



# Divorce and economic wellbeing

A life course perspective on the interplay of work-family lives in West Germany and Sweden

Berlin, February 2023

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Dissertation submitted to the Hertie School  
in partial fulfilment of the requirements for the degree of

**Doctor rerum politicarum (Dr.rer.pol)**

in the

**Research Training Group  
"The Dynamics of Demography, Democratic Processes and Public Policy"  
(DYNAMICS)**



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## Summary

This cumulative dissertation investigates the relationship between divorce and economic wellbeing from a life course perspective in West Germany and Sweden. The analyses are based on large-scale register data from the German public pension and the Swedish population registers. The first paper studies mothers' earnings trajectories from one year before their first childbirth until ten years after in both countries. Separation negatively affects mothers' earnings trajectories in Sweden, while it positively affects them in West Germany. In Sweden, although the earnings of separated mothers lag behind those of partnered mothers, both groups can surpass their pre-birth earnings, which is not the case for either separated or partnered mothers from western Germany.

The second paper investigates how divorce relates to retirement trajectories, defined as the monthly insurance history from age 50 to age 65 of women and men in West Germany. Divorcees are more likely than married to retire through unstable retirement trajectories characterised by receipt of reduced-earnings-capacity pensions and unemployment. Whereas the relationship between divorce and retirement trajectories seems to be overall adverse for men, it is more ambiguous for women. Some divorced women are also more likely than married women to retire through a stable high-income trajectory.

The third paper compares the gendered consequences of divorce on public pension income in both countries. Divorced women from West Germany have significantly higher public pension incomes than married women. The German 'divorce splitting' mechanism increases women's and decreases men's pension incomes, which contributes to equalising their public pension incomes. In Sweden, women show comparable pension incomes across marital status, although divorced women have slightly lower pension incomes, while divorced men receive approximately 26 % less pension income than married men.

The dissertation illustrates that family and work life are intertwined, that they unfold gradually across the life course, and that the welfare state context shapes the interrelation of divorce and economic wellbeing: The event of divorce (and separation) not only directly impacts employment biographies of mothers but is, in a long-term perspective, related to retirement trajectories of women and men and their public pension incomes.



## Acknowledgements

First and foremost, I wish to thank Michaela Kreyenfeld for all her support and encouragement during these years and for sharing her constant curiosity about research with me. Thank you, Michaela. I am glad that you have been my supervisor.

A special thank you goes to Anette Fasang. Without her, I probably would not have started a PhD in the first place. Thank you, Anette, for supporting me after my MA and accompanying me again as my supervisor during my PhD.

I was fortunate enough to get to know Ann-Zofie Duvander, who gave me the opportunity to spend almost half a year at the Stockholm University Demography Unit (SUDA) and supported me as my third supervisor. Thank you, Ann-Zofie.

Two persons from whom I have learned a lot during my PhD and with whom I hope to continue working are Linda Kridahl and Anna-Karin Nylin. Thank you for your collaboration.

Further, I wish to thank the Research Training Group "The Dynamics of Demography, Democratic Processes and Public Policy" (DYNAMICS), funded by Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) - 390285477/GRK 2458. I would especially like to thank the first DYNAMICS cohort and the Sociology-Demography Group – Thank you, Maria Hornung, Tabea Naujoks, Daniele Florean, Cristina Samper, and Miriam Siglreitmaier for our weekly meetings and enriching discussions.

I would also like to thank Daniel Brüggmann and Tatjana Mika from the Research Data Centre at the German Public Pension Fund for providing the data used in this thesis.

I am very grateful for my friends and family who have supported me throughout the years. Thank you for the time we spent together, every meeting by day and night, and every phone call or visit during my studies abroad.

Finally, thank you, Kubi.





