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A long arm of adversity? Financial hardship during the life course and income in retirement

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Abstract

This study investigates whether and when financial hardship during the life course is related to pension income levels in 27 European countries and whether relations between hardship and pension income differ across gender and welfare regimes. Data from the Survey for Health, Ageing and Retirement in Europe (SHARE) are used, combining retrospective information on respondents' experienced financial hardship and their current pension income (N = 38,574). We apply two-part regression models with country-fixed effects to estimate the associations of pension income with hardship that starts in one's youth (age <20), the transition to adulthood (age 20-29), mid-career (age 30-44) and late career (age >44), as well as with the duration of hardship. The results show that financial hardship during the life course does not always have negative consequences for income in old age. We find positive associations of pension income with financial hardship in youth (among men) and in early adulthood (among women). These results suggest that short spells of financial hardship are often related to crucial life-course transitions that allow subsequent career development and pension accrual. In contrast, financial hardship in late career is negatively associated with pension income, especially among men in Continental and Southern European countries.

Keywords: pensions, financial hardship, life course, gender, welfare state

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Introduction

As populations are ageing, an increasing share of people will be dependent on pensions for their livelihood. To deal with the impact of population ageing on pension systems, pensions have become increasingly financialized, privatized and marketized (Ebbinghaus 2015; Hinrichs 2021). This has resulted in an individualization of the risks of retirement, meaning that the dependence of income in retirement on the possibilities to earn and to save during the life course is growing. Therefore, periods of financial hardship during the life course, when earnings are low and possibilities to save are limited, pose a growing risk for income adequacy in a growing share of the population.

Spells of financial hardship and poverty at some point across the life course are relatively common (Layte and Whelan 2003). In the US, for example, Rank and Hirschl (2015) found that around 60 per cent of the population experienced at least one year of poverty before the age of 65. Fouarge and Layte (2005) found that in the mid-1990s around one-third of Europeans experienced poverty in a timeframe of five years. In the current study, we find that up to one in four Europeans reported experiencing some distinct period of financial hardship before their retirement.

Financial hardship can be understood as an individual's subjective experience of financial or economic difficulties and can come in various shapes and sizes. It can be poverty, but also include milder forms of difficulties to make ends meet. Most of hardship is transient: restricted to certain transition periods or life course events, and short in duration (Layte and Whelan 2002; Vandecasteele 2010). In these cases, the eventual impact on pensions might be limited. However, financial hardship may also be persistent and recurrent, having a deeper and lasting impact on earnings and savings across the life course. Furthermore, financial hardship can have more severe long-term consequences when occurring at particularly vulnerable stages of the life course when resources for recovery and compensation are scarce. This might be, for example, the case for poverty during childhood (Duncan, Magnuson, Kalil, and Ziol-Guest 2012; Lesner 2018).

This study investigates whether and when financial hardship before retirement is related to pension income levels in 27 European countries. More specifically, it analyzes whether hardship's timing and

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duration matter. This is done with the help of data from the Survey for Health, Ageing and Retirement in Europe (SHARE) and combining subjective retrospective information on respondents' financial hardship before retirement and their current pension income. The SHARE data offers a unique opportunity to link developments and events during the life course with the situation in old age. Yet, in case of financial hardship it also comes with an important limitation: respondents were able to only report one spell of hardship. This means that it is not possible to analyze multiple spells and their interdependence.

Nevertheless, this article contributes to the existing literature by exploring how economic conditions in earlier stages of the life course are linked with economic wellbeing in retirement. Previous empirical studies have often focused on the various risk factors for poverty and financial hardship across various stages of the life course (Mirowsky and Ross 1999; Sandoval, Rank, and Hirschl 2009), the relation between life course events and subsequent risks of poverty (DiPrete and McManus 2000; Layte and Whelan 2002 2003; Vandecasteele 2010, 2011), or on the relation of risky life events with income and poverty in later life (Madero-Cabib and Fasang 2016; Muller, Hiekel, and Liefbroer 2020; Möhring 2018; Peeters and De Tavernier 2015). The current study builds on the findings of the previous literature but focuses on the question whether financial hardship as such – regardless of particular life course events – carries over into retirement and whether the life-course stage in which this hardship occurs matters. Moreover, by using comparative and harmonized data for 27 countries, we build on previous literature that has shown that the causes for and nature of hardship differs across various institutional contexts and welfare regimes (DiPrete 2002; Vandecasteele 2010; Fouarge and Layte 2005). Our study shows how also the long-term outcomes of financial hardship vary across welfare regimes. Furthermore, the study adds a gender perspective on the experience and consequences of financial hardship. Men's and women's life course risks are differently associated with the family and the work sphere due to the gendered distribution of paid work and unpaid care work. This relationship varies between welfare states due to varying degrees in the support of women's financial independence.

With pensions becoming increasingly dependent on one's own earnings and savings across the life course, retirement income is not only measure of economic wellbeing in old age but can also be seen as

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the outcome of accumulated opportunities and economic wellbeing throughout the life course (Crystal, Shea, and Reyes 2017). This article sheds light on the crucial periods during the life course when financial hardship affects pension outcomes the most. This information should also be valuable for policymaking in deciding at which stages of the life course interventions could carry most weight.

The nature of financial hardship across the life course

The relation between the life course and financial hardship for long has been a topic of research. At the beginning of the twentieth century Rowntree (1902) studied urban working-class poverty in the English city of York and identified three phases in the life cycle when people are at increased risk of experiencing poverty: in childhood, when having children, and in old age. In each life stage there is a need to balance needs and resources. In these three stages either resources are low – such as in childhood or old age – or needs are high – such as when having children. From the life-cycle perspective, poverty is usually transient, while recurrent yet predictable. Other recent studies have approached the relation between the life cycle and hardship from a more linear perspective. As adults age, they accumulate more income and wealth (increase of resources), while at the same time their children age and move out of the household (a decrease of needs) (Mirowsky and Ross 1999; Rank and Hirschl 2015; Sandoval et al. 2009).

Life course theories differ from lifecycle and linear-age approaches to poverty as they link economic hardship not to certain ages but to risky life events. Leaving the parental home, childbirth, divorce, widowhood, unemployment, and retirement are all events that contribute to the risk of subsequent economic hardship (DiPrete and McManus 2000; Polizzi, Struffolino, and Van Winkle 2022; Vandecasteele 2010, 2011).

Theories of social stratification emphasize that the risk of hardship is not evenly distributed in the population, but that certain disadvantaged groups, in terms of gender, class and race, are more likely to experience financial hardship. Not only are disadvantaged groups often more likely to experience risky life events such as divorce and unemployment (Pintelon, Cantillon, Van den Bosch, and Whelan 2013), their risk of economic hardship also tends to be higher after experiencing such events (Popova and Navicke 2019; Vandecasteele 2011).

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Various theoretical traditions also have different perspectives on the duration of hardship and poverty. In earlier lifecycle and life course literature, it was often expected that poverty is transient and can be overcome once the risky life stage or event has passed (Layte and Whelan 2002, p. 215). From a social stratification perspective, hardship is less likely to be transient: spells can last long and recur due to a lack of resources to climb out of deprivation. Groups who are at higher risk of poverty in early- and mid-life are simultaneously at higher risk of poverty in old age due to their disadvantaged status (Gabriel, Oris, Studer, and Baeriswyl 2015). Recent studies often combine life-course and social-stratification perspectives, stressing the interactions between socioeconomic status and risky life events (Popova and Navicke 2019; Vandecasteele 2011). Especially theories of cumulative advantage/disadvantage (CAD) emphasize that inequalities tend to grow across the life course and that disadvantages, including financial disadvantage, are part of a lifelong process that may culminate in old age (Crystal et al. 2017; Dannefer 2003).

The role of welfare regimes, social policy, and pension systems

Social policy and the welfare state have played an important role in altering the role of poverty and hardship across the life course (Dewilde 2003; Kangas and Palme 2000). They do so by 1) determining who is at risk of financial hardship (i.e., the social stratification of risk), 2) determining when someone is at risk of financial hardship (i.e., what role risky life events play), 3) offering possibilities for compensation and recovery in case of financial hardship (i.e., affecting the duration and depth of hardship) (Diewald 2016; DiPrete 2002). Furthermore, pension systems can buffer, sustain, or exacerbate the impact of adversity during the life course on economic wellbeing in old age.

