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ARTICLE

Redefining retirement: a sequence analysis of how older adults extend working life in Sweden

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Abstract

Increasingly, older adults are redefining retirement by combining part-time employment with pension benefits, that is, becoming 'working retirees'. This trend highlights socio-economic inequalities: some working retirees use part-time employment as a bridge to full retirement, while others must remain employed to prevent old-age poverty. However, little is known about how these work-retirement transitions unfold over time or the socio-economic factors that shape them. This knowledge gap is problematic because understanding the socio-demographic influences on these trajectories is essential for addressing inequalities in later-life employment and retirement security. This study examines transitions from work to retirement by following individuals from their 50s into their 70s and analysing the socio-demographic factors that differentiate these trajectories. It identifies the various pathways that older workers take when exiting the labour force and analyses how prior life course factors – including education, occupational status, career field, civil status, number of children and disposable income – predict the likelihood of following each work–retirement trajectory. The results reveal two distinct work–retirement trajectories: one reflects status maintenance, with higher income and education, white-collar and often men; the other reflects financial necessity, with lower income, children at home, no partner and often women. More advantaged working retirees experience greater employment changes in late life, highlighting the diversity of late-life careers. These findings suggest a broader range of extended work–life pathways than previously recognized and emphasize the need for policies that account for gendered and economic disparities in work and family responsibilities to ensure equitable and sustainable retirement transitions.

Keywords: register-based research; sequence analysis; Sweden; working retirees

Introduction

The share of older adults working while collecting pension benefits, that is, working retirees, has steadily increased over the last ten years, particularly among those 67 to 71 years old (Swedish Pension Agency 2022). In Sweden alone, working retirees

constitute 16 per cent of the entire retiree population, making it one of the highest shares in Europe (Dingemans et al. 2017; Swedish Pension Agency 2021). This development has been driven by population ageing, strained early exit programmes, flexible pension arrangements and economic incentives for extended working life (Axelrad and Mahoney 2017; Calvo et al. 2018; Hofäcker and Radl 2016). Hence, the trend of working retirees reflects a new and growing segment of the labour force, with an increasing need for flexible and financially stable employment in later life (Turek et al. 2024). However, there is still limited understanding of the temporal dynamics of how older adults balance part-time employment with pension benefits, who can pursue working retirement and what prerequisites enable this option.

Working retirees[1] signify retirement as a dynamic process that unfolds over time and encompasses diverse trajectories (Beehr & Bennett, 2015; Calvo et al. 2018; Swedish Pension Agency 2021). For some individuals, working retirement may serve as a brief transitional phase before full retirement, whereas others may opt to pursue a new career later in life. It may include various events, such as reduced working hours in their former career job, finding flexible employment in a new occupational sector or employer, or becoming self-employed or a freelancer (Lassen and Vrangbæk 2021). However, before the actual decision-making process, older adults' ability, willingness and necessity to extend their working life are shaped by the challenges and opportunities they encounter throughout their careers (Dingemans and Möhring 2019; Wahrendorf et al. 2018), underscoring the need for a longitudinal approach. Individuals with strong labour market attachment during mid-adulthood tend to stay on advantageous career paths until retirement age, and they are more willing to work beyond the typical retirement age (Wahrendorf et al. 2018). In addition, they are more likely to be offered individual working arrangements in their former career jobs (Dingemans et al. 2016). In contrast, older workers with weaker labour market attachment and employability (*i.e.* lower education, lower skills, part-time, temporary employment) struggle to remain employed in their former career jobs while also struggling to find new employment (Dingemans et al. 2016). Hence, older adults who have spent much of their careers in part-time or low-wage employment are likely to struggle to accumulate sufficient savings or pension benefits (Cahill et al. 2024; Mazumdar et al. 2021) and, consequently, they are more likely to accept poor non-standard employment combined with partial pension benefits as their only option to avoid old age poverty. From a societal perspective, it is important to enhance our understanding of how socio-economic heterogeneities during working life are transmitted into later-life work decisions to further understand the contemporary features of this new labour force segment. This may, in turn, show economic and social polarization among working retirees and reveal new patterns of (dis)advantages related to working retirement.

[1]Broadly, the term bridge employment is used to describe older adults who work beyond the expected retirement age. As the term implies, it assumes that older adults end their former career job to enter a new late-life phase in working life, a temporary bridge to full-time retirement or death. However, due to the ambiguous definitions of this concept in the literature (see, for example, Beehr & Bennett, 2015; Mazumdar et al., 2021), the term working retiree is used to denote the combination of part-time paid employment with pension benefits, alongside the term bridge employment when referring to the broader field of research.

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This study examines how individuals navigate these complicated work–retirement transitions over an extensive period of time, to gain a better understanding of the challenges and opportunities that working retirees face. The aim is twofold. The primary goal is to identify typical occupational trajectories of working retirees by following a cohort from their 50s into their 70s. This will unravel general patterns of how and when working retirees combine part-time employment and pension benefits over time. A second goal is to investigate the heterogeneities in these typical work–retirement trajectories, in terms of gender, career field, occupational status, education, civil status, number of children and disposable income, showing how and for whom various types of working retirement are an option.

This study makes two important contributions to the literature. First, while most studies focus on single events rather than trajectories, this study uses sequence analysis to fully capture the individual life course perspective of working life for working retirees. Sequence analysis, by contrast, analyses the retirement process as a combined unit, including the order of various sources of income and pension states, and the duration and number of transitions between labour market positions. Late-life careers can be divided into two phases (Sacco et al. 2022). The first phase stretches from mid-life until the age of state pension eligibility, characterizing a stable labour market attachment, while the second phase continues until the actual full retirement. The latter has been described, owing to the temporary state, as more flexible, less stressful and sometimes more rewarding, depending on the nature of the work. By combining these two phases and a range of various labour market positions, this study will apply a more complete view of work and retirement as a process, including both the present and the past in the same framework. With this analytical approach, this study will ascertain significant trends in the accumulation of inequalities that aggregated trends tend to hide.

