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**Gender biases in popular sample**  
**definitions for studies on the elderly**

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# Housewives never retire!? Gender biases in popular sample definitions for studies on the elderly

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## **Abstract**

While research emphasized the risk of gendered sample selection bias among the elderly decades ago, the empirical literature on old-age inequalities remains largely unaware of it. This research note addresses this issue by investigating gendered sample selectivity for individuals aged 65 or older employing two common sample criteria: self-reported retirement status and pension receipt in countries covered by the Survey of Health, Ageing, and Retirement in Europe (SHARE).

Findings show that more than half of older women are excluded when these criteria are applied. Gender selection bias varies widely across countries and is less pronounced in post-socialist or social-democratic welfare states. Visualizing work trajectories by sample status reveals that women with long unpaid care work periods and men with high self-employment, unemployment, and extended education levels are particularly likely to be excluded.

Studies employing such sample criteria risk underestimating gender inequalities in pensions, health, and life satisfaction. The implications are severe for Southern, conservative, and liberal welfare states, and for cross-country comparisons, where sample bias often goes undetected due to its variability across contexts. While this article cannot offer a universal recommendation for sample definitions, it aims to promote less biased sample conceptualizations in studies of the elderly population.

**Key words:** old age inequalities, retirement, sample bias, sample definition, gender bias, life course

# 1 Introduction

Studies on old-age inequalities are increasingly important as more individuals are affected by them due to population aging. Large survey data harmonization projects focusing on the older population, such as the Survey of Health, Ageing, and Retirement in Europe (SHARE) and the Gateway to Global Aging Data covering SHARE and other Health and Retirement Study (HRS) family surveys, facilitate country comparisons focusing on the elderly. However, defining and measuring the elderly population for such studies, especially across countries, is not always straightforward. For example, Denton et al. (2009) discuss nine different measurements for retirement alone, and the various combinations thereof that are applied in empirical studies. The implications of “fuzzy concept[s]” (Fasang, 2009, p. 277) of retirement become particularly apparent when they are applied in the empirical literature, e.g., for the sample definition. Which sample definition is meaningful may differ depending on the country and the life-course context of the studied population. Consequently, finding a sample definition that is meaningful across contexts and subgroups can be challenging.

Luckily, harmonized surveys contain indicators that can be applied across countries and provide an accessible starting point for defining the elderly. A popular sample definition is self-reported retirement status, which is used in analyzing outcomes among the elderly, such as life satisfaction, social security wealth, financial well-being, and pension income (e.g., Belloni et al., 2020; Bridgen, Meyer, & Davison, 2022; Madero-Cabib & Fasang, 2016; Palomäki, 2017; Ponomarenko, 2016; Tambellini, 2023). Another sample criterion is receipt of pension income

(e.g., Dingemans & Henkens, 2019; König, Johansson, & Bolin, 2019).<sup>1</sup> However, both measures risk excluding a selective proportion of the elderly, and as I show, this risk applies disproportionately to women. I argue that such gender bias emerges as both pension receipt and self-identification with retirement depend on previous life courses that are often gendered, particularly in conservative and liberal welfare contexts (e.g., Madero-Cabib & Fasang, 2016; Uccheddu, Emery, Gauthier, & Steverink, 2022). Self-reported retirement status is likely to be gendered because the broad notion of retirement is more applicable to male-typical biographies characterized by continuous full-time employment (e.g., Fasang, 2009; O’Rand, 1996). Thus, individuals with life experiences deviating from such biographies, who are disproportionately women, may identify less with the male-centric notion of retirement. Sample selection based on pension receipt depends on the types of pension income considered and how pension systems regulate access. Nevertheless, given that pension access is contingent upon a minimum contribution level in many pension systems, individuals with insufficient employment years may be unable to secure access to their own pensions.

In contexts where traditional gender roles are prevalent, this has a particularly adverse impact on women. The gender bias level based on both sample criteria likely varies by country, given the cross-country differences in gender-specific work life-courses. I assume that the meanings and implications of the two sample definitions differ across genders and countries, which might, in turn, give rise to country-specific gendered sample biases. While the underlying relations are straightforward, the conceptual application of either measure as a sample criterion inevitably

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<sup>1</sup> This is a selective and not fully exhaustive list of studies applying these two measurements. These studies are transparent about their sample selection criteria. Many other studies in the field do not describe their sample selection in such detail.

produces country-specific gendered sample biases that are often concealed and are not discussed in empirical studies on the elderly population.

First, I discuss the conceptual difficulties that arise when using pension receipt or retirement identification as sample criteria. I then descriptively reveal the sample bias for the elderly by applying the two popular sample criteria to the countries covered in SHARE, and show descriptively to what extent they exclude men and women aged 65 or older. The results confirm that both definitions can lead to dramatic gendered sample biases, which differ considerably across countries. In about half of the countries considered, 20-76% of women aged 65 or older are erased from the sample when these criteria are applied.

This research note makes a conceptual contribution, highlighting the risk of severe gendered sample bias for studies on the overall elderly population when applying the two popular sample criteria. It calls for the use of more cautious and transparent sample concepts in future research.

## 2 Data and empirical approach

I use cross-sectional data from the Survey of Health, Ageing, and Retirement in Europe (SHARE, Bergmann, Kneip, De Luca, & Scherpenzeel, 2019; Börsch-Supan, Brandt, Hunkler, Kneip, & Korbmacher, 2013).<sup>2</sup> I pool waves 2, 4, 5, 6, and 9, using wave 9 as the baseline, and add

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<sup>2</sup> This paper uses data from SHARE waves 2, 3, 4, 5, 6, 7, 9 (DOIs: [10.6103/SHARE.w2.900](https://doi.org/10.6103/SHARE.w2.900), [10.6103/SHARE.w3.900](https://doi.org/10.6103/SHARE.w3.900), [10.6103/SHARE.w4.900](https://doi.org/10.6103/SHARE.w4.900), [10.6103/SHARE.w5.900](https://doi.org/10.6103/SHARE.w5.900), [10.6103/SHARE.w6.900](https://doi.org/10.6103/SHARE.w6.900), [10.6103/SHARE.w7.900](https://doi.org/10.6103/SHARE.w7.900), [10.6103/SHARE.w9.900](https://doi.org/10.6103/SHARE.w9.900)) see Börsch-Supan et al. (2013) 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, VS 2020/0313 and SHARE-EUCOV: GA N°101052589 and EUCOVII: GA

individuals from waves 6, 5, 4, and 2 if they were not surveyed in wave 9 to maximize the number of observations across birth cohorts, while using the most recent data available. The overall sample consists of all respondents aged 65 or older to demonstrate the implications for the whole elderly population.

*Operationalization of sample criteria.* The first sample criterion, self-reported retirement status, is, as is common in the empirical literature, derived from self-assessed employment status (see Appendix A2 for details). Individuals who state that “retired” best describes their employment status are considered retirees based on this operationalization and included in the sample. The second sample criterion, pension receipt, is defined based on the total imputed pension income generated by SHARE, i.e., the sum of public (including survivor pensions), occupational, and private pensions, as well as disability pensions and sickness and unemployment benefits, but excluding social assistance. Individuals receiving any such pension income are considered pension recipients, and are thus included in the sample.

*Empirical strategy.* I first show the country- and gender-specific shares for both pension receipt and employment status to quantify the shares of men and women in the sample of individuals aged 65+ that are excluded when applying the two sample definitions.

Second, I visualize the work life-courses by sample status to indicate the selectivity arising from applying such sample criteria, and show to what extent gendered work life-courses are related to the gender bias in both sample measures. For this, I use retrospective data from SHARELIFE and the Job Episodes Panel (Brugiavini, Orso, Genie, Naci, & Pasini, 2019), and differentiate between

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10 categories. The Appendix A1 describes the retrospective data sample, and the operationalization of the work categories.<sup>3</sup>

Third, I show how gender inequalities in pensions, health, and life satisfaction differ across sample definitions by country. This highlights the implications and conceptual importance of the sample criteria.

I use the total imputed pension income as described above, and top code it with the 99<sup>th</sup> percentile. Individuals without any pension income are included with a pension income of 0. For health, I consider mental health, measured on the depression scale EURO-D based on 12 items ranging from 1 (not depressed) to 12 (very depressed); and self-perceived health, with values ranging from 1 (excellent) to 5 (poor). The generated version provided by SHARE is used for both variables. Lastly, life satisfaction is measured on a scale from 0 (completely dissatisfied) to 10 (completely satisfied). For summary statistics of the outcome variables, see Table A3.

For calculating the gender gaps in the four different outcomes, I apply OLS regression analysis, adjusting for wave and cohort, treating all outcomes as continuous variables.

### **3 Gendered life courses and self-reported retirement**

Pension systems operate based on idealized male-typical biographies and retirement pathways characterized by continuous full-time employment as “prototype life courses” linking public pension receipt to stable paid employment (Allmendinger, Brückner, & Brückner, 1993; Fasang, 2010; Grady, 2015; Kuitto, Kuivalainen, & Möhring, 2021). The resulting common understanding

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<sup>3</sup> This paper uses data from the generated Job Episodes Panel (DOI: *10.6103/SHARE.jep.900*), see Brugiavini et al. (2019) for methodological details. The Job Episodes Panel release 9.0.0 is based on SHARE Waves 3 and 7 (DOIs: *10.6103/SHARE.w3.900*, *10.6103/SHARE.w7.900*).



of retirement “as the withdrawal of older workers from paid working life” (Denton & Spencer, 2009, p. 65) does not capture the reality of the whole population in old age, particularly that of individuals with interrupted labor market experiences, who tend to be women (Allmendinger, Brückner, & Brückner, 1992; Fasang, 2009; O’Rand, 1996). For these women, there is less of a strict age range or clear pathway determining retirement (Allmendinger et al. 1992). Indeed, current studies show highly gendered retirement pathways across country contexts, with female pathways to retirement often being characterized by periods of part-time employment or non-employment (e.g., Madero-Cabib, Le Feuvre, & König, 2021; Riekhoff & Järnefelt, 2017). These gendered retirement pathways demonstrate that the meanings and experiences of retirement strongly differ between genders (Fasang, 2010). Ambiguity about self-identification with retirement is likely greater the more individual experiences diverge from the institutionalized transition from employment to pension receipt (Fasang, 2009).

The assignment of retirement to typical male life courses terminating continuous employment leads to an overall “steady worker bias” (O’Rand, 1996, p. 235), which increases the risk of a gendered sample definition (Allmendinger et al. 1992). Consequently, men are more likely to self-identify as retirees in surveys than selective groups of individuals who deviate from ideal-typical male pathways to retirement, including women with interrupted careers.