In this study, we group countries into welfare regimes consisting of the Nordic (social democratic), Continental (conservative), the Southern European (Arts and Gelissen 2002; Esping-Andersen 1990; Ferrera 1996; Korpi 2000), and the post-communist countries. [1] While treated as a single welfare regime for now, we split the former communist countries into two groups in the analysis, reflecting the

[1] Unfortunately, the SHARE data lacks a sufficient number of representative countries of the liberal or Anglo-Saxon regime.

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heterogeneity in the region and some of the diverging paths that were chosen after the fall of communism. (Kuitto 2016). We return to this division in the data section and in the robustness checks.

Individual risks can be broadly divided into those related to the labor market (e.g., unemployment or disability) and those related to family formation and dissolution (e.g., leaving the parental home, marriage, having children, divorce and widowhood). Welfare states differ in the ways that these risks turn into financial hardship. Especially for men, these risks are often related to the labor market, especially in welfare regimes that de-commodify labor to a lesser extent (Esping-Andersen 1990). Moreover, in welfare states where women have poorer access to paid work and are less able to form and maintain an autonomous household (O'Connor 1993; Orloff 1993), women's risks are more often related to family structures and events, and especially to having a husband who provides a living.

In the countries of the Nordic welfare regime the risks of financial hardship have relatively low due to universal social policies that traditionally promoted gender and social equality and offered ways for compensation and recovery in case of risky life events such as having children, divorce, or unemployment (Diewald 2016; DiPrete 2002). Continental and Southern European welfare states traditionally emphasized the prevention of certain risky events, for example through legal restrictions on divorce or strict employment protection legislation, rather than the prevention of adversity following risky events (DiPrete 2002). However, in case of a risky event occurring, individuals are often left less compensated. Especially women tend to be at risk of hardship following risky family-related events, as welfare state design is largely based on the norm of a male breadwinner arrangement in a lifelong marriage (Korpi 2000). Further, we expect that if financial hardship occurs, spells are shorter in Nordic countries than in the other welfare regimes due to greater efforts towards individuals' recovery from hardship, for example through activation and re-employment policies, but also higher benefit levels (DiPrete 2002; Fouarge and Layte 2005; Vandecasteele 2010).

Risks of poverty have been found socially stratified more strongly in Southern European and post-communist countries (Gioachin, Marx, and Scherer 2023; Pintelon et al. 2013; Popova and Navicke 2019). This can be, at least partly, attributed to strong familization in social policies and the overall

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residual nature of social safety nets in those countries. However, in terms of gender equality, Southern and post-communist countries until 1989 represented opposites. In the state-socialist countries, divorce was often relatively easy, and women equally participated in the labor market on a fulltime basis, while divorce was not possible and female labor market participation low in most Southern European countries.

Furthermore, in the post-communist countries a distinction needs to be made between the periods before and after the fall of communism. During the times of communism, poverty "officially" did not exist, nor did unemployment. If there was hardship, it was not due to lack of money but rather lack of consumer goods to spend on. State-subsidized housing and consumer goods as well as public services for childcare helped making ends meet even with scarce financial resources. During the transition to capitalism, unemployment and poverty rose in most of the countries in the region. In family policies, some countries in the region, especially those with a strong presence of the catholic and orthodox churches, took a more conservative turn, while others moved more towards a liberal welfare model (Kuitto 2016; Mach, Mayer, and Pohoski 1994; Möhring 2016). Hence, there is reason to expect that also within the post-communist group there are differences in outcomes.

The Beveridgean multi-pillar pension systems in the Nordic countries (and the Netherlands) tend to have relatively generous basic pensions and wide coverage (Ebbinghaus and Möhring 2022), which should most effectively buffer the impact of unpaid or low paid spells during working life (Ebbinghaus 2021; Möhring 2018 2021). Pension systems in the other welfare regimes can be classified as variations of the Bismarckian type and rely more heavily on earning- and contribution spells, effectively maintaining the economic status from before retirement (Ebbinghaus 2021). Also these systems can incorporate various buffering mechanisms that target the impact of risky life events of particularly women, such as pension points for care leaves, pension splitting after divorce, and survivor pensions (Chau, Foster, and Yu 2017; Peeters and De Tavernier 2015), although these schemes tend to buffer such life-course events to a lesser extent than generous basic pensions (Möhring 2018). Ebbinghaus (2021) described the pension systems of Southern European countries as Bismarckian 'lite', due to the relatively low coverage and benefits. Benefits also are low in most of the post-communist countries, where funded

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schemes have been immature (or even later abolished) since they were established after the fall of communism.

Table 1 summarizes the expected nature of financial hardship and its associations with pension income in four broad welfare regimes. Financial hardship is predicted to have the smallest negative impact on pension income in the Nordic countries because of low incidence and short duration of hardship spells, as well as buffering effects of the pension system. We expect to find intermediate negative impact of financial hardship on pension income in the Continental countries due to, in particular, longer duration of hardship spells and the status maintenance focus of pension systems. Finally, the adverse effects of hardship on pension income are expected to be greatest in the Southern European and post-communist countries, especially among women, because of a residual social safety net, possibly longer spells of financial hardship, and strong status maintenance in the pension system.

<Table 1 around here>

Timing of financial hardship

Most theories on how the risk of financial hardship develops across the life course seem to agree that at some stages individuals are more at risk to experience hardship than in others due to different financial, social, and mental resources to cope with hardship. Yet, theories differ in their views whether hardship has long-reaching consequences or whether it is likely to repeat or reinforce itself across the life course. Moreover, consequences can be expected to differ by gender and welfare regime. In this study, we focus on the nature and long-term economic consequences - in the form of pension income in later life - of financial hardship that starts during four distinct phases of the life course: childhood and youth, early adulthood, mid-life, and late working life.

Studies on the 'long arm' of childhood have shown how deprivation starting in early life can have impact on, for example, one's educational attainment as well as one's physical and mental health (Duncan, Magnuson, Kalil, and Ziol-Guest 2012; Lesner 2018; Pakpahan, Hoffmann, and Kröger 2017) and thereby limit possibilities for successful employment and occupational advancement throughout one's further life. This means that financial hardship provides a set-back in early life, which will negatively

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affect possibilities for pension accrual and savings from then onwards. From this perspective it is expected that the negative consequences of financial hardship in early life will still play a role in later life, regardless of the person's gender and welfare regime (Sieber et al. 2020):

> Hypothesis 1: Financial hardship that starts in childhood and youth is negatively related to retirement income (*the long arm of childhood hypothesis*).

From a life course perspective, financial hardship that starts in early adulthood can be expected to be part of a 'natural' transition phase of moving out of the parental home, entering a career, and starting a family (Dewilde 2003). Hardship is likely to be transient and especially in countries with historically more developed social safety nets, such as in the Nordic countries or in communist countries before 1989, policy is equipped to compensate the worst effects of financial difficulties. Financial hardship due to becoming an independent adult in this stage of life, for example when leaving the parental home to pursue an education, could even be a predictor of higher earnings in the later career. In Southern Europe, and to some extent in Continental countries, moving out of the parental home traditionally took place after obtaining economic security (Vandecasteele 2010), making financial hardship in this phase less common but possibly also more severe if it did occur. This would be the case especially among women, who were less expected to start a career or an independent household of their own in the traditional male-breadwinner societies.

> Hypothesis 2a: Financial hardship that starts in early adulthood is positively associated to retirement income, especially for women in the Continental and Southern European countries (*the adulthood transition hypothesis*).

In contrast, financial hardship during early adulthood can also be an indication of a marginalized entry to the labor market. In many countries young adults face difficulties in finding continuous, secure, and fulltime work (Hofäcker and Kuitto 2023). Not only may a precarious position in the labor market create financial difficulties in early adulthood, but its negative consequences may also carry over into the next stages of life, even all the way into retirement. Studies have shown, for example, that working in atypical employment or experiencing spells of not being employed in the early career has long-term consequences

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for one's earnings development and retirement income (Möhring 2021). Because of the historically greater normative pressure on men to have full and standard careers in most societies, we expect that the negative relation of financial hardship with pensions is greater for men and in the traditional male-breadwinner societies of Continental and Southern Europe.

