the IV pillar, which includes all assets held outside the pension system by the household (World Bank, 2008). They can also (as well as these in I, II, and III pillar) be used to provide security in old age, e.g. thanks to the use of reverse mortgages (or not burdening future income by debt repayment).

Pension systems can also be classified according to their main purpose: smoothing consumption during life or counteracting poverty in old age – the Bismarck and Beveridge models, respectively. The „Bismarckian factor" which determinates the dependence of pension on income during one's career differs in this (two) models. In purely Bismarckian pension system, the ratio of pension to income is identical for people from all income brackets, whereas in a purely Beveridgean one all people receive the same benefit. Measurement of the „Bismarckian factor" is possible to carry out using econometric methods and was performed by Krieger and Traub (2008).

Another method of classifying pension systems (which focuses mainly on one pillar) is to compare practices of calculating the amount of pension. In Europe, there are five ways of the I pillar benefit calculation: Defined Benefit (DB), Defined Contribution (DC), Hybrid (HY), Flat

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[1] The above classification also distinguishes the zeroth pillar (social assistance for the poorest, independent of the payment of contributions) and the IV pillar (property outside the pension system and family assistance) (World Bank, 2008). They have been omitted here because the activities of European legislators regarding pension security focus on pillars from one to three (European Commission, 2021). The zeroth and fourth pillars will be taken into account later in the article.

[2] Only Finland, Luxembourg and Sweden have a significant (greater than 10% of GDP) public pension reserve fund (OECD, 2021).

[3] Occurrence and value of basic/targeted pension; net replacement rate (for mandatory and widely used voluntary pension programmes); household saving rate and net debt; initiatives to save in the III pillar; presence of minimum age to withdraw money from private pension plan; requirements and initiatives to annuitize private pension; treatment of occupational pension benefits after changing an employer; division of pension benefits in case of divorce; level of home ownership; proportion of pension assets (public and private) invested in growth assets (equities and property); accruement of retirement benefits during e.g. parental leave, ill health or disability.

Rate (FL), and Point System (PS). In the DB system, the saver is generally entitled to previously known amount of benefit at retirement, while in DC only the amount of the contribution paid to the program is determined – the benefit depends on the accumulated amount and remaining life expectancy, while HY is a combination of both. Pensions in the FL model are paid independent of income but may depend on the number of years of work/residence in a country. In PS system, the pension amount is the quotient of pension points collected by employees during career and the pension amount per one point (Cichon, 1999; OECD, 2021; Serrano & Peltonen, 2020). Information on the models used in EU countries is available in publications of the European Commission (2021, p. 52) – I pillar and European Insurance and Occupational Pensions Authority (2015, p. 12) – II pillar. However, this distinction does not apply to the III pillar, because except for two countries (Austria and Croatia), throughout the EU they are based on DC (Lakotová & Zamrazilová, 2019).

The above-mentioned method of calculating benefits is important because it considers the distribution of risk between savers and the pension plan manager, what may influence retiree well-being in a long run. DB systems are indicated as vulnerable to unfavourable demographic or macroeconomic changes because the benefits are fixed and cannot be reduced (savers receive predictable pensions, while managers take market and demographic risk)[4]. Therefore, in state-managed systems, there may be pressure to increase the deficits or taxes, while in privately managed there is a solvency risk. In DC systems, the situation is different, because negative phenomena result in a decline in benefits – which may translate into an insufficient pension for future retirees (International Monetary Fund, 2017; Jakubowski, 2022; Serrano & Peltonen, 2020).

2. Data and methodology

To construct the retiree financial well-being index, four most important factors influencing the economic situation of a pensioners were identified. They include:
– High nominal income,
– Lack of income decline after retirement (pension close to last salary),
– Income close to the median in society (lack of relative poverty),
– High satisfaction from consumption (ability to spend money on pleasures).

The selection of factors reflects different dimensions that may influence well-being in retirement. Nominal income defines how much goods and services retirees can purchase in absolute terms. This is an important indicator of life quality but ignores the level of consumption achieved during work and by other community members. These variables are reflected by subsequent factors: the ratio of the pension to the last salary indicates whether after retirement individuals are forced to limit their consumption, and the absence of risk of poverty determines whether the retirees' standard of living does not differ significantly from the standard in each country. (An additional measure of pensioners' income in relation to all society is the amount of government spending on pensions). The ability to spend on pleasures is the last factor measured; its purpose is to reflect whether retirees, after many years of professional activity, can enjoy the fruits of their labour by affording non-essential expenses. This quite subjective measure gives some weight to factors which are hard to estimate, like accumulated (outside pension system) or inherited wealth. It is also an important factor influencing pensioners' well-being. For example, Härtull and Nygård (2024) used similar subjective measure (capacity to make ends meet) alongside objective (household quintile in the country income range) when studying poverty among EU senior citizens.

