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COVID-19 pandemic severity and the financial resilience of older Europeans: regional disaggregation of SHARE data

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Abstract. This study explores changes in financial wellbeing among Europeans aged 50+ before, during, and after the COVID 19 pandemic, using longitudinal SHARE data (Waves 7–9 and the two SHARE Corona Surveys) and regional excess mortality as a proxy for pandemic severity. Guided by García Mata and Zerón Félix's (2022) multidimensional theory, we integrate subjective and objective indicators, temporal dynamics, and contextual factors. Subjective financial wellbeing is measured by the ability to make ends meet; explanatory variables include income, employment transitions, education, and regional mortality anomalies. Multilevel ordered logistic regressions with clustered standard errors show that higher excess mortality correlates with greater odds of financial deterioration, particularly in less-developed regions. At the same time, the strong association between mean regional income and regional excess mortality suggests that excess mortality may reflect broader contextual differences that are not directly related to containment measures or healthcare system quality. Retirement improved resilience for previously unemployed individuals, while job loss or retirement from employment increased vulnerability. We also found that the protective effect of staying in employment mainly prevents severe deterioration of financial wellbeing. The findings confirm that financial wellbeing is dynamic and context-dependent, highlighting the need for policies that strengthen social protection, reduce regional inequalities, and promote financial literacy.

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1. Introduction

1.1. Context and theoretical background

Global crises, including public health emergencies, are generally disruptive to physical, psychological and social wellbeing (Aref, 2024), and the outbreak of the COVID-19 pandemic and the associated containment measures had multidimensional consequences, at both macro and micro levels. From an individual's perspective, the most relevant concerns are related to health, the functioning of the healthcare system, working and employment conditions, and the increased risk of overall financial instability, leading to increased relative poverty (Kumar et al., 2023).

In our paper, we analyse the evolution of the financial wellbeing of people during and after the COVID-19 pandemic using a multidimensional framework that draws upon economic wellbeing theories. These theories have evolved from utility-based models to incorporate subjective life satisfaction and broader multidimensional welfare frameworks, focusing on health, equity and sustainability. Financial wellbeing theory differentiates between objective resources and subjective perceptions, supported by behavioural, institutional and psychometric foundations. García Mata and Zerón Félix (2023) review and consolidate the conceptual foundations of financial wellbeing and propose the development of a theory that integrates: time (present obligations vs. future goals/resilience), human needs vs. wants (commitments/needs vs. discretionary lifestyle choices), saving motives and behaviours (short term buffers, long term planning), and institutional context and policies (markets, inclusion, consumer protection, and shocks such as pandemics).

This study builds on the multidimensional framework of financial wellbeing proposed by García Mata and Zerón Félix (2022), which integrates subjective and objective indicators, temporal dynamics and contextual factors. In line with their model, we conceptualise financial wellbeing not only as the ability to meet current obligations but also as resilience to shocks and confidence in future financial security. Our analysis reflects these dimensions by examining subjective financial wellbeing ("difficulty making ends meet") alongside objective resources (income, employment transitions), across time (pre-, during, and post-pandemic), and within institutional and regional contexts (pandemic severity). By incorporating both individual capabilities (education) and macro-level conditions, this study operationalises key pillars of García Mata and Zerón Félix's theory to understand how older Europeans adapted financially during and after the COVID 19 crisis. Our objective is to examine how subjective financial wellbeing among older Europeans evolved before, during, and after the COVID 19 pandemic, considering both individual-level factors (employment transitions, education, household size) and contextual determinants (regional pandemic severity, mean regional income), thereby operationalising the model's emphasis on temporal dynamics, resilience and institutional context.

Financial wellbeing, as conceptualised in our study, extends beyond objective indicators like income or wealth. It encompasses individuals' subjective perceptions of their financial situation, including their sense of financial security, satisfaction with their current financial status and stress related to finances. According to Brüggen et al. (2017), financial wellbeing includes both the ability to maintain financial freedom in daily life and the confidence in sustaining one's standard of living in the future. This broader view allows for a more nuanced understanding of how pandemic-related pressures may have affected the financial situation of older adults.

Negative changes in financial wellbeing resulting from economic downturns are studied in the recent literature concerning individual financial resilience during the COVID-19 pandemic. Financial resilience, being a specific type of a broader concept of resilience (*Note* 1), is understood as a process of positive financial adaptation to adverse (usually unexpected) financial events, involving the feeling of financial security that allows for a satisfying life (Consumer Financial Protection Bureau, 2015).

In developing personal financial resilience, both dispositional attributes (individual traits) and access to appropriate external financial resources play a vital role. This dual emphasis reflects two key theoretical perspectives in financial resilience research. The first focuses on internal capacities (such as financial knowledge, skills and attitudes) that enable individuals to adapt to financial stress. The second highlights the role of external support systems (including the availability and adequacy of financial resources or assistance) that individuals can rely on during periods of hardship, such as governmental support and the role of social protection systems (Tahir & Richards, 2025). An important stream of literature emphasises the role of family support – emotional, instrumental and collaborative – in buffering the negative effects of economic pressure, drawing on theoretical concepts such as the Family Stress Model and the reciprocal relationship between financial strain and family cohesion (Conger & Conger, 2002). In this context, both internal capabilities and external resources are often shaped within the family environment, highlighting the family's role in fostering financial resilience. Some theoretical frameworks also identify social capital – such

as interpersonal networks, trust and reciprocity – as a key component of financial resilience (Salignac et al., 2019). Furthermore, certain studies focus on individuals' ability to absorb financial shocks or raise funds during an emergency, such as the COVID-19 pandemic, highlighting the importance of various financial literacy indicators, especially savings (Lusardi et al., 2021).

The aim of this article is to explore the association between excess mortality related to the COVID-19 pandemic and changes in subjective financial wellbeing among people aged 51 and older across 27 European countries and Israel, with a specific focus on employment transitions. We analyse changes in two periods: between March 2017 and January 2019 and between October 2021 and September 2022. Our main research question asks, "To what extent did the severity of the COVID-19 pandemic interact with employment transitions to influence subjective financial wellbeing in older adults, and how does this relationship depend on regional income levels?"

In our study, subjective financial wellbeing is reflected by the ability to make ends meet financially, while financial resilience is viewed as the ability to thrive or maintain a stable subjective financial wellbeing despite negative exogenous shocks. It is worth noting that the study of subjective financial wellbeing, unlike income, does not require the use of regional purchasing power parities to enable cross-regional comparisons.

Based on the location and severity of 2021–22 mortality rates in Europe, we hypothesise that the negative financial effects of changing the labour market status were amplified in regions with high excess mortality and lower income, whereas the transition from unemployment to retirement may have offered a degree of financial protection in such settings.

The novelty of our study lies in the large number of second-level units. Data from the 2024 internal NUTS codes SHARE release enabled us to estimate two-level models that account for heterogeneity across secondary territorial units through random effects, rather than relying solely on fixed effects.

The article is organised as follows. It starts with the description of the data and methods with the special focus on the method of disaggregation of the regional-level information of SHARE respondents' residence. Then, a descriptive analysis shows the patterns of changes in subjective financial wellbeing during the COVID-19 pandemic in 27 European countries and Israel. Subsequently, in order to show the association between pandemic severity, economic status and financial resilience in the analysed countries, we perform the econometric analysis based on logistic regression models. Finally, we discuss the results and draw conclusions.

1.2. Literature review and research objectives

Strict labour market policy measures introduced at the beginning of the pandemic increased the number of layoffs and reduced employee working hours for many workers (Wang et al., 2022). Some labour market changes had long-lasting consequences, affecting, among others, vulnerable individuals, including those aged 50+. For this group, one of the consequences was continuing to work reduced hours even after the incipient phase of the pandemic, when many lockdown measures were relaxed (Börsch-Supan et al., 2023).

The COVID-19 crisis also led to increased job losses and unemployment, predominantly affecting such sectors as: leisure and hospitality, construction, trade and transportation (Weinstock, 2021). According to Eurostat data, in terms of differences by age, the pandemic primarily affected the employment rates of the youngest European workers. Nevertheless, job contract type seems to be a more relevant factor than age in differentiating between individuals based on their vulnerability to job loss (Ando et al., 2022).

Furthermore, the pandemic influenced individuals' financial situation more directly. Pike et al. (2023) found that costs associated with post-COVID-19 conditions are higher among older and male American adults, indicating a positive association between this type of costs and a greater risk of severe COVID-19 outcomes (Pastor-Barriuso et al., 2020).