> Hypothesis 2b: Financial hardship that starts in early adulthood is negatively related to retirement income, especially for men in the Continental and Southern European countries (*the false-start hypothesis*).

Once people become more attached to the labor market and the need to stay home to care for children recedes, financial resources tend to grow and the risk of poverty decreases (Mirowsky and Ross 1999; Rank and Hirschl 2015). However, the risks of some adverse life course events, such as divorce, are likely to increase in this mid-stage of life. Financial hardship in this stage of the life course might have negative long-term consequences. In contrast to financial hardship during the transition to adulthood phase, financial hardship during midlife is more likely to come unexpectedly. This means that people are poorly prepared, both mentally and financially. Moreover, while social policies have developed to support and compensate people in their transition to adulthood (Kangas and Palme 2000), the social safety net for hardship in the midlife phase is likely to be less targeted and adequate, especially in countries with less-developed policies for compensation and recovery, such as in Southern Europe and East-Central Europe after the fall of communism. While family-related events, such as divorce, might have a greater impact on women's financial situation and labor market-related events have greater impact on men financial situation in this phase of life, we do not see a reason to suspect that the relation of hardship in midlife with retirement income differs between men and women.

> Hypothesis 3: Financial hardship that starts in midlife is negatively related to retirement income, particularly in the Southern and East-Central European countries (*the midlife shock hypothesis*).

Financial hardship starting in late working life and closer to the retirement age can be related to retirement income in at least two ways. On the one hand, it is possible that the impact on retirement

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income is smaller than if financial hardship starts earlier in life, as the person has been able to develop a career and has built up resources and resilience to handle adversity, while already having accumulated pension rights. On the other hand, financial hardship that starts at a later age might be the outcome of several disadvantages that have accumulated throughout the life course. This will most likely be a precursor for low income in retirement as well. The eventual outcome will also depend on whether policies are in place that support older workers or enable them to retire early. In many countries, especially in Continental and Southern European countries, early exit pathways have been in place that, in case of redundancy or reduced work ability, have allowed older workers to retire early while receiving relatively generous benefits (Ebbinghaus 2006). However, this also meant that workers exited their career at a point when (seniority-based) earnings should have been at their highest, leading to substantially lower pension accrual under many occupational and earnings-related pension schemes. As early exit schemes were often aimed at typically male-dominated jobs in declining industries, we expect men's pensions to be affected more by financial hardship in late careers than women's pensions.

Hypothesis 4a: Financial hardship that starts in later working life is not related to retirement income (*the buffering hypothesis*).

Hypothesis 4b: Financial hardship that starts in later working life is negatively related to retirement income, particularly among men in the Continental and Southern European countries (*the late-career vulnerability hypothesis*).

Duration of hardship spells matters as well. Short and transient spells during the life course are relatively common (Fouarge and Layte 2005; Layte and Whelan 2003; Rank and Hirschl 2015) and are less likely to leave a permanent mark on income mobility, saving possibilities, or pension accrual. If a short spell of financial hardship is an indication of leaving the parental home to study or of the start of a career, it can even be a predictor of greater income mobility and pension accrual. In contrast, long spells of financial hardship limit the possibilities for pension savings and accrual and are more likely to be an indication of multiple disadvantages during the life course that will continue to negatively affect economic wellbeing in retirement:

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Hypothesis 5: The longer the duration of financial hardship, the lower the retirement income (*the duration hypothesis*).

Data and methods

Data and sample selection

This study utilizes data from SHARE - the Survey on Health, Ageing and Retirement in Europe (Bergmann, Kneip, De Luca and Scherpenzeel 2019; Börsch-Supan et al. 2013). Since 2004, SHARE data have been collected in 28 European countries and Israel among people aged 50 or older and their spouses. Thus far, eight waves of data are available with over 140,000 respondents, many of whom have been followed across several waves. Respondents are asked about a great variety of issues related to ageing and aspects of wellbeing, including their economic situation, health, retirement, and social networks. Waves 3 (collected in 2009) and 7 (collected in 2017) include retrospective data (also known as SHARELIFE), where respondents were asked about their life courses, including their past relationships, employment histories, spells of adversity and prosperity, as well as various life events.

We selected participants from 27 countries. Israel and Ireland were excluded because they could not be straightforwardly grouped according to the typical regime types. The five regimes that we study are: Nordic (Denmark, Finland and Sweden), Continental (Austria, Belgium, France, Germany, Luxembourg, the Netherlands and Switzerland), Southern (Cyprus, Greece, Italy, Malta, Portugal and Spain), and with the post-communist countries split into East-Central Europe (ECE - Czech Republic, Hungary, Poland, Slovakia, and Slovenia) and the Baltic and Southeast European (SEE) countries (Estonia, Latvia and Lithuania together with Bulgaria, Croatia and Romania).[2] The aim of grouping countries into welfare

[2] The former group of post-communist countries belong to some of the frontrunners in the transition to democracy and capitalism after 1989. With the exception of the Czech Republic, they have relatively strong catholic traditions that became visible in public life and family policies as conservative parties overtook power. Moreover, again with the exception of the Czech Republic, they adopted pension systems that were strongly based on Bismarckian principles and the recommendations for a multi-pillar system by the World Bank, although Hungary, Poland and Slovenia turned back some of these reforms in the 2010s. The latter group of post-communist countries is possibly more heterogenous. The three Baltic states were part of the Soviet Union until 1991, but quickly reformed thereafter with a liberal transition course and were among the first post-communist countries to join the EU in 2004. Bulgaria, Romania joined the EU only in 2007, followed by Croatia in 2011. However, in all six countries the welfare state and the pension systems have remained at a rather minimal level. Descriptive tables S1 and S2 in the supplementary materials shows that average pension benefits in these countries were particularly low. Moreover, Figure 2 indicates that he development of financial hardship across the life course in these countries was rather similar.

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regimes is not to explain differences in outcomes by the welfare regime, but mainly to see if outcomes differ by welfare regime.[3]

The sample formation for this study starts from the two retrospective waves of SHARELIFE, as they include questions related to financial hardship experienced during the life course. Respondents were asked: 'looking back on your life, was there a distinct period of financial hardship?', which can be answered with 'yes' or 'no'. We exclude those with missing values on this variable.

Participants who entered the data in the waves 3 and 7 did not respond to all questions for the usual panel data, including the detailed questions on income. Therefore, we used the adjacent waves 2 and 4 (for those who answered the retrospective questionnaire in wave 3) and 6 and 8 (for wave 7 respondents) for all other variables in our analysis. The selection of the sample is illustrated in Figure 1. We prioritized the interviews from the waves *following* the SHARELIFE waves (i.e., from waves 4 and 8), but in case information from those waves was missing, we used the interview data from the preceding waves (i.e., from waves 2 and 6). Only those who were 65 or older at the time of interview were included, because 65 has been the most common retirement age in most European countries. Although not everyone at this age is retired and receives a pension, only around four percent of the sample indicated to still be employed. Additionally, while it is possible to be retired before the age of 65, using the same age restrictions for all countries increases the homogeneity of the country samples, as statutory retirement ages and early exit options differ across countries and between genders within countries. People may exit the labor market early for different reasons and with different types of pensions or benefits, which may differ from the old-age pension that is typically provided after the age of 65 (Ebbinghaus 2006; Palomäki, Kuitto, Kuivalainen, and Riekhoff 2022). We chose to avoid using self-reported measures of retirement from the data, as they are known to lead to selection bias and exclude, in particular, women who spent most of their lives as housemakers and, therefore, never retired (Rowold 2023). The total sample size is N = 38,574.

[3] In the section with robustness checks we also explore some alternative groupings of countries into welfare regimes.

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<Figure 1 around here>

Dependent variable

Our main outcome variable is total individual pension income. We are particularly interested in pension income, as we hypothesized that financial hardship is related to individual possibilities to accumulate a pension in one's own name. Total individual pension income is the sum of all public, occupational, and private pension benefits and lumpsum payments received by the respondent in the reference year. Income is adjusted for purchasing power parities with German Euros in 2015 as the reference that is provided by the SHARE data. Pension income can be zero, most commonly due to a lack of pension entitlements or due to not being retired.