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[4] In practice, in some countries' solutions protecting the I pillar stability are introduced. They include linkage of retirement age or benefits with life expectancy, indexation determined by the economic situation or balancing mechanisms (which impact both benefits and a contribution rate) (Bravo & Ayuso, 2021; OECD, 2021).

Based on the above-mentioned factors, variables which construct the index have been identified – they are presented in Table 1. Selected variables reflect subsequent factors (listed in the order they had been mentioned above) influencing well-being, although some of them, in the Eurostat methodology, appears as destimulants: variable "high satisfaction from consumption" is measured as "lack of money for pleasures" as well as "income close to the median in society" reflected by "at risk of poverty rate." Other variables act as stimulants – higher value means higher well-being. The amount of the average pension in relation to GDP was introduced as an additional measure of the share of pensioners in society's income (indicating what part of GDP per capita, the government redistributes to the average pensioner).

Table 1. Variables used in retiree financial well-being index

Variable	Description
Median equivalised income	Median net equivalised income of people aged 65+ (including private and public pensions, social transfers, investment income, and salary) PPS
Aggregate replacement ratio for pensions	Ratio of median pension income of population aged 65-74 to median salary of population aged 50-59 (excluding other social benefits and investment income, including pensions from private plans[5])
At risk of poverty rate	Percentage of pensioners aged 65+ at risk of poverty (receiving income less than 60% of mean income, after social transfers)
Lack of money for pleasures	Percentage of persons who cannot afford to spend a small amount of money each week on themselves (buy something for pleasure: go to the movies, buy a magazine/small book/cake, go to the hairdresser) in population aged 65+
Average public pension to GDP per capita	Government expenditure on old age pensions (% of GDP) divided by the percentage of people aged 65+ in total population

Data were collected from Eurostat (2023a, 2023b, 2023c, 2023d, 2023e, 2023f). All variables as of 2022 (except "average public pension to GDP per capita" where 2021 was the latest available).
Source: own elaboration.

Selected variables are intended to reflect many opportunities for retirees to obtain appropriate consumption in old age. Nominal income includes social benefits, as well as income from investments and voluntary pension programs – therefore it is a broader measure than the pension (replacement ratio). "Lack of money for pleasures" is even wider because it reflects all the assets accumulated by retirees (and the opportunity to spend them), not only the funds counted as "income" in the 2022 year. Nevertheless, the constructed index to some extent gives greater weight to pensions paid from the I pillar, because they have a positive impact on each of the variables (not only one or two) which may bias the results.

Table 2 presents descriptive statistics of variables used in index construction, while Table 3 shows correlation among them. The direction of correlation among all variables is explainable from an economic point of view. A higher replacement rate results in a lower risk of poverty and the ability to spend funds on small pleasures. It is accompanied by a higher median income and a higher percentage of GDP allocated to pensioners. At the same time, the risk of poverty is lower in countries where a proportionally larger part of GDP is spent on pensions, and where pensioners'

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[5] Eurostat distinguishes two groups of pensions, one classified as: "Pensions from individual private plans" – regularly paid pensions from voluntary schemes, and the second one classified as "Social benefits" – mandatory and based on the principle of social solidarity (i.e. entitlements and premium are not proportional to the risk exposure) (Eurostat, 2022). Used measures include both types of pensions, to better reflect well-being on retirement (resulting also from incentives for voluntary saving).

incomes are higher, which makes spending on pleasures possible. There is also a positive corre-lation between pension expenses and retirees' income and a negative correlation with having funds for pleasures (this variable is also negatively correlated with nominal income).

Table 2. Descriptive statistics of variables at the EU level

Variable	Mean	Standard deviation	Minimum	Maximum
Median income (EUR)	15 332	5 900	7 207	35 599
Replacement ratio (%)	53	14	33	89
At risk of poverty (%)	21	12	8	62
Lack of money for pleasures (%)	10	9	2	37
Average pension to GDP (%)	40	10	24	60

Source: own elaboration based on data as in the Table 1.