Even in highly developed countries, older individuals often do not have sufficient savings to cover the costs of the formally provided long-term care services (Brugiavini et al., 2017). This financial vulnerability was exposed during the pandemic, as long-term care facilities faced disproportionate strain due to high infection rates, staffing shortages and increased operational costs, amplifying financial pressure on older adults (Thompson et al., 2020). Simultaneously, the weakening of social networks caused by forced social distancing and broader pandemic-related disruptions also meant reduced access to informal care and intergenerational support, both of which could have otherwise mitigated some of the associated financial and emotional burdens (Steijvers et al., 2023).

The economic situation, health inequalities and geriatric syndromes are closely related (Stolz et al., 2016), and older adults often face difficult financial decisions while simultaneously coping with health problems (Asebedo et al., 2018). For instance, according to a West Health-Gallup survey conducted in Autumn 2021, 24 percent of American adults aged 50–64 considered healthcare expenses a major burden. Meanwhile, an even higher percentage declared that they had avoided treatment due to

excessive costs of care (Gallup, 2021). The results of the SHARE survey in 28 countries (in Europe and Israel) show that one in five older people faces multiple challenges: bad physical health, activity limitations and chronic diseases, combined with poorer financial situation and low quality of life, or difficult financial situation, limitations in activities, the highest depression and loneliness scale and the lowest quality of life (Abramowska-Kmon et al., 2024).

Based on the literature, we see that the COVID-19 pandemic introduced a range of new risks to the financial wellbeing of older adults. These risks stemmed not only from broader economic instability and labour market disruptions, but also from more-immediate consequences of the pandemic, such as increased healthcare expenses, the strain on long-term care services, and the weakening of informal support networks.

Importantly, the severity of the pandemic and the stringency of related public health measures varied substantially across regions. For this reason, contextual regional factors should be considered when analysing changes in financial wellbeing during the pandemic. Recent research highlights excess mortality as a proxy for institutional capacity and regional development during health crises. At the national level, studies show that countries with stronger governance, measured by indicators such as government effectiveness, regulatory quality, and rule of law, experienced significantly lower excess mortality during COVID 19 (da Silva et al., 2023). Aizenman et al. (2022) further demonstrate that higher institutional quality correlates with smaller discrepancies between official and excess death counts, reflecting better transparency and policy implementation. At the regional scale, Bayerlein (2024) finds that European regions receiving greater structural investment in healthcare infrastructure reported lower excess mortality, underscoring the role of institutional resources. Similarly, Hajdu et al. (2024) document substantial subnational variation in excess mortality across Europe, linked to socio-economic and institutional disparities. Collectively, these findings position excess mortality as a meaningful indicator of local and regional institutional development, particularly in contexts of systemic stress.

Focusing on Europe, the literature on changes in financial wellbeing during the COVID-19 pandemic indicates that households in Northern Europe had a lower share of residents with income losses compared to those in Western, Central and Eastern and especially Southern Europe, with considerable intra-regional variation (Schumacher & Bethmann, 2023). Furthermore, economic vulnerability and financial distress are associated with labour market activity, educational attainment, previous exposure to economic stress, stringency of containment measures and regional economic inequality. In essence, problems of financial wellbeing are more common among vulnerable groups (Chłoń-Domińczak et al., 2023; Bonfatti et al., 2023). It is worth noting that the analysis of Bonfatti et al. (2023) covered employment status, finding a protective effect of public pension systems.

Studies concerning changes in financial situation during the COVID-19 pandemic have applied different study designs, including various correlates or measures of individual financial wellbeing. Focusing on psychological factors related to information processing, Barrafrem et al. (2020) investigated sentiments about the future household's economic situation in an online survey conducted among British and Swedish respondents. A survey was also used by Vieira et al. (2021) to analyse the association between economic activity, occupation, job stability and financial wellbeing during the pandemic in Brazil. Based on the data obtained from the Australian Bureau of Statistics, Sun et al. (2022) explored the influence of the COVID-19 crisis on household finances, depending on family composition and income.

Given that existing studies either cover a small number of countries or, in the case of larger longitudinal surveys, are constrained by a lack of information about the post-pandemic financial situation of individuals who responded to the questionnaire before the pandemic, this study addresses an empirical research gap by incorporating the data from Wave 9 of the Survey on Health, Ageing and Retirement in Europe (SHARE) conducted mainly in 2022.

More importantly, unlike the vast majority of similar existing studies, this analysis accounts for regional mortality-related data from up to 550 European and Israeli regions in order to control for a contextual aspect of factors shaping individual financial wellbeing. Addressing this methodological gap is possible thanks to data from the 2024 internal NUTS codes available in the SHARE data. The large number of second-level units enabled us to estimate the two-level models accounting for the heterogeneity between secondary-level territorial units using the random effects (variance components), and not only fixed effects (unit-specific intercepts). This approach enables the analysis of how various components of financial resilience, such as education (individual capabilities), household composition (external support), income (financial resources), and labour market status, interact to shape individuals' financial outcomes.

2. Data and methods

This study leverages data on subjective financial wellbeing from the Survey of Health Ageing and Retirement in Europe (SHARE), which was assessed based on difficulty making ends meet financially, taking into account a household's total monthly income. We used data from Wave 7 (March 2017 – January 2019), Wave 8 COVID-19 (Corona 1) Survey (June 2020 – September 2020), Wave 9 COVID-19 (Corona 2) Survey (June 2021 – August 2021), as well as Wave 9 (October 2021 – September 2022). Standard control variables used in the analysis relate to the socio-demographic characteristics of SHARE respondents from Wave 7 (*Note* 2).

Rregional level data on excess mortality during the COVID-19 pandemic were used as an explanatory variable in the econometric part of the analysis. We retrieved these data from the Eurostat and Israel Central Bureau of Statistics. Regional-level excess mortality was expressed as the mean of the weekly mortality rate (per 10,000 inhabitants) between June 2021 and March 2022 (the timespan roughly corresponding to the period of increased mortality associated with the spread of the Delta and Omicron SARS-COV-2 variants) compared to the average weekly mortality rate from 2014–2019.

In order to use regional Eurostat data in the analysis, SHARE respondents were assigned to the regions from which they were sampled or to their regions of historical usual residence. Information about the regions came from several sources (the main one being the internal NUTS codes release for the SHARE-COVID19 project) that provide information about NUTS 3 codes of respondents (at sampling). The secondary source of regional-level information, allowing for even further disaggregation into regions smaller than NUTS 3 in the case of Cyprus, Luxembourg and Malta, included two modules of the SHARE database (Housing Generated-Variable and Retrospective Accommodation modules) (Stuck et al., 2024). The last and additional source of information on the respondents' region of residence was the language in which the questionnaire was conducted, which was especially useful in the disaggregation of Israel (*Note* 3) and of the Baltic countries, Belgium and Switzerland.

The disaggregation was performed in two ways. In the first, 28 SHARE countries were divided into 125 regions to ensure balance between the minimum sample size condition and similarity in economic development level. This disaggregation was performed in order to visualise the data in the descriptive analysis part of this work. The second disaggregation aimed to obtain as administratively low units as possible, while ensuring that the Eurostat information about excess mortality was available at the same level, in order to use these units in the econometric analysis involving mixed-effects two-level logistic regression models. This disaggregation included 550 regions and was additionally used in the selection of the timespan of the excess mortality variable, based on the correlation between the individual-level subjective financial wellbeing and assigned regional-level excess mortality. The timespan selected was that for which the median weekly mortality anomaly correlated most strongly with the household's difficulty making ends meet financially.

The descriptive part of this analysis contains a comparison of shares of respondents who reported financial distress during Wave 7, Corona 1, Corona 2 and Wave 9 of SHARE. Depending on the wave of SHARE, between 118 and 125 regions were included in the analysis. The econometric part of the analysis was performed in the Stata 17.0 statistical software package. The analysis was based on generalised partial proportional odds ordered logistic regressions (allowing for flexible relaxation of the proportional odds assumption for selected covariates) and two-level binary logistic regressions. The former were estimated using two different techniques accounting for heteroscedasticity across regions: clustering of standard errors and two-level modelling. The models relying on standard error clustering were estimated using the gologit2 command in Stata. These models corrected the standard errors to account for the intra-region correlation (White, 1980).

The two-level generalised partial proportional odds ordered logistic models were estimated using the gllamm command, whereas the two-level binary logistic regression model, explaining the subjective wellbeing deterioration during the pandemic was estimated using the melogit command. In both cases, random intercepts for regions were included in the specification to account for unobserved heterogeneity at the regional level (Goldstein, 1987).