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# List of Abbreviations

BMFSFJ	Bundesministerium für Familie, Senioren, Frauen und Jugend (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth)
CDR	Crude divorce rate
CMR	Crude marriage rate
EM pension	Erwerbsminderungsrente (reduced-earnings-capacity pension)
EU	European Union
Eurostat	Statistical office of the European Union
FDZ-RV	Research Data Centre of the German Pension Insurance
FE	Fixed effects
FRG	Federal Republic of Germany (West Germany)
FTPT	Full-time part-time
GDR	German Democratic Republic (East Germany)
GPG	Gender pension gap
GRV	German public pension fund
LFP rate	Labour force participation rate
MNLR	Multinomial logistic regression
OA pension	Old age pension
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least square
RTB	Registret över totalbefolkningen (total population register)
SCB	Statistics Sweden
SUF	Scientific use file
U.S.	United States
VA	Versorgungsausgleichsstatistik (statistics on the equalisation of pension entitlements after divorce)
VSKT	Versicherungskontenstichprobe (sample of insurance accounts)
VVL	Vollendete Versicherten Leben (completed insurance lives)
WWII	Second World War





# Chapter 1

# 1. Introduction

Demographic changes, such as ageing societies and diversifying family patterns, challenge nearly all developed countries (Eurostat, 2019). In Sweden, and even more so in Germany, the old-age dependency ratio increased steadily over the last 50 years (OECD, 2022c). This implies an increasing number of older people in relation to working-age people. At the same time, family patterns started to change, for example, through increasing divorce and decreasing marriage rates (BiB, 2021a; SCB, 2022b). This entails not only a greater variability in family forms, such as remarriages, cohabitations and stepfamilies. Together with the trend towards an ageing society, it also entails that there will be a growing share of older people who are or have been divorced at least once by the time they reach retirement age. In Germany, the share of divorcees aged 65 to 69 increased from 6 % to 18 % for women and from 4 % to 12 % for men from 1996 to 2018 (Mikrozensus, 1996, 2018). In Sweden, the pattern is comparable but at an even higher level. The share of divorced women aged 65 to 69 increased from around 16 % in 1999 to around 22 % in 2019, and of men from 14 % to 19 % during the same period (SCB, 2000, 2020b).<sup>1</sup>

Retirement is usually defined as the time after the end of the working life (Kohli, 2000). Similarly, pension income is the result of working life, especially in Bismarckian pension systems, where pension income strongly depends on lifetime earnings (Schludi, 2005). Although most pension systems explicitly have regulations concerning family life, such as childcare credits or survivors' pensions, the main focus on contributions from paid work often neglects family biographies as an essential driver of retirement behaviour and pension income (Söhn & Mika, 2017). Family life not only develops concurrently with working life but the two are intertwined. A person's economic situation in old age can be defined as a late-life outcome of intersecting and cumulative life course developments within a given institutional context. This becomes quite evident in the Swedish and German public pension systems, in which pension entitlements strongly reflect lifetime earnings and a large gender pension gap of 24.9 % in Sweden and 31.8 % in Germany in 2021 exists (Eurostat, 2022a). This gap can be attributed to a large extent to women being more affected, on average, by interrupted career paths than men due to family obligations (Chłoń-Domińczak et al., 2018; Cukrowska-Torzewska & Matysiak, 2018; Grimshaw et al., 2015; Klerby et al., 2020; Möhring & Weiland, 2022; Sefton et al., 2011).

The problems arising from the interplay of work-family lives become particularly evident in cases of divorce and separation. Divorce was shown to be a disruptive event that has severe immediate and long-term economic consequences (Boertien & Lersch, 2020; de Vaus et al., 2017; Mortelmans, 2020b), negative implications for health (Zhang et al., 2016; Zulkarnain & Korenman,

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<sup>1</sup> Similar increases are observed for the age groups 70-74 and 75-79 in both countries, see section 1.2.2.