Independent variables

The main explanatory variables are based on the retrospective question 'looking back on your life, was there a distinct period of financial hardship?'. If the respondent answered with 'yes', then they were asked about the year when the spell started and the year when it ended. Since we are interested in financial hardship that started before retirement, we identify retirees who experienced hardship during the life course as those who answered that hardship began before age 60. Age 60 is set as the cut-off point, as around this time most people start to enter retirement and our aim was to reduce the possibility that financial hardship was caused by the change from work income to pension benefits. Moreover, since it is possible that our dependent variable is observed at age 65 in the wave two years prior to the SHARELIFE wave that records the history of financial hardship, censoring the variable at age 60 ensures that the same cut-off point applies to all.

Studies have emphasized the usefulness of subjective measures of economic wellbeing in addition to objective measures, especially when comparing countries and different points in time (Palomäki 2017; Palomäki et al. 2022). Admittedly, a self-reported and retrospective measure of financial hardship also has its limitations. People might not correctly remember years of hardship, although careful inspection of SHARELIFE data has shown that this recall bias for retrospective data is relatively small (Havari and Mazzonna 2015; Schröder 2011). Moreover, people may have different understanding of what financial

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hardship means. It is possible that this understanding differs structurally, for example, between men and women, and between countries.[4] Another limitation of these data is that each respondent can only report one spell, so there is no possibility to study the recurrence of hardship. Still, this variable is the closest approximation to an indicator that measures financial hardship across the entire life course, not just in a few consecutive years.

We created a categorical variable for age of onset based on our hypotheses. With 'experienced no financial hardship before retirement' as the reference category, the variable includes categories for those whose financial hardship started in their youth (below 20 years old), in early adulthood (20-29 years old), in mid-career between ages 30 and 44, and in the later working life (between 45 and 60). Duration of financial hardship is a continuous measure from 0 to 61 for the number of years in which hardship occurred. In case hardship was ongoing at the time of retirement, duration was censored at the age 60.

In the regression analysis we control for other factors that might explain the level of retirement income and its relations with financial hardship. We used the SHARE Job Episodes Panel data (Brugiavini, Orso, Genie, Naci, and Pasini 2019) to create an indicator for the total length of working life. This is done in line with an earlier study by Dingemans and Möhring (2019) by adding the total number of years worked until the year of retiring, with years in part-time work counting as 0.5. Years when the respondent switched between part-time and full-time work count as 0.75. Usually, the stronger the earnings-related pillar in a pension system, the stronger the link between years worked and pension income (Möhring 2015).

The other control variables are retrieved from waves 2, 4, 6 and 8 and therefore reflect the situation in retirement. Controlling for marital status is important for several reasons. It provides an indication of the person's history of family formation, while risky life events, such as divorce or widowhood, could have been triggers for financial hardship (Layte and Whelan 2002; Vandecasteele 2010, 2011). More importantly, it provides an indication of the current household situation which has been shown to

[4] There can also be slight differences in the translations of the questions into different languages. In several languages the question seems to refer more to economic or financial *difficulties* rather than hardship.

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determine pension income more strongly than changes in marital status in the past (Peeters and De Tavernier 2015). In addition to being married or cohabiting, never married, divorced or separated, or widowed, we include an additional category for being married or cohabiting with a spouse who experienced financial hardship. Since having children constitutes another risky life event and may also affect earning possibilities thereafter, we control for the number of children. This variable consists of four categories: no children, one child, two children, and three or more.

Level of education is divided into low (ISCED 0-2), medium (ISCED 3-4) and high (ISCED (5 or higher). Education is a relevant proxy for socioeconomic status that remains largely constant throughout life (Gabriel et al. 2015). Being born outside the country of residence is controlled for with a dummy variable. A dummy is also included for performing paid work in the year of the survey. To account for possible cohort effects, we include a categorical variable, dividing respondents into those born before 1939, those born between 1939 and 1945, and those born after 1945. In all regression models we include country dummies and a dummy for the SHARE wave, while analysis is split by gender to incorporate differences in life courses, retirement and pensions between men and women. Summary statistics for all variables are presented in Table 2.

Methods

After presenting descriptive statistics, we apply a series of regression models with country-fixed effects to investigate the relations between the financial hardship dimensions and pension income variable, while controlling for all other factors. One problem with pension income as a dependent variable is that a substantial number of individuals have no pension income and that these shares differ considerably by country and gender. Especially women in Southern Europe often have zero pension income, while in some of the post-communist countries almost all respondents reported to have some income from pensions. Keeping these zero values as such would skew the analysis and lead to unreliable results that would be difficult to compare across countries or welfare regimes. Therefore, we apply two-part models (Belotti, Deb, Manning and Norton 2015; Duan, Manning, Morris and Newhouse 1984). In these models, the first part estimates a logistic regression model for the probability of observing a positive versus a zero

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outcome. In the second part, which is conditional on the first part, a linear regression model is estimated for the positive outcome, using the log-transformation of pension income. In addition to separately producing coefficients for both parts of the model, the method also allows estimating their combined average marginal effects (AME) in Euros. For this we use Duan's smearing estimate for re-transforming the log-values and bootstrapping of the standard errors (Belotti, Deb, Manning and Norton 2015; Duan 1983).

In a first model we include a dummy for having experienced financial hardship at all. In the second model we specify financial hardship by age of onset. In the third model, the variable for duration of financial hardship is included. As the duration variable ranges from zero (if no hardship was experienced) to 61 (if hardship was experienced in all observed years), the coefficients for the age of onset in these models indicate the association with pension income if the duration was particularly short. It is possible that the duration of hardship also differs by age of onset. Figure S1 in the Supplementary Materials shows these differences and indicates, for example, that financial hardship might be especially persistent when it started below age 20. Yet, it also shows that hardship starting after age 44 is practically censored after 15 years due to the limited observation period. Therefore, and to avoid collinearity issues, we decided not to include an interaction between age of onset and duration of financial hardship and assume that the slope for duration does not vary by age of onset. Finally, we estimate Models 2 and 3 separately for each welfare regime, to observe whether associations between financial hardship's age of onset and income in retirement differentiate between these.

Findings

Who experiences financial hardship and when?

On average, 26 per cent of our study population indicated that they experienced financial hardship at some point during their lives. This percentage was somewhat higher among women (27.6%) than among men (23.4%) (see Table 2). Tables S1 and S2 in the supplementary materials present the percentages by each country included in the study. The incidence of reported financial hardship was highest among men and women in Cyprus (47.6% and 41.6%) as well as women in Finland (37.8%), Germany (34.5%) and

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France (34.4%), and lowest among men and women in Slovakia (5.7% and 8.4%) as well as men in Czech Republic (14.4%) and Slovenia (14.8%)

Figure 2 shows the percentage of the study population in financial hardship at each age in all countries grouped by our welfare regimes. Hardship in the Nordic and Continental countries shows relatively strong similarities. It was generally low during childhood but rose steeply upon entry into adulthood. After peaking around the ages of 30-35, it started to decline. By the age of 60, incidence of hardship dropped, although remaining at somewhat higher levels among women in some of the Continental countries. The Southern European countries show somewhat different patterns and more heterogeneity. In Italy, Spain and Malta, financial hardship remained relatively low throughout all ages. In Greece, financial hardship increased until the age 20, then declined but rose again towards later working life. Cyprus and Portugal show higher levels of financial hardship and, especially in Cyprus, increasing with age.

<Figure 2 around here>

In the post-communist countries various patterns can be observed. In Czech Republic, Slovenia and Slovakia, financial hardship on average remained low throughout the life course. Hungary and Poland are different, as the incidence of financial hardship increased in early life and remains at a relatively high level after age 30, especially among women. Among the Baltic and Southeast European countries, the incidence of financial hardship, with some fluctuations, seemed to increase with age. This can be seen among Bulgarian women in particular. Figure S2 and Tables S1 and S2 in the Supplementary Materials indicate that there were also differences between welfare regimes in the duration of hardship. After 10 years since onset, only 25 per cent were still in hardship in the Nordic countries, while in the Southern European countries the share was closer to 60 per cent.