Different versions of disaggregation were used: into 106 regions and into 507. In order to further check the structural validity of the models, different specifications were applied – one accounting for mean regional income, and the second one additionally accounting for experience of job loss during the pandemic and the pre-pandemic economic activity status (from 2017). Both of these modifications further altered the number of respondents and regions included in the analysis. Furthermore, generalised partial proportional odds ordered logistic regression was estimated using cross-sectional individual weights from SHARE Wave 7. Proportional odds and unweighted versions of the models were

estimated at the initial stage of the analysis, further contributing to the extensive robustness check performed in this study.

The dependent variable in ordinal regressions (Models 1, 2 and 3) was based on a declaration of how easy it is for the respondent's household to make ends meet financially. Based on four possible responses ("with great difficulty", "with some difficulty", "fairly easily" and "easily"), respondents were assigned one of three ordinal statuses, namely "worsening", "stabilisation", "improvement", reflecting the nature of the change in their subjective financial wellbeing between Wave 7 and 9. Subjective financial wellbeing worsened for 20.2 percent of respondents, did not change for 52.6 percent, and improved for 27.2 percent (*Note* 4).

Importantly, ordered logistic regressions were estimated using the following formula for the cumulative probability that the response variable Y for a respondent i is in category less than or equal to the threshold j:

$$P(Y_i \leq j) = \frac{\exp\left(a_j + \sum_{r \in R} \beta_r X_{i,r} + \sum_{s \in S} \gamma_{s,j} X_{i,s}\right)}{1 + \exp\left(\alpha_j + \sum_{r \in R} \beta_r X_{i,r} + \sum_{s \in S} \gamma_{s,j} X_{i,s}\right)},$$

$$j = 1, 2; i = 1, 2, \ldots, N$$

The components of the formula are defined as follows:
R – subset of predictors $X_{i,r}$ for which the proportional odds assumption is relaxed;
S – subset of predictors $X_{i,s}$ for which the proportional odds assumption is violated;
a_j – threshold-specific intercept (cut-point);
β_r – coefficients for variables meeting the proportional odds assumption;
$\gamma_{s,j}$ – threshold-specific coefficients for variables violating the proportional odds assumption;
N – number of respondents.

The main explanatory variable was the regional-level mean weekly excess mortality from June 2021 until March 2022, added as a measure of an institutional environment quality. Apart from this variable, the following socio-demographic variables were used as indicators of individual capabilities:

- age (5-year groups);
- gender;
- educational attainment – with three possible values: pre-primary, primary and lower secondary (1), upper and post-secondary (2), and tertiary (3);
- household size – with three possible values: 1, 2 and 3+;
- the economic activity status change between 2017 and 2022 – with nine possible economic status changes (most prevalent in the data), capturing transitions to retirement of respondents who declared in Wave 7 that they were employed, homemakers, unemployed, or permanently sick or disabled.

Two of the regressions, estimated as a check of structural validity and a means to obtain supplementary conclusions, included the following additional variables reflecting different resilience strategies:

- economic status in Wave 7 – differentiating between pensioners, the employed, the self-employed, and the unemployed or inactive;
- job loss during the pandemic – a binary variable equal to one for respondents who declared in the SHARE Corona 2 survey that, since July-September 2020, they had either become unemployed, been furloughed, been laid off, or had to close their businesses.

The two aforementioned regressions included two "institutional environment" indicators: in addition to excess mortality, they also accounted for the total equivalised monthly household net income, averaged over all households from each of the 106 representative regions. The latter variable was calculated in several steps aiming to overcome methodological caveats, with initial income values based on thinc and thinc2 variables from the Generated-Variable Imputations module. In the SHARE module, five different imputations of the missing values were provided for each respondent, based on the hot-deck method and a fully conditional specification method (De Luca & Li Donni, 2024). To begin with, we calculated the percentage error between values of both variables based on data from Waves 2, 4, 5, 6, 7, 8 and 9. Percentage errors were calculated twice – first on the basis of the variable thinc and then using thinc2. For each variable, respondents were assigned a value corresponding to the minimum percentage error out of the five obtained errors, with the values dropped when the minimum error was higher than 30 percent. Subsequently, respondents were assigned the non-missing values of thinc. Wherever possible, the resulting missing values were replaced with the values of thinc2.

The obtained income was then equivalised using data from the SHARE Coverscreen module and the modified OECD equivalence scale. In the next step, extreme outliers of income (1st and 99th centiles) were excluded from the analysis.

Subsequently, in order to identify respondents who indicated their yearly and not monthly income, all the possible inter-wave comparisons of income were prepared. When the ratio between values from two given waves was considered too high or too low, the higher value was divided by 12 (*Note* 5), a method partially in line with a twofold method proposed

by Lewandowski and Sałach (2017). Finally, extreme centiles were eliminated from the income distribution for the second time.

Descriptive statistics of all explanatory variables are presented in Tables 1 and 2.

Table 1 juxtaposes percentages of respondents belonging to given categories of categorical variables. Positional and classical summary statistics for continuous variables are presented in Table 2.

The decision to incorporate generalised partial proportional odds instead of a more restrictive fully proportional odds model was dictated by the violation of the parallel-lines assumption by the majority of the explanatory variables used. In order to test this assumption, a Brant test was performed based on differences in coefficients and their respective variances of the fully proportional odds model. Its results indicated that, at a level of significance of 0.05, the assumption was violated mainly by the gender, education, household size and mean excess mortality variables. The results of the test, however, were obtained for an unweighted version of the proportional odds model, with an additional series of Wald tests on each variable in the generalised ordered logistic regression in its unweighted and weighted version performed to see whether its coefficients differed significantly across equations. Tests were performed for both two-level and clustered standard error regressions. In both cases, tests for weighted versions of the model revealed that education was the main variable violating the parallel-lines assumption.

The estimation of several alternative specifications of the model revealed that several other variables failed to satisfy the parallel-lines assumption. Therefore, the two main ordered logistic models (presented in the Results section in Tables 3 and 4) had the following set of variables freed from this assumption: education, household size (category "3+"), mean weekly excess mortality, as well as economic status change (category "Homemaker→Retired").

3. Results

3.1. Regional patterns in subjective financial wellbeing

In this part of the analysis, we investigate changes in subjective financial wellbeing in SHARE countries before, during and after the pandemic. Figure 1 illustrates the percentages of respondents who stated that, considering their total monthly income, they

Table 1. Descriptive statistics of categorical variables

Age group	Percent	Sex	Percent
51-55	6.6%	Male	34.6%
56-60	14.6%	Female	65.4%
61-65	19.9%	**Household size**	**Percent**
66-70	20.1%	1	34.0%
71-75	16.5%	2	48.0%
76-80	12.6%	3+	18.0%
81-85	6.8%	**Economic status change between 2017 and 2022**	**Percent**
86-90	2.5%	Retired→Retired	66.1%
91+	0.5%	Employed→Retired	10.6%
Educational attainment	**Percent**	Employed→Employed	12.7%
Pre-primary, primary or lower	32.8%	Unemployed→Retired	1.2%
Upper and post-secondary	43.1%	Unemployed→Unemployed	0.5%
Tertiary	24.1%	Homemaker→Retired	2.1%
Economic status in 2017	**Percent**	Homemaker→Homemaker	5.1%
Retired	64.5%	Sick or disabled→Retired	1.7%
Employed	23.1%	**Job loss during the pandemic**	**Percent**
Self-employed	0.6%	No	93.0%
Inactive or unemployed	11.8%	Yes	7.0%

Source: Own elaboration based on SHARE Wave 7, SHARE Wave 9 and SHARE Corona (W1 & W2), release 8.0.0

Table 2. Descriptive statistics of continuous variables

Statistic	Mean weekly excess mortality	Mean income (regions)
Minimum	-0.108	2,276.3
Median	0.287	10,994.3
Maximum	2.164	45,793.1
Mean	0.404	14,433.5
Standard deviation	0.370	9,637.4
Sample size	508	507

Source: Own elaboration based on SHARE Wave 7, SHARE Wave 9 and SHARE Corona (W1 & W2), release 8.0.0.

had found it difficult or very difficult to make ends meet (among all respondents answering the question). Orange lines indicate an increase in this percentage between 2017 (Wave 7) and 2022 (Wave 9), whereas grey lines indicate a decrease. These percentages account for individual cross-sectional weights from each of the four Waves of SHARE used in this analysis – Wave 7, Corona 1 Survey, Corona 2 Survey and Wave 9, respectively. Since the information about the difficulty making ends meet was not directly available for all waves in the case of Austria and the Netherlands, four Austrian and three Dutch regions were not presented in Fig. 1, which covers 118 regions.