Table 3. Correlation matrix of variables at the EU level

Median income	Replacement ratio	At risk of poverty	Lack of money for pleasures	Average pension to GDP	
1.00	**0.49**	-0.46	**-0.53**	0.40	Median income
	1.00	**-0.57**	-0,01	**0.53**	Replacement ratio
		1.00	0,12	**-0.63**	At risk of poverty
			1.00	-0.04	Lack of money for pleasures
				1.00	Average pension to GDP

Note: bolded correlation coefficients are significant at 1% level.
Source: own elaboration based on data as in the Table 1.

To create an index, it is necessary to standardize the measures, dividing them into stimulants and destimulants. For this purpose, the Zero unitarization method will be used. It allows the values to be standardized in the range from 0 to 1 (where 0 means the worst situation and 1 the best). Standardization is accomplished by the following equations (equation 1 for stimulants, 2 for des-timulants) (Kukuła, 2000).

$$S_i = \frac{X_i - min_i}{max_i - min_i} \qquad (1)$$
$$S_i = \frac{max_i - X_i}{max_i - min_i} \qquad (2)$$

Where Xi is the actual value of the variable, min_i and max_i are respectively the lowest and the highest value of the variable.

In the next step, the arithmetic mean of the standardized values was calculated to obtain the index. To facilitate data presentation, the average values for countries were then multiplied by 100. The result is a retiree financial well-being index, with the values in the range <0;100>.

Similar methodology was used by the UN in calculation of Human Development Index (United Nations Development Programme, 2007)[6]. The use of an arithmetic variable assumes the

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[6] When constructing the retirement well-being index, there are no fixed minimum/maximum values used for standardization, they are (unlike the HDI construction) selected from the sample. This makes the index relative: dependent on the sample and the year of the study – representing the situation in one country compared to others in the sample. Since 2010, the HDI has been calculated using the geometric mean instead of the arithmetic mean, eliminating the assumption of full substitutability between dimensions (United Nations Development Programme, 2010).

occurrence of (at least partial) substitution between variables. For example, high nominal pension can compensate for a decline in income after retirement (relative to an even higher last salary) – a person living in a country with such a pension system will likely feel similar "well-being" to a person who has earned a low income throughout his life and receives a small pension (although close to the last salary). However, this relationship is taken for granted and is difficult to be verified empirically. If a different "well-being perception" applies (e.g. without substitution among variables), an alternative method of index calculation should be used, such as the geometric mean (Mazziotta & Pareto, 2015).

After creating an index, it is possible to group countries according to the index values, for example, to separate groups by index values for individual countries in relation to the mean and standard deviation. However, such an analysis ignores the values of individual variables constituting the index and does not allow to determine the number of groups into which the division should be made.

Therefore, to identify the existing "welfare/pensions regimes," a better tool is hierarchical cluster analysis (Powell & Barrientos, 2004) which divides the sample into many groups and then combines them into larger clusters. This makes it possible not only to identify the clusters (at different levels of similarity) but also to determine to what extent the countries constituting them are similar to each other. Therefore, the study will also present a dendrogram performed by hierarchical cluster analysis, with the usage of squared Euclidean distance and Ward's method (Ward, 1963).

3. Results and discussion

The index values are presented in Table 4. Obtained results reflect the relative level of senior citizens' financial prosperity in EU countries. The range of variables creating the index (presented in Table 2) means that there is a significant difference in the level of financial well-being of elderly people between countries. (Values of particular variables for all countries presented in Table 5 in the Appendix).

Table 4. Values of retiree financial well-being index

Country	Index	Country	Index	Country	Index	Country	Index
Bulgaria	17	Malta	41	Poland	58	Finland	63
Estonia	24	Hungary	44	Greece	59	Spain	68
Lithuania	26	Czechia	52	Portugal	60	Italy	71
Latvia	29	Slovenia	52	Belgium	60	France	72
Croatia	29	Cyprus	54	Denmark	60	Austria	77
Romania	34	Slovakia	55	Netherlands	62	Luxembourg	86
Ireland	38	Germany	58	Sweden	63		

Source: own elaboration.

Graph 1 presents the dendrogram created on the values of individual variables. Obtained results show the existence of two main groups (cutoff at a distance 10) – one includes countries with an index value below 44 and Slovakia, while the second other EU countries[7].