Regression models: Associations of financial hardship with retirement income

Table 3 and 4 shows the results for the two-part regression analysis for men and women, respectively. While all controls are included in both parts of the models, only the results for the financial hardship indicators are reported to save space. Detailed tables with all controls can be found in the supplementary materials (Tables S3 and S4). Model 1 includes a dummy for whether someone has experienced financial

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hardship at all. Men who experienced financial hardship received on average a pension that was €873 lower than men who did not experience hardship (Table 3). This effect is due to both negative selection into pension receipt (*b* = -0.206 in part 1) and a lower pension income (*b* = -0.049 in part 2). Among women, experiencing financial hardship as such was not statistically significantly related to pension income (Table 4, Model 1).

<Table 3 around here>

<Table 4 around here>

When observing hardship by its age of onset in Models 2 and 3, it becomes clear that timing and duration matter more than the occurrence of hardship as such. Among men (Table 3), there is no support for the long arm of childhood hypothesis (Hypothesis 1). In fact, hardship that started before age 20 is positively related to pension income in Model 3 (AME = +1283€) that controls for duration. Hardship starting between ages 20 and 29 is not related with pension income, although Model 3 shows that when controlling for the duration of hardship, the coefficient for the age category 20-29 in part 2 of the model becomes statistically significant (b = 0.051).

Men who experienced hardship of any length that started between the ages 30-44 on average had a pension income that was €1150 lower than for those without hardship. However, once controlling for the duration of hardship (Model 3), effects are reduced and become statistically insignificant in the case of hardship that started between ages 30-44. This finding seems to suggest that the negative impact of financial hardship comes mainly from its relatively long duration and is partly in support of Hypotheses 3, that expected that financial hardship that starts in mid can be the result of a shock. However, it also shows that if the spell of hardship in late working life was relatively short, there was no or only weak association with the level of retirement income. For men experiencing hardship after age 44 there was a reduction in pension income of €1790 (Model 2) and €1362 when controlling for duration (Model 3). This supports Hypothesis 4c, that predicted that especially men's retirement income is negatively associated with financial hardship in the late career.

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Among women we also did not find evidence for Hypothesis 1 on the 'long arm of childhood' (Table 4). There is evidence that supports Hypothesis 2a (adulthood transition): women who experienced financial hardship between ages 20 and 29 had a consistently higher pension income across all models, while Model 3 suggest that this effect became more pronounced when duration of the spell was short. The two-part models indicate that the positive association was due to having a higher pension income after selection into pension receipt. There is no support for Hypothesis 3, neither for Hypothesis 4a nor 4b: hardship that started between ages 30 and 44 or after age 44 were not related to pension income among women.

Overall, we found support for Hypothesis 5: duration is negatively related to pension income for both men and women. Models 3 in Tables 3 and 4 show that each year of experiencing financial hardship reduced pension income of men with €82 and of women with €32. The two-part models indicate that this effect is particularly due to lower pensions if receiving a pension at all, and not to selection into receiving a pension.

Differences by welfare regimes

Figure 3 shows AMEs (in euros) for the age of onset of financial hardship by welfare regime and gender for the same Models 2 and 3 as in Tables 3 and 4 (detailed models are presented in Tables S5-S14 in the supplementary materials). When splitting the results by welfare regime, we find support for the 'long arm of childhood' hypothesis among Southern European men (Panel c, Model 2), while (short) financial hardship in youth is positively related to pension income among Nordic men (Panel a, Model 3) and Continental women (Panel b, Model 3). Support for the 'adulthood transition' hypothesis (Hypothesis 2a) is unexpectedly found for men in the Nordic countries (Panel a, Models 2 and 3) and, as hypothesized, for women in Continental (Panel b, Model 3) and Southern European countries (Panel c, Models 2 and 3).

Hardship that starts between ages 30 and 44 was negatively related to pension income among men in Continental and Southern European countries (Panels b and c, Models 2), confirming the midlife-shock hypothesis in those regimes, but for men only. Among men in Continental and Southern European countries, financial hardship after age 44 was also negatively related to pension income, especially in the

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models without controls for duration, indicating that part of the explanation of the negative association is that spells in this age bracket tended to be relatively long in those countries. These findings confirm Hypothesis 4b. No statistically significant associations between financial hardship and pension income were found in either group of post-communist countries.

<Figure 3 around here>

Additional background and sensitivity analysis

While this study did not scrutinize the reasons for financial hardship, Table S15 in the Supplementary Materials describes employment and marital statuses at the time of the start of the hardship, based on SHARE's retrospective interview data. It also shows whether certain typical risky life course events had occurred in proximity to the age of onset. Unemployment around the time of onset was relatively uncommon. Most individuals were employed or, if hardship started between ages 20 and 29, in fulltime education. The majority of those with the onset above the age of 19 were married and had children. The onset of financial hardship often happened within one year from having a first child (16% among men and 19% among women) and establishing an own home (17% among men and 19% among women). In the age bracket 20-29 these events coincided with the onset of hardship even in up to 40 to 50 per cent of the cases. Among women, divorce often coincided with the onset of hardship in the age bracket 30-44, while co-occurrence with widowhood was relatively frequent after the age of 44.

We performed several robustness checks to test the sensitivity of the results to various specifications and operationalization of the main dependent and independent variables (see Tables S16-S20 in the Supplementary Materials). First, our measure for financial hardship only includes hardship that occurred before retirement. This means that those whose financial hardship started after retirement are included in the 'no hardship' reference category. This might be problematic as respondents can mention only one distinct period of hardship. It is possible that financial hardship after retirement is still the outcome of economic difficulties throughout the life course that only became 'distinct' in recent years. It is also possible that such a recent occurrence comes to mind more easily than past occurrences. To account for

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this, we split the 'no hardship' category into those with no hardship at all and those who experienced hardship after retirement (Tables S16 and S17). This, however, did not alter our main findings.

Next, the pension income indicator includes all types of pensions. One may argue that survivor pensions are a poor indicator of possibilities to earn and save during the life course but are a means of redistribution between one partner (the deceased, often the husband) to the other (the surviving spouse, often the wife). At the same time, it is relevant as such as a measure of redistribution in the risky life course event of widowhood. Tables S18 and S19 shows the regression results excluding survivor pensions from total pension income. The main results remain practically unaltered. Finally, redistribution within households in retirement also occurs in other ways. Especially in traditionally male-breadwinner societies, women's economic wellbeing in retirement cannot be defined by how much pension they have been able to accrue in their own name but should be seen in the context of their spouse's earnings and pensions (Möhring 2021). Table S20 shows the result for including total equivalized household income as the dependent variable in a regression model.[5] The results are remarkably similar to those for individual pension income, with positive associations for hardship experienced in early life and adulthood and negative associations for hardship experienced in later life.

The a priori selection of countries into welfare regimes can be risky. Some countries can be assigned to one welfare regime based on a certain set of criteria and to another based on another set (Arts and Gelissen 2002). A typical case of a 'hybrid' welfare state between the social-democratic and conservative regimes is the Netherlands. Also, the classifications of the post-communist countries remain troublesome (Kuitto 2016) and especially the grouping together of the Baltic and Southeast European countries into one regime is contestable. Therefore, we have also tried several other groupings. Figure S3 shows the AME plots when moving the Netherlands to a social-democratic regime together with the Nordic countries. Financial hardship in the late career among men now became clearly negatively associated with pension income in the social-democratic countries as well, while no differences occurred between the continental and conservative groupings. We also grouped Baltic countries together with Czech Republic,

[5] One-part linear regression was applied here, as zero household income is relatively rare.

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Slovakia and Slovenia as the three ECE countries with relatively little financial hardship and Poland and Hungary together with the SEE countries. In the ECE and Baltic regime we now find a statistically significant relation between financial hardship that starts in midlife with pension income for women. These results suggest that more research on within-regime differences is needed with larger country-specific datasets.

Discussion and conclusions

In this study we explored the relation between financial hardship during the life course and pension income. Financial hardship was relatively common in Europe: around one in four of the respondents reported that they had experienced a distinct period of hardship at some point before retirement, although cross-country differences in incidence rates were substantial. The results of the regression analysis for pension income showed that it is important to observe at what stage of the life course hardship occurred and how long it lasted.