Second, following the destandardization perspective of the life course, this study draws from recent empirical findings stressing that employment and retirement are less predictable events for today's older adults (Calvo et al. 2018; Turek et al. 2024). As individuals age, their unique characteristics and circumstances become increasingly pronounced (Dannefer 2020), where the transition from paid employment to retirement marks a particularly dramatic change in both the social and the economic situation. However, the growing complexity in late careers, for example, owing to the flexible pension system, bridge employments and re-employments, has shifted greater responsibility and individual preferences onto individuals to manage work and retirement decisions (Turky et al. 2024). While these developments provide opportunities for prolonged working life, they also introduce new uncertainties, making retirement an individualied rather than a standardied life course event. In this study, we focus on individuals born in the 1940s who, in a Swedish context, are characterized as an age cohort of rapid occupational mobility, welfare expansion, rising women's labour market participation rates, globalization and flexible pension systems. In comparison to prior age cohorts, this cohort had more freedom to make individualized life course choices, including when and how to full-time retire. Hence, from the perspective of a growing share of working retirees, this is a particularly interesting age cohort to identify for whom working retirement was an option.

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Literature review and theoretical framework

Working beyond expected retirement age

A growing body of research has demonstrated various pre-retirement determinants of working retirement (Dingemans et al. 2017; Scharn et al. 2018) such as education, gender, health, partners' employment, work characteristics and financial factors. A general perception is that older adults who have been deeply involved in their work are more likely to seek continuity through some bridge employment in later working life (Sacco et al. 2022). This is sometimes referred to as the labour market attachment or status maintenance hypothesis, where older adults with strong personal fulfilment and human capital invested in their careers have shaped stronger attachments to the labour market and, in turn, are more likely to remain working at a later age. In support of this hypothesis, research has shown that men and women with continuous careers with few employment breaks extend their working life to maintain social networks and wellbeing (Finch 2014; Riekhoff and Järnefelt 2017; Wahrendorf et al. 2018).

By contrast, others are compelled to continue working owing to economic necessity (Björklund Carlstedt et al. 2022; Dingemans et al. 2017), sometimes referred to as the compensation hypothesis (König 2017). This hypothesis stipulates that older adults who remain in the workforce do so to compensate for the lack of prior labour market opportunities, which have resulted in low or insufficient earnings, savings or public pension entitlements. For example, prior longitudinal studies have shown that partial retirement or bridge employment is more prevalent among women, individuals with lower education, divorced or unmarried, and those with multiple children and grandchildren (Calvo et al. 2018; Dingemans and Möhring 2018; Wahrendorf et al. 2018; Zanasi et al. 2020). Collectively, these groups are more exposed to vulnerable or disadvantaged labour market positions, such as low-wage or part-time work, temporary employment, unemployment, sick leave and parental leave (Brydsten et al. 2025). Although these precarious labour market positions contribute to public pension entitlements to some extent, the accumulated effect of lower earnings over time is worrisome as it severely limits public pension accrual and increases financial insecurity in later life. As a result, they are more likely to need to continue working later in life to avoid old-age poverty.

An important concern is the inequity among older adults in finding flexible and financially stable employment at a late age. Bridge employments are primarily offered to those who financially need it the least (Cahill et al. 2024). This is partly explained by the higher employability of more advantageous older workers, such as professionals with higher education and skills (Dingemans et al. 2017). However, it may also be related to age discrimination in the hiring process of older adults. Hence, older adults with lower education and fewer requested skills are less likely to be offered to stay employed as a working retiree at their former career job, and meanwhile less likely to find new employment (Oude Mulders et al. 2014). On a population level, this means that the late-life economic disparities increase if older adults with advantageous occupational trajectories are those most likely to remain working beyond the expected retirement age (Cahill et al. 2024). However, it is important to note that studies on working retirees are limited, and, as of now, no research explores the employment trajectory leading up to these types of employment.

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Life course perspective on extended working life

While it can seem like individuals' lives and careers are rather similar, the life course perspective argues that there are events and situations both in the present and in the past that influence an individual's unique intentions and opportunities to extend working life (Beehr, 2014; Elder and Giele 2009). In this regard, it is central to disentangle which labour market trajectories lead to lower lifetime earnings or shorter working life, as these factors significantly elevate the risk of insufficient pension benefits. For example, employment interruptions such as unemployment, sick leave and unpaid domestic work can influence both the immediate economic situation as well as future employment prospects. Therefore, more knowledge is needed to detect patterns and early signs across and within these groups, prevent individual poverty, avoid workforce shortages, ensure financially sustainable pension systems and maintain levels of welfare provisions (König et al. 2016).

Moreover, working life decisions are not solely independent personal choices but are often influenced and, at times, constrained by opportunities available to them. Together, these work and retirement decisions are shaped by an array of interdependent or interacting factors, including individual resources such as gender, health, education/employability, family ties and financial situation, broader structural systems such as the pension systems and labour market policies, as well as societal norms and values influencing the underlying values, beliefs and preferences of individuals. Elder and Giele (2009) define the core principles of life course theory as age-related events and transitions, social roles and positions embedded in the current and past social structure, emphasising the temporality of an event and human agency. In this regard, working retirement needs to be viewed as a cumulative process that develops over time and interplays with the historical context in a given setting, creating heterogeneity and divergence in life course trajectories.

In this context, three archetypal types of life course are of particular interest in understanding how retirement processes are formed by prior labour market experiences, namely: the traditional, the destandardized and the precarious life course. Drawing from the long-standing sociological discourse of the individualization process about the life course, Mills (2007) argues that the roots of these broader categories are the *detraditionalization* or the *dissolution of collective structures* that detach individuals from traditional ideas, values, norms, beliefs and ideologies and generate greater individual autonomy and freedom of choice to shape their lives. In turn, there is a general perception that individuals are in control of their destinies, which denotes a shift in the responsibility of risk from the welfare state to the individual.

The traditional life course suggests that some groups of individuals will continue to conform to a normative trajectory, even as societal norms evolve. While it may seem that the traditional life course is an internalized collective conscience caused by a lack of individual awareness of alternative options, it is rather a persistent structure within generations. Hence, although the traditional life course can seem rather standardized within a generation, there can still be large differences between generations (*e.g.* cohabitation, children outside of marriage and working mothers). In a Swedish context, the traditional life course may imply a stable employment trajectory (*e.g.* few employment changes) followed by a single-event work-retirement transition, typically at age 65.