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[7] Analysis performed by the k-means method (to verify obtained results), confirmed that countries belong to the same two clusters, with five exceptions: Czechia, Cyprus, Romania, Slovenia, and Slovakia. They were assigned to another group than in the hierarchical cluster analysis. ANOVA proved, that for both clustering methods, all variables except "Lack of money for pleasures" are statistically significant differentiating criteria.
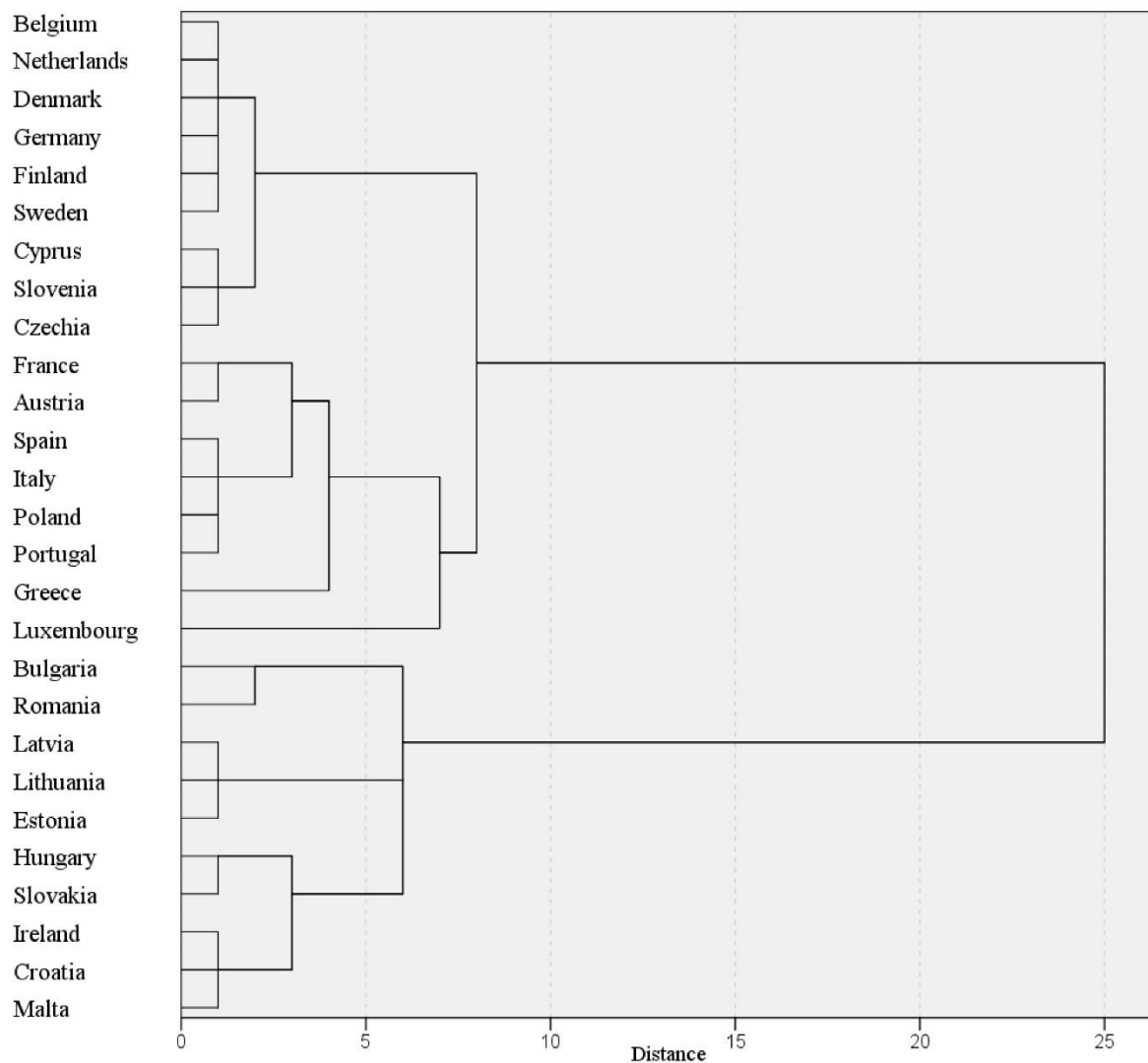
Figure 1. Dendrogram – result of hierarchical cluster analysis

Source: own elaboration with IBM SPSS programme.