Survey design may intensify the conceptual gendered reporting and sample selection bias if respondents are compelled to select between the categories of “retired” and other states such as “homemaker” when reporting their employment status (e.g., in HRS and SHARE, see Appendix A2). I argue this is due to both gendered work trajectories and the gendered understanding of retirement identified in qualitative research: “Housewives never retire!” (Loretto & Vickerstaff 2013: 77). Women who engage in unpaid care work, for which there is no discrete institutional

pathway to retirement equivalent to that for paid work (Fasang, 2010), are likely to describe themselves as homemakers. Thus, using self-reported retirement status as a sample criterion (and more generally as a covariate in any model) risks excluding large shares of women and producing gendered selectivity issues.

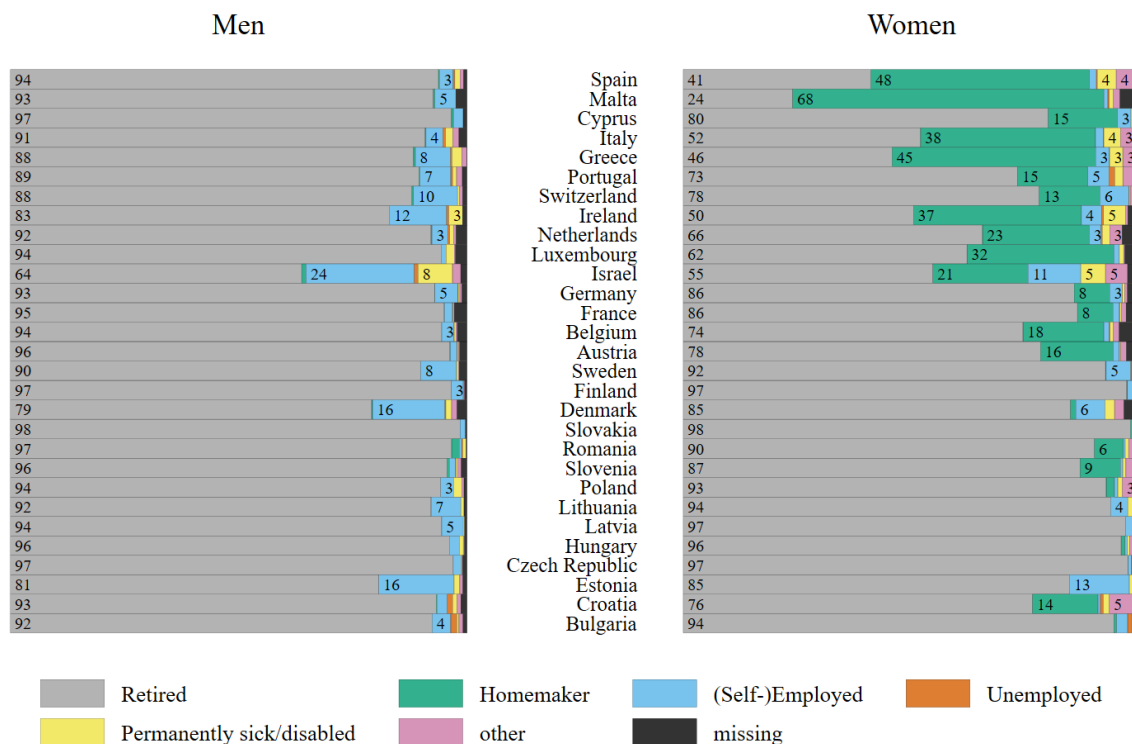
However, the magnitude of such bias likely depends on how gendered normative and welfare contexts are, and how pathways to retirement are shaped given that gender segregation levels in work(-family) life courses differ across countries (e.g., Komp-Leukkunen, 2019; Rowold, 2022). Consequently, I expect that the closer women's work life-courses are to the ideal of continuous full-time employment, the more likely they are to describe themselves as retired. Thus, countries that facilitate more gender-equal career opportunities, such as social-democratic or post-socialist regimes, tend to have smaller gender differences in retirement identification than states that have historically encouraged a traditional gender-specific division of labor, such as conservative, liberal, and Southern welfare regimes.

The implications of the gendered notion of retirement and survey design for the elderly population sample are visible in Figure 1.

As expected, in many countries, there are large gender differences in the shares of individuals self-identifying as retirees, with smaller shares of women doing so (Figure 1). For example, using self-defined retirement status as sample criterion excludes more than 50% of women but only 6-12% of men in Malta, Spain, and Greece. However, as expected, the size of the gender gap varies strongly across countries. The gender bias in self-assessed retirement status is largely in line with the gendered work trajectory levels across countries, which broadly follow the overall welfare state regime typology (e.g., Komp-Leukkunen, 2019). In most liberal, conservative, and Southern

European welfare states, except for France and Germany, large shares of women aged 65+, ranging from 13% in Switzerland to 68% in Malta, self-identify as homemakers rather than as retirees or any other employment state, while a large majority of men (approximately 90%) self-identify as retirees. By contrast, much less gendered self-identification with retirement is observed in post-socialist and social-democratic welfare states, except for Slovenia and Croatia.

**Figure 1. Self-assessed employment status at age 65 or older by country and gender**



Note: Shares higher than 2.5% are displayed as relative frequencies. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

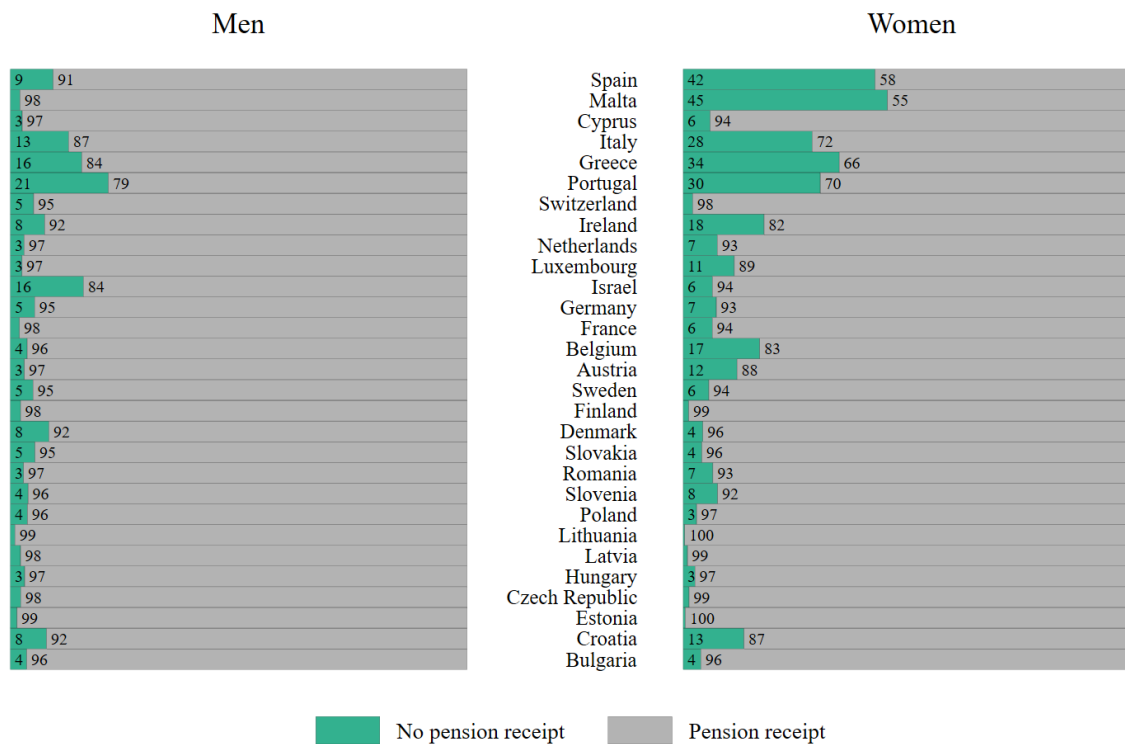
The gender bias in self-assessed retirement status might become less pronounced for younger cohorts, given that increasing female labor market participation is leading to a convergence of women's and men's employment biographies, and thus to a common understanding of retirement. The share of women self-identifying as retirees tends to increase across cohorts, but the gendered

sample selection is still relevant for the youngest cohorts observed (Figure A1). This suggests that the gendered sample bias can also lead to cohort selectivity among women.

## **4 Gendered life courses and pension receipt**

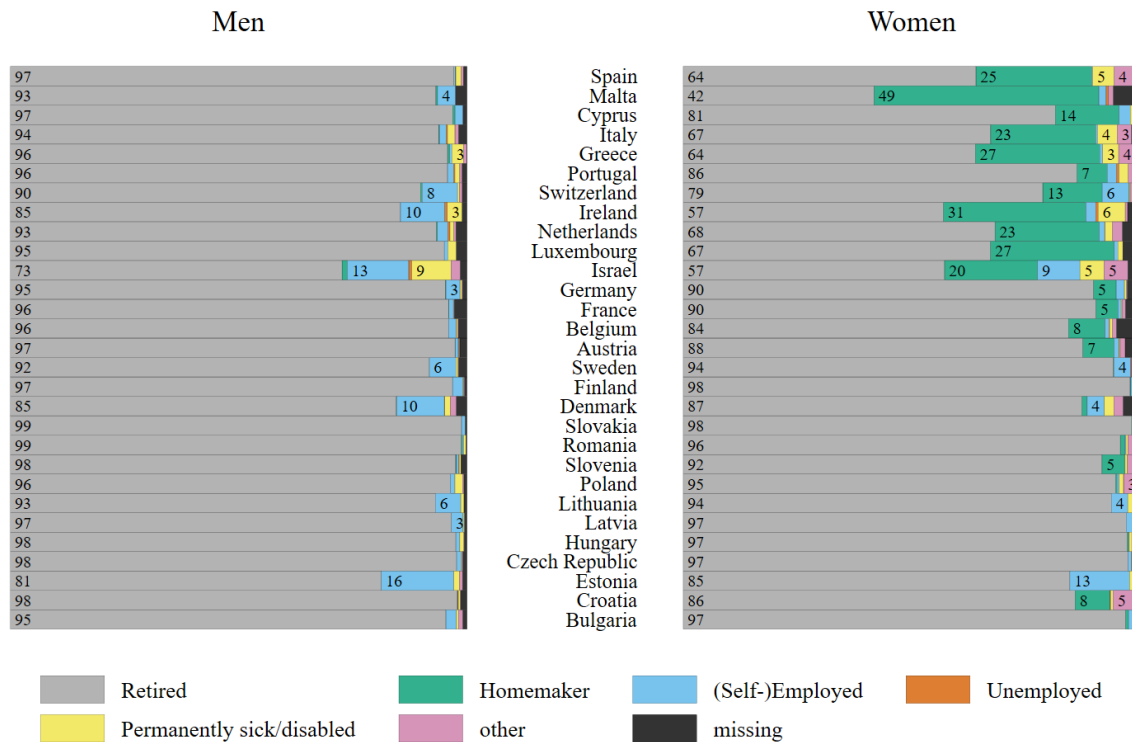
Similar to identification with retirement, and given that pension policies reward certain life courses (Ginn, Daly, & Street, 2001; Möhring, 2021), pension receipt can be determined by individuals' life courses. However, this can vary depending on the pension system. Pension systems such as that in the Netherlands guarantee relatively broad access to public pensions through flat-rate pensions. By contrast, systems with high minimum contribution years, such as 20 years in Italy, constrain access, particularly for individuals with interrupted careers (Leitner, 2001; Rowold, Struffolino, & Fasang, 2024), which can lead to large gender differences in pension access (Gender Coverage Gap, e.g., Tinios, Bettio, Betti, & Georgiadis, 2015). Furthermore, the definition and operationalization of pension income matter, including which pillars (public, occupational, and personal pensions) and pension types (e.g., survivor pensions) are considered. The narrower the definition of pension income, the more likely it is to exclude specific groups. Using pension receipt as a sample criterion for the population aged 65 or older produces highly gendered sample biases in about half of the countries, but often to a lower degree than using self-reported retirement status (Figure 2). However, in many Southern European countries, the share of women who would be excluded remains relatively high (e.g., 45% in Malta, 42% in Spain, and 31% in Greece).