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The *destandardized life course* stipulates that life stages and events are less structured and linear in contemporary welfare states of today (Mills 2007), causing more individualized risks and opportunities associated with each decision that potentially could influence economic circumstances, health and wellbeing in late life. With a market-oriented welfare system, it implies that individuals need to examine risk, make strategic life planning and then create and adopt a lifestyle, rather than having it handed down by tradition or former generations (Turky et al. 2024). The heterogeneity in the life course structure has been demonstrated in previous research, showing that women, for example, are more likely to experience a less structured life course (*e.g.* unsecured and changing employment, part-time employment, spending more time on parental leave, sick leave and caring for family members) (Calvo et al. 2018; Dingemans and Möhring 2018; Wahrendorf et al. 2018; Zanasi et al. 2020). The risk of the destandardized life course implies that working retirement may be the result of a precarious employment trajectory, leading to working retirement to make ends meet (Cahill et al. 2024). The opportunities, by contrast, imply a rather advantageous occupational trajectory with a high degree of human agency and willingness to extend working life.

Lastly, the *precarious life course* stipulates that life stages and events are individualized to the point of alienation and anonymity, which are shown in the form of discrepant, flexible and challenging life paths. With a general lack of ontological security, some groups will experience difficulties with trust in the welfare system, employer, partner and ultimately themselves, likely resulting in the postponement of life events or multiple transitions between different statuses (*e.g.* low-wage employment, more work–life breaks, divorce). Hence, the precarious life course may be characterized by a rather disadvantageous employment trajectory, likely resulting in involuntary early retirement (Raymo et al. 2011). Drawing from these archetypal types of life course, this study explores the heterogeneities of work–retirement trajectories *within* the group of working retirees.

When the baby boomers left the labour market: social and economic impact

Understanding the work–retirement trajectories of older workers, specifically those of the baby boom generation (*e.g.* 1.2 million individuals born between 1940 and 1949 in Sweden), is important because this population segment represents a new and less predictable generation (Turek et al. 2024) with significant economic and social impact (Boveda and Metz 2016). For decades, the labour market debate, in Sweden and countries worldwide, was dominated by speculation, concerns and strategies about the retirement behaviours of the baby boomers (Boveda and Metz 2016; Oredsson 2013). In Sweden, this age cohort was one of the largest in the 1900s (Statistic Sweden 2025), and they had a profound impact on the labour market by occupying many of the leading positions in the private and public sectors (Oredsson 2013). Despite the extensive debate about the impending skills shortage of the baby boomers, little is known about how and when they left the labour market, particularly concerning working retirees.

This generation is described as powerful, demanding, competent, self-centred and privileged throughout life (Oredsson 2013). From a young age, they were the first to experience a youth culture with international movies, magazines and music (see

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Appendix A, Figure A1 for an illustrative overview of societal and policy events influencing the baby boomers in Sweden). Globalization also meant a worldwide political and social movement, affordable travel options (train and charter) and a wave of drug use and sexual liberation. Regardless of their active participation in these social movements, they were likely influenced by the evolving social role models, which presented diverse paths of life choices. Consequently, this generation enjoyed the liberty of dissolving traditions, increasing individualization and a destandardized life course.

Undoubtedly, people born in the 1940s had higher financial standards compared to retirees from earlier generations. In a Swedish context, they gained access to higher education, welfare reforms such as childcare and parental leave, and the rapid rise in women's employment rates (Börjesson 2011; Lewis and Åström 1992). These reforms and social developments collectively resulted in upward social class mobility for many individuals born in the 1940s, offering them stable, long working lives and substantial individual wealth growth. However, when analysing financial standards over time, it becomes evident that a significant majority within this age group experienced an improvement in their financial situation upon reaching the expected retirement at age 65 compared to when they were in the workforce at age 50. This improvement can be attributed to real wage growth and reduced financial responsibilities owing to fewer children living at home. However, one crucial factor contributing to this trend is their ability and willingness to continue working into their later years (Heggemann and Lindberg 2018).

Finally, as they entered mid-life and the later stages of their working years, this generation experienced a significant paradigmatic shift in ageing reforms, with a focus on extending working life (Ståhlberg et al. 2006). In Sweden, as in most Western European countries, the pension system was reformed to address the demographic challenges posed by an ageing population and strained welfare systems. The state pension system, originally based on the income replacement principle, was replaced by a more flexible model, where pensions are calculated based on a person's entire work–life earnings rather than just the best 15 years. Additionally, part of the pension is influenced by the financial investments of pension funds, thereby introducing market risk (Palmer 2002; Ståhlberg et al. 2006). As a result, Sweden's baby boomers were affected by the transition to the income pension system, with their pensions becoming a mix of both the old and the new systems. They did not have the same opportunities to influence their future pensions through the premium pension, but their pensions were adapted to reflect the changing economic conditions and the new pension model.

While literature is abundant on concerns about competence and skill supply, generational shifts in management and the financial strain on the pension system and health care as the baby boomers age, become ill and pose a greater cost to society, less attention has been given to the unfolding retirement processes within the non-standardized life course of the baby boomers. This study addresses this gap by focusing on the heterogeneity of older workers. Specifically, this study follows baby boomers, the first age cohort in Sweden, where the individualization of retirement likely has resulted in an increasingly diverse range of later-life working trajectories.

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Method

This study used longitudinal data from the Panel Survey of Ageing and the Elderly (PSAE), which includes survey data paired with administrative registers for more than 30 years. The PSAE survey is an integrated part of the nationally representative survey Statistics on Income and Living Conditions (SILC) administered by Statistics Sweden. It covers areas such as attitudes towards work and retirement, labour market history, education, health, working conditions, financial situation and social relations. The selected sample is from the last PSAE survey (2010/2011) of 1,721 individuals born between 1940 and 1949. People who died during the study period and people who, for other reasons, had missing values for the majority of the study period (1.3 per cent) were excluded to ensure comparable observations over time. To analyse how retirement unfolds over time, the selected sample was followed across 19 years, from age 52 until age 70.

Measures

Work and retirement trajectories

The administrative registers used in this study were collected from the Longitudinal Integrated Database for Health Insurance and Labour Market Studies (LISA), which includes various sources of taxable income over 100 SEK (approximately 9.6 USD) reported each calendar year. The LISA contains data on old age pensions, wage earnings and benefits such as unemployment, sick leave and disability pension. The selection bias in these data is generally very low since the registers are government-administered and participation is non-optional for all citizens over age 15.