2019), and wellbeing (Clark et al., 2008; Leopold, 2018). Women are by far more exposed to the economic consequences in the years following a divorce than men (Bayaz-Ozturk et al., 2018; Boertien & Lersch, 2020; Burkhauser et al., 1991; Hauser et al., 2016; Mortelmans, 2020b), especially when children are present (Hübgen, 2017; Nieuwenhuis & Maldonado, 2018; Zagel et al., 2021), and when they followed a gendered division of paid and unpaid labour during their marriage (Andreß et al., 2006; de Vaus et al., 2017). Related, a large body of research has amassed that examines the impact of divorce on employment, showing that women often expand their labour market activity after divorce (Couch et al., 2013; Tamborini et al., 2015; Van Damme et al., 2009). For men, results are less conclusive but point in the direction of a decrease in labour market activity (Brüggmann et al., 2018; Brüggmann & Kreyenfeld, 2020; Couch et al., 2015; Covizzi, 2008; Kalmijn, 2005; McManus & DiPrete, 2001), which is also reflected in divorced men's relatively lower pension incomes (Möhring, 2021). As for the impact of divorce on women's and men's economic situation, employment behaviour, and retirement, research has revealed that this depends largely on the country context. Institutional differences in welfare states, such as policies supporting the reconciliation of paid and unpaid work, social security systems, family law as well as pension systems, shape the economic consequences related to divorce (de Vaus et al., 2017; Fasang et al., 2013; Madero-Cabib et al., 2015; Möhring, 2016; Uunk, 2004; Van Damme et al., 2009).

This dissertation aims to deepen knowledge about the relationship between divorce and economic wellbeing during the life course. Although many variables can be used to operationalise economic wellbeing, in this dissertation, it is defined over labour earnings and public pension income. The overarching research question is how the interplay of family-work lives, particularly divorce, is associated with women's and men's economic wellbeing in two different social policy contexts, Sweden and West Germany.<sup>2</sup> To answer this question, I examine how divorce interrelates with different aspects of economic wellbeing, such as labour earnings, retirement trajectories and public pension income in both countries at different life stages. The core of this dissertation lies in three analytical chapters in which I focus on the following: Chapter 2 concentrates on divorce and separation in midlife and how it affects the earnings trajectories of mothers in western Germany and Sweden. Chapter 3 investigates the relationship between divorce, health and retirement trajectories of women and men from West Germany and, thus, focuses on the end of the working life and the transition to retirement. Chapter 4 analyses the association between divorce and public pension income of women and men in West Germany and Sweden once retirement is reached, thereby considering different social policies during the life course and pension regulations.

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<sup>2</sup> For most of this dissertation, the terms West Germany and East Germany are used, referring to the former territories of the Federal Republic of Germany (FRG) and the German Democratic Republic (GDR). The only exception is Chapter 2, in which the terms western and eastern Germany are used.

The main contribution of this dissertation is a country comparison grounded on large-scale register data. This approach allows me to have robust estimates of labour earnings and public pension incomes in relation to divorce and to analyse subgroups that are otherwise often too small in sample sizes. Further, the cross-national approach reveals strengths and weaknesses in Germany's and Sweden's social policy context regarding the protection of women and men from the adverse effects of divorce during the life course. By analysing divorce and its associated consequences at different life course stages, this dissertation illustrates how each country's overall social policy context affects the life course of women and men and their opportunities for economic wellbeing.

In addition to this dissertation's sociological and demographical relevance, the link between life course events, such as divorce, and economic wellbeing during working life and in old age is a social policy concern in several regards. First, family structures characterised by high divorce and separation rates most likely contribute to the development of 'ageing unequally'. This concept refers to inequalities that emerge throughout life courses. These inequalities materialise in old age as a sum of different developments during an individual's life, which has a detrimental effect on health and income (OECD, 2017). The outlined consequences associated with divorce not only limit economic wellbeing during working life but might accumulate, transmit and persist into old age. This could further disadvantage the overall wellbeing and living standard of divorced women and men – economically and health-wise. Second, and related to ageing unequally, the question of pension adequacy must be discussed in light of a growing share of older people who are divorced when reaching retirement age. 'Pension adequacy' refers to preventing old-age poverty and sustaining a decent income for elderly people for the duration of their pension (Eurostat, 2019). If, as outlined in the beginning, there is a growing share of divorced women and men who are economically disadvantaged in old age, pension adequacy should be discussed in more detail with respect to different family forms and related policies. In Sweden and Germany, the expected time spent in retirement in 2020 was around 22.5 years for women and 19.5 years for men (OECD.Stat, 2022a). It is very likely that the economic wellbeing of divorced women and men in these years will be primarily determined by their pension income, as divorced people have often accumulated less wealth by the time they retire (Boertien & Lersch, 2020; Kapelle & Baxter, 2021). Ageing unequally and pension adequacy fit the picture of economic wellbeing being both "life course sensitive" and "life course relevant" (Leisering, 2003: 217). Life course sensitive, as for instance, pension income depends on the previous life course (i.e., work-family life), and life course relevant, as the amount of pension income defines economic wellbeing in retirement.