**Figure 2. Pension income receipt at age 65 or older by country and gender**



Note: Shares are displayed as relative frequencies. Receipt of any (imputed) total pension income that is operationalized by SHARE as the sum of all pension income from public, occupational, and private pensions (including survivor pensions but excluding social assistance). The gender difference documents the gender gap in pension coverage. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted. SHARE provides five imputation alternatives. I display the results using imputation 1, but the results remain robust when using the other imputation outcomes. No personal pensions are included in the imputed pension income.

**Figure 3. Self-defined employment status of pension recipients**



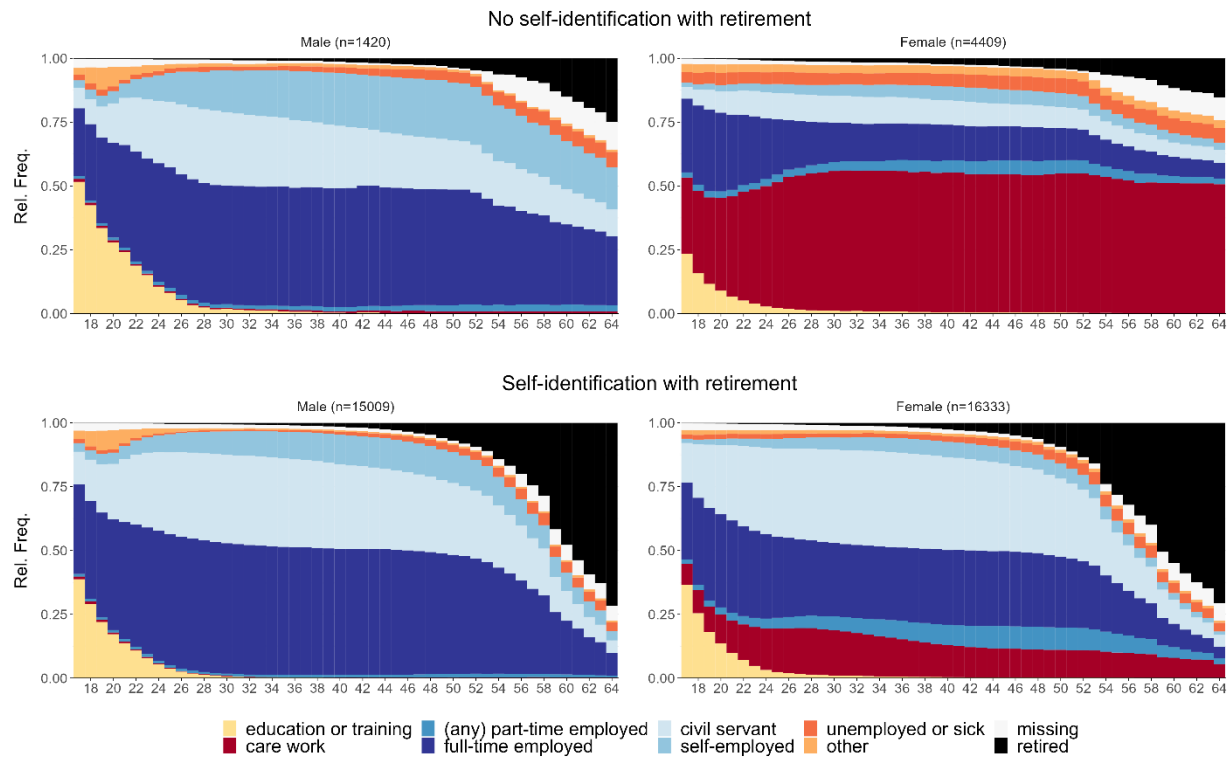
Note: Shares are displayed as relative frequencies. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

While the share of men receiving pension income is lower (Figure 2) than that of men self-identifying as retirees in some countries (Figure 1; e.g., Spain, Italy, Greece), the share of women receiving pension income is higher than that of women self-identifying as retirees in almost all countries (except for Portugal). This sheds light on the complexity of retirement identification: even among women receiving pension income, a substantial share (up to 49%) identify as housewives rather than as retirees (Figure 3). This is particularly the case in countries where there is a traditional gendered division of labor. However, the proportion of women self-identifying as retirees is greater among pension recipients than among the overall elderly population in, for example, Spain, Italy, Malta, Greece, and Belgium. Consequently, using self-reported retirement status as a sample criterion excludes a greater number of women than using pension receipt, except in Portugal and Slovakia.

## 5 Work trajectories of individuals not identifying as retirees or receiving pensions

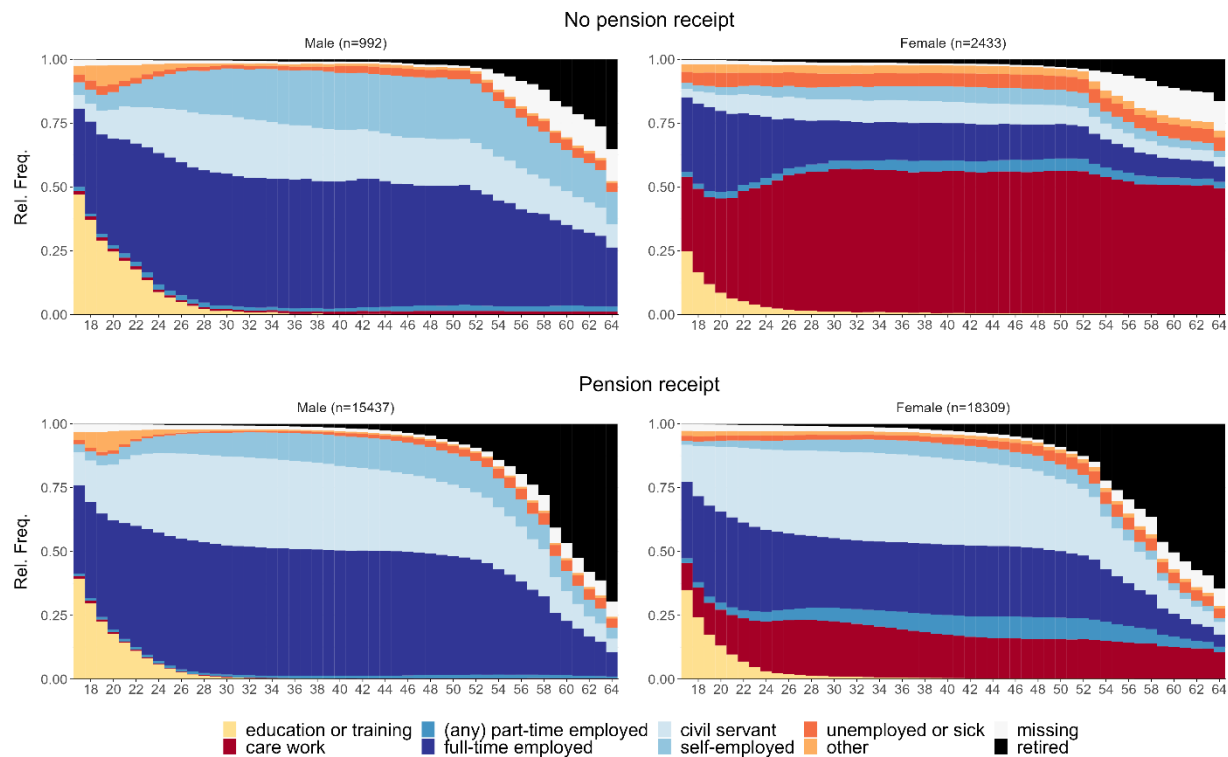
To explore the selectivity of both sample criteria regarding work life-courses, Figure 4 and Figure 5 visualize for each age the distribution on the different work categories by gender and sample status from age 18 to 65, pooled over countries. The patterns are similar for both sample definitions.

**Figure 4. Distribution of work states from age 18 to 65 by self-identification with retirement**



Note: “No self-identification with retirement” covers all categories of the self-assessed employment state at age 65 or older other than retired. Own calculations based on SHARE sample including all respondents aged 65 or older with retrospective data, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

**Figure 5. Distribution of work states from age 18 to 65 by pension receipt**



Note: Own calculations based on SHARE sample including all respondents aged 65 or older with retrospective data, waves 2, 4, 5, 6, 7, 9, release 9.0.0. Not weighted.

Among men who do not self-identify as retirees (Figure 4) or receive pensions (Figure 5), the proportions who were in education (until age 30), self-employed and working part-time until their thirties are higher than among men who identify themselves as retired or receiving a pension. Among women who would be excluded based on both sample criteria, the share engaged in unpaid care work is at least three times higher than the share who self-identify as retirees or receive pension income at all ages. Simultaneously, the shares of women in any type of employment, particularly civil service employment and full-time private sector employment, are much lower. The most frequent work life-courses of women who do not self-identify as retirees are characterized by continuous engagement in unpaid care work (see Appendix A4, Figure A2).



Of the men and women who are excluded by both sample criteria, larger shares experienced unemployment or sickness.

## **6 Implications for inequalities among the elderly**

Lastly, I briefly document the implications of using the two sample criteria and excluding a significant proportion of women in some countries for a set of frequently studied old-age inequalities. For comparison, I selected an age threshold as a third sample definition option, as it is also commonly used in studies on the elderly. An age threshold covers the overall elderly population, and is often paired with additional marginal sample characteristics.