Each participant has a unique retirement sequence of different labour market positions where the order of positions, the duration in specific positions and transitions across positions entail a life course trajectory. In the analysis, the work and retirement trajectories were treated as a combined unit of analysis, to gain better knowledge of the longitudinal process and passages of retirement. Hence, through these data, each participant was assigned to one mutually exclusive labour market position (referred to as a state) by their main source of income per year.

The first states include wage earnings, old age pension and working retirement. Wage earnings were dichotomized into *high* or *low wages* by the median wage each year, as an indicator of distribution between the most precarious and privileged wage positions (OECD 2023; Statistic Sweden 2022). The threshold was calculated per year using the wage distribution estimation from Statistic Sweden's Labour Force Survey, adjusted for inflation. A comparison of various thresholds showed consistent results (*e.g.* dichotomizing by first and third quantile, and including medium categories). *Old age pension* was measured by total income from pension each year, including occupational pension, private pension and survivor's pension to partners or family members. In Sweden, there is no fixed statutory retirement age, but most people start to collect old age pensions around age 65. However, the regulations allow people to start lifting pension earlier, depending on the type of pension benefit, occupational sector and local agreements at the workplace. Likewise, for this age cohort, the legal right to work ends at age 67 owing to Employment Protection Act (LAS) regulations, but individual agreements with the employer allow people to extend their working life further.

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Working retirement was defined as combining wage earning and old age pension and classified as either a *working retiree with lower wages* or a *working retiree with higher wages*. By differentiating between high and low wages, this study highlights heterogeneity within the group of working retirees, showing both the difference in late-life economic positions as well as a general overview of the internal proportion between wage income and pension benefits over time.

The next three states include precarious state-founded benefits from *disability pension, unemployment, labour market policies* and *sick leave*. Disability pension is provided for people with limited ability to work. During the study period, the eligibility rules for disability pension have been restricted in two steps: first by removing the permanent basis of the benefit (in 2003) and then by a restriction on permanent loss of ability to work (in 2008). However, in this study, people who were granted disability pension before 2003 kept the benefit until the statutory pension age. Similar restrictions have also been implemented for unemployment and labour market policies, resulting in a sharp reduction in the number of older people in these states (Palme and Laun 2021). In the case when a participant occupied multiple states, they were classified by their largest source of income. For example, if they received sick leave benefits, unemployment benefits and wage earnings in one year, the assigned state was the main source of income. Lastly, *inactivity* or missing values were included as a separate state to include people without any registered earnings. This category may also include people unemployed without unemployment benefits, short-term homemakers or people working without paying taxes.

Socio-economic characteristics

Prior life course factors known to impact the lengths of working lives were included as the main explanatory variables (Gutiérrez et al. 2025), measured in the first year of our study period (at age 51). The highest level of education was used as an indicator of skills and access to resources and measured using Statistic Sweden's International Classification of Education. The variable was coded as 'compulsory education' (*i.e.* nine years or less of primary and lower secondary education), 'secondary education' and 'postsecondary education' (*i.e.* at least one year of higher education). Career field and socio-economic status were measured in 1990 for all participants using Statistic Sweden's classification of sector and occupation status (Statistic Sweden 1984). Career fields were categorized into 'technical and sciences' including natural science, social science, humanities and artistic work; 'healthcare'; 'administrative work' including clerical and office technical work and commercial work; 'transport' including communication work; 'manufacturing work' including machine operation; and 'other' which included, military work, agricultural, forestry and fishery work and unknown occupations. Occupation statuses were categorized into 'blue-collar employees', 'white-collar employees', 'employers including self-employed' and 'unknown'.

Family measures (civil status, children and wealth) were used as indicators of both collective resources from partners and close networks, but also as financial strain and a necessity for extending working life (Tambellini et al. 2023). Civil status was coded as 'married', 'divorced' (including widowed) and 'single/unmarried'. Unfortunately, our data do not include information on cohabitation. In addition, prior research has shown

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that older adults with younger children living at home are more likely to remain working. Hence, a measure of the number of children living at home was included when our participants were 51 years old. The variable was coded into 'no children', 'one child' and 'two or more children'. Wealth was measured using the individual share of the household's disposable income, as a proxy for supplementary economic resources, such as savings, capital and property, compensating for wage income. The variable was measured per consumption unit per year and divided into quintiles. Participants' race/ethnicity, gender identity and sexual orientation were not available in our data.

Statistical analysis

Sequence analysis is an individual-centred 'event-based' approach that allows us to analyse the work–retirement process as a combined unit, including the *order* of various sources of income and pension states, the *duration* of each state and the number of *transitions* between states. Compared to single-event approaches, it allows for a more holistic approach.

A unique sequence of yearly labour market states across 19 years (age 52 to age 70) was constructed for each individual in the sample. Cluster analysis was applied to reduce sequence complexity from large single sequences to a few clusters. It permits quantifying the distance between pairs of individual sequences by similarity of states and experiences at similar times. Optimal matching (OM) was used to calculate the pairwise distance matrix (substitution cost = 2, indel cost = 1) and the partitioning around medoids (PAM) algorithm (Studer 2013) was used to define the smallest weighted sum of distances from the other observations in each cluster, identifying the best representatives of the total sample. To determine the number of clusters, the average silhouette width (ASW) was used. The ASW calculates the within-cluster homogeneity and between-cluster heterogeneity (Kaufman and Rousseeuw 2009) and revealed an average fit of 0.26 (men) and 0.29 (women), which indicates a weak but reasonable structure (Studer 2013). The dynamic hamming distance (DHD) algorithm on the distance matrix was also tested as a robustness check, and the results are consistent. An entropy index was calculated to assess the degree of complexity embedded within the trajectories (Ritschard et al. 2018). Plotting the entropies can illustrate how the diversity of states evolves over time (Gabadinho et al. 2011), where lower values indicate similarities in state position and higher values indicate a higher degree of complexity (0 = all in the same state to 1 = largest possible complexity between states). The cluster analysis was conducted separately for women and men.

Multinomial regression analysis was used to predict the likelihood of individuals pursuing each of the trajectories using level of education, career field, occupational status, civil status, number of children living at home and disposable income as the independent variables. Results are presented as the predicted probabilities, with the *traditional* (T1) trajectory as the base category, showing the likelihood of an individual pursuing each trajectory given their values for the explanatory variable. Hence, in this study, predicted probabilities are used to compare probabilities within an individual, showing the most likely trajectory given their specific values on the independent variables. In other words, an increase in one trajectory's probability necessarily reduces the probabilities for other trajectories. Data analyses were carried out in R Statistics

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(R Core Team 2022), using the TraMineR library (Ritschard 2021), and STATA 18.0.

