OLD AGE POVERTY AND
FINANCIAL AWARENESS IN EUROPE

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ABSTRACT

"*End poverty in all its forms everywhere*". The United Nations has identified the eradication of poverty worldwide as the first priority of its Sustainable Development Goals. However, poverty in old age is not given a specific place in this effort, despite the fact that developed societies are all ageing, with an increasing proportion of the population over 65 years. Financial insecurity in old age can lead to poverty and social exclusion, which is largely a matter for the pension system to prevent and tackle, and to a lesser extent for financial readiness and conscious preparation. In our study, we address the relationship between old age poverty and financial awareness, using data from 25 European countries to identify groups that can be considered similar from aspects of poverty, pension systems, macroeconomic factors, and some aspects of financial awareness. Using clustering, we found that the countries studied can be divided into four distinct clusters, with all combinations of financial readiness and old age poverty. The results could help decision makers identify intervention points to reduce poverty in old age.

INTRODUCTION

In September 2015, the United Nations established seventeen Sustainable Development Goals (SDGs), the first of which is "*end poverty in all its forms everywhere*" (United Nations, 2015). However, the Goals do not clearly delineate how poverty in old age is to be addressed and tackled, despite the urgent importance of understanding the social, financial and other characteristics of the growing elderly population in ageing societies (Kwan and Walsh, 2018). Financial insecurity in old age can lead to poverty and other forms of social exclusion. The inadequacy of social security pensions is one of the main reasons why the standard of living of older people may fall below what is considered decent. Lack of financial resources, combined with other factors such as illness, disability, or weakness, can reduce the quality of life of older people. Principle 15 of the European Pillar of Social Rights emphases the right to an adequate pension and to age with dignity. To achieve this principle, there is also a concrete action plan to reduce the number of people at risk of poverty in the EU by 15 million by 2030.[1] Given these factors and trends, our study will examine the relationship between poverty in old age and financial awareness using data from 25 European countries.[2]

LITERATURE REVIEW

The international literature relevant to our research can be divided into two main groups of sources: first, there are more sources on the relationship between poverty and financial awareness in general, and second, there is a second group of sources focusing on the relationship between poverty in old age and pension provision systems. However, we did not find sufficient literature on the contexts of old age poverty and financial awareness.

In their paper, Kwan and Walsh (2018) provide a comprehensive literature review on the topic of poverty in old age. They find that, in addition to the large number of studies on poverty in

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[1] This target is, of course, not only for the elderly, but should also be understood as a reduction in the overall poor population.

[2] 24 European countries + Israel

general, there is a limited number of papers that specifically analyse poverty in old age. In ageing societies, the role of the pensioner population is becoming increasingly important, both economically and culturally, and for communities, and it is therefore (and would be) important to address poverty in old age in academic research. Kwan and Walsh have compiled a collection of studies on poverty in old age that analyse (i) the risk of poverty in old age and the factors that lead to it, (ii) the other factors and processes that are affected by poverty in old age, (iii) the living conditions of older people living in poverty, and (iv) the relationship between a number of different factors in relation to poverty in old age (e.g. (v) microsimulation to predict poverty. In our analysis, we reviewed the literature on (i) and (iii) and highlighted the most relevant correlations.

The sustainability of pension systems in ageing societies is addressed by a number of platforms, but the adequate level of pension income is not sufficiently emphasised in most countries. According to Ebbinghaus (2021), this is mainly because in welfare states, poverty in old age is not the most important economic policy concern in the current economic context: (i) after the 2008 economic crisis, the focus in many countries shifted to working-age poverty; (ii) the pandemic of the 2020s put pension incomes at less risk than incomes of the working-age population. In recent years, almost all countries have launched some kind of initiative to increase the financial security of the poorest older people who, for whatever reason, were unable to generate sufficient pension income in their preretirement years, but in many cases still failed to protect a proportion of the age group from poverty (Ebbinghaus et al., 2019).

The European Commission's triennial Pension Adequacy Report (2021) examines the adequacy of Member States' retirement incomes along three dimensions: poverty prevention, income maintenance, and retirement longevity. The 2021 report pays particular attention to the sharing of risks and resources between older women and men and to income gaps.

According to the summary of the Pension Adequacy Report (2021), an increasing number of European countries have implemented reforms to their pension systems in recent years to maintain pension income and make the public pillar more inclusive. These have generally included measures to address the tax implications of pensions, point system calculations, supplementary savings options, with a view to pension adequacy. To reduce the risk of poverty, several countries have also increased the basic pension / minimum pension.