Figure 6 illustrates the variation in the gender gap in total pensions across different sample definitions in various countries. In nearly all countries, the gender pension gap exhibits some degree of variation across the sample definitions. As expected, in some countries with large gender disparities in retirement identification or pension receipt, the discrepancies in the gender pension gap across sample definitions are most pronounced (e.g., Spain, Italy, Greece, Israel). In most countries, the gender pension gap is larger when age cut-offs are used as sample criteria, and is smaller when pension receipt or self-reported retirement is used, with women with care-dominated life courses being disproportionately excluded. As these women often receive no or very small pensions, excluding them from the analysis will result in an underestimation of the gender pension gap. For example, the gender pension gap in Spain is less than half as large when excluding individuals who do not self-identify as retirees. Nevertheless, in countries with comparable gender differences in retirement identification or pension receipt, such as Ireland and the Netherlands, the gender pension gap exhibits less pronounced variation in relative terms across sample criteria. One

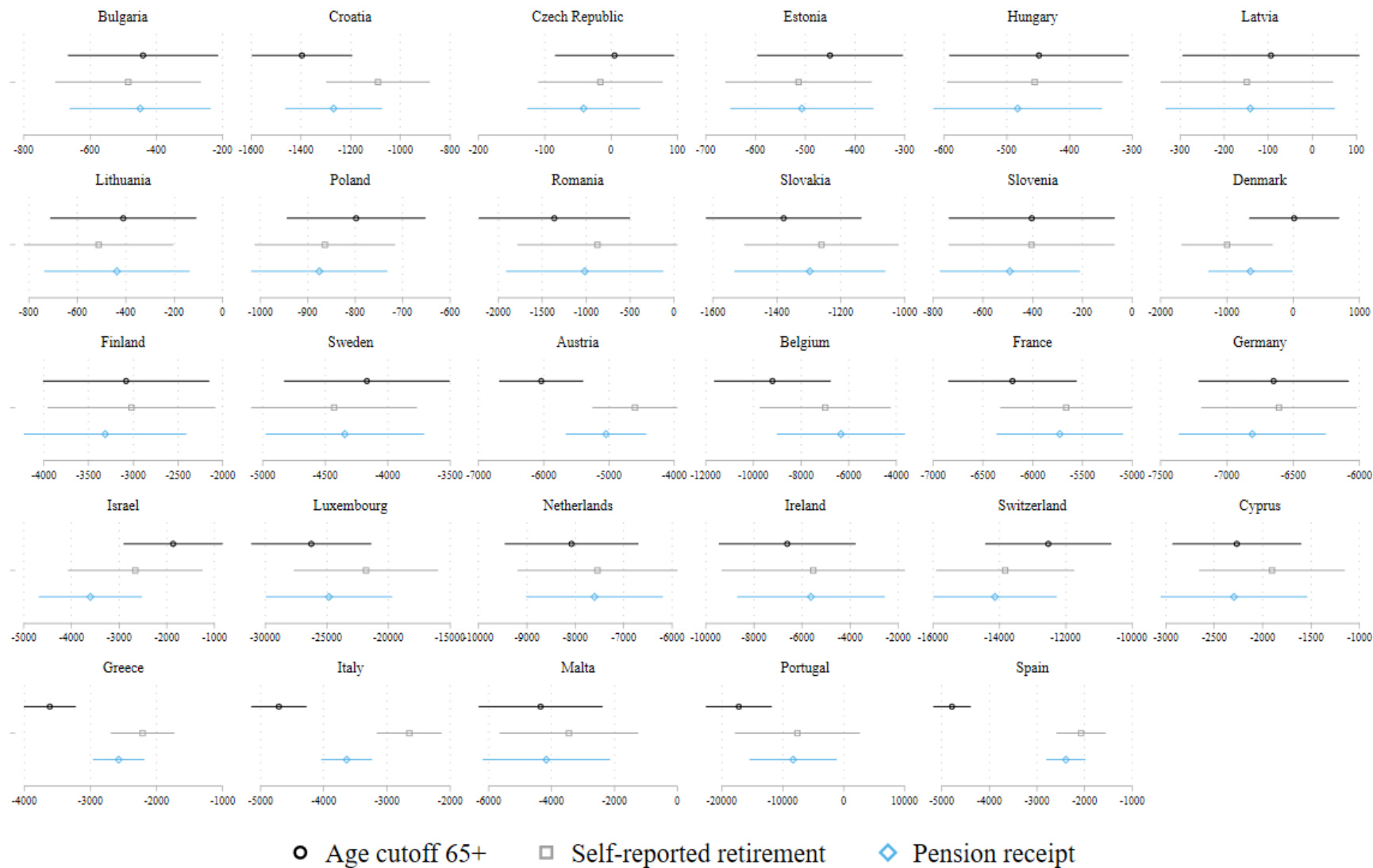
potential explanation is that both countries have relatively progressive public flat-rate pensions (OECD, 2015), which may mitigate the reproduction of inequalities.

Additionally, in a few countries, such as Israel and Switzerland, the gender pension gap is more pronounced when pension receipt or retirement identification is considered rather than the age cut-off. In both countries, a higher proportion of men than women receive no pension income (see Figure 2). Excluding the higher shares of men with zero pension income results in a greater increase in the average pension for men than for women, and thus in a larger gender pension gap.

Furthermore, differences in gender gaps by sample criteria emerge when examining popular non-economic outcomes in old age, although they are smaller in most countries. In nearly all countries, women report poorer mental and subjective health than men, and these gender gaps tend to be underestimated if individuals who do not identify as retirees, or, to a lesser extent, who are not receiving pensions, are excluded. The discrepancies in the gender gaps by sample definition are especially pronounced in Spain, Italy, and Israel, but are relatively minor in Greece (Figure 7, Figure 8), particularly in comparison to the disparate gender pension gap levels (Figure 6). Conversely, in Ireland, the gender health gap levels differ more than the gender pension gap levels.

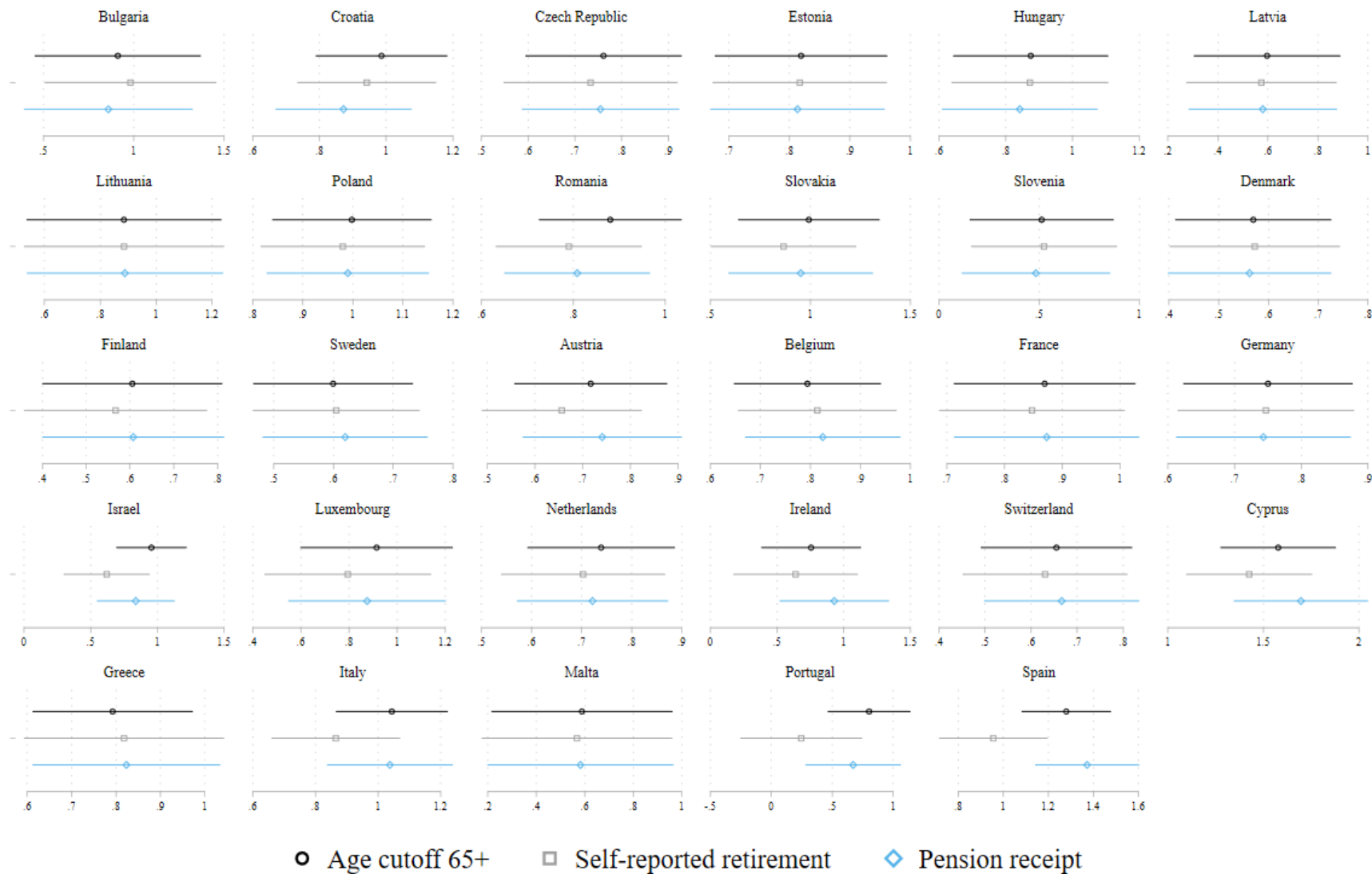
The differences in gender gaps across sample definitions tend to be smallest for life satisfaction. In certain countries, such as Spain and Belgium, the gender gap in favor of men is more pronounced among pension recipients than among the general elderly population. However, in other countries, such as Croatia and Israel, the discrepancies follow a pattern similar to that for the other outcomes, i.e., the gender gap is largest when considering the most complete sample using age cut-offs.