Hardship that started during childhood and youth (i.e., below the age of 20) was found relatively uncommon apart from in some of the Southern European countries. Unlike our first hypothesis (*the long arm of childhood hypothesis*) predicted, we did not find a negative relation between financial hardship in childhood and youth and pension income, except for cases of relatively short duration among Southern European men. In contrast, there was a positive and statistically significant relation among men in general, but also among women in the Continental and Southern European countries. The positive relation only held for relatively short spells of hardship, from which it might be quite well possible to recover across time. Hence, the findings do not necessarily contradict earlier studies that found that especially chronic and deep poverty and hardship during younger years have lasting negative impact (Duncan, Magnuson, Kalil, and Ziol-Guest 2012; Pakpahan, Hoffmann, and Kröger 2017). Several explanations are possible. Early financial hardship may alter the subsequent behavior in terms of a "lesson learnt". In other words, financial hardship in youth may push people into the labor market at an early age and longer contribution periods are then rewarded with higher pensions in Bismarckian pension systems. Also, the experience of financial difficulties may teach them skills to plan their career and handle money wisely.

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Between the ages 20 and 30 the onset of financial hardship quickly increased in most countries. During this life-course phase, the timing of the onset of hardship was often related to being in full-time education, but also moving out from the parental home or having one's first child. The nature of financial hardship as part of a transition into adulthood is reflected by support for Hypothesis 2a (*the adulthood transition hypothesis*): financial hardship that started between ages 20 and 29 was positively related to pension income, in particular for women and in the Continental and Southern European countries. The effect may be due to selection: financial hardship early in the career might simply be a sign of a longer than average education phase which is then rewarded by higher earnings and higher pension entitlements over the further career. It is also possible that especially in these countries with male-breadwinner cultures, it has been financially more difficult to establish an autonomous household (O'Connor 1993; Orloff 1993). However, becoming an independent adult is also a forbode of women being able to make a career and accrue individual pensions in pension systems where benefits are strongly earnings-related (Möhring 2015).

In line with the expectation that, once people have established themselves in the labor market and started their families the risk of financial hardship starts to alleviate, the incidence of hardship starts to decrease after ages 30-35. This could be observed particularly in the Nordic and Continental countries, while in some of the Southern European and especially in Southeast Europe and the Baltic countries financial hardship continued to increase with age. In the latter country group, economic difficulties during the transition period after 1989 were particularly strong and may have affected our sample population in those countries just in their mid-lives. We found mixed evidence for Hypothesis 3 theorizing that the relatively untypical and unexpected nature of the onset of hardship between ages 30 and 44 would leave individuals unprepared as well as unprotected by social policy, leading to lower pensions in later life. The hypothesis was supported for men (in case spells lasted longer) and particularly those in the Continental and Southern European welfare regimes (but not in the post-communist countries as hypothesized). This might be due to men who experience financial hardship that is due to atypical careers and family

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trajectories are often punished under strongly Bismarckian pension systems (Möhring 2015; 2021). Among women, no support for the *midlife-shock hypothesis* (Hypothesis 3) was found.

The incidence of financial hardship continued to decline after age 44 in the Nordic and Continental countries, while a slight upsurge towards the retirement age was observed among men in the post-communist and Southern European countries. In support of Hypothesis 4b (*the late-career vulnerability hypothesis*), among men financial hardship that started at age 45 or later was associated with substantially lower pension income. This was particularly the case in, once again, the Continental and Southern European welfare regimes. It is possible that in these countries, the onset of financial hardship was related to an accumulation of health and employment problems and resulting in early exit to the labor market. Early exit due to disability or long-term unemployment among older workers has been rather common in these countries (Ebbinghaus 2006). While social or pension benefits related to early exit might have been relatively generous, these people also end their careers at the age when their earnings should have reached their peak. This means a substantial loss of pension accrual in the late career and resulting in lower old-age pension benefits. Among women, we did not find statistically significant relations between financial hardship in the late career and pension income, which could be in support of the buffering hypothesis (Hypothesis 4a). However, especially in countries where women's labor market attachment is low, this association is unlikely to be due to having built buffers to deal with financial adversity but rather due to hardship in the late career hardly affecting overall (low) pension accrual in one's own name.

There was strong support for Hypothesis 5 that duration of financial hardship was negatively related to pension income. Moreover, duration of hardship proved to be an essential indicator of the nature of hardship. In line with previous research, this study showed that short spells, however unwelcome they are, can be overcome and do not necessarily inflict long-term damage to economic wellbeing (Fouarge and Layte 2005). Results indicated that they might often be related to life course events and as such are an indication of short transition periods while moving forward through life. In contrast, long or persistent hardship, although much less common than shorter spells, had clear negative consequences for financial wellbeing in later life.

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Overall, the most pronounced associations, both positive and negative, between financial hardship and pension income were found in the Continental and Southern European countries. This could be caused by the strong presence of earnings-related and occupation pensions in these Bismarckian countries (Ebbinghaus 2021), where there is a clear link between what you earn and accrue during the life course and what you receive in retirement. In the more Beveridgean-oriented Nordic countries, the presence of basic pensions, in addition to more compensating and activating social policies, might cancel out the impact of financial hardship on economic wellbeing in later life (Diewald 2016; Sieber et al. 2020). In the post-communist countries, the history of state-socialism followed by the radical transition to capitalist democracy and the establishment of new pension systems in the 1990s has contributed to the lack of a clear link between financial hardship and pension income in these countries. However, it is possible that one starts to see similar relations as in other parts of Europe, when the cohorts who entered the labor market after 1989 retire, and welfare states and pension systems mature.

The results for men and women were remarkably different. Women were more likely to experience financial hardship, but women's pensions were less often related to financial hardship and if they were, it was more often positive (especially in the transition to adulthood phase). While men were less likely to experience financial hardship, the relation with pension income was more often negative (especially in mid- and late careers). These gendered relations were found especially in the Continental and Southern European countries. It is possible that men's financial hardship is more often related to work and careers, thereby negatively affecting their pension accrual in Bismarckian pension systems. Women's financial hardship is more often related to events in the family life course, which do not directly impact pension accrual or are compensated by pension systems in some way (Möhring 2018; 2021). Another explanation here might be that financial hardship early in life of women in conservative Continental and Southern European countries is a sign of becoming independent through prolonged educational participation. These more economically independent women then enter more male-like employment histories which typically are associated with an adequate accumulation of pension rights and later higher pension benefits than those of women with lower labor market attachment. In Nordic and post-communist countries gender

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differences were smaller or absent, which might be due to historically women being integrated to a greater extent in the labor market, and therefore pension system, in those countries.

There were several notable limitations to this study. It was possible for respondents to mention only one distinct spell of financial hardship. Repeated spells of financial hardship could be a sign of lifelong marginalization and negatively influence pension income. It is unclear if, in the presence of repeated spells, respondents combine all into one long spell or choose a short spell that they remember as most severe. Furthermore, it is possible that, if financial hardship is permanent across the life course, respondents have adapted to it and will not mention it as such. Therefore, financial hardship might be underreported, especially for those severe and chronic cases. At the same time, those who are relatively well off in retirement might consider certain periods as financially challenging compared to their current situation, although objectively those periods would not qualify as such. Other limitations of this study relate to conceptualizations of time and place. We analyzed financial hardship by age but did not scrutinize cohort or period. Especially period effects might play an important role in financial hardship through, for example, war or economic crisis. Naturally, these period effects can be specific to certain countries. In this study, countries were grouped into welfare regimes due to the large number of countries, the often-small number of observations per country, and the desire to test whether regime-specific effects could be detected. The setback of this approach is that intra-regime differences between countries remain underexposed. Robustness checks showed assigning countries to different regimes can affect the results somewhat, indicating that more research on individual countries instead of regimes would be useful. Also, more research is needed on financial hardship and pensions in the liberal welfare regime.

Future studies could investigate the relation of experienced financial hardship with other subjective measures for economic wellbeing in retirement (Palomäki 2017; Palomäki et al. 2022). For example, Isengard and König (2021) reported that having experienced financial hardship earlier in life was related with lower perceived income adequacy among older people, even if they objectively could be considered to be well off. Furthermore, as longitudinal and panel data, such as SHARE, are becoming increasingly available for longer timespans, future research could and should address the links between changes in

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institutions, financial hardship, and pension income across the life course as they evolve (Brüderl, Kratz and Bauer 2019). Panel survey life-course data should allow observing the timing of financial hardship with greater accuracy and additionally allow for the possibility of repeated spells. Such data should also be more adequate in detecting cumulative advantage/disadvantage in old age (Crystal et al. 2017; Dannefer 2003), something that we did not find in our study possibly due to the limitations of the data.