Figure 1 shows that, between Wave 7 and 9, the average subjective financial wellbeing improved in 89 out of 118 regions. At the same time, the share of individuals who found it difficult to make ends meet increased by more than 5 percentage points in only 10 regions.

Financial wellbeing between 2017 and 2022 worsened mainly in less economically developed regions of Southeast and Central Europe, poorer parts of North and South Israel, as well as regions comprising large urban areas, especially the ones with a high positive net migration rate (including the Lake Geneva Region, Piedmont, Provence-Alpes-Côte d'Azur, Alsace, Helsinki-Uusimaa or South Luxembourg). At the same time, regions that experienced the largest improvement included moderately developed units (at the European scale) with a relatively high Human Development Index (at least part of which seems to successfully converge to Western Europe), including Malta, Central and West Slovenia, North and Central Spain, Central and Eastern Lithuania, Northeast Italy, different parts of the Czech Republic and Eastern Poland.

Finally, Figure 1 can be analysed in the context of inter-wave differences originating from the possible influence of COVID-19 stringency measures and from methodological differences. In both SHARE Corona Surveys, for some regions, there were large declines and fluctuations in the shares of people declaring difficulties in making ends meet, which could be the result of actual changes in the subjective assessment of one's financial situation, resulting not only from a change in income but also from expenditure (declining due to reduced mobility and lockdowns). However, methodological differences (especially in data collection) may also have partly influenced the results. Namely, the Corona Surveys were administered using a computer-assisted telephone interviews (CATI) data collection method, whereas regular SHARE rounds, including Wave 7 and 9, used computer-assisted personal interviews (CAPI).

The prevalent lower percentages in Wave 9 compared to Wave 7 observed for the vast majority of Central, Western and Northern Europe in the Corona Surveys indicate that the changes in economic status during and after the pandemic potentially exert a positive effect on the financial situation of people aged 50+, which can be partly associated with the transition to retirement, as the crisis-induced risk of income loss during the COVID-19 pandemic in Europe was found to be higher among residents of the late working age than among residents of the early retirement age (Schumacher & Bethmann, 2023).

3.2. Econometric analysis

In order to investigate the association between excess mortality and the change in subjective financial wellbeing experienced by people aged 51 or above in SHARE countries during the COVID-19 pandemic, two types of logistic regressions were applied: a generalised partial proportional odds ordered logistic regression with clustered standard errors and a two-level generalised partial proportional odds ordered logistic regression. In these regressions, 22,800 individuals (lower level) were nested within 507 regions (higher

level). The number of regions was lower than the initially delimitated 550 regions because of missing data for some respondents, especially from Ireland and the Netherlands.

Both coefficients (β – logarithms of odds ratios) and average marginal effects (AMEs) were estimated for each regression, with the main results indicating that higher regional-level excess mortality was associated with a higher odds ratio for worsened financial wellbeing in 2022 compared to 2017. Model 1 shows that each excess death per 10,000 inhabitants in a region of residence of a respondent is associated with 37.0 percent higher odds of belonging to a category of respondents whose financial situation deteriorated during the pandemic.

Average marginal effects (AMEs) in Model 1 indicate that, on average, an increase in the mean weekly excess mortality from June 2021 until March 2022 greater by 1 additional excess death per 10,000 inhabitants in a given region is associated with the probability of an individual's subjective financial wellbeing changing for the worse (between 2017 and 2022), up 4.96 percentage points. Considering that this excess death increase corresponds to a relatively large change

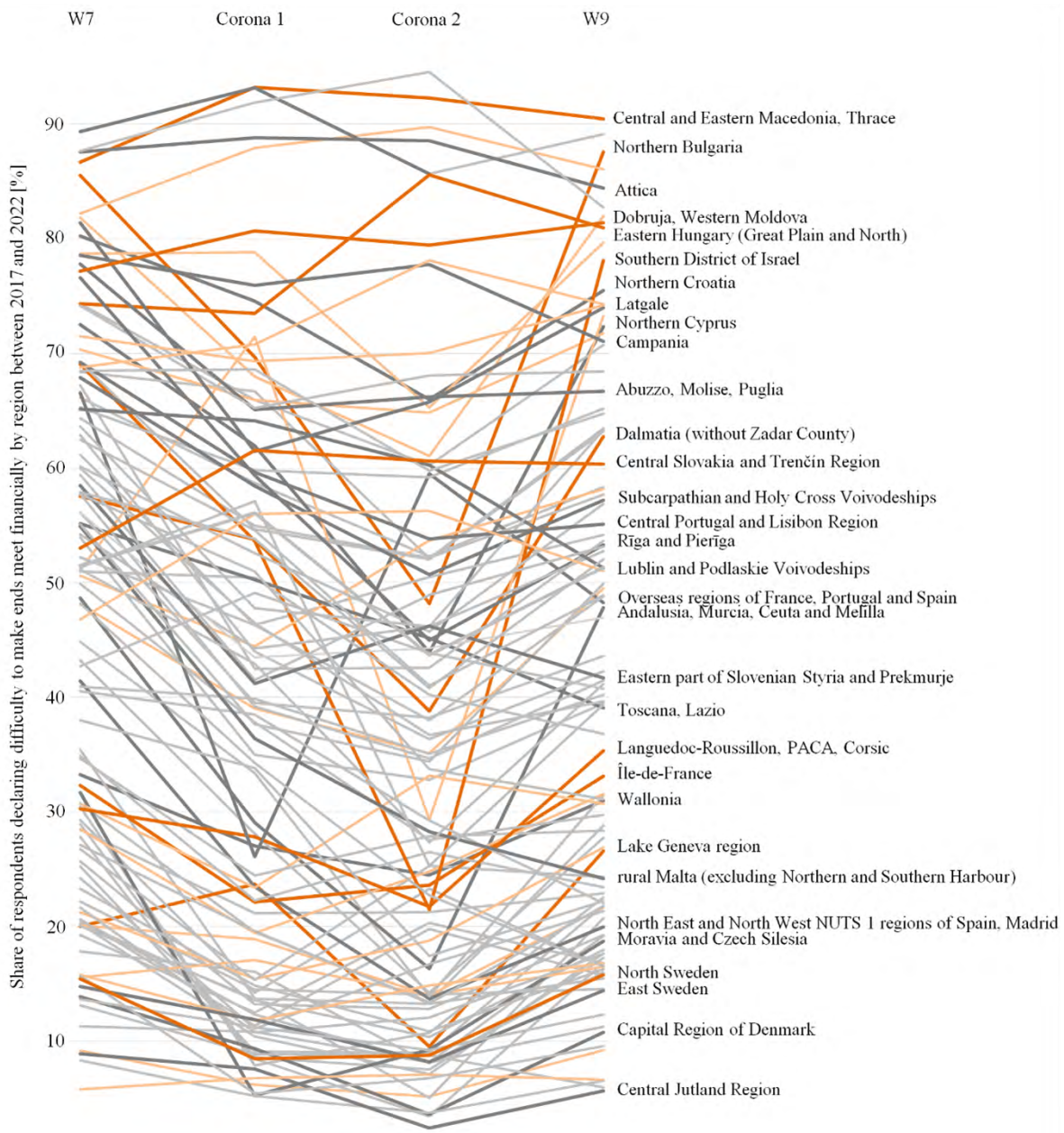

Fig. 1. Share of respondents declaring difficulty making ends meet financially by region between 2017 and 2022
Source: own preparation based on SHARE Wave 7, SHARE Wave 9 and SHARE Corona (W1 & W2), release 8.0.0

in excess mortality, the result indicates a relatively large effect. In order to visualise in more detail how significant this increase is, it should be noted that 119 out of 507 regions (12.9 percent of the analysed areas in terms of population – *Note* 6) experienced an increase of at least 1 mean weekly excess death per 10,000 inhabitants between late spring and autumn 2021 (*Note* 7). At the same time, 32 out of 507 regions (*Note* 8) experienced an increase of at least 2 mean weekly excess deaths per 10,000 inhabitants.

An alternative version of Model 1, containing 106 representative regions, indicates similar results: according to AME, the effect of excess mortality on financial wellbeing amounts to 5.12 percentage points on average.

These findings are reiterated by a comparison of shares of respondents whose financial wellbeing worsened between 2017 and 2022, calculated for different groups. This percentage was 20.2 percent for all SHARE respondents. Meanwhile, it amounted to 23.5 percent for respondents from 119 regions where the pandemic was the most severe (an excess mortality increase exceeding one excess death per 10,000 people between late spring and autumn 2021). The analogical percentage was 19.8 percent for SHARE respondents from regions where the COVID-19 pandemic was less severe (*Note* 9).