**Figure 6. Gender pension gaps by different sample criteria**



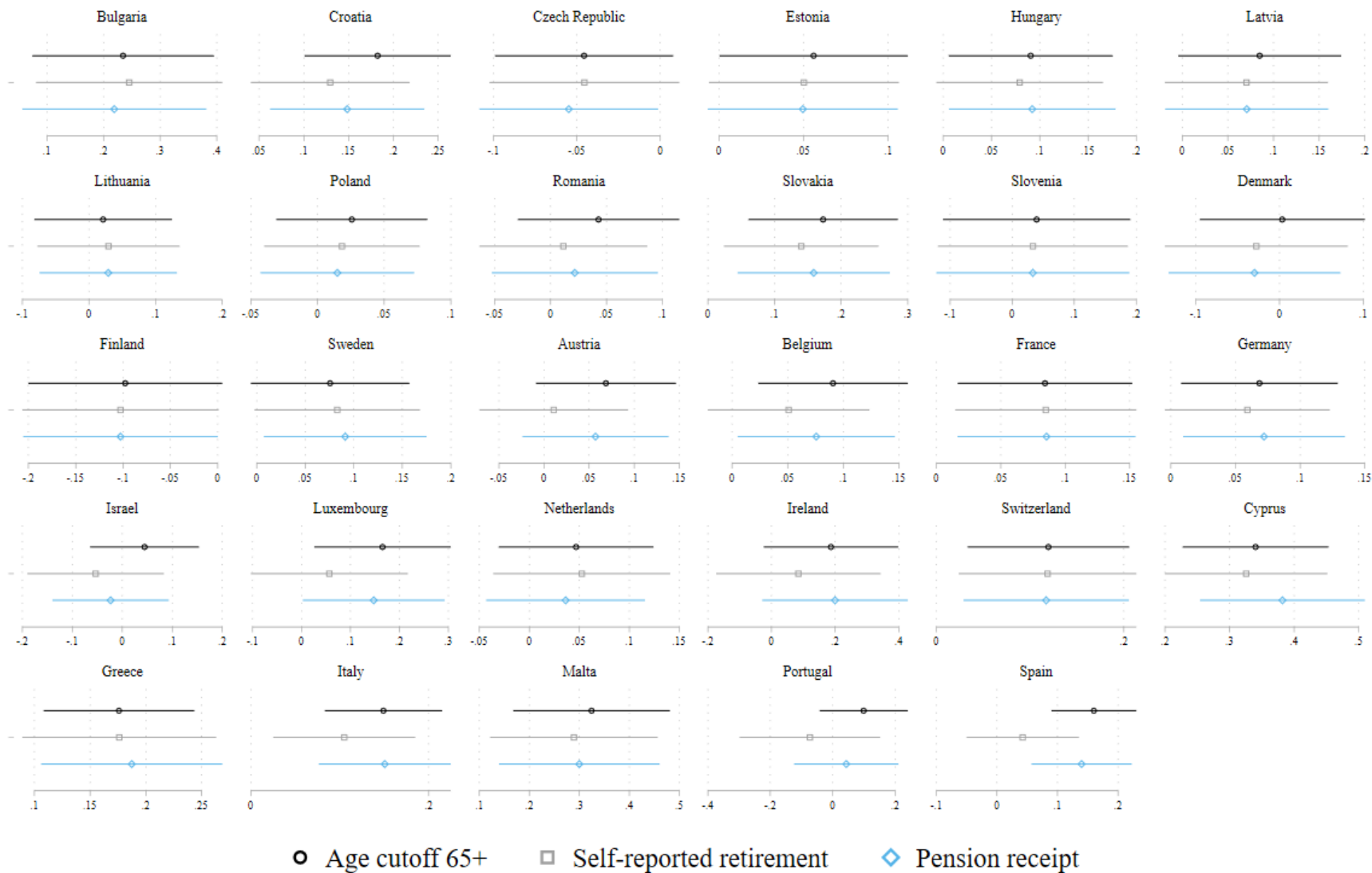
Note: Gender gaps adjusted for survey wave and birth cohort. Negative values indicate that the average pension income of women is lower than that of men. Own calculations based on SHARE, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

**Figure 7. Gender gaps in mental health by different sample criteria**



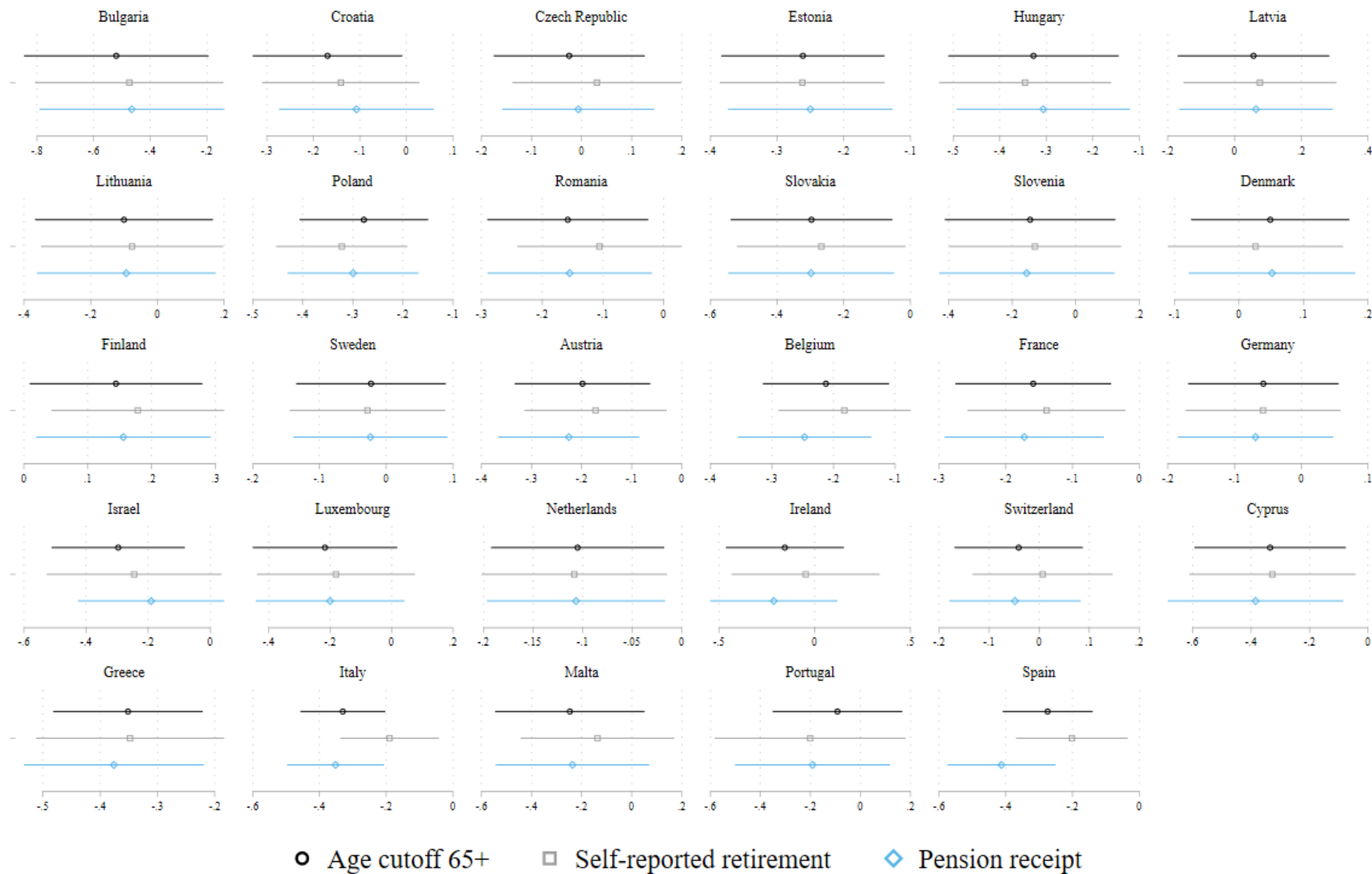
Note: Gender gaps adjusted for survey wave and birth cohort. Positive values indicate that women's average mental health is worse than that of men (scale 0-12, with 12 being "very depressed"). Own calculations based on SHARE, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

**Figure 8. Gender gaps in self-perceived health by different sample criteria**



Note: Gender gaps adjusted for survey wave and birth cohort. Positive values indicate that women's average self-perceived health is worse than that of men (scale 1-5, with 5 being "poor"). Own calculations based on SHARE, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

**Figure 9. Gender gaps in life satisfaction by different sample criteria**



Note: Gender gaps adjusted for survey wave and birth cohort. Negative values indicate that women's average life satisfaction is worse than that of men (scale 0-10, with 10 being "completely satisfied"). Own calculations based on SHARE, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

For all outcomes, the gender gaps differ only marginally in the countries where the sample does not vary greatly across sample definitions. These are mainly the post-socialist and social-democratic countries. However, some exceptions exist, notably Croatia, where a relatively high share of elderly women self-identify as homemakers rather than as retirees, and the implications of the different sample conceptualisations are evident for gender inequalities in all four outcomes.

## **7 Robustness**

The gender bias remains consistent regardless of the age cut-off selected for the baseline sample. Focusing on individuals 70+ or 75+, which dramatically reduces the sample size, does not change the overall gendered pattern of retirement identification and pension receipt, although the shares change marginally (see Figures A3-A6). In some countries, the proportion of older individuals not receiving pensions is marginally smaller, but the proportion of women self-identifying as homemakers instead of as retirees even increases. Conversely, the proportion of men self-identifying as retirees increases for the older samples due to the lower proportion of those in employment.

Furthermore, for pension receipt, similar patterns are found when defining pension recipients based not on total pensions but on public pensions only (see Figure A7).

## 8 Discussion

This research note confirms that large gendered sample biases can arise when conceptually relying on self-reported retirement or pension receipt as sample criteria for the whole elderly population, as suggested before (Allmendinger et al., 1992). While using such easily applicable sample definitions is popular, it is problematic, especially for country comparisons, given that the gender bias differs across country contexts.

Relying on self-reported retirement status assumes that the notion of and identification with retirement, understood as the withdrawal from (continuously) paid work, is neutrally applicable to the whole old-age population. This undermines life-course experiences deviating from the norm of stable (full-time) employment, and risks systematically excluding groups of individuals. Up to 50-76% of women aged 65 or older are excluded when self-assessed retirement status is used as the sample criterion. This gendered selection bias is particularly severe in conservative, liberal, and Southern European welfare states with strongly gendered work life-courses (Komp-Leukkunen, 2019; Rowold, 2022; Uccheddu et al., 2022). Using pension receipt as the sample criterion produces a similar gendered sample bias, but at a lower level. Furthermore, the interaction between the two sample definitions highlights the complexity and the gendered notion of retirement identification. Even among female pension recipients, up to 58% do not classify themselves as retirees, whereas a higher share of men self-identify as retirees than the share of male pension recipients in some countries. This highlights that retirement means “very different things for women and for men” (Loretto and Vickerstaff, 2013, p. 65), and suggests that the identification with retirement is more strongly shaped by the overall distance to ideal-typical retirement transitions from continuous paid work than by pension receipt.



Visualizing the employment trajectories by sample status confirms that women and men with employment trajectories deviating from the ideal-typical continuous employment biography were excluded by both sample criteria. Women not identifying as retired or not receiving pension income spent many more years doing unpaid care work at all ages between 18 and 65. Most of their work trajectories were characterized by continuous unpaid care work, descriptively confirming qualitative research showing that “Housewives never retire” (Loretto & Vickerstaff 2013: 77).