Results

Table 1 shows that the majority of our sample are white-collar employees and married. Women have slightly higher education than men, while men have slightly more children living at home and are wealthier than women. Around 30 per cent of our sample are unmarried (single or divorced), although some may be cohabiting with a partner. All gender differences were statistically significant < 0.05 (data not shown).

The first goal of this study was to identify typical trajectories of how and when working retirees combine work and pension benefits over time. Five clusters were identified, separately for women and men, and each trajectory is labelled based on both the state representation within each trajectory as well as the heterogeneity and turbulence of states. The entropy plots, presented in Appendix A, illustrate the diversity of states over time within each cluster. In Figure A2, the curves indicate a general increase in their early 60s, turning into a noticeable decrease as they enter the normative retirement age (age 65–66). This is likely a consequence of the increased proportion of older workers entering into various types of working retirement or retirement, stressing the heterogeneity in employment positions at the end of working life. Moreover, the entropy plots display the emergence of two subgroups, namely those with an overall low diversity and those with more diversity across the study period.

Figure 1 presents the state distribution plots for each trajectory type across 19 years (between ages 52 and 70). The most common trajectory is labelled 'traditional' (26.7 per cent of women and 25.8 per cent of men). A typical person in this trajectory type spends the years between ages 52 and 64 in stable employment, followed by one year as a working retiree at age 65 and a complete transition into full-time retirement by age 66. Women in these trajectories are often in lower-wage employment, while men are in higher-wage employment.

The following two trajectories are labelled 'destandardized with higher wages' (20.0 per cent of women and 23.5 per cent of men) and 'destandardized with lower wages' (18.4 per cent of women and 20.0 per cent of men) and reveal different pathways of working retirement. The defining characteristics of these trajectories are the overall stable employment until age 60, either in higher-wage or in lower-wage employment, and that they are more likely to combine work and pension after the age of 65. While women and men in these trajectories share similar working life patterns, they differ in terms of how they extend their working lives. Among men with higher-wage and women with lower-wage employment, working retirement is commonly extended for the full study period (until age 70). By contrast, men with lower wages and women with higher wages are more likely to either make a rather rapid transition into full-time retirement or become working retirees for the entire study period. Furthermore, these findings show that the turbulence of employment transition scores increases when entering the expected retirement age; however, while the trajectory of lower wages stabilizes at the prior level, the high-wage trajectory remains higher for the remaining time. This implies that the type of working retirement for older adults in these trajectories differs. These differences are further explored in the regression analysis.

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Table 1. Descriptive statistics

	Women	Men
% (n =)	52.3 (908)	47.7 (829)
Career field		
Technical and sciences	18.3 (166)	24.3 (201)
Healthcare	26.7 (242)	2.8 (23)
Administrative	29.1 (264)	22.4 (186)
Transport	3.1 (28)	6.2 (51)
Manufacturing	5.4 (49)	28.1 (233)
Other	17.5 (159)	16.3 (135)
Occupational status		
Blue-collar employees	32.8 (298)	34.1 (283)
White-collar employees	56.2 (510)	50.8 (421)
Employers and self-employed	6.0 (54)	10.6 (88)
Unknown	5.1 (46)	4.5 (37)
Education		
Compulsory	21.8 (197)	29.2 (241)
Secondary education	44.6 (403)	45.0 (371)
Higher education	33.6 (304)	25.8 (213)
Civil status		
Married	68.2 (617)	72.8 (601)
Divorced	13.7 (120)	12.1 (100)
Single	18.6 (168)	15.1 (125)
Number of children living at home		
No child	46.5 (421)	41.9 (246)
One child	30.8 (279)	28.5 (235)
Two or more children	22.7 (205)	29.7 (245)
Disposable income		
Q1	33.8 (306)	15.3 (126)
Q2	29.9 (271)	19.6 (162)
Q3	21.9 (198)	28.5 (235)
Q4	14.4 (130)	36.7 (303)
Year born (Mean (SE))	1944 (0.09)	1944 (0.08)

The last two trajectories are labelled 'early exit' (15.2 per cent of women and 17.3 per cent of men) and 'precarious' (19.7 per cent of women and 13.4 per cent of men). As the label implies, a typical person in the early exit trajectory starts to collect parts of the old-age pension before the expected retirement age. This transition typically starts around age 61 (*i.e.* the first year to collect old-age pension for these age cohorts), followed by one year of working retirement before a final exit from the labour force.

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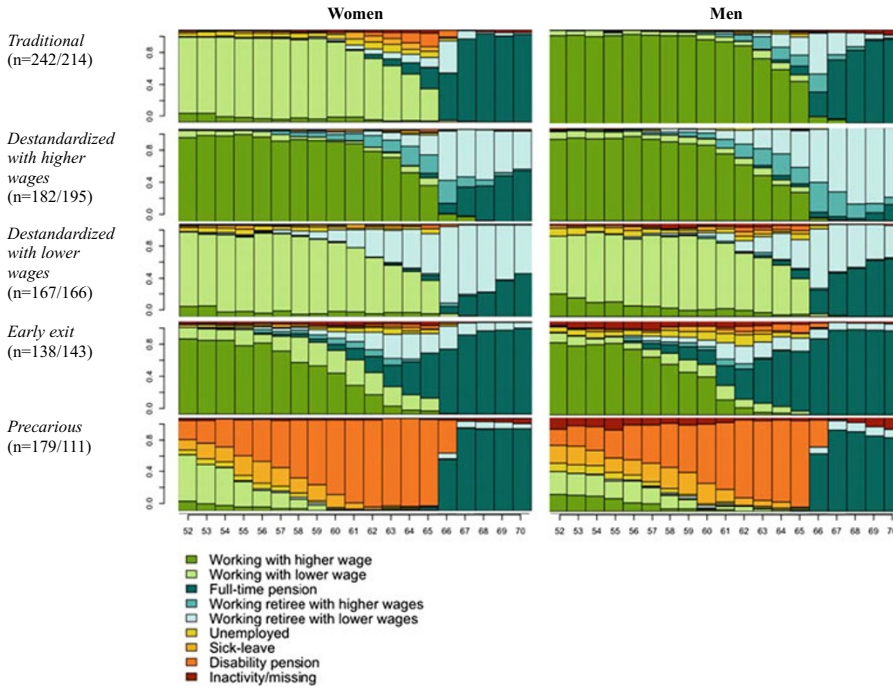

Figure 1. State distribution plot of five work–retirement clusters for women (left) and men (right).