The remainder of the introduction is structured as follows. The next section outlines the theoretical background, followed by a country section briefly sketching Sweden's and Germany's overall welfare state arrangements, as these are particularly relevant when studying the possible adverse effects of divorce on the economic wellbeing of women and men. The subsequent sections dive

into macro-level developments, such as divorce- and marriage trends, employment behaviour and related pension differences, to illustrate the interplay of the family- and work-life within each welfare state's policy context. Although East Germany was not part of the analytical investigations of this dissertation, it will be presented alongside Sweden and West Germany to demonstrate the different but also partly converging trends in family behaviour in Germany. The introductory chapter concludes with a summary of each analytical chapter, the data and methods used, limitations, and concluding remarks.

## 1.1 The life course perspective and prior research

This dissertation adopts the *life course perspective* (Elder et al., 2003) as a conceptual approach to examine how divorce relates to labour earnings, retirement trajectories and public pension entitlements. The life course perspective is a well-established framework in sociology and demography (Dykstra & van Wissen, 1999; Fasang & Mayer, 2020). The core of the life course perspective lies in the view that the life course is a dynamic process. This view highlights the following relationships: I) that previous phases of the life course influence later ones, II) that different domains of the life course are linked with each other (e.g., family and working life), III) that the individual life courses are interlocked with experiences of other people (linked lives), and IV) that life courses are shaped by institutional contexts, such as welfare states (Bernardi et al., 2019; Elder et al., 2003).

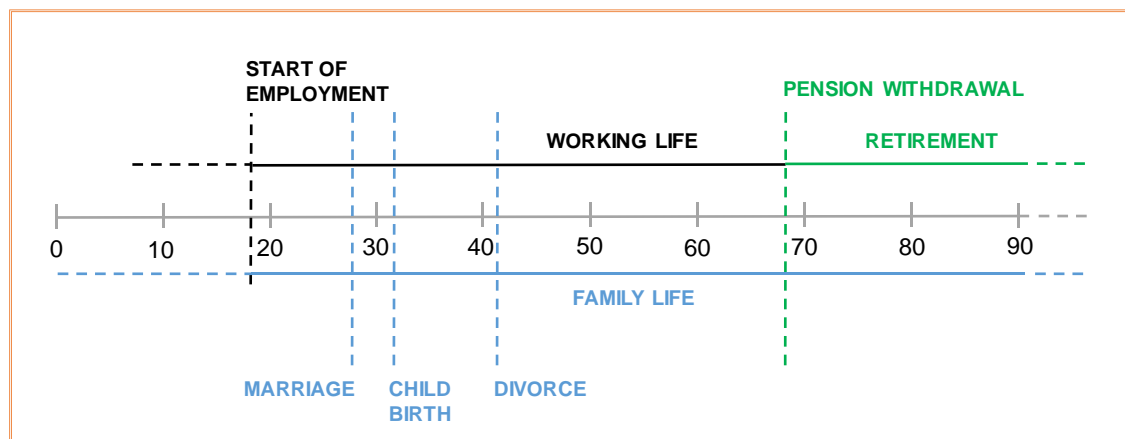
All four aspects are relevant in the study of divorce, employment, and economic wellbeing. Particularly the first aspect – namely that *previous phases of the life course influence later ones* – are pivotal for this dissertation. It emphasises the life course's trajectory character: experiences and conditions later in life are often the results of previous experiences. Pension incomes are a good illustration as they are strongly related to prior earnings, especially in earnings-related pension systems like the German one. The life course can be regarded as a 'chain' in which positive or negative events string together, increasing the possibility of a follow-up event. This 'chain' leads to cumulative (dis)advantages in later life (Dannefer, 2003; DiPrete & Eirich, 2006; Ferraro & Shippee, 2009). Periods out of employment, for example, directly reduce pension incomes as lifetime earnings will be lower. Additionally, the longer these periods are, the more likely they negatively impact re-entry into the labour market or career opportunities and salary levels compared to those of a continuously employed person. The first break in employment thus leads to further disadvantages in the labour market that accumulate and result in lower pension incomes.