Such differences in work trajectories across samples are likely reproduced in old-age inequalities (O’Rand, 1996). Consequently, research using such sample criteria risks concealing the extent of inequalities (Allmendinger et al., 1992; Fasang, 2009). As their application to popular old-age outcomes demonstrates, both sample criteria underestimate the gender gaps in pensions, health, and life satisfaction when compared to the complete sample of the elderly population based on an age cut-off. However, this pattern varies considerably across countries, with the most severe underestimations occurring in Southern, conservative, and liberal welfare regimes. Consequently, future research on these welfare state types or country-comparison studies should rely on more inclusive sample conceptualizations, such as simple age cut-offs. Furthermore, other group disparities beyond gender inequalities are likely also affected, such as those based on socioeconomic status or ethnic background.

The same bias applies to the use of self-reported retirement and pension receipt in empirical models that extend beyond the sample definition, as well as in measures that are based on this information. For example, the retirement age or reasons for retirement are only surveyed if respondents identify as retirees in SHARE, which perpetuates the gendered sample bias. Nevertheless, studies on retirement transitions or age frequently employ self-reported retirement status as a straightforward

measure of being retired (e.g., Radl, 2013; Tambellini, Danielsbacka, & Rotkirch, 2023). While some studies are transparent about the sample selectivity (e.g., Ponomarenko, Leist, & Chauvel, 2019; Sohler, Van Ootegem, & Verhofstadt, 2021; Tambellini, 2023), they do not discuss the implications of the sample selection. A more inclusive definition of retirement might also be based on the receipt of the first pension payment or the first period of economic inactivity after a certain age (Komp-Leukkunen, 2021), rather than solely relying on self-reported retirement status.

It is not feasible to propose a solution that is universally applicable, as the sample conceptualization must be aligned with the objective of the analysis. However, if the aim is to study inequalities in the overall elderly population, researchers may wish to rely on age cut-offs combined with supplementary marginal sample characteristics contingent on the research objective (e.g., individuals still in the workforce primarily), instead of applying ambiguous measures. If the aim is to capture retirees, this research note may help to demonstrate that the concept of “retirement” is highly gendered. Concerning gendered work life-courses and pension systems, self-identification with retirement and pension receipt are ambiguous measures that result in disparate samples when compared across measures. Whereas the application is less problematic in some countries with more gender-equal work trajectories, particularly post-socialist and socio-democratic contexts, it is more problematic in contexts with highly gendered work life-courses and pension systems with strong links to employment. However, if defining retirement inclusively is not possible or intended, researchers should clearly delineate their sample and address the potential implications of their sample selection.

This research note raises awareness of the gender selectivity deriving from popular sample criteria employed in studies on the elderly. It encourages researchers to exercise caution and transparency in defining their samples and to consider the implications of their choices. By providing insights

into the potential for bias in different research contexts, this note seeks to facilitate more informed sample conceptualizations when studying inequalities in old age. Without such awareness, researchers may risk systematically excluding select subgroups of the elderly and underestimating inequalities.

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## **Data availability statement**

Access to the SHARE data is available upon registration. The replication files will be made available online upon publication.

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## 10 APPENDIX

### A1 Data and sample

#### Cross-sectional data.

The fieldwork for wave 8 was suspended due to the COVID pandemic which led to a switch of the interview mode. I therefore do not use data from wave 8 to prevent incomparability across waves.

#### Retrospective data and sample.

**Sample.** Roughly 40% of the sample have no retrospective data and must be excluded. Table A1 shows the number of observations before and after the exclusion by gender and self-assessed retirement status. It reveals that the overall share of those who identify as retirees is almost the same (84.3 vs. 84.1%). Among women, a slightly higher share declare themselves retirees after the exclusion compared to the full sample (78 vs. 78.7%) whereas for men the share remains the same (91.4%).

**Table A1 Summary statistics for retirement identification and sample**

	Full sample			Sample with retrospective data (after exclusion)		
	Male	Female	Total	Male	Female	Total
Does not identify as retired	2363 (8.6)	7234 (22.0)	9597 (15.9)	1420 (8.6)	4409 (21.3)	5829 (15.7)
Does identify as retired	25108 (91.4)	25700 (78.0)	50808 (84.1)	15009 (91.4)	16333 (78.7)	31342 (84.3)
Total	27471 (100.0)	32934 (100.0)	60405 (100.0)	16429 (100.0)	20742 (100.0)	37171 (100.0)

Note: Relative shares in parenthesis. Own calculations based on SHARE release 9.0.0. Not weighted.

Pension receipt is a little less frequent for the matched sample (90.8% compared to 91.3% for the full sample) and the pattern is similar across genders (see Table A2).

Overall, the changes in the distribution of self-assessed retirement and pension receipt vary only to a minor degree across samples and do not substantially affect the gendered bias in both measurements.

**Table A2 Summary statistics for pension receipt and sample**

Pension receipt	Full sample			Sample with retrospective data (after exclusion)		
	Male	Female	Total	Male	Female	Total
No	1600 (5.8)	3643 (11.1)	5243 (8.7)	992 (6.0)	2433 (11.7)	3425 (9.2)
Yes	25871 (94.2)	29291 (88.9)	55162 (91.3)	15437 (94.0)	18309 (88.3)	33746 (90.8)
Total	27471 (100.0)	32934 (100.0)	60405 (100.0)	16429 (100.0)	20742 (100.0)	37171 (100.0)

Note: Relative shares in parenthesis. Own calculations based on SHARE release 9.0.0. Not weighted.

**Table A3 Summary statistics for outcomes.**

	<b>Bulgaria</b>	<b>Croatia</b>	<b>Estonia</b>	<b>Czech Republic</b>	<b>Hungary</b>	<b>Latvia</b>	<b>Lithuania</b>	<b>Poland</b>	<b>Slovenia</b>	<b>Romania</b>	<b>Slovakia</b>	<b>Denmark</b>	<b>Finland</b>	<b>Sweden</b>
Pension income, mean	0.96	0.89	0.99	0.98	0.97	0.99	0.99	0.97	0.94	0.95	0.95	0.94	0.98	0.95
Pension income, sd	0.19	0.31	0.09	0.13	0.17	0.12	0.08	0.18	0.23	0.22	0.21	0.24	0.13	0.23
Self-Perceived Health, mean	3.54	3.50	3.99	3.45	3.64	3.92	3.77	3.74	3.40	3.63	3.08	2.67	3.31	2.83
Self-Perceived Health, sd	1.00	1.12	0.82	0.97	1.03	0.76	0.74	0.94	1.02	0.92	0.94	1.18	0.96	1.16
Depression Scale Euro-D, mean	2.74	2.71	3.29	2.48	2.91	2.49	3.43	3.14	2.39	3.19	2.19	1.70	2.40	1.96
Depression Scale Euro-D, sd	2.78	2.59	2.40	2.33	2.69	2.27	2.47	2.50	2.11	2.85	2.18	1.84	1.86	1.85
Life satisfaction, mean	7.17	7.18	6.53	7.13	7.16	7.14	7.15	7.16	7.30	7.73	7.55	8.43	8.31	8.10
Life satisfaction, sd	2.07	2.54	2.50	2.34	2.43	1.84	2.15	2.55	2.20	2.24	1.68	2.07	1.66	2.20
	<b>Austria</b>	<b>Belgium</b>	<b>France</b>	<b>Germany</b>	<b>Israel</b>	<b>Luxembourg</b>	<b>Netherlands</b>	<b>Ireland</b>	<b>Switzerland</b>	<b>Portugal</b>	<b>Greece</b>	<b>Italy</b>	<b>Cyprus</b>	<b>Malta</b>
Pension income, mean	0.92	0.89	0.96	0.94	0.89	0.93	0.95	0.87	0.96	0.74	0.74	0.79	0.96	0.75
Pension income, sd	0.27	0.31	0.21	0.24	0.31	0.26	0.22	0.34	0.19	0.44	0.44	0.41	0.21	0.44
Self-Perceived Health, mean	3.10	3.11	3.36	3.35	3.45	3.21	3.03	2.84	2.78	3.80	3.25	3.46	3.34	3.36
Self-Perceived Health, sd	1.05	1.04	1.03	0.98	1.17	1.02	1.06	1.11	0.97	0.97	0.94	1.03	0.95	0.95
Depression Scale Euro-D, mean	2.18	2.57	2.82	2.21	2.95	2.55	1.98	1.96	1.85	3.38	2.15	2.99	2.12	2.98
Depression Scale Euro-D, sd	2.13	2.23	2.29	2.02	2.65	2.32	1.96	1.99	1.82	2.51	2.46	2.74	2.20	2.17
Life satisfaction, mean	7.95	7.47	7.05	7.71	6.72	7.77	7.87	8.25	8.43	6.77	6.96	7.06	7.70	8.37
Life satisfaction, sd	2.15	2.09	2.29	2.06	3.20	2.24	1.59	1.71	1.55	2.74	2.04	2.31	2.39	2.01

**Working trajectories.** The work trajectories cover 10 mutually exclusive work states: education or training, full-time care work, part-time employment in the private sector, full-time employment in the private sector, civil service, self-employment, unemployed, other, missing, and retired. I differentiate between full-time and part-time employment only for employment in the private sector. Part-time employment is considered if any part-time employment occurs for that year and includes short-term employment without information on working hours. Care work is based on the response item '*Looking after home or family*'. This measure exclusively captures full-time and unpaid care work that was done for at least 6 months a year. Therefore, the actual degree of unpaid care work given per year is rather underestimated. For example, it is most likely that 'part-time employment' contains large shares of care work given that women often work part-time to reconcile care duties and paid work. 'Other' mostly contains activities that did not fit with any of the suggested options (58.63%) as well as activities such as military service (19.67%), leisure (7.82%), or volunteering (8.11%). Missing contains the remaining person-year spells with no information on the missing data.

## **A2 Survey of self-assessed retirement**

The self-assessed employment state is surveyed in question ep005 in the core questionnaire of SHARE as follows: 'Please look at card 7. In general, which of the following best describes your current employment situation?' The response options are: 1. Retired, 2. Employed or self-employed (including working for family business), 3. Unemployed, 4. Permanently sick or disabled, 5. Homemaker, and 97. Other. In SHARE, the interviewer is asked to refer to the following if respondents are in doubt about their current employment situation: '1. Retired (retired from own work, including semi-retired, partially retired, early retired, pre-retired). Retired refers to retired from own work only. Recipients of survivor pensions who do not receive pensions from

own work should not be coded as retired. If they do not fit in categories 2 through 5, they should go into other.<sup>4</sup> Since women are less likely to receive pensions in general (e.g., Bettio, Tinios, & Betti, 2013), they might be more in doubt about their situation in old age in the first place, given the gendered notion of retirement. Thus, the structure of the questions and the interviewer's instructions are likely to level down the share of women self-reporting themselves as retired and thus exacerbate the gendered sample bias.