As the respondents in this study have already retired and are looking back on their lives, the study describes a historic period that has already passed. As emphasized in the introduction, European pension systems have been and still are undergoing a transformation to privatization and multi-pillarization, where the individual's ability to earn and save becomes increasingly essential. At the same time, retrenchment of the welfare state and deregulation of labor markets increases insecurities throughout the life course. Therefore, the subject of this study is one that needs following in the future as well.

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Data availability statement

This paper uses data from SHARE Waves 2, 3, 4, 6 7 and 8 (DOIs: 10.6103/SHARE.w2.800, 10.6103/SHARE.w3.800, 10.6103/SHARE.w4.800, 10.6103/SHARE.w6.800, 10.6103/SHARE.w7.800, 10.6103/SHARE.w8.800) as well as from the generated Job Episodes Panel (DOI: 10.6103/SHARE.jep.800). See Börsch-Supan et al. (2013) and Brugiavini et al. (2019) for methodological details. The SHARE data collection has been funded by the European Commission, DG RTD through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N°676536, SHARE-COHESION: GA N°870628, SERISS: GA N°654221, SSHOC: GA N°823782, SHARE-COVID19: GA N°101015924) and by DG Employment, Social Affairs & Inclusion through VS 2015/0195, VS 2016/0135, VS 2018/0285, VS 2019/0332, and VS 2020/0313. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C, RAG052527A) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

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Tables and Figures

Table 1. Expected nature of financial hardship in four welfare regimes

Welfare regime	Social stratification of financial hardship risk	Prevention of risky life events	Compensation	Recovery	Buffering through pension system
Nordic	Low	Low/medium	High	High	High
Continental	Medium/high	Medium	Medium	Low	Medium
Southern	High	High	Low	Low	Low
Post-communist	Until 1989: low, after: high	Until 1989: high, after: low	Until 1989: mixed, after: low	Until 1989: high, after: low	Low

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Table 2. Descriptive statistics

		All		Experienced no FH		Experienced FH	
Variable	Categories	Men	Women	Men	Women	Men	Women
Total individual pension income, mean € (SD)		14927 (40998)	9881 (14426)	14747 (19753)	9817 (14565)	15518 (76822)	10048 (14052)
Total individual pension income, median €		11089	7774	11117	7683	11006	7944
Zero pension income, %		7.0	11.9	6.6	12.4	8.3	10.5
Experienced FH, %		23.42	27.6	0	0	100	100
Onset of FH, %	Age <20	3.3	5.1			14.0	18.7
	Age 20-29	7.5	8.7			31.9	31.5
	Age 30-44	7.3	8.2			31.1	29.6
	Age >44	5.4	5.6			23.0	20.3
Duration of FH, mean years (SD)		2.5 (6.7)	3.3 (8.1)			10.5 (10.4)	12.0 (11.5)
Length of working life, mean years (SD)		38.1 (7.7)	25.9 (14.9)	38.1 (7.7)	26.0 (15.1)	38.0 (7.5)	25.8 (14.3)
Marital status, %	In a relationship, partner no FH	63.4	43.5	71.5	50.2	37.2	26.0
	In a relationship, partner FH	16.6	10.2	8.8	5.5	42.4	22.7
	Never married	4.3	4.2	4.5	4.4	3.4	3.8
	Divorced	5.2	8.1	4.7	6.7	6.9	11.8
	Widowed	10.4	34.0	10.5	33.3	10.2	35.8
No. of children, %	No children	8.9	8.7	9.4	9.3	7.2	7.1
	1	17.3	19.2	17.8	19.5	15.9	18.4
	2	41.1	40.7	42.9	41.5	39.7	38.9
	3 or more	31.7	31.4	30.0	29.8	37.2	35.6
Level of education, %	Low	39.1	49.6	38.4	49.0	41.4	51.3
	Medium	38.4	33.9	38.4	34.5	38.3	32.4
	High	22.6	16.5	23.2	16.5	20.4	16.3
In paid work, %		10.3	6.5	10.0	6.0	11.5	8.0
Born outside country, %		7.3	7.8	6.8	7.1	9.0	9.5
Birth cohort, %	<1939	34.5	36.4	34.5	36.9	34.5	35.2
	1939-1945	31.3	30.5	31.5	30.7	30.7	29.9
	>1945	34.2	33.1	34.0	32.4	34.8	35.0
Wave, %	2	7.5	7.2	7.5	7.1	7.7	7.3
	4	30.6	28.8	29.1	27.4	35.4	32.3
	6	8.0	8.0	8.5	8.8	6.1	5.9
	8	53.9	56.1	54.9	56.7	50.7	54.6
Welfare regime	Nordic	14.3	12.5	13.8	11.9	16.0	14.2
	Continental	33.9	32.2	32.3	30.5	39.0	36.5
	Southern	21.3	19.7	21.8	20.8	19.6	16.7
	ECE	17.8	19.3	19.2	21.0	13.1	14.9
	Baltic & CEE	12.7	16.4	12.9	15.8	12.3	17.8
N		16,990	21,584	13,011	15,633	3,979	5,951

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Table 3. Two-part regression models for total individual pension income, men

		Model 1			Model 2			Model 3		
		Part 1, coef.	Part 2, coef.	AME, €	Part 1, coef.	Part 2, coef.	AME, €	Part 1, coef.	Part 2, coef.	AME, €
Experienced FH (ref. No FH)		-.206*	-.049***	-873***						
		(.081)	(.013)	(204)						
Onset of FH (ref. No FH)	Age <20				.195	-.031	-313	.270	.072	1,283*
					(.198)	(.029)	(479)	(.245)	(.037)	(624)
	Age 20-29				-.074	-.007	-168	-.035	.051*	727
					(.132)	(.020)	(328)	(.151)	(.024)	(386)
	Age 30-44				-.243*	-.067**	-1,150***	-.210	-.019	-455
					(.121)	(.021)	(305)	(.136)	(.023)	(342)
	Age >44				-.480***	-.099***	-1,790***	-.460***	-.069**	-1,362***
					(.123)	(.024)	(329)	(.129)	(.025)	(345)
Duration of FH								-.003	-.005***	-82***
								(.006)	(.001)	(17)
Pseudo / Adj. R^2		.154	.338		.156	.338		.156	.337	
N		16,990	15,806	16,990	16,990	15,806	16,990	16,990	15,806	16,990

Note(s): Standard errors in parentheses, controls and country dummies included in the models but not reported (see full results in Table S3 in the supplementary materials). Part one is a logistic regression model, part two a linear regression model with income values log-transformed. Average marginal effects (AME) are estimated for both parts combined. Reported are pseudo-R^2 for part one and adjusted R^2 for part two.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Table 4. Two-part regression models for total individual pension income, women

		Model 1			Model 2			Model 3		
		Part 1, coef.	Part 2, coef.	AME, €	Part 1, coef.	Part 2, coef.	AME, €	Part 1, coef.	Part 2, coef.	AME, €
Experienced FH (ref. No FH)		.092 (.062)	.004 (.011)	108 (114)						
Onset of FH (ref. No FH)	Age <20				.155 (.114)	-.019 (.022)	-71 (216)	.224 (.146)	.040 (.028)	549 (282)
	Age 20-29				.173 (.099)	.032 (.018)	437* (175)	.223 (.118)	.072** (.021)	873*** (213)
	Age 30-44				.098 (.100)	-.004 (.0181)	31 (181)	.133 (.110)	.026 (0.20)	349 (201)
	Age >44				-.113 (.114)	-.005 (.022)	-134 (207)	-.093 (.117)	.013 (.022)	52 (214)
Duration of FH								-.003 (.004)	-.003*** (.001)	-32*** (8)
Pseudo / Adj. R^2		.306	.274		.306	.275		.306	.275	
N		21,584	19,020	21,584	21,584	19,020	21,584	21,584	19,020	21,584