Figure 1.1 shows exemplary a family biography which includes the beginning of a relationship, followed by the birth of the first child and subsequent separation. All these events mark turning points in the family domain of the life course but they might also entail changes in the working

domain. This highlights the second aspect that *different domains of the life course are linked with each other*. The event of divorce not only marks the transition from ‘married’ to ‘divorced’ in the family biography but can also interrelate with the working biography. For example, previous decisions of the couple about a gendered division of paid and unpaid work might not be suitable anymore once a marriage is dissolved, which could lead to a stronger labour market participation for women after divorce. On the other hand, events in the working domain, such as a transition from ‘employed’ to ‘unemployed’, might put financial pressure on a couple and thus increase the risk of getting divorced. The previous example also highlights a third aspect of the life course approach, that behaviour and wellbeing are *interlocked with the experiences of other people*. This is most obvious in the impact that the partner has on one’s own wellbeing – be it positive (Waite, 2000; Wilson & Oswald, 2005) or negative (Clark et al., 2008). From a couple’s perspective, most events and periods in the life course of one partner, such as job loss followed by periods of unemployment and uncertainty, or health problems followed by care periods, can affect the life course of the other partner and vice versa.

Figure 1.1: Schematic representation of some aspects of the life course perspective

**INSTITUTIONAL CONTEXT**



*Note:* The vertical dashed lines represent events (i.e., turning points) that then define the following state in the respective domain of the life course (e.g., event = marriage, state = being married). The events are just examples and could be replaced with other events, such as the start of cohabitation followed by separation.

*Source:* Own illustration.

The core of the life course approach lies in the view that the life course is a dynamic process. As outlined, this dynamic process depends on previous developments, different domains of the individual’s life course and those of other individuals, and is embedded in a welfare state context. Hence, *life courses are shaped by institutional contexts*. Welfare states shape life course trajectories as normative patterns, culture and general social policies define an individual’s opportunity structure and establish links between different stages of life (Kohli, 2007; Leisering, 2003; Ostner,

1994; Pfau-Effinger, 1998). The way welfare states structure the relationship between the family and the labour market and how policies of both domains reinforce each other is complex and depends on the gender regime (Korpi et al., 2013; Lewis, 1992; Neyer, 2021; Sainsbury, 1999a). Often it is not one specific policy but rather a set of policies. For example, family law might define the rights and responsibilities of different kinds of relationships, both during and after the dissolution of a union, which may favour one relationship form over another (Perelli-Harris & Gassen, 2012). Moreover, these laws might be linked to a broader set of regulations governing the unions' taxation, pension regulations or health care coverage, giving different incentives for couples' division of labour. In welfare states with a male breadwinner model, for instance, marriage is often coupled with benefits in the tax and transfer system, such as joint taxation and family health care coverage. Together with high marginal tax rates that penalise second earners, this set of policies encourages a gendered division of paid and unpaid work for married couples (Gottschall & Schröder, 2013; Sainsbury, 1999b) compared to regulations that treat women and men as individuals instead of a unit.