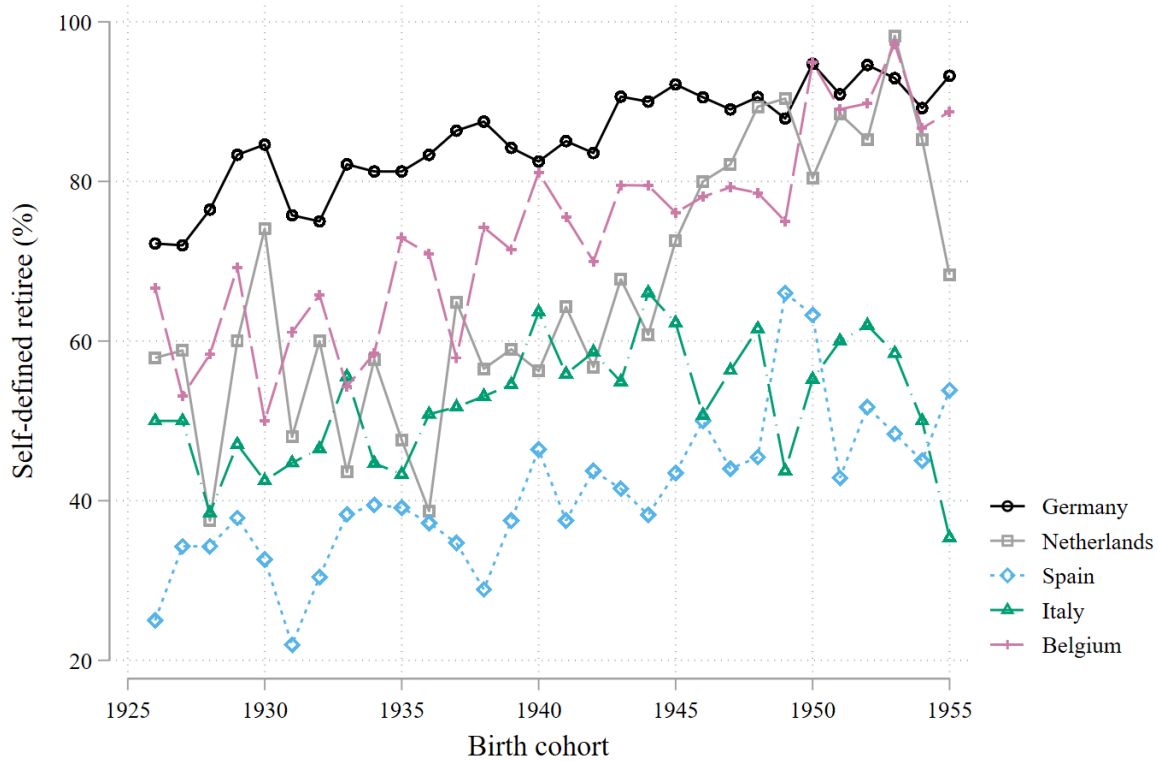
### **A3. Self-assessed retirement by cohort**

Figure A1 shows the shares of women aged 65 or older self-reporting their employment state as retired by birth cohorts for a selected set of countries. The shares of women who identify as retirees slightly increased across cohorts for the selected countries. In Germany and Belgium for example, the share increases from about 70% for the 1926 birth cohort to up to 80-90% for the youngest birth cohorts (1946-1956). In Italy, it increases from about 40% up to 65% roughly, in Spain from about 20% up to almost 60%, and in the Netherlands from about 40% to up to almost 100% for the younger birth cohorts.

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<sup>4</sup> Other surveys focussing on the old-age population, such as HRS, do not have such an interviewer instruction. In HRS the question is “Are you working now, temporarily laid off, unemployed and looking for work, disabled and unable to work, retired, a homemaker, or what?”.

**Figure A1 Cohort trend of self-assessed female retirees for selected countries**



Note. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

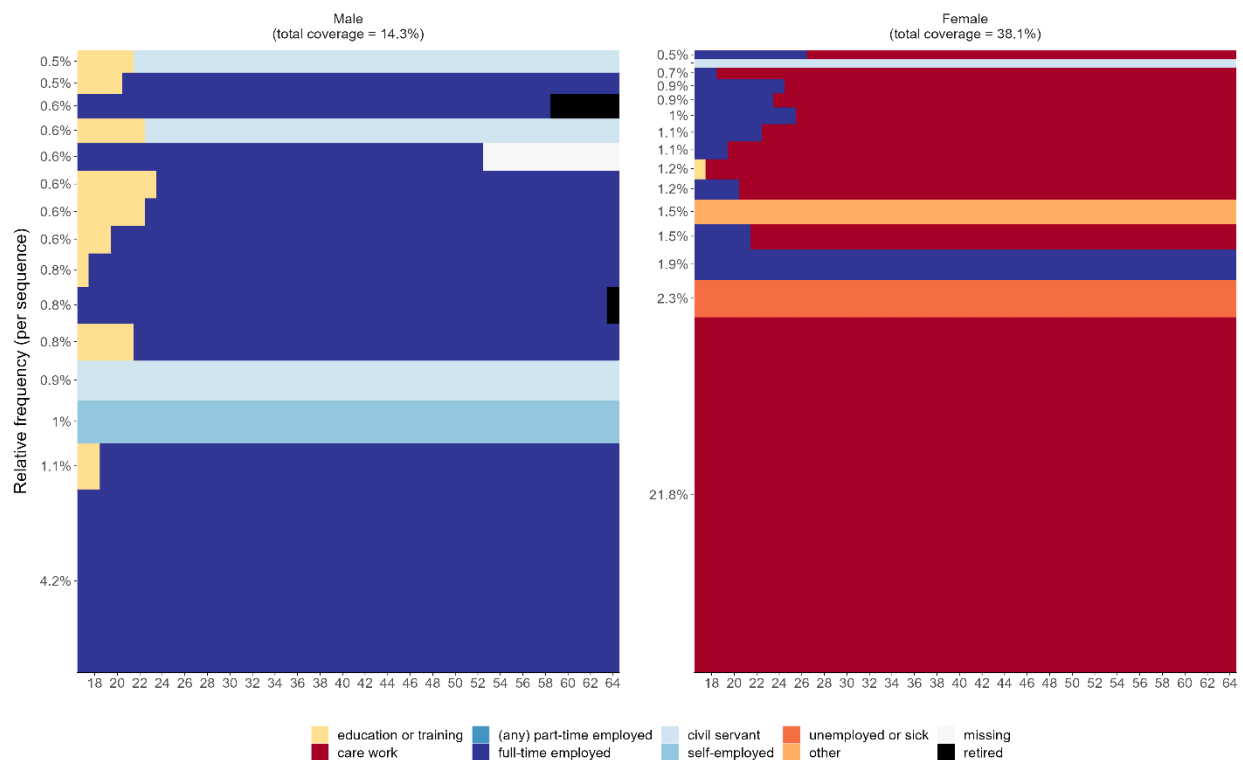
#### **A4. Most frequent work trajectories of individuals not identifying as retirees.**

Figure A2 displays the fifteen most frequent work trajectories among men and women who do not self-identify as retirees and thereby reveals how the ordering and timing of working states most often unfold over the life course. 22% of women who do not report being retired continuously engaged in unpaid care work from age 18-65. Another frequent work life-course pattern is characterized by women transiting from full-time employment to continuous unpaid care work in their early twenties, which might be linked to family formation as shown previously (Rowold et al., 2024). For men, the work trajectories are more heterogeneous: the fifteen most frequent trajectories only cover 14% of those who do not self-identify as retirees (compared to 38% for

women). They are mostly characterized by either continuous full-time employment or continuous full-time employment following educational spells until the early 20s.

Figure A2 shows the most frequent trajectories for the whole sample pooled over countries (like Figures 4a and 4b). Pooling across countries masks potential country differences. In addition, countries with high shares of not identifying with retirement or not receiving a pension (see Figures 1, 2) drive the results for the pooled sample. Nevertheless, the visualization of the working life courses shows the selectivity of the life courses of those who do not meet the sample criteria and who would be excluded from the analysis.

**Figure A2 Most frequent work trajectories of individuals not self-defining as retirees**

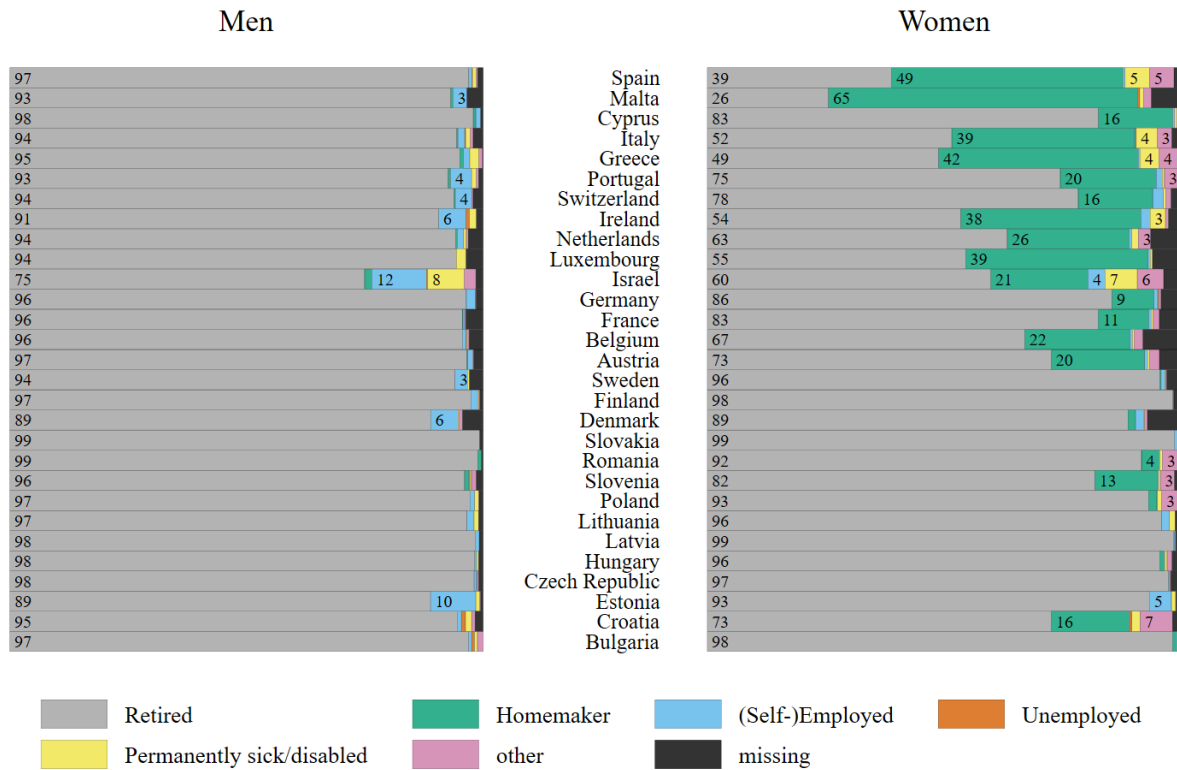


Note: Sequence Frequency Plot (Müller, Gabadinho, Ritschard, & Studer, 2008) displaying the 15 most common work trajectories for men and women separately. Own calculations based on SHARE sample including all respondents aged 65 or older with retrospective data, waves 2, 4, 5, 6, 7, 9, release 9.0.0. Not weighted.