A comparison of marginal effects for different regressors indicates that the association between the broadly understood pandemic severity and subjective financial wellbeing is rather modest compared to the effects of education and income. A one-standard-deviation change in excess mortality corresponds to a 1.5 percentage-point increase in the probability of worsened subjective financial wellbeing between 2017 and 2022. Similarly, a one-standard-deviation increase in education distribution (*Note* 10) is associated with a decrease in the probability of worse financial wellbeing amounting to 2.6 percentage points. Additional models including equivalised net income confirm the expectation that the effect of physical income on subjective financial wellbeing is even greater, being equal to at least 4.1 percentage points (*Note* 11).

The association between mean weekly excess mortality per 10,000 people from June 2021 until March 2022 and income is visible at the regional level. The map depicted in Figure 2, prepared using the QGIS software, visualises the values of the excess mortality variable used in the econometric analysis (Models 1 and 2). Regions marked in white indicate a lack of SHARE respondents from a given region, and mean weekly excess mortality in French overseas regions not presented in the map would amount to 0.503 additional deaths per 10,000 people.

The regional distribution in Figure 2 indicates that the mortality anomaly was higher in many regions characterised by relatively lower economic development, mainly in Eastern and Southern Europe. Income calculated at the regional level for the same regions based on SHARE data is highly correlated with excess mortality calculated for different periods of increased mortality (August 2020 to February 2021, August 2021 to February 2022, and March 2020 to August 2021): Pearson's correlation coefficient ranges from –0.65 to –0.75.

Results of the logistic regression model are presented in Table 3. Signs of coefficients related to the household size variable in Models 1 and 2 indicate that people living in larger households (with 3+ members) were probably the most financially resilient during the crisis. However, in Model 1 (unlike Model 2), odds ratios and AMEs corresponding to both analysed categories of the variable reflecting the household size were statistically insignificant.

The economic status change between 2017 and 2022 indicates that the transition to retirement of people who were unemployed during the pandemic potentially made them more resilient in terms of their financial wellbeing. In Model 1, a significant average marginal effect shows that unemployed respondents who retired in 2022 were 8.5 percentage points less likely to experience a deterioration in their financial situation, compared to people who remained retired in both analysed periods.

In order to extend these conclusions, we prepared an alternative version of Model 1. Its dependent variable also expressed improvement, deterioration and no change in the ability to make ends meet; however, the category of relative stabilisation was expanded to include the smallest possible changes (e.g., a change in status from "Fairly easily" to "Easily"). In other words, categories of improvement and worsening became narrower and measured less strong changes in the subjective financial wellbeing. After such a replacement, the status of being employed before and after the outbreak of the pandemic became significant at the significance level equal to 0.1, indicating that employment in both periods (2017 and 2022) may exerted a certain protective effect on people aged 50+ by counteracting a serious deterioration in their financial situation. This potential favourable effect of remaining in employment is therefore present only at the edge of the distribution of the dependent variable. Furthermore, transition to retirement from employment during the pandemic was particularly beneficial for people at risk of a relatively small deterioration in financial wellbeing – after changing the dependent variable, the strength of the corresponding marginal effect was three times lower.

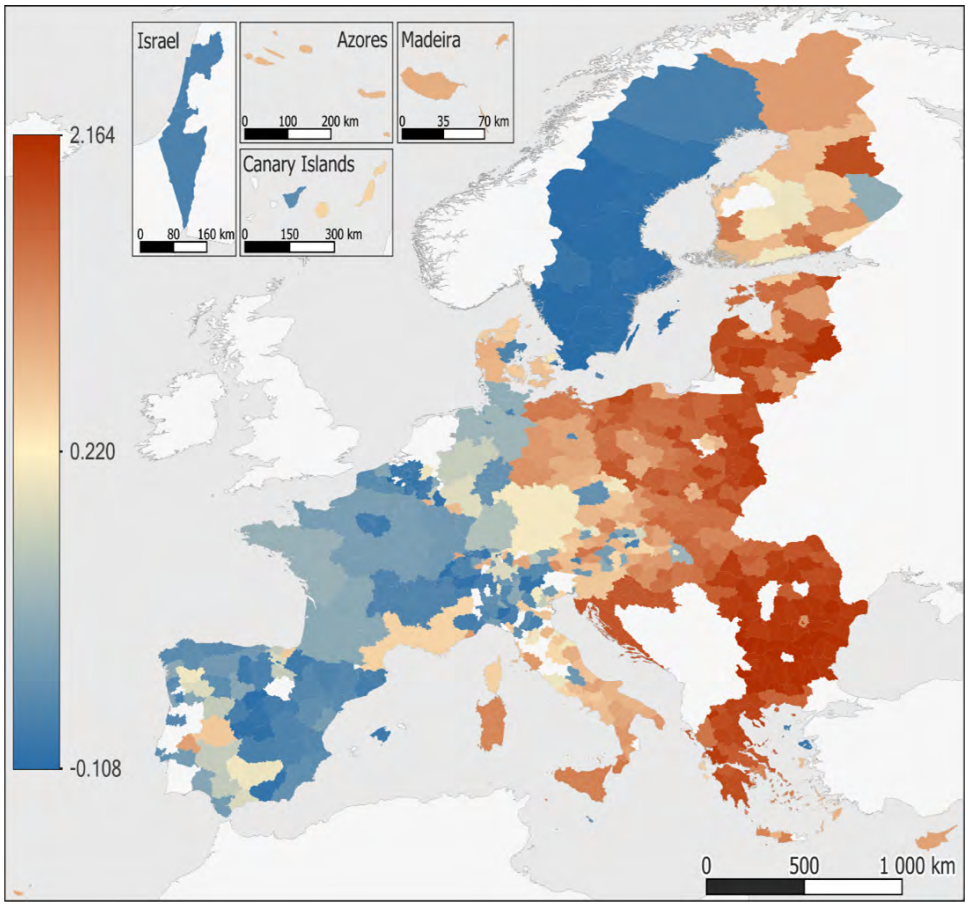

Fig. 2. Mean weekly excess mortality from June 2021 until March 2022 in 506 regions used in the econometric analysis
Source: own elaboration based on Eurostat, Israel Central Bureau of Statistics

The results of Model 2 presented in Table 4 confirm that the transition to retirement during the pandemic had a protective effect on financial situation of particularly vulnerable groups. In Model 2, the positive effect of retirement is also visible not only for respondents who were unemployed but also for those with disabilities or permanently sick. On the other hand, transition to retirement had a negative impact on the situation of people who were employed before the COVID-19 outbreak.

Moreover, Model 2 confirms that single-person households were more financially resilient during the pandemic than two-person households – the respective AME indicates that the probability of financial situation changing for the worse was 1.5 percentage points lower for respondents who lived alone, as compared to two-person households.

It is noteworthy that the auxiliary versions of Models 1 and 2 with the binary dependent variable, equal to one for respondents whose financial wellbeing worsened during the pandemic, lead to similar results related to different variables. In general, all the corresponding AMEs in binary logistic regressions are similar to the ones from ordinal models (being slightly weaker in both cases).

We also present results of further Models 3 and 4 (Tables 5 and 6 respectively), which were specified to measure the interaction between the excess mortality and income variables (differentiated at the regional level). Model 3 constitutes a simple modification of Model 1 assuming a different disaggregation into 106 larger representative regions, whereas Model 4 is a two-level regression including variables accounting for job loss during the pandemic, as well as pre-pandemic economic status. Despite large differences in the number of observations and regions, the results show that excess mortality loses its significance after controlling for income, the impact of which is similar in both models. As presented below in Model 3, average marginal effect corresponding to mortality anomaly not only lost its significance but its value is also very close to zero.

According to the results in Model 4, a job loss during the pandemic increased the probability of a worsening financial situation – AME indicates that the probability of experiencing a financial wellbeing deterioration is 5 percentage points higher for respondents who lost their job during the COVID-19 pandemic.