DATA AND METHODOLOGY

Our analysis is based on macro and micro data from 25 countries. The starting point was the OECD Pension at a Glance (2019) biennial study, which includes data and analysis for all OECD countries. Although the data in the 2019 analysis cover 36 countries, we narrowed our own analysis to 23 countries in the European Union[3] and included Switzerland and Israel. From the OECD database, we chose to include the 32 variables listed in Table 1, which we grouped into 5 categories.

Table 1: Macro variables included in the analysis

Income poverty (AROPE)	Income poverty rates *by age* (age groups 65-75, 75+)
	Income poverty rates *by gender* (male / female)
	Income poverty rates (total population)
	Change in relative income poverty rates between the mid-1990s and 2016 (aged over 65)
Country's economy	HDI
	GDP per capita (USD)
	Public pension expenditures current (% of GDP)
	Public pension expenditures 2050 expected (% of GDP)
	Average wage in PPP (USD)
Life expectancy	Life expectancy at birth (male / female)
	Life expectancy at age 65 (male / female)
	Expected years in retirement (male / female)

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[3] Our dataset does not include data for Ireland, Malta, the Netherlands, and Sweden, mainly due to the limited range of SHARE financial data.

Elderly income	Employment rate of older workers (age group 65-69)
	Old age disposable income (% of AW) (age groups 65-75, 75+)
Pension income	Net pension replacement rate (male / female): at 50%, 100% and 150% of AW
	Net pension wealth (male / female, by % of AW)

We included macro variables that are strongly related to the old age poverty, as correlations are shown in Table 2. [4]

Table 2: Correlations between macro variables and income poverty rates

Group of macro variables	Variables	Income poverty rates	
		65-75	75+
Country's economy	Public pension expenditures current	-0.482	-0.493
	Public pension expenditures 2050 expected	-0.485	-0.522
Life expectancy	Expected years in retirement (male)	-0.555	-0.595
	Expected years in retirement (female)	-0.543	-0.596
Elderly income	Employment rate of older workers (age group 65-69)	0.641	0.708
	Old age disposable income (AW) (age group 75+)	-0.546	-0.673
Pension income	Net pension replacement rate (150% AW, male)		-0.408
	Net pension wealth (AW, female)		-0.422

Correlations are significant on 5.0% level.

For all variables, data from 2018 or the last available year were used. For some countries, as they are not OECD member countries, we encountered missing data and therefore imputed them in relation to the average value for that region or countries with similar HDI and GDP values. [5]

Financial awareness was quantified using (micro)variables from the financial module of SHARE Wave 7 (Survey of Health, Ageing and Retirement in Europe) (2017). SHARE is a multidisciplinary and transnational panel database – based on a questionnaire survey – that contains information such as marital status, cognitive and physical abilities, mental health, household, daily habits, financial assets, and behaviour in 140 thousand individuals over the age of 50 (SHARE, 2019).

We included five variables from the SHARE financial module in our analysis:
- Have you ever had any money in stocks or shares (listed or unlisted on stock market)?
- Have you ever had any money in mutual funds or managed investment accounts?
- Have you ever subscribed to an individual retirement account?
- Have you ever taken out a life insurance policy?
- Have you ever been the owner or co-owner of a business which you did not work in?

We were able to use data from a total of 19,795 respondents, filtering out those with "not responding" or "do not know" values, so only the truly evaluable observations were included in the analysis.

To reveal the differences between the countries studied, we performed hierarchical agglomerative clustering on the 32+5 standardized variables, the robustness of which was confirmed by partitioning (McQueen's) k-means clustering. In hierarchical clustering, we used Ward's method in an effort to create as even a cluster distribution as possible. The distance between observations was calculated using the squared Euclidean distance measure.

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[4] We listed the most important correlations; however, the full table is accessible by the authors.

[5] Romania, Bulgaria, Croatia, and Cyprus: poverty indicators, average wage values, and variables on elderly incomes were required data imputation.

To determine the optimal cluster number, we used the Calińksi-Harabasz (1974) index.