## A5 Robustness checks

**Figure A3 Self-assessed employment status at age 70 or older by country and gender**



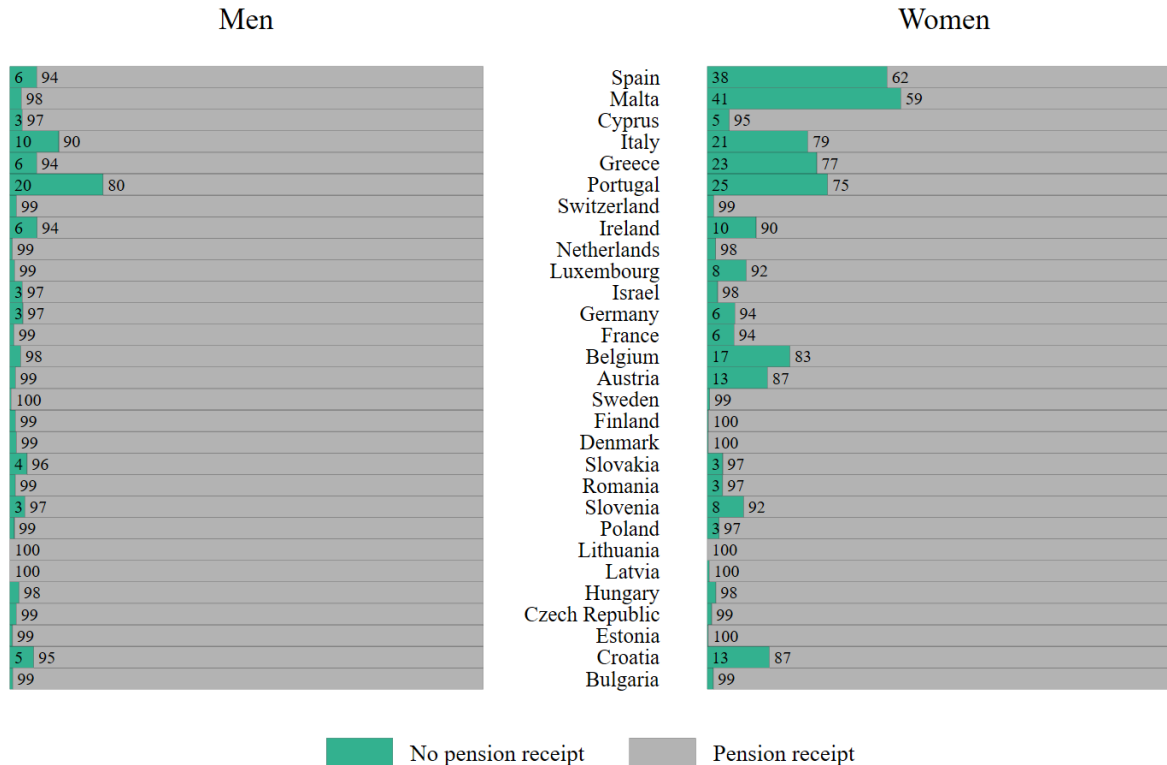
Note. Shares higher than 2.5% are displayed as relative frequencies. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

**Figure A4 Self-assessed employment status at age 75 or older by country and gender**



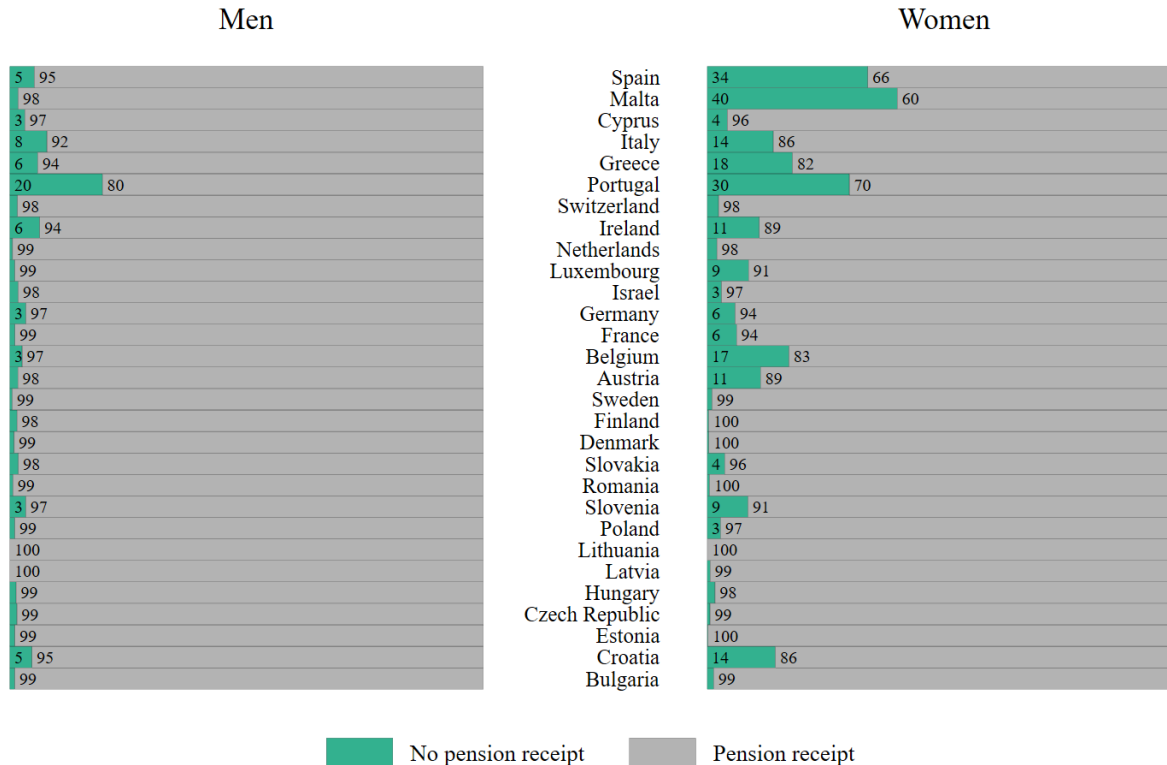
Note. Shares higher than 2.5% are displayed as relative frequencies. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.

**Figure A5 Pension income receipt at age 70 or older by country and gender**



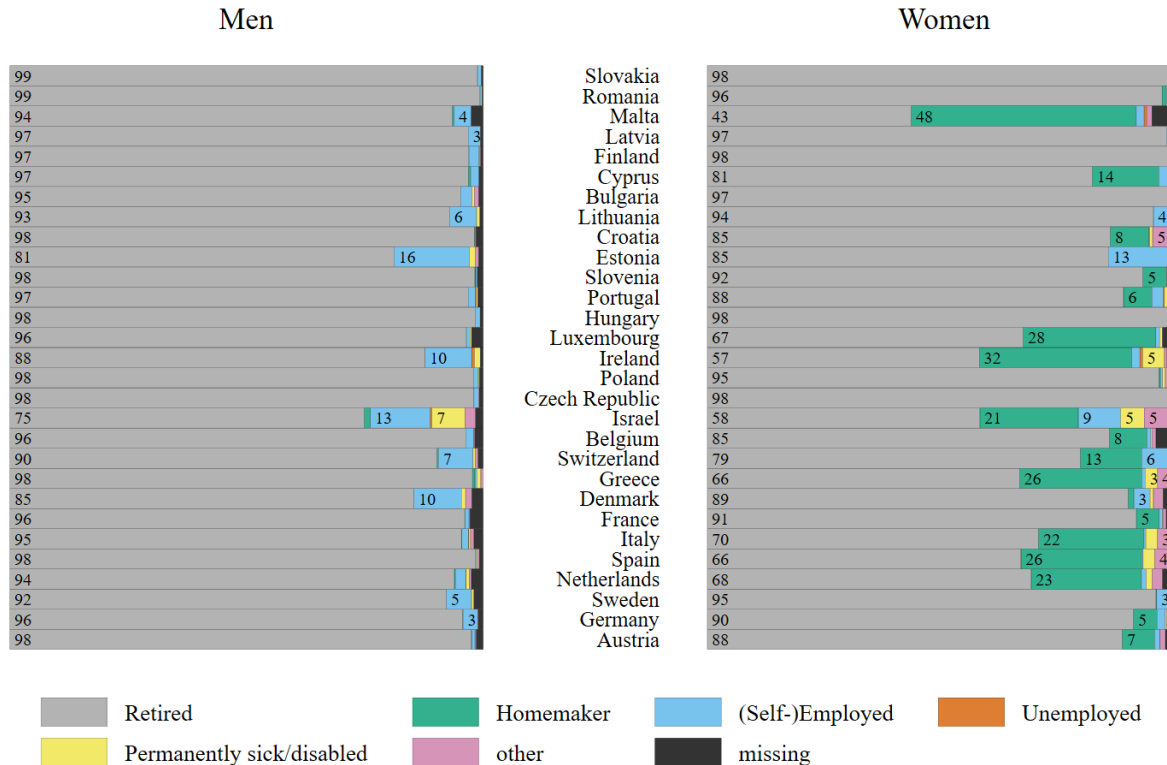
Note: Shares are displayed as relative frequencies. Receipt of any (imputed) total pension income that is operationalized by SHARE as the sum of all pension income from public, occupational, and private pensions (including survivor pensions but excluding social assistance). The gender difference documents the gender gap in pension coverage. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted. SHARE provides five imputation alternatives. I display the results using imputation 1, but the results remain robust when using the other imputation outcomes. No personal pensions are included in the imputed pension income.

**Figure A6 Pension income receipt at age 70 or older by country and gender**



Note: Shares are displayed as relative frequencies. Receipt of any (imputed) total pension income that is operationalized by SHARE as the sum of all pension income from public, occupational, and private pensions (including survivor pensions but excluding social assistance). The gender difference documents the gender gap in pension coverage. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted. SHARE provides five imputation alternatives. I display the results using imputation 1, but the results remain robust when using the other imputation outcomes. No personal pensions are included in the imputed pension income.

**Figure A7 Self-defined employment status of public pension recipients**



Note. Shares higher than 2.5% are displayed as relative frequencies. Own calculations based on SHARE sample including all respondents aged 65 or older, waves 2, 4, 5, 6, 9, release 9.0.0. Not weighted.