Note(s): Standard errors in parentheses, controls and country dummies included in the models but not reported (see full results in Table S4 in the supplementary materials). Part one is a logistic regression model, part two a linear regression model with income values log-transformed. Average marginal effects (AME) are estimated for both parts combined. Reported are pseudo-R^2 for part one and adjusted R^2 for part two.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Figure 1. Illustration of sample selection

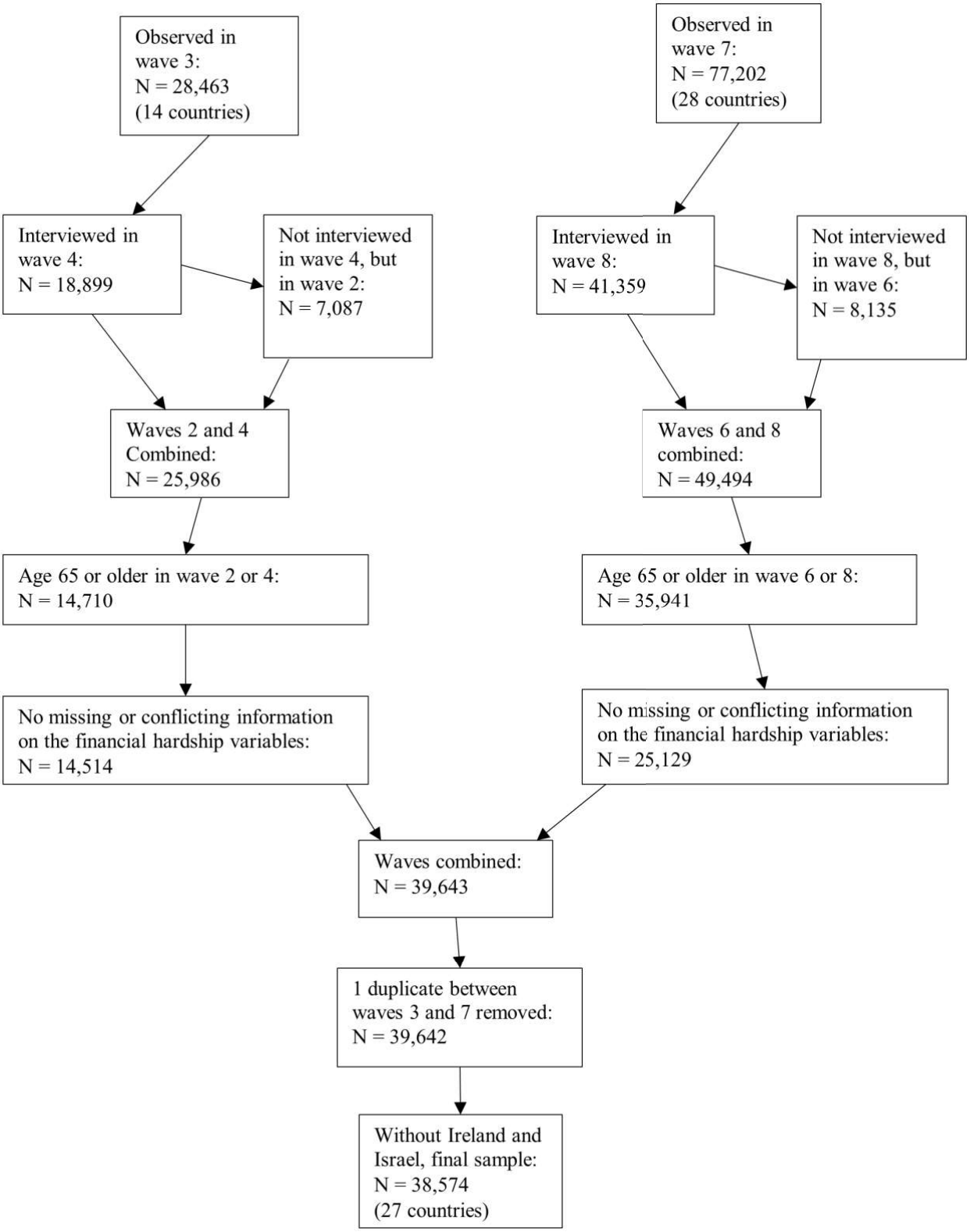

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Figure 2. The share of the study population in financial hardship at each age, by gender and welfare regime

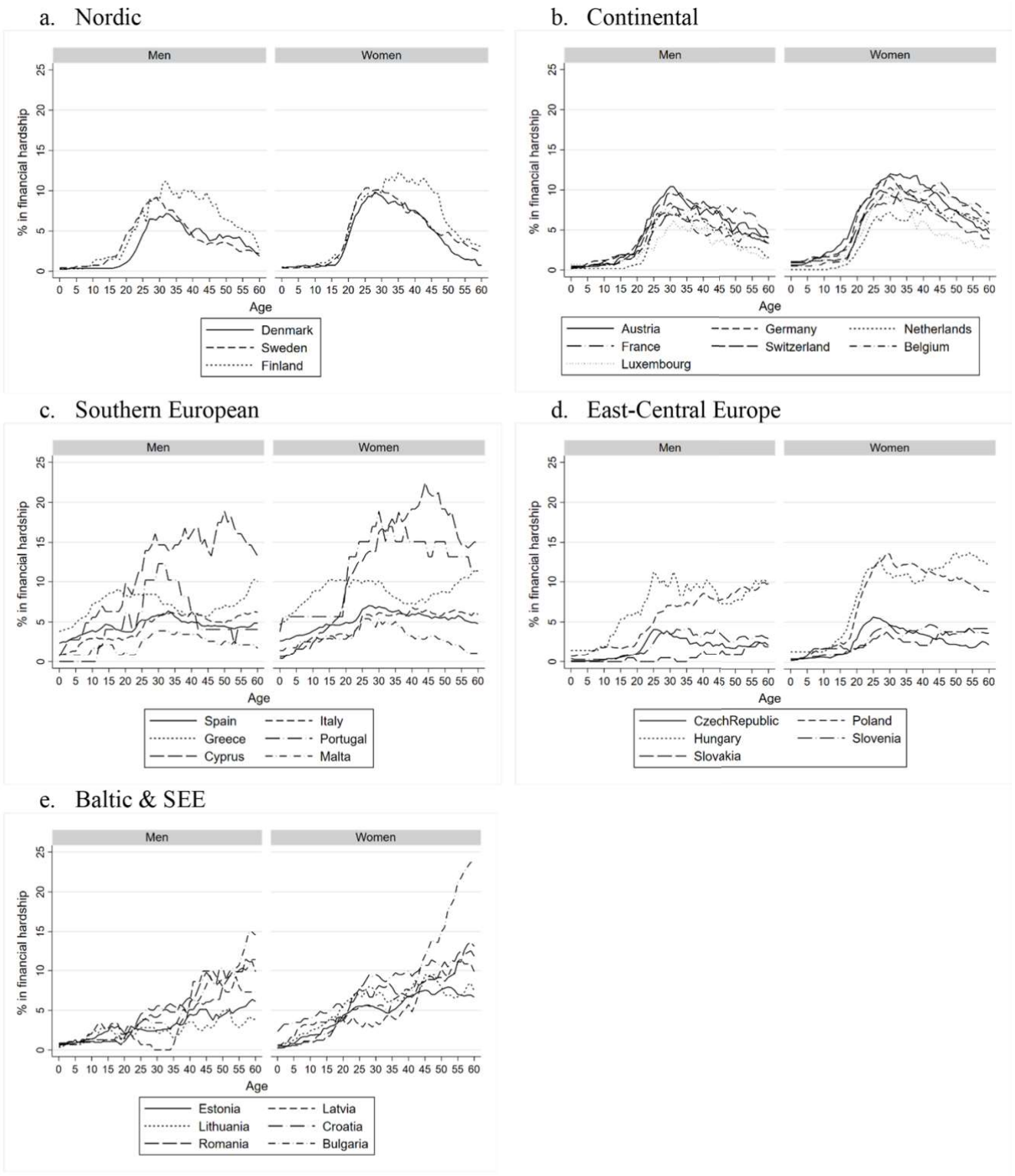

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Figure 3. AMEs (with 95% CI) for the relation between age of onset of financial hardship and pension income by welfare regime and gender
Note: Details on the models in Tables S5-S14 in the Supplementary Materials. Mind the different scale on the x-axis for the Continental regime.