What is also important, the results confirmed the similarities among countries observed in other studies (concerning broadly defined models of capitalism), and obtained results are consistent with countries' models of capitalism. However, it should be noted that the structure of social security systems is most country-specific of all the commonly researched institutional areas (including: product, labour, and housing markets; financial system; education) (Rapacki, 2019). Therefore, it should be assumed that obtained results may not fully reflect the models of capitalism. In order to describe the results in more detail, clusters containing more similar countries (based on the graph) will be discussed.

The pension systems in the Baltic states (Latvia, Lithuania, Estonia) are highly similar, while the low index values result from the transformation towards a neoliberal model after the collapse of the Soviet Union, combined with the limitation of pension benefits (Bohle & Greskovits, 2012). Additionally, in all these countries poverty rates among pensioners are higher than in the working age population (the difference is especially high in comparison with other EU states – in many of them, poverty rates are lower in groups age 65+) as well as senior citizens' income

inequalities are comparatively (to other countries) high. It confirms that Baltic states haven't created effective social protection systems that reduce poverty or compress pensioners' income distribution (Ebbinghaus, 2021).

The Nordic countries (Denmark, Finland, Sweden), associated with high social benefits and a social democratic model of capitalism (Amable, 2003; Powell & Barrientos, 2004) also have very similar pension systems. These countries were identified by Esping-Andersen (1990) as having high decommodification capability (also in the case of old-age benefits; in particular Denmark and Sweden). Interestingly, these countries did not obtain the highest index values, but only above average, this may be due to the priority given to expenditures to support families instead of pensioners in these countries' social protection systems.

The opposite situation occurs in the Mediterranean countries, where pension expenses constitute an important part of (less developed than in the Nordic countries) social protection system (Amable, 2003)[8]. Countries from this region (Spain, Italy, Portugal, Greece; the latter slightly standing out from the others) were classified as having a similar pension system (in cluster analysis). Index values placed them above average – with significantly higher values for Spain and Italy.

Ireland, depending on the study, is classified as either a liberal market economy (Esping-Andersen, 1990; Hall & Soskice, 2001) or closer to the continental European model (Amable, 2003). In the measure of retiree well-being, the country achieved low values, similar to those of the former Communist countries and Malta. This may confirm that, in the case of pensions, this country is closer to the liberal market economy because it offers retirees smaller benefits compared to continental countries. In Ireland, the I pillar offers flat rate benefits, which means that regardless of income, each retiree receives a similar (small) pension. This results in a replacement rate of 34% (EU average 53%) and low values in the case of other dimensions of financial well-being. There are occupational pensions in Ireland, however, they are offered voluntary only by some employers. The small values obtained by this country in the created index may be one of the reasons for the introduction of a new retirement account, with automatic enrolment and limited opt-out options, planned for the 2026. This should result in a noticeable increase in financial well-being in retirement, because the contribution rate will be up to 14% of salary – 6% financed by the employee, the rest by the employer and the state (Department of Social Protection, 2022).

Luxembourg is also an interesting example. This country received the highest marks of all countries[9] in three of the five index components (replacement ratio, median income, lack of money for pleasures) and the second highest for "at risk of poverty," relying mainly on the I pillar because occupational pensions are voluntary (OECD, 2015). Only in the measure of "average pension to GDP" this country achieve middling results. Therefore, it obtained the highest index value and was classified as the most outlier (from other countries) in the cluster analysis[10]. This is possible due to Luxembourg's generous pension system, which includes: a basic pension (543 EUR[11]) and an earnings-related pension (between 1,788% and 2,05% of total accumulated income). There is also a minimum pension (1,986 EUR) guaranteed after at least 40 years of career (OECD, 2023a). Such structure of the pension system, as indicated by the index components, ensures an appropriate replacement rate, a decent pension for people with low earnings and an even distribution of income in the society.

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[8] OECD (2023b) data for 2019 confirms the persistence of this relationship. Average public expenditure on family benefits (as a percentage of GDP) in the Nordic countries was 3.2% while in the Mediterranean 1.4%. Simultaneously, expenditure on old-age and survivors benefits amounted to 9% and 13.4%, respectively.

[9] The highest ratings correspond to the highest values after standardization and unification of the measures.