However, as the state distribution plot reveals, the pension measure includes various sources of pension benefits (occupational pension, private pension and survivor's pension to partners or family members). Although most people in this trajectory are in stable higher-wage employment, there are also people struggling with unemployment, sick leave and inactivity. Across the trajectories, these people experience the highest level of turbulence across the study period (as high as 0.8 among both women and men). The precarious trajectory is, by contrast, characterized by instability with frequent shifts between employment, unemployment, sick leave and inactivity. A large share of people following this trajectory are on disability pension for the majority of the time, followed by a permanent exit of full-time pension at age 65 or 66.

The second goal of this study was to explore the heterogeneity in who can pursue different types of working retirement. Table 2 presents the predicted probability of pursuing each work–retirement trajectory depending on career field, occupational status, education, civil status, number of children and wealth, separately for women and men (see Figure A2 in Appendix for probability plots). These predicted probabilities represent the likelihood of an individual following a particular trajectory given their values for the independent variables and are used to compare probabilities within an individual across trajectories. This means that probabilities are constrained to sum up to 1 for each individual across trajectories, that is, an increase in one trajectory's probability reduces the probabilities for other trajectories.

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Table 2. Multinomial model of women's and men's labour market trajectories: predictive probabilities (SE)

	T1 *Traditional*	T2 *Destandardized with higher wages*	T3 *Destandardized with lower wages*	T4 *Early exit*	T5 *Precarious*
Women (n = 904)	(n = 242)	(n = 182)	(n = 167)	(n = 138)	(n = 179)
Career field					
Technical and Sciences	0.28 (0.05)	0.23 (0.02)	0.17 (0.04)	0.15 (0.03)	0.20 (0.05)
Healthcare	0.29 (0.03)	0.18 (0.02)	0.20 (0.03)	0.20 (0.03)	0.13 (0.02)
Administrative	0.28 (0.03)	0.20 (0.02)	0.20 (0.03)	0.16 (0.02)	0.17 (0.03)
Transport	0.31 (0.08)	0.09 (0.07)	0.41 (0.10)	0.01 (0.01)	0.18 (0.07)
Manufacturing	0.18 (0.05)	0.23 (0.09)	0.16 (0.05)	0.17 (0.09)	0.25 (0.06)
Other	0.24 (0.04)	0.19 (0.06)	0.14 (0.03)	0.12 (0.04)	0.30 (0.05)
Occupational status					
Blue-collar employees	0.31 (0.03)	0.13 (0.03)	0.23 (0.03)	0.07 (0.02)	0.26 (0.03)
White-collar employees	0.28 (0.02)	0.22 (0.02)	0.16 (0.02)	0.19 (0.02)	0.15 (0.02)
Employers and self-employed	0.17 (0.05)	0.17 (0.07)	0.24 (0.06)	0.24 (0.08)	0.17 (0.05)
Unknown	0.15 (0.05)	0.09 (0.07)	0.17 (0.07)	0.26 (0.11)	0.33 (0.08)
Education					
Compulsory	0.32 (0.03)	0.12 (0.03)	0.18 (0.03)	0.16 (0.03)	0.22 (0.03)
Secondary education	0.29 (0.02)	0.15 (0.02)	0.18 (0.02)	0.18 (0.02)	0.21 (0.02)
Higher education	0.19 (0.03)	0.26 (0.02)	0.24 (0.03)	0.15 (0.02)	0.17 (0.03)
Civil status					
Married	0.28 (0.02)	0.20 (0.01)	0.19 (0.02)	0.16 (0.01)	0.17 (0.01)
Divorced	0.27 (0.04)	0.19 (0.03)	0.17 (0.03)	0.12 0.03)	0.24 (0.04)
Single	0.22 (0.03)	0.19 (0.02)	0.17 (0.03)	0.15 (0.03)	0.26 (0.03)

(*Continued*)

Table 2. (*Continued.*)

	T1 *Traditional*	T2 *Destandardized with higher wages*	T3 *Destandardized with lower wages*	T4 *Early exit*	T5 *Precarious*
Children living at home					
No child	0.25 (0.02)	0.18 (0.02)	0.17 (0.02)	0.18 (0.02)	0.21 (0.02)
One child	0.28 (0.02)	0.20 (0.02)	0.18 (0.02)	0.15 (0.02)	0.19 (0.02)
Two or more children	0.28 (0.03)	0.23 (0.02)	0.20 (0.03)	0.11 (0.02)	0.16 (0.03)
Disposable income					
Q1	0.45 (0.03)	0.02 (0.01)	0.27 (0.03)	0.05 (0.01)	0.21 (0.02)
Q2	0.25 (0.03)	0.14 (0.02)	0.23 (0.03)	0.14 (0.02)	0.24 (0.03)
Q3	0.13 (0.03)	0.33 (0.03)	0.13 (0.03)	0.23 (0.03)	0.18 (0.03)
Q4	0.12 (0.03)	0.34 (0.04)	0.07 (0.03)	0.31 (0.04)	0.15 (0.04)
	T1 *Traditional*	**T2** *Destandardized with higher wages*	**T3** *Destandardized with lower wages*	**T4** *Early exit*	**T5** *Precarious*
Men (n = 825)	(n = 214)	(n = 195)	(n = 166)	(n = 143)	(n = 111)
Career field					
Technical and Sciences	0.30 (0.04)	0.30 (0.04)	0.14 (0.04)	0.13 (0.03)	0.13 (0.04)
Healthcare	0.15 (0.07)	0.39 (0.10)	0.16 (0.07)	0.05 (0.04)	0.25 (0.09)
Administrative	0.26 (0.04)	0.32 (0.04)	0.18 (0.04)	0.17 (0.03)	0.07 (0.03)
Transport	0.21 (0.06)	0.27 (0.07)	0.22 (0.05)	0.08 (0.04)	0.22 (0.05)
Manufacturing	0.27 (0.05)	0.12 (0.03)	0.22 (0.03)	0.25 (0.05)	0.13 (0.02)
Other	0.19 (0.05)	0.19 (0.05)	0.25 (0.04)	0.23 (0.05)	0.14 (0.03)
Occupational status					
Blue-collar employees	0.21 (0.05)	0.35 (0.06)	0.21 (0.03)	0.12 (0.03)	0.10 (0.02)