#### *Empirical evidence for the interplay of divorce, earnings, and retirement*

A broad strand of the literature across different countries shows that women often increase employment and related earnings after divorce (Couch et al., 2013; Jenkins, 2008; Mortelmans, 2020b; Raz-Yurovich, 2013; Tamborini et al., 2015; Van Damme et al., 2009), illustrating the interplay of work-family lives. The cumulative character of the life course is further exemplified by studies from the U.S. and Europe demonstrating that divorced women tend to work full-time before retirement (Olivetti & Rotz, 2016), prolong their working life (Couch et al., 2013; Damman et al., 2015; Radl & Himmelreicher, 2014) or even work after retirement (Dingemans & Möhring, 2019; Hokema & Scherger, 2016). Especially if women do not remarry, these developments are usually referred to as copying mechanisms to offset the 'economic legacy' of the years spent in marriage (Mortelmans, 2021). This is further supported by studies showing that divorced women have higher pension entitlements than married women (Fasang et al., 2013; Möhring, 2021). For men, however, family history was found to have a reversed effect on pension entitlements, with married men having the highest pension entitlements and divorced men lagging behind (Möhring, 2021; Yabiku, 2000). The relationship between divorce and working histories, thus, does not necessarily seem to be the same for women and men. Studies have demonstrated that patterns are strongly gendered, as women's and men's employment situations usually differ before and after divorce. For men, the interrelations between family and work lives are generally weaker than for women (Chłoń-Domińczak et al., 2018; Fasang & Aisenbrey, 2022; Ostner, 1994). Studies have revealed that for men, divorce can lead to an increased risk of invalidity (Brüggmann, 2020a; Couch et al., 2015), unemployment (Kalmijn, 2005) and downward social mobility (Covizzi,

2008). From a long-term perspective, however, results are more mixed for men, with studies indicating no significant relationship between family status and working after retirement (Dingemans & Möhring, 2019), while other studies point out that divorce can be an obstacle to retiring early (Damman et al., 2015; Madero-Cabib et al., 2015). Hence, depending on the individual and her/his situation, the event of divorce might put individuals on up- or downward trajectories that reinforce further developments.

#### *Selection into marriage and divorce*

Albeit there is ample evidence that divorce is related to income and employment, there is also evidence that there is strong selection into divorce. This raises the question of whether prior findings can be interpreted in any causal manner (Mortelmans, 2021) as the outcomes seem similar – for example, lower pension incomes of divorced men. Following the literature on consequences of divorce, divorce was shown to be a disruptive life course event, which can cause various consequences, such as on health, household income, earnings and child outcomes, that then accumulate over the life course (Amato, 2000, 2014; Mortelmans, 2020a). On the other hand, the literature based on selection arguments would describe divorce as more of an outcome. Staying with the example of lower pension incomes for divorced men (see, e.g., Möhring, 2021), selection-based arguments state that it is not the event of a divorce that leads to lower pension incomes. Instead, the association is driven by the selection of individuals with different characteristics into specific family life courses (Jalovaara & Fasang, 2019). Following our example, men with unfavourable traits, such as lower education or unstable working careers, are more likely to ‘deviate’ from the so-called ‘normative life course’ by getting divorced or separated. Hence, there is a selection into divorce. This is supported by studies showing that men’s wages were already falling prior to divorce (Killewald & Lundberg, 2017) and that unemployment (Solaz et al., 2020), lower education (Härkönen & Dronkers, 2006) and poorer health (Mortelmans, 2021) increase the risk of getting divorced for men. Thus, some consequences after divorce might have already been present during marriage and mainly accumulated afterwards. Although it is difficult to unravel the causal relationships, in the long run, both channels of work-family trajectories – a poorer earnings trajectory leading to divorce or divorce leading to an increased risk of adverse health effects or unemployment – could have a similar cumulative character and affect the accumulation of lifetime earnings and related old-age pensions.

#### *Anticipation of divorce and separation*

Another theoretical and methodological challenge concerning the question of the causal direction between divorce and working histories are anticipation effects. In divorce research, it is often only the dates of separation and divorce that can be observed in the data. However, divorce and separation may often be anticipated by one or both actors. Thus, present behaviour may be influenced



by future outcomes, and changes might appear before the actual divorce. The rationale behind anticipation effects would be that, for instance, women who either become dissatisfied with their marriage or perceive their marriage as unstable, hence anticipate an upcoming divorce, adjust their labour market participation. This anticipatory behaviour could include taking up employment before a divorce or increasing their working hours to prepare for possible economic consequences (Poortman, 2005; South et al., 2004; Van Damme & Kalmijn, 2014; Vignoli et al., 2018; Wagner, 2020). While this work is in the tradition of divorce research addressing the adverse consequences of divorce, focusing mainly on manifest economic factors, it neglects that divorce can also have positive consequences. As already indicated with the anticipation effects, divorce can be intentional, and wives were shown to more often initiate divorce than husbands (Amato & Previti, 2003). The possibility to divorce was not always available, and it was not until the 1970s that most European countries increasingly introduced liberalising policies, such as ‘no-fault’ and ‘unilateral’ divorces (González & Viitanen, 2009). Therefore, the possibility of ending a dysfunctional relationship can be a relief, at least for the spouse who filed for divorce, and can positively affect health and mental wellbeing (Amato, 2000; Härkönen, 2014; Hawkins & Booth, 2005; Kalmijn, 2017).