[10] Luxembourg has the greatest distance, of all EU countries, from the most similar country (the one for which the distance measure – the square of the Euclidean distance – is the smallest).

[11] All values as of 2022.

In the case of other countries, the dependence on the model of capitalism is less visible. However, the countries identified as the continental European model (Belgium, Netherlands, Germany, France, Austria) achieved results above average and all were classified as providing quite similar benefits. Notwithstanding, Austria and France offers higher benefits (the highest index values, except Luxembourg) and are classified as closer to each other than to remaining countries.

The remaining post-Communist countries: Slovenia, Czechia, Poland, Bulgaria, Romania, Hungary, Slovakia, and Croatia were classified as similar to different models of capitalism, confirming that they have adopted different models of economic development after independence. This makes (at least part of) them more comparable to Western countries than to each other (Rapacki, 2019). Cyprus was discovered most similar to Slovenia and Czechia, but all three countries are close to Nordic/continental European group.

It is also interesting how countries achieve a given level of retiree well-being. Comparison of obtained groups/subgroups does not show a clear connection with pensions regimes identified by Marcinkiewicz & Chybalski (2019)[12]. Although the highest index values (above 63) were obtained by countries whose pension systems are based mainly on public pensions[13], in the cluster analysis countries with different pension systems were identified as very similar to each other. For example, Denmark, Netherlands and Sweden (countries with a significant share of mandatory private pensions) were identified as very similar to Belgium, Germany, and Finland – countries with a key role of public pensions. A similar situation occurs in the case of Slovakia (high similarity to Hungary) and Poland (a system similar to Italy, Portugal and Spain).

Additionally, countries with important voluntary pensions were identified as providing little financial welfare to retirees. This may confirm the thesis, that in countries with a less generous pension system, people save for the future on their own (or expect their employer to do so, even without statutory obligation), while generous mandatory systems crowd out the III pillar. However, the studied sample is too small to draw such conclusions. Conducting research (including index calculation) on a sample with more countries relying on voluntary pensions should address this issue. Detailed study of the III pillar solutions, including financial and behavioural initiatives could also provide more precise results.

Summary

The article presented a possible way to measure the well-being of retirees from individual EU countries. The proposed index uses five components, which allows for a broad assessment of the financial situation of elderly people, going beyond the solutions of a specific pillar in the pension system, or even taking into account other sources of funds available to elderly people. Diversified dimensions allow also to conduct hierarchical cluster analysis. Proposed measure can be used in future research as a method of measuring the well-being of retirees in different countries (depending on the availability of data) or to determine its change over time[14].

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[12] This study concerned OECD countries and assigned: Czech and Ireland to the group of countries where voluntary pension plans are important. Denmark, Estonia, Netherlands, Poland, Slovakia, and Sweden to one with significant compulsory private pensions. The rest of the OECD countries (Austria, Belgium, Finland, France, Germany, Greece, Hungary, Italy, Luxembourg, Portugal, Slovenia, Spain) where classified as relying mainly on compulsory public pensions. Based on European Commission (2021) data, it can be assumed that Bulgaria, Croatia, Cyprus, and Malta (countries not covered by the study) also have a system based on public pensions. Classification of Latvia, Lithuania, and Romania is ambiguous.

[13] Public pensions entail some intra-generational redistribution, so their greater importance in the entire pension system translates into lower levels of inequality and poverty among older people (Been et al., 2017). This may be one of the reasons why these countries obtained high scores.

[14] In this case, it may be helpful to specify minimum and maximum values for variables when standardizing, as in the Mercer studies and the HDI construct.

The range of values used as index components showed that there is significant variation between the well-being of retirees in EU countries, while cluster analysis identified two main groups of countries. The division of countries into more similar subgroups showed that there is a connection between the model of capitalism existing in each country and the well-being of retirees – countries identified as having a similar economic model are identified as similar in the cluster analysis. This applies in particular to the Baltic, Nordic and Mediterranean countries.

Index values can serve as one of several components in a comprehensive assessment of pension systems. The presented index reflects the well-being of current retirees, but ignores, among other things, the ability of the pension system to maintain them at the same level in the future – its long-term sustainability. This issue requires further research, as the highest index values were obtained in countries relying on a public pension system, which operates in the pay as you go model. While countries with a significant share of funded pension schemes (especially Denmark and Netherlands) received lower (but also high) scores.