(*Continued*)

Table 2. (*Continued.*)

	T1 *Traditional*	T2 *Destandardized with higher wages*	T3 *Destandardized with lower wages*	T4 *Early exit*	T5 *Precarious*
White-collar employees	0.28 (0.03)	0.21 (0.02)	0.19 (0.03)	0.20 (0.03)	0.11 (0.03)
Employers and self-employed	0.16 (0.05)	0.19 (0.05)	0.23 (0.04)	0.17 (0.05)	0.25 (0.04)
Unknown	0.20 (0.12)	0.08 (0.08)	0.15 (0.06)	0.34 (0.11)	0.22 (0.07)
Education					
Compulsory	0.26 (0.03)	0.21 (0.03)	0.22 (0.02)	0.17 (0.03)	0.15 (0.02)
Secondary education	0.28 (0.02)	0.22 (0.02)	0.20 (0.02)	0.18 (0.02)	0.12 (0.02)
Higher education	0.25 (0.03)	0.29 (0.03)	0.17 (0.03)	0.16 (0.03)	0.13 (0.03)
Civil status					
Married	0.26 (0.02)	0.26 (0.02)	0.19 (0.02)	0.16 (0.02)	0.12 (0.01)
Divorced	0.25 (0.05)	0.14 (0.04)	0.21 (0.04)	0.23 (0.04)	0.17 (0.03)
Single	0.29 (0.04)	0.17 (0.04)	0.24 (0.04)	0.17 (0.03)	0.14 (0.03)
Children living at home					
No child	0.27 (0.03)	0.21 (0.02)	0.19 (0.02)	0.19 (0.02)	0.14 (0.02)
One child	0.26 (0.03)	0.23 (0.03)	0.20 (0.03)	0.16 (0.02)	0.16 (0.02)
Two or more children	0.24 (0.03)	0.27 (0.03)	0.23 (0.03)	0.16 (0.02)	0.10 (0.02)
Disponible income					
Q1	0.04 (0.02)	0.12 (0.04)	0.42 (0.05)	0.11 (0.03)	0.31 (0.04)
Q2	0.20 (0.03)	0.17 (0.03)	0.34 (0.04)	0.12 (0.03)	0.17 (0.03)
Q3	0.27 (0.03)	0.25 (0.03)	0.13 (0.02)	0.24 (0.03)	0.10 (0.02)
Q4	0.36 (0.03)	0.31 (0.03)	0.09 (0.02)	0.20 (0.03)	0.04 (0.01)

The predicted probabilities reflect an individual's likelihood of following each trajectory based on their independent variable values. Probabilities sum to 1 for each set of independent variable values. The model is adjusted for age/time (data not shown in table).

Results for labour market domain (career field, occupational status and education) showed that women with higher education had greater probabilities of becoming working retirees with *higher wages* (T2:0.26) and *lower wages* (T3:0.23) compared to *traditional* (T1:19), *early exit* (T4:15), *precarious* (T5:17). Women in white-collar jobs were more likely to follow the *traditional* and *higher wages* trajectories (0.22–0.28), while employers and self-employed women had higher probability of becoming working retirees with *higher wages* (0.24) or taking an *early exit* (0.24). While career fields were relatively evenly distributed across trajectories, women in technical and science, and administration career fields were slightly more likely to follow the *higher wages* (0.23) whereas those in transportation sectors had a greater likelihood of becoming working retirees in *lower wages* (0.41).

Among men, those with higher education were most likely to follow the *higher wages* trajectory (0.29) and least likely to follow the *precarious* trajectory (0.13). In contrast, men with compulsory and secondary education were most likely to follow the *traditional* (0.26–0.28) and *lower wages* trajectories (0.22–0.20). Blue-collar workers in health care, administrative and technical fields had higher probabilities of *higher wages* (0.35 and 0.30–0.39). Employers and self-employed men in less defined career fields (such as service, military, agriculture and unspecified occupational affiliation) were more likely to follow the *lower wages* trajectory (0.23 and 0.25).

Turning to the family domain (civil status, children, disposable income), civil status had less influence on women extending their working life. Married, divorced or single women showed similar probabilities within trajectories (0.17–0.20). However, single women were most likely to follow the *precarious* trajectory (0.26) and less likely to take an *early exit* (0.15), while married and divorced women had the highest probability following the *traditional* trajectory (0.27–0.28). Women with multiple children living at home showed a higher probability of *traditional* (0.28), *higher wages* (0.23) and *lower wages* (0.20) trajectories, compared to *early exit* (0.11) and *precarious* (0.16). For men, being married showed higher probability of following *higher wages* (0.26), whereas single men were more likely to follow the *lower wages* trajectory (0.24). For both women and men, having younger children living at home showed a higher probability of extending working life (0.20–0.27).

Disposable income was shown to be the most dividing factor, stressing the buffering role of financial resources in addition to wage income. Among both women and men, a high disposable income was associated with higher probabilities of *higher wages* (0.34–0.31). Additionally, women with higher disposable income were more likely to take an *early exit* (0.31) whereas men with higher disposable income were more likely to follow the *traditional* trajectory (0.36). Conversely, lowest disposable income showed higher probabilities for *lower wages*, particularly for men with the lowest disposable income quintile (0.42). Among women with low disposable income, the highest probability was for the *traditional* trajectory (0.45), followed by *lower wages* (0.27) and *precarious* (0.21).

Discussion

This study provides new insights into how older workers navigate complex work–retirement transitions. While policies promoting extended working life and flexible

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pension systems have been introduced, less is known about how older adults combine work and pensions over time and the socio-economic heterogeneities that limit these societal and organizational goals. This study focused on the baby boom generation born in the 1940s, representing a new, less predictable generation with a significant economic and social impact on society and future generations. By understanding these dynamics, society can better adapt to changes in the labour market and create conditions for a more inclusive and equal working life.