Figure 3 summarises the obtained results, presenting AMEs with 95-percent confidence intervals for Models 1–4 in the form of a forest plot. This graph includes AMEs for excess mortality and educational attainment – categories of upper and post-secondary, as well as tertiary education. Figure 3 shows that excess mortality is insignificant after accounting for income in the model. Furthermore, upper and post-secondary education also becomes statistically insignificant, indicating that differences in subjective financial wellbeing between respondents belonging to this education group and those with pre-primary, primary and lower-secondary education can be largely explained by income discrepancies. In all models, tertiary education is a statistically significant factor associated negatively with worsening of subjective financial wellbeing during the pandemic. The interaction between excess mortality and regional income further enhances the result which could be deduced from the map in Fig. 2 about the strong relationship between regional socio-economic development level and pandemic severity (especially for the later period of the pandemic). This indicates that pandemic severity was highly associated with macro-level differences, such as quality of healthcare infrastructure, higher vaccination rates or institutional factors, including greater compliance to formal regulations. In line with Arbia's law (Arbia et al., 1996), regionally

Table 3. Model 1: Generalised partial proportional odds ordered logistic regression with robust standard errors clustered for 507 regions estimated using individual weights from Wave 7

	Financial wellbeing change		
	β – log odds (ref.: Improvement)		AME for the worsening situation
Variables	**Worsening**	**Stabilisation**	
Age (ref.: 51-55)			
56-60	-0.107	-0.107	0.017
	(0.130)	(0.130)	(0.021)
61-65	-0.0839	-0.0839	-0.013
	(0.123)	(0.123)	(0.020)
66-70	0.00193	0.00193	0.0003
	(0.140)	(0.140)	(0.023)
71-75	0.0630	0.0630	0.010
	(0.133)	(0.133)	(0.022)
76-80	-0.126	-0.126	-0.020
	(0.163)	(0.163)	(0.026)
81-85	-0.0223	-0.0223	-0.004
	(0.145)	(0.145)	(0.023)
86-90	0.0240	0.0240	0.004
	(0.195)	(0.195)	(0.032)
91+	0.239	0.239	0.041
	(0.269)	(0.269)	(0.048)
Gender (ref.: Female)	0.00377	0.00377	0.00059
	(0.0723)	(0.0723)	(0.0114)
Education (ref.: Pre-primary, primary or lower secondary)			
Upper and post-secondary	-0.154	0.134	-0.026
	(0.103)	(0.0923)	(0.017)
Tertiary	-0.470***	0.350***	-0.071***
	(0.118)	(0.107)	(0.018)
Household size (ref.: 1)			
2	0.0922	0.0922	0.015
	(0.0622)	(0.0622)	(0.010)
3+	-0.0199	-0.207*	-0.003
	(0.106)	(0.109)	(0.016)

continuation of table 3

Economic status change between 2017 and 2022 (ref.: Retired→Retired)			
Employed→Retired	0.0985	0.0985	0.0155
	(0.117)	(0.117)	(0.018)
Employed→Employed	0.00658	0.00658	0.00104
	(0.119)	(0.119)	(0.019)
Unemployed→Retired	-0.538**	-0.538**	-0.085***
	(0.228)	(0.228)	(0.036)
Unemployed→Unemployed	0.222	0.222	0.035
	(0.423)	(0.423)	(0.067)
Homemaker→Retired	0.0598	-0.241	0.009
	(0.222)	(0.186)	(0.035)
Homemaker→Homemaker	-0.0142	-0.0142	-0.002
	(0.119)	(0.119)	(0.019)
Sick or disabled→Retired	0.0131	0.0131	0.002
	(0.238)	(0.238)	(0.037)
Sick or disabled→Sick or disabled	-0.172	-0.172	-0.027
	(0.249)	(0.249)	(0.039)
Mean weekly excess mortality	0.315***	0.118	0.050***
	(0.114)	(0.169)	(0.018)
Constant	-1.329***	0.905***	
	(0.178)	(0.159)	
Log-likelihood		-22250.874	
Pseudo-R^2		0.0096	

Notes: Observations: 22,303. Regions: 507
Significance levels: *** p<0.01, ** p<0.05, * p<0.1
Source: Own elaboration based on SHARE Wave 7, SHARE Wave 9 and SHARE Corona (W1 & W2), release 8.0.0

Table 4. Model 2: Two-level generalised partial proportional odds ordered logistic regression with robust standard errors clustered for 507 regions estimated using weights from Wave 7

	Financial wellbeing change		
	β – log odds (ref.: Improvement)		**AME for the worsening situation**
Variables	**Worsening**	**Stabilisation**	
Age (ref.: 51-55)			
56-60	-0.0831	-0.0831	-0.0124
	(0.1074)	(0.1074)	(0.0195)
61-65	-0.2059	-0.2059	-0.0309
	(0.1409)	(0.1409)	(0.0293)
66-70	-0.1413	-0.1413	-0.0212
	(0.1410)	(0.1410)	(0.0269)
71-75	-0.1288	-0.1288	-0.0193
	(0.1436)	(0.1436)	(0.0268)
76-80	-0.2414	-0.2414	-0.0363
	(0.1598)	(0.1598)	(0.0336)
81-85	-0.1741	-0.1741	-0.0261
	(0.1572)	(0.1572)	(0.0306)
86-90	-0.0810	-0.0810	-0.0121
	(0.2134)	(0.2134)	(0.0355)
91+	0.22449	0.22449	0.0335
	(0.2907)	(0.2907)	(0.0353)
Gender (ref.: Female)	0.0433	0.0433	0.00647
	(0.0539)	(0.0539)	(0.0065)

continuation of table 4

Education (ref.: Pre-primary, primary or lower secondary)			
Upper and post-secondary	-0.1049	0.2216***	-0.0157**
	(0.0807)	(0.0698)	(0.0082)
Tertiary	-0.3841***	0.4127***	-0.0572***
	(0.1056)	(0.0939)	(0.0012)
Household size (ref.: 1)			
2	0.0984*	0.0984*	0.0147***
	(0.0593)	(0.0593)	(0.0052)
3+	-0.0028	-0.0894	-0.0004
	(0.0805)	(0.0028)	(0.0121)
Economic status change between 2017 and 2022 (ref.: Retired→Retired)			
Employed→Retired	-0.0733	-0.0733	-0.0110
	(0.0768)	(0.0768)	(0.0145)
Employed→Employed	-0.1193	-0.1193	-0.0179
	(0.0958)	(0.0958)	(0.0191)
Unemployed→Retired	-0.6671***	-0.6671***	-0.1008*
	(0.2041)	(0.2041)	(0.0569)
Unemployed→Unemployed	0.4276	0.4276	0.0636
	(0.3879)	(0.3879)	(0.0420)
Homemaker→Retired	0.0032	-0.3070*	0.0005
	(0.1904)	(0.1721)	(0.0290)
Homemaker→Homemaker	0.0038	0.0038	0.0006
	(0.0916)	(0.0916)	(0.0137)
Sick or disabled→Retired	-0.0717	-0.0717	-0.0107
	(0.1912)	(0.1912)	(0.0318)
Sick or disabled→Sick or disabled	-0.1762	-0.1762	-0.0264
	(0.2568)	(0. 2568)	(0.0458)
Mean weekly excess mortality	0.3804***	0.2159***	0.0572**
	(0.0708)	(0.0663)	(0.0254)
Constant	-1.5726***	-0.7723***	
	(0.1560)	(0.1551)	
Var(Region)	0.1893***		
	(0.0087)		
Log-likelihood	-46891156		
Pseudo-R^2	0.0643		

Notes: Observations: 22,303. Regions: 507
Significance levels: *** p<0.01, ** p<0.05, * p<0.1
Source: Own elaboration based on SHARE Wave 7, SHARE Wave 9 and SHARE Corona (W1 & W2), release 8.0.0

Table 5. Model 3: Generalised partial proportional odds ordered logistic regression with standard errors clustered at the regional level estimated using individual weights from Wave 7, including income