Additionally, analysis was performed on data relating well-being of current pensioners, so it does not take into account changes in pension systems affecting younger cohorts (like less generous ways of benefit calculation) and different attitudes to voluntary saving among generations (Domańska, 2025; Xie et al., 2023). As a result, future index levels (e.g. after 30 years) of particular countries may be different. To issue recommendations for future reforms of the pension system, the expected benefits of current workers and possible differences among professional groups (including access to company pension schemes) should be studied. Such research may concern the same variables that were presented in this article[15] (go beyond gross replacement rate) but focus on their values expected for future generations of pensioners.

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[15] Except subjective variable "lack of money for pleasures," which is impossible to forecast.

Appendix

Table 5. Values of variables constructing the index for individual countries

Country	Median income (EUR)	Replacement ratio (%)	At risk of poverty (%)	Lack of money for pleasures (%)	Average pension to GDP (%)
Belgium	18 726	48	17	8	47
Bulgaria	7 207	36	39	29	29
Czechia	11 990	49	17	3	36
Denmark	18 839	45	14	4	45
Germany	20 302	47	18	6	42
Estonia	10 030	44	62	6	24
Ireland	16 765	34	25	7	24
Greece	10 674	75	12	31	59
Spain	17 391	76	15	11	48
France	19 525	57	12	9	59
Croatia	9 477	37	31	13	26
Italy	18 134	75	14	6	47
Cyprus	15 861	42	22	2	41
Latvia	8 836	42	48	12	32
Lithuania	9 640	33	43	13	29
Luxembourg	35 599	89	11	2	37
Hungary	9 869	53	13	12	28
Malta	15 831	53	26	14	26
Netherlands	19 672	52	17	8	48
Austria	24 131	59	15	4	60
Poland	13 649	61	16	10	44
Portugal	11 920	66	15	12	48
Romania	9 874	52	18	37	40
Slovenia	15 627	43	19	5	38
Slovakia	9 566	60	8	10	38
Finland	17 364	50	15	4	48
Sweden	17 476	54	16	3	45

Source: own elaboration based on data as in the Table 1.

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JAK MIERZYĆ DOBROBYT FINANSOWY EMERYTÓW? RODZAJE SYSTEMÓW EMERYTALNYCH W UE NA PODSTAWIE ŚWIADCZEŃ

Streszczenie

Cel. Systemy emerytalne stanowią podstawę zabezpieczenia na starość. Porównywanie ich między państwami członkowskimi EU jest jednak skomplikowane ze względu na znaczne różnice w sposobach wyliczania świadczeń, opodatkowaniu dochodów emerytów i roli sektora prywatnego. Artykuł przedstawia miarę dobrobytu finansowego emerytów w krajach UE oraz identyfikuje podobieństwa pomiędzy poszczególnymi krajami ze względu na wypłacane świadczenia. W opracowaniu wzięto pod uwagę następujące zmienne: nominalny dochód, stopę zastąpienia, brak względnego ubóstwa, wydatki państwa na emerytury w stosunku do PKB oraz posiadanie przez emerytów środków na wydatki na przyjemności.
Metoda. Hierarchiczna analiza skupień została wykonana z wykorzystaniem metody Warda, co pozwoliło na identyfikację okrajów o podobnym poziomie świadczeń. Indeks dobrobytu finansowego emerytów zbudowano z wykorzystaniem metody unitaryzacji zerowanej.
Wyniki. Artykuł proponuje szeroką miarą dobrobytu finansowego emerytów, biorąca pod uwagę nie tylko emeryturę z I filaru, ale również II i III filar oraz majątek zgromadzony poza systemem emerytalnym. Na tej podstawie zidentyfikowano znaczne różnice w dobrobycie emerytów pomiędzy państwami UE. Analiza skupień potwierdziła występowanie zależności pomiędzy różnymi modelami kapitalizmu obecnymi w Europie, a aktualnymi świadczeniami emerytalnymi. Najwyższy poziom emerytur został zidentyfikowany w krajach z kluczową rolą systemy repartycyjnego, co podważa możliwość utrzymania ich na dotychczasowym poziomie w przyszłości.

Słowa kluczowe: system emerytalny, III filar emerytalny, oszczędności emerytalne, państwa dobrobytu

Klasyfikacja JEL: I38, J18, P51, H55, J32

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