RESULTS

The clustering seeks to identify which countries are the most similar along the dimensions of old age poverty, financial awareness, and the macro factors that influence the quality of life in retirement. We will also examine the typical differences between the clusters and explore which poverty-financial awareness-pension combinations occur in the 25 countries studied. The clustering of the countries was carried out using hierarchical clustering. The classification process was plotted on a dendrogram (Figure 1), suggesting that three or four clusters at a distance level of 40% and slightly below (rescaled distance of 10) seem to be justified.

Figure 1: Dendrogram of cluster analysis
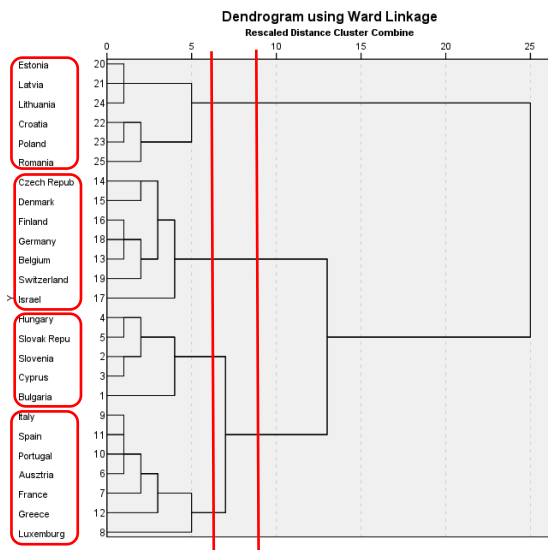
To determine the optimal number of clusters, we calculated the Caliński-Harabasz index, whose value changes with increasing cluster number and is shown in Figure 2.

**Figure 2**: Clustering of countries (k=3)
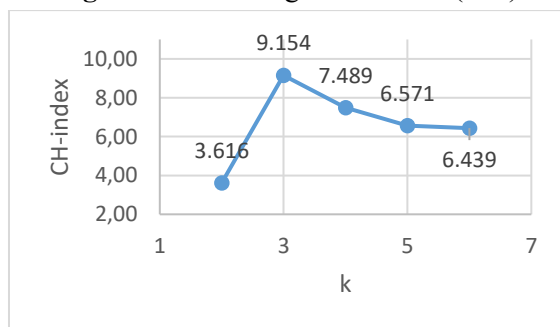
According to the CH-index values, we found that the 25 countries need to be classified into 3 clusters, as illustrated in Figure 3.

Figure 3: Clustering of countries (k=3)
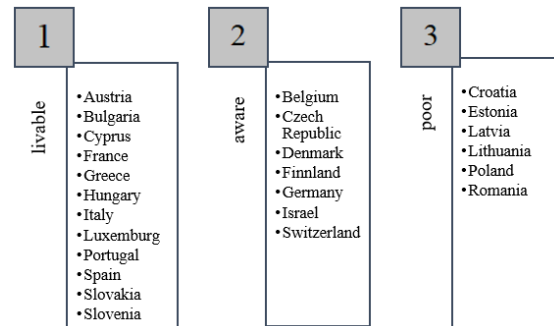
Based on our statistical analysis, three clusters are formed from the 25 countries, the first cluster contains 12 countries, the second cluster contains 7 countries, and the third cluster contains 6. We examined the first cluster and found that it contains several very different countries, such as Bulgaria and Luxembourg. To reduce the strong heterogeneity of the first cluster, we decided to create four clusters. k=4 also has a sufficiently high CH-index value (CH=7.489) and the dendrogram suggests that an increase in the number of clusters may be justified. Using four clusters, the groups of countries shown in Figure 4 were formed.

Figure 4: Clustering of countries (k=4)
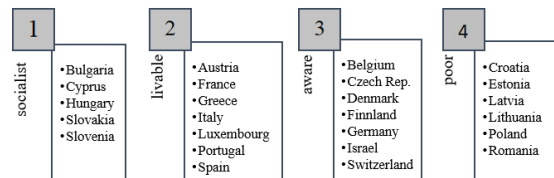
To examine the four clusters, the median values of the variables involved were reviewed (see Appendix 1). Table 3 shows the ranking of the clusters by groups of variables (the first ranked cluster has the highest values in a given group of variables).

**Table 3:** Order of clusters based on median values of variables

	Clust 1 socialist	Clust 2 livable	Clust 3 aware	Clust 4 poor
poverty	3.	2.	2.	1.
financial awareness	3.	2.	1.	4.
economy	3.	2.	1.	3.
life expectancy	3.	1.	2.	4.
elderly income	2.	1.	3.	3.
pension income	2.	1.	3.	4.