	Financial wellbeing change		
Variables	**β – log odds (ref.: Improvement)**		**AME for the worsening situation**
	Worsening	**Stabilisation**	
Age (ref.: 51-55)			
56-60	-0.107	-0.107	-0.0169
	(0.129)	(0.129)	(0.0205)
61-65	-0.102	-0.102	-0.0161
	(0.122)	(0.122)	(0.0196)
66-70	-0.0172	-0.0172	-0.0028
	(0.135)	(0.135)	(0.0220)
71-75	0.0358	0.0358	0.0059
	(0.131)	(0.131)	(0.0215)
76-80	-0.160	-0.160	-0.0249
	(0.157)	(0.157)	(0.0246)
81-85	-0.0550	-0.0550	-0.0088
	(0.142)	(0.142)	(0.0228)
86-90	0.00347	0.00347	0.0006
	(0.193)	(0.193)	(0.0315)
91+	0.235	0.235	0.0409
	(0.275)	(0.275)	(0.0495)
Gender (ref.: Female)	0.00545	0.00545	0.00086
	(0.0723)	(0.0723)	(0.0114)
Education (ref.: Pre-primary, primary or lower secondary)			
Upper and post-secondary	-0.111	0.0464	-0.0183
	(0.106)	(0.104)	(0.0176)
Tertiary	-0.406***	0.227**	-0.0614***
	(0.126)	(0.111)	(0.0190)
Household size (ref.: 1)			
2	0.0962	0.0962	0.0154
	(0.0622)	(0.0622)	(0.0099)
3+	-0.101	-0.101	-0.0152
	(0.0956)	(0.0956)	(0.0144)
Economic status change between 2017 and 2022 (ref.: Retired→Retired)			
Employed→Retired	0.0797	0.0797	0.0125
	(0.110)	(0.110)	(0.0173)
Employed→Employed	-0.0207	-0.0207	-0.0033
	(0.112)	(0.112)	(0.0176)
Unemployed→Retired	-0.564**	-0.564**	-0.0888
	(0.222)	(0.222)	(0.0352)
Unemployed→Unemployed	0.213	0.213	0.0335
	(0.421)	(0.421)	(0.0661)
Homemaker→Retired	-0.106	-0.106	-0.0166
	(0.198)	(0.198)	(0.0313)
Homemaker→Homemaker	0.000373	0.000373	0.00006
	(0.113)	(0.113)	(0.0179)
Sick or disabled→Retired	-0.00219	-0.00219	-0.0003
	(0.234)	(0.234)	(0.0368)
Sick or disabled→Sick or disabled	-0.193	-0.193	-0.0303
	(0.240)	(0.240)	(0.0378)
Mean weekly excess mortality	0.00722	0.770***	0.0011
	(0.185)	(0.290)	(0.0291)

continuation of table 5

Mean income (regions)	-1.49e-05** (6.89e-06)	2.99e-05*** (7.78e-06)	-2.34e-06** (1.08e-06)
Constant	-0.970*** (0.205)	0.257 (0.265)	
Log-likelihood		-22160.421	
Pseudo-R^2		0.0136	

Notes: Observations: 22,303. Regions: 106
Significance levels: *** p<0.01, ** p<0.05, * p<0.1
Source: Own elaboration based on SHARE Wave 7, SHARE Wave 9 and SHARE Corona (W1 & W2), release 8.0.0

Table 6. Model 4: Two-level binary logistic regression, including income, job loss and pre-pandemic economic status

	Financial wellbeing worsening	
Variables	**β – log odds**	**AME**
Age	0.00284 (0.00685)	0.00043 (0.00103)
Gender (ref.: Female)	0.0724 (0.0795)	0.0110 (0.0121)
Education (ref.: Pre-primary, primary or lower secondary)		
Upper and post-secondary	-0.103 (0.102)	-0.016 (0.0163)
Tertiary	-0.332*** (0.114)	-0.0496*** (0.0173)
Household size (ref.: 1)		
2	0.0447 (0.0896)	0.0068 (0.0137)
3+	-0.110 (0.109)	-0.0160 (0.0159)
Economic status in 2017 (ref.: Retired)		
Employed	0.3596 (0.3434)	0.0609 (0.0626)
Self-employed	-0.0253 (0.1248)	-0.0039 (0.0191)
Inactive or unemployed	-0.3405** (0.1622)	-0.0475** (0.0218)
Job loss during the pandemic (ref.: No)	0.2878** (0.1493)	0.0464* (0.0256)
Mean weekly excess mortality	0.0850 (0.194)	0.0128 (0.0291)
Mean income (regions)	-1.22e-05* (6.92e-06)	-1.83e-06* (1.05e-06)
Constant	-1.368*** (0.464)	
Var(Constant)	0.191*** (0.0593)	
Log-likelihood	-2334.900	
Pseudo-R^2	0.0071	

Notes: Observations: 4,854. Regions: 426
Significance levels: *** p<0.01, ** p<0.05, * p<0.1
Source: Own elaboration based on SHARE Wave 7, SHARE Wave 9 and SHARE Corona (W1 & W2), release 8.0.0

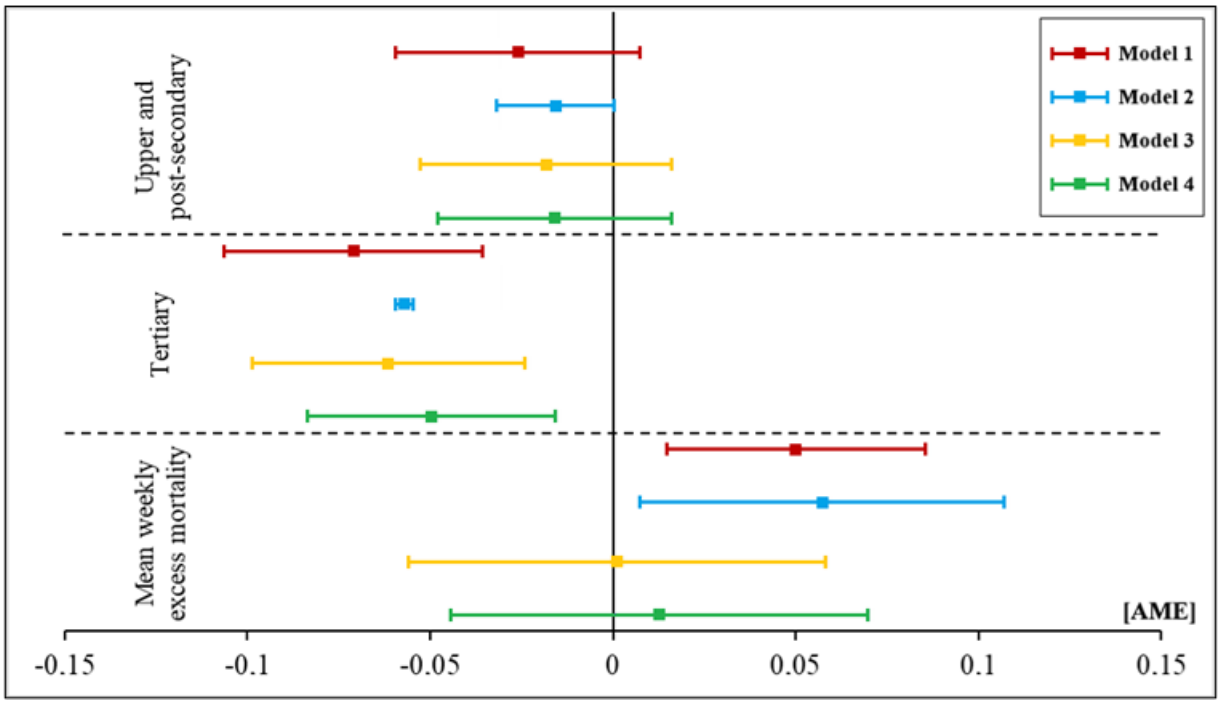

Fig. 3. Average marginal effects and 95-percent confidence intervals for models assessing changes in financial wellbeing for the education categories (reference category: pre-primary, primary or lower secondary) and mean weekly excess mortality in Models 1–4
Source: Own elaboration based on SHARE Wave 7, SHARE Wave 9 and SHARE Corona (W1 & W2), release 8.0.0

aggregated variables tend to exhibit stronger spatial interdependence than individual-level characteristics. For this reason, mean regional income is not included jointly with excess mortality in the main model specifications (Table 3 and 4).

4. Conclusions

In this study we aimed to investigate the association between excess mortality related to the COVID-19 pandemic, economic status and changes to subjective financial wellbeing experienced by SHARE respondents between SHARE Waves 7 and 9 – that is before, during and after the pandemic and associated stringency measures.

Descriptive statistical analysis showed that, between 2017 and 2022, the average subjective financial wellbeing improved in 93 out of 122 of the analysed regions. Financial wellbeing worsened primarily in certain less economically developed regions (mainly Greece and the Balkans), as well as regions comprising large urban areas, especially the ones with highly positive net migration rates. At the same time, the territorial units that experienced the largest improvement include moderately developed but fast-progressing regions (at European scale), or the ones that are already highly developed compared to the European Union average GDP per capita, such as West Slovenia.

Despite these overall improvements in financial wellbeing across most regions, the severity of the pandemic is associated with a sizeable negative effect on individual financial situation. On average, we found that an increase in the mean weekly excess mortality from June 2021 until March 2022 greater by one additional excess death per 10,000 inhabitants in a given region was associated with the probability of an individual's subjective financial wellbeing changing for the worse (between 2017 and 2022), up around 5 percentage points, with the value ranging from 4.88 to 5.72 depending on the model.

Focusing on SHARE respondents from regions here the pandemic was the most severe, the percentage of individuals whose financial situation worsened amounts to 23.5–24.2 percent, with 19.7–19.8 percent in the case of regions where the COVID-19 pandemic was less severe.