Our findings reveal two primary types of wage-based work–retirement trajectories. Some individuals extend their working lives owing to financial necessity, characterized by low disposable income, children living at home or not having a partner (*i.e.* T3: *Destandardized life courses with lower wages*). Others do so to maintain their socio-economic status, often having high disposable income, higher education and white-collar occupations (*i.e.* T2: *Destandardized life courses with higher wages*). Consistent with previous research, older adults are increasingly extending their working lives, though the extent and the nature of this extension vary significantly by gender, education and income (Calvo et al. 2018; Dingemans and Möhring 2019; Turky et al. 2024).

For women, working retirement was strongly associated with higher education, suggesting that higher employability, human capital and skills are important factors in a late career. This age cohort of women has likely benefited from greater access to higher education, paid parental leave, and childcare services, facilitating the rise of women's employment rates and social mobility (Börjesson 2011; Lewis and Åström 1992). These findings suggest that a flexible and individualized pension system may be particularly advantageous for women with strong labour market histories. However, prior studies also highlight the widespread age discrimination, particularly against older women (Oude Mulders et al. 2014), indicating that some may struggle to find stable and relevant employment in late careers. For men, working retirement was closely linked to partnership and family. Research suggests that men are more likely than women to re-partner after divorce or separation (De Graaf and Kalmijn 2003), increasing the likelihood of becoming parents later in life. Moreover, research has shown that extended periods of singlehood have a negative impact on financial and subjective wellbeing after 50, especially in combination with a trajectory of weak labour market involvement (Comolli et al. 2021). The findings indicate that family responsibility plays an important role in men's decision to extend their working life. Taken together, these results support the compensation and status maintenance hypotheses, showing that both financially advantaged and disadvantaged individuals, based on their working careers and family resources, are most likely to extend their working life after age 65 by combining wage income and pension benefits. However, important differences are also revealed within these patterns.

One key finding is that individuals following higher wage trajectories experience more employment transitions in late life compared to those in lower wage trajectories, who primarily continue working out of financial necessity. This finding makes an important contribution to prior bridge employment research that emphasizes the importance of employability for extending working life (Björklund Carlstedt et al. 2018; Dingemans et al. 2016). It shows that those who overcome the challenges of finding

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new employment, regardless of human capital, experience different levels of stability in their late-life careers. It could be that highly skilled working retirees may be more willing and have the opportunity and agency to change employers and control their work tasks and schedules. This trend may also be driven by the growing temporary staffing sector, where professionals such as locum doctors, nurses, dentists and teachers frequently switch between employers. However, further research is needed to examine working conditions for working retirees and the stability of their employment. A more detailed exploration of employment and retirement patterns using multichannel sequence analysis could provide additional insights into these transitions.

Significant gender differences were observed within the trajectory types. Women in the higher wage trajectory and men in the lower wage trajectory tended to extend their working lives only moderately, whereas their counterparts continued working as retirees for longer periods. These findings align with prior research showing that the outcome of advantageous and disadvantageous employment trajectories is strongly gendered. Prior studies have shown that women with stable employment trajectories and men in precarious, non-standard employment trajectories often experience poorer health outcomes compared to their respective counterparts (Cabib et al. 2024). The results further indicate that accumulated wealth plays a critical role for women, differentiating between those who use working retirement as a form of bridge employment and those who rely on it as a late-career necessity. This distinction further supports the compensation and status maintenance perspectives, reinforcing the idea that gender disparities in employment persist throughout life and become more pronounced with age.

Beyond financial and career-related factors, the findings also underscore the multifaceted and multi-directional features of working retirement, revealing a greater variety of pathways for extending working life than previously recognized by research. As societal goals aim for extended working lives, norms about the appropriate retirement age are gradually changing among older adults and employees. However, working–retirement trajectories are likely influenced by various other, and often gendered, factors that this study, unfortunately, was not able to account for, such as coordinating retirement timing with a partner, being a care provider for older relatives and perhaps taking on new care-giving roles as grandparents (Gutiérrez et al. 2025; Loretto and Vickerstaff 2015; Zanasi et al. 2020) but also maintaining good health and avoiding stressful work-related issues (Björklund Carlstedt et al. 2018; Cabib et al. 2024). Hence, these interests can conflict, as both work and family responsibilities demand time and energy. Thus, policies aimed at increasing the labour market participation of older workers are not guaranteed to be effective without acknowledging the gendered aspects of work, working life and family responsibilities.

This study has several limitations that should be addressed. Firstly, the working retirement variable captured income from old-age pensions and wage income but did not account for the number of hours worked. We recognize that older adults may reduce their working hours, leading to lower wage income, as a strategy for a more flexible working life. Unfortunately, our data did not include information on working hours. Likewise, the analysis was limited by not having data on unpaid work, such as caring obligations and domestic work, although we acknowledge that these variables can be

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strongly gendered and significantly impact labour market attachment, pension savings and employability for late careers (Loretto and Vickerstaff 2015; Zanasi et al. 2020). We recommend that future research incorporate adjustments for working hours, including other gender aspects of working life, to better capture the heterogeneity among trajectories of working retirement. Secondly, although our trajectories included states of sick leave and disability pension, we were unable to control for health selection, as our registers did not include measures for chronic diseases and mental health issues. These health factors both affect the ability to work and increase the risk of unemployment and precarious non-standard employment, as well as the prospects of finding new employment in later life (Cabib et al. 2024). Hence, in addition to the large share of sick leave and disability pension in the precarious trajectories, it is likely that poor health is a key mechanism across all trajectories, particularly in the early exit trajectories shown in this study. Lastly, this study focused on a specific age cohort with certain institutional and societal characteristics, which may limit comparability to other generations. We have not controlled or taken institutional factors into account, although we acknowledge that changes in welfare benefits, labour market policies, pension reforms and economic crises are affecting people's working and retirement processes. While controlling for age to account for some institutional changes over time, generalizing these findings to other age cohorts from different periods should be made with caution.

Despite these limitations, our research shows that work trajectories, along with socio-economic factors (such as education, disposable income and occupational status) and family resources (particularly the number of children), are crucial to understanding the likelihood of working in retirement. Notably, a long, possibly new late-life career was identified among both advantaged men and disadvantaged women. As destandardized work lives become more common in many Western countries, it is essential for both scientific researchers and policy makers to understand how these flexible careers may lead to transitions in and out of employment at the end of individual work careers.

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