Explanation of notation:
1 = first ranked, 4 = last ranked

The countries in the first cluster have the lowest poverty rates in old age, despite the limited use of financial awareness tools. The net pension replacement rate is very high, life expectancy is relatively low, and, partly as a result, the net pension wealth (which the present value of pension annuities) is one of the highest. Apparently, in these countries, the public pension system provides decent care for pensioners (which, on the other hand, risks the sustainability of the benefit system), but there is no incentive for financial awareness or retirement employment. Therefore, we have called this group "socialist".

The four clusters were placed on the map of Europe, as shown in Figure 5.

Figure 5: Clusters on the map of Europe
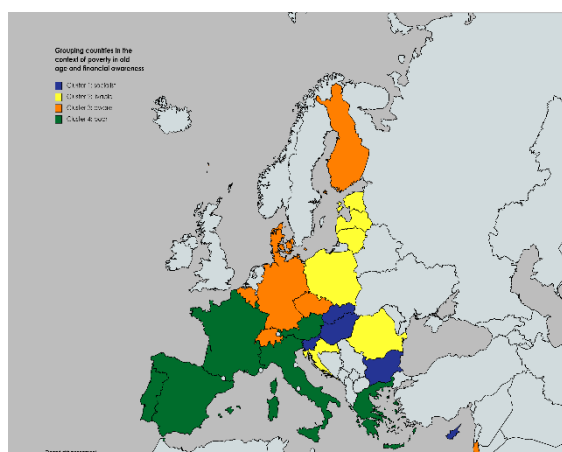
The countries in the second cluster have medium levels of old age poverty, high levels of old age income, net pension replacement rate, and net pension wealth, associated with low old age employment rates. This group has the highest life expectancy, hence the highest expected years in retirement, and the highest public pension expenditure. We called this group "livable".

The third cluster countries also have a medium level of old age poverty, with the most financially aware populations, but also with high GDP and average wages. They have the second highest life expectancy, but their elderly income and net pension replacement rates are below those of the previous two clusters. It also has the highest old-age employment rate. This cluster has been termed "aware".

Finally, the fourth cluster included the countries with the highest poverty rates, where not only is the rate high, but this is the only cluster where the proportion of poor elderly people increased between 1990 and 2016. The use of financial awareness tools is the lowest, coupled with low GDP and average wages. There is a very low pension replacement rate (about half the value of cluster 2) and net pension wealth. Public pension expenditures are also lower compared to other clusters, and only in this cluster is it expected to decline by 2050. The elderly employment rate is just as high as in the previous cluster, but the reason is the opposite, while in the "aware" countries it is assumed that people voluntarily take up work in retirement as a form of conscious financial awareness, in this cluster it is more a matter of necessity that induces an equally high employment rate in old age among the over 65s. This group has been labelled the "poor".

CONCLUSIONS

European countries face different poverty impacts in old age and for the whole population. As a complement to the literature, we have attempted to identify the relative position of countries in terms of their financial awareness and other factors that specifically affect poverty among the over-65s. We found that the 25 countries studied can be divided into four distinct clusters with all combinations of financial awareness and old age poverty. The creation of groups of similar countries can serve as an indication for policy makers of intervention points.

The first group ("socialist") included Central and Eastern European countries (HUN, SVK, SVN, BUL) and Cyprus, where the state pension system is typically generous, partly because of this, people are less conscious of the

use of financial awareness tools, but at the same time old age poverty is also low.

The second cluster ("livable") consists of four Southern European countries (GRC, ITA, PRT, ESP) and three Western European countries (AUT, FRA, LUX), where the life expectancy and the elderly income are high, partly due to the generosity of the public pension system and partly due to high retired employment. Overall retirement well-being is associated with moderate levels of financial awareness and poverty in old age.

The third cluster ("conscious") includes those countries (BEL, CZE, DNK, FIN, ISL, DEU, CHE) where the use of financial awareness tools is most widespread, coupled with favourable macroeconomic indicators but less generous pension system. Old age poverty is moderate in these countries.

The fourth group of countries ("poor") includes the most vulnerable countries (HRK, POL, EST, LVA, LTU, ROM), where, according to European directives, there is the greatest scope for a policy to tackle poverty in old age. In these countries, the least conscious financial awareness is combined with the least generous pension systems, which makes old age poverty the highest and, at the same time, the lowest life expectancy.