The strong, negative regional-level correlation between economic development and pandemic severity

during the second and third pandemic waves may be due to diverse common factors, reflected by excess mortality – the measure of pandemic severity used in this study. The application of various specifications, model types and two different regional divisions indicated that accounting for income results in a loss of significance of excess mortality. Nevertheless, the inclusion of income is only treated as auxiliary, as it might be less structurally valid (income variability accounted for a significant part of the variability in subjective financial wellbeing). Aside from these changes, the coefficient for excess mortality remains similar across multiple models and regional divisions, demonstrating relative robustness (especially after adding variables related to the micro-level labour market situation). Thus, excess mortality seems to constitute a valid measure of the general pandemic severity because of its association with healthcare quality and accessibility, containment policies' effectiveness, as well as the more general health of society.

On the one hand, these findings indicate that regional measures of pandemic severity should be used with caution in individual-level analyses, especially when other regional-level variables are accounted for. On the other hand, major studies focusing on personal financial resilience during the pandemic typically either compare individuals' situations before and after the COVID-19 outbreak (Bonfatti et al., 2023), or examine the post-outbreak period within a limited timeframe or geographic scope (Schumacher & Bethmann, 2023; Stevenson et al., 2022; Sun et al., 2022), or analyse financial preparedness prior to the crisis (Lusardi et al., 2021), often without accounting for regional differences in pandemic severity. Furthermore, the outcomes of the descriptive analysis and the income-related results of the econometric part suggest that the importance of financial literacy and access to financial resources is evident not only at the individual level (Lusardi et al., 2021) but also at the regional level, with populations in more-developed regions demonstrating greater financial resilience than less-developed ones.

The transition to retirement of the most vulnerable groups of people (unemployed or with disabilities) could improve their financial resilience during the crisis. At the same time, the transition to retirement or job loss negatively affected the situation of people who were employed before the COVID-19 outbreak. These results show that pension systems have a potential protective effect on the financial resilience of the elderly during a crisis period, particularly for people who entered the crisis with an already vulnerable labour market situation. Additionally, we found that staying in employment during the pandemic likely prevented a serious deterioration in subjective financial wellbeing of people aged 50+.

The findings on the protective effect of public pension systems extend the results of previous studies. For example, Bonfatti et al. (2023), using data from the Wave 8 COVID-19 (Corona 1) Survey, showed that individuals aged 64 or older living in single-person households had significantly lower odds of experiencing a decline in subjective financial wellbeing (defined similarly to this study) during the first pandemic wave, compared to younger cohorts. Our findings that focus on the transition to retirement, controlling for age, and based on the post-pandemic Wave 9 of SHARE (which has a larger sample size) confirm that this protective effect is indeed associated with retirement. Moreover, our analysis provides evidence of the positive aspects of remaining in employment during periods of stringent public health measures and related economic slowdown.

One limitation of this study is the fact that the variable reflecting the difficulty making ends meet financially has four values, although its coefficient of variation is relatively high (amounting to 0.36) for SHARE countries. Since the dependent variable is ordinal with only three categories, a large part of the variability is inherently difficult to explain. This is reflected in a relatively modest McFadden's pseudo-R^2, exceeding 0.06 in only one of the models. Nevertheless, such a value is often considered acceptable in analyses dealing with microdata, and pseudo-R^2 is not directly comparable to R^2 in OLS regression (McFadden, 1977).

Future research based on large, longitudinal data series dealing with the COVID-19 pandemic could account for regional excess mortality used rather as an auxiliary variable, in order to measure individual-level phenomena, such as the transition to retirement or job loss, which are merely touched upon in this study. Future research could also focus on a comparison of the influence of pandemic severity on financial and social wellbeing.

Our analysis of older Europeans' financial wellbeing during and after the COVID 19 pandemic aligns closely with the multidimensional framework proposed by García Mata and Zerón Félix (2022). First, the observed deterioration in subjective financial wellbeing in regions with high excess mortality underscores the model's emphasis on contextual and institutional factors: macro-level shocks and regional disparities in healthcare and economic development significantly shape individual outcomes. Second, the protective effect of retirement for previously unemployed individuals and the buffering role of household composition reflect the theory's resilience dimension, through which both internal capabilities and external

resources mitigate vulnerability. Third, the strong association between income and financial wellbeing confirms the importance of objective resources, while the subjective measure of the difficulty making ends meet captures perceived security and financial freedom, consistent with the model's call for integrating objective and subjective indicators. Finally, the temporal perspective embedded in our longitudinal design (tracking changes before, during and after the pandemic) operationalises the theory's life-course approach, highlighting how financial wellbeing evolves under stress and recovery phases.

Overall, these findings are consistent with García Mata and Zerón Félix's proposition that financial wellbeing is a dynamic, context-dependent state shaped by individual capabilities, institutional environments, and resilience strategies. Our results provide additional evidence regarding how financial wellbeing may respond to systemic shocks such as the COVID-19 pandemic. When designing public policies, it is important to account for factors that contributed to lower financial resilience during the pandemic in order to reduce future vulnerability of individuals and households. At the macro level, this includes considering healthcare accessibility, employment opportunities and labour market conditions, at both the national and the regional level. In the EU regions that were particularly affected by the pandemic in terms of excess mortality (in 2021 these were Bulgaria, Romania, Northeast Poland, East Hungary, East Slovakia, the Baltic countries and North Greece), it is crucial to identify the potential causes, such as limited public health policies, ineffective healthcare infrastructure, income inequalities, vaccination reluctance or public health responses. Our findings also suggest that cohesion policies aimed at reducing regional disparities could benefit from targeted, region-specific investments addressing economic development, labour market potential and the availability of social infrastructure, including healthcare.

Notes

1. The concept of resilience has its origins in multiple scientific disciplines. It was first defined in applied mechanics and materials engineering in the 19th century (Rankine, 1862). Ecological and disaster studies, particularly those focusing on human-induced disturbances in ecological systems, conceptualised resilience as a system's ability to persist and adapt (reorganise) despite shocks while preserving its essential characteristics (Holling, 1973). The concept was also developed in the fields of developmental psychology and child psychiatry (Garmezy, 1971; Waters & Sroufe, 1983), later spreading to fields such as human geography, sociology, economics and demography. Recent works on social resilience emphasise not just adaptability but also the potential for transformative change in response to threats (Bartova et al., 2023).
2. Wave 8 data was excluded from the analysis due to the disruption of its fieldwork, with only 70 percent of longitudinal interviews conducted before the pandemic outbreak in March 2020.
3. Arab-speaking respondents with no information about the region of residence available from other sources were assigned to the Northern District of the country, and Russian-speaking respondents to the Southern District. The number of Arab citizens in the internationally recognised parts of Israel is highest in the Northern District. Assigning Russian-speaking Israeli respondents with no information about the region of residence to the Southern District constituted a strong assumption, related to the large number of Russian-speaking Israelis living in Ashdod and Be'er Sheva – major cities of the region (having the highest absolute numbers of Russian-speaking people in Israel, just after Haifa).
4. These shares were calculated using cross-sectional individual weights from Wave 7.
5. Income ratios were considered too high if they indicated a difference higher or lower by a factor of 7 for all possible inter-wave comparisons between Waves 5 and 9. Given the relatively long time differential between fieldwork for the pairs of Waves 2 and 8, Waves 4 and 9, as well as Waves 2 and 9, a larger difference was considered too high – corresponding to factors of 10 and 11, respectively.
6. Additional analysis, using 106 bigger regions instead of 507 units, indicated that a similar percentage (11.4 percent) of the population of SHARE countries inhabited regions where the mean weekly excess mortality increased by more than 1 excess death per 10,000 inhabitants.
7. More specifically, the compared periods were: late May – mid-June 2021, and late October – early December 2021.
8. Regions with an increase in the mean weekly excess mortality larger than 2 deaths per 10,000 people were mainly located in Bulgaria, but also in Romania, Northeast Poland and East Hungary.
9. These statistics were based on the disaggregation into 507 regions. If we calculated these percentages for the 106 larger regions, the share of respondents (whose financial situation worsened) from the 19 regions where the pandemic was most

severe would amount to 24.2 percent, while the analogical percentage of respondents from the remaining regions would be equal to 19.7 percent.

10. For the purpose of obtaining this statistic, education was added to the model as a quasi-continuous variable with seven possible values depending on the ISCED 1997 level.
11. It should be noted, however, that after accounting for household income, the average influence of the one-standard deviation change in mean weekly excess mortality on subjective financial wellbeing becomes negligible – 0.3 or 0.4 percentage points for Models 3 and 4, respectively.

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