Each EU member state sets its own pension policy, but certain common guidelines, such as the need to reduce poverty in old age at an appropriate rate, must be respected. Ebbinghaus (2021) notes that poverty in old age can best be reduced by applying minimum pensions and that in countries where the pension replacement rates are high, old age poverty is relatively lower. By analysing our data, we found that generous pension systems combined with financial awareness can have a positive impact on poverty rates, especially in age groups older than 65.

We consider it important to monitor the change in old age poverty, especially as an increasing share of the population in developed societies will be living in retirement in the coming decades. Over the past 10 years, there has been a significant increase in old age poverty in all the countries studied. It is still difficult to determine whether this is a continuing trend or just a temporary spike, but in any case, in addition to the sustainability of pension systems, the sufficiency of pension incomes (the purchasing power of pensioners) and, through this, aspects of old age poverty should definitely be kept in the field of view of decision-makers.

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APPENDIX 1: Median values in each cluster

		k=4 Ward Method			
		1	2	3	4
		socialist	livable	aware	poor
		Median	Median	Median	Median
Financial awareness	Have you ever had any money in stocks or shares?	5,2%	11,9%	35,2%	8,3%
	Have you ever had any money in mutual funds or managed investment accounts?	3,1%	15,3%	30,1%	2,2%
	Have you ever subscribed to an individual retirement account?	4,4%	12,0%	40,5%	1,7%
	Have you ever taken out a life insurance policy?	30,9%	16,5%	45,7%	14,6%
	Have you ever been the owner or co-owner of a business which you did not work in?	2,1%	2,0%	4,8%	1,4%
Poverty rates	Income poverty rates (age group 65-75)	5,854	8,717	7,968	17,814
	Income poverty rates (age group 75+)	5,729	8,478	9,410	24,276
	Income poverty rates (age group 65+, male)	4,810	6,398	6,974	13,731
	Income poverty rates (age group 65+, female)	5,511	10,558	9,065	24,377
	Income poverty rates (total population)	8,494	12,459	9,084	16,151
	Change in relative income poverty rates between the mid-1990s and 2016 (aged over 65)	-2,188	-6,551	-0,330	7,249
Macro factors	Human Development Index	0,859	0,901	0,936	0,872
	GDP/capita	19 486	34 622	47 939	16 685
	Public pension expenditures current (% of GDP)	9,677	13,807	9,957	8,058
	Public pension expenditures 2050 expected (% of GDP)	11,063	13,756	10,849	7,251
	Average wage in PPP (USD)	24 846	44 807	60 578	28 125
Life expectancy	Life expectancy at birth (male)	73,7	79,5	78,7	73,2
	Life expectancy at birth (female)	80,8	84,6	83,7	81,3
	Life expectancy at age 65 (male)	15,4	19,1	18,6	15,2
	Life expectancy at age 65 (female)	19,3	22,1	21,9	19,5
	Expected years in retirement (male)	17,1	21,7	18,8	15,3
	Expected years in retirement (female)	22,9	25,7	22,7	21,1
Elderly income	Employment rate of older workers (age group 65-69)	8,4	9,4	17,0	17,0
	Old age disposable income (% of AW) (age group 65-75)	92,300	106,979	86,205	84,539
	Old age disposable income (% of AW) (age group 75+)	84,000	89,782	73,760	68,580
Pension income	Net pension replacement rate (male): at 50% of AW	71,7	88,0	70,7	46,2
	Net pension replacement rate (male): at 100% of AW	82,8	89,6	60,3	47,4
	Net pension replacement rate (male): at 150% of AW	79,9	85,9	48,3	44,0
	Net pension replacement rate (female): at 50% of AW	71,7	88,0	69,2	46,2
	Net pension replacement rate (female): at 100% of AW	78,4	89,6	60,3	46,4
	Net pension replacement rate (female): at 150% of AW	78,4	85,9	48,3	43,1
	Net pension wealth (male): at 50% of AW	14,0	13,9	12,4	7,8
	Net pension wealth (male): at 100% of AW	14,0	14,1	10,4	7,5
	Net pension wealth (male): at 150% of AW	12,9	14,0	8,5	7,0
	Net pension wealth (male): at 50% of AW	15,0	15,7	13,6	8,7
	Net pension wealth (male): at 150% of AW	14,4	15,9	9,3	7,9