#### *Life course and welfare states*

Women’s and men’s intentions and behaviour have to be studied within their opportunity structure (Ostner, 1994; Pfau-Effinger, 1998). Policies aimed at facilitating the reconciliation of paid and unpaid work are a good example of how welfare states shape work-family life, especially for women (Möhring, 2016). The availability of paid parental leave, subsidized public child care, and flexible work arrangements will impact a mother’s capacity to be part of the labour market and to earn an income (Grimshaw et al., 2015; Halldén et al., 2016; Hofäcker et al., 2013), which will also allow her greater economic independence. The previously outlined findings on the interplay between work-family lives in relation to divorce have to be seen in the context of these intertwined policies. Studies indicate that in countries where women, particularly mothers, are effectively integrated into the labour market, they are better equipped to withstand the adverse economic effects of divorce and separation than in countries in which women follow a gendered division of paid and unpaid work (Andreß et al., 2006; Korpi et al., 2013; Van Lancker, 2018; Zagel & Van Lancker, 2022). In line, studies are showing that women’s dependence on a male-breadwinner pension in old age – i.e., their husband’s pension income and the widow’s pension if he is deceased – depends on the welfare state context (Fasang et al., 2013; Madero-Cabib & Fasang, 2016; Möhring, 2021).

Pension income, seen as “the result of a cumulative process emerging from the interaction of lifelong gender imbalances and the operation of pension systems and social policies” (Lodovici et al., 2016: 33), is an excellent example of how welfare states shape work-family lives. A large

body of literature has revealed that gender pension gaps can be traced back to differences in employment histories of women and men (e.g., duration, earnings, part-time work), family structure (e.g., number of children, marital status), and pension regulations (e.g., access to occupational and private pension schemes, redistributive elements) (Bettio et al., 2015; Chłoń-Domińczak et al., 2018; König, 2017; König et al., 2019; Lis & Bonthuis, 2020; Lodovici et al., 2016; Westermeier et al., 2017). In welfare states where women and men have comparable labour force participation rates and where the part-time rate of women is low, i.e., contexts where women tend to be well-integrated into the labour market, gender pension gaps are small (Hammerschmid & Rowold, 2019; Lodovici et al., 2016). In countries such as Germany, where women's employment histories are strongly intertwined with their family history as the welfare and gender regime favours a gendered division of paid and unpaid work, gender pension gaps are large (Chłoń-Domińczak et al., 2018). The opportunity structure provided by policies early in the life course, such as reconciliation policies, has path-dependent, cumulative effects on later life outcomes, such as the possibility to advance employment biographies and income levels (Dannefer, 2003). Further, pension systems can mitigate the negative consequences of career interruptions through compensatory measures, such as childcare credits. While these usually compensate for short interruptions, they are not able to compensate for the career advancement foregone due to the interruption and the often lower earnings afterwards (Lis & Bonthuis, 2020; Westermeier et al., 2017). The link between divorce, earnings, and pension entitlements is strongly moderated by social policies on various levels and illustrates how welfare and gender regimes (Sainsbury, 1999a) shape women's and men's economic wellbeing during the life course.

## **1.2 Germany and Sweden**

This dissertation aims to give a comprehensive overview of the relationship between divorce and economic wellbeing during the life course in Sweden and West Germany. Both countries are ideal cases to examine the interplay between divorce, labour earnings, and pension entitlements: Concerning divorce, both countries faced similar developments as divorce rates steadily increased since the 1970s (see section 1.2.2). However, both countries used to have and still have distinct policy approaches, which have different supportive or restrictive effects on the employment of women (especially mothers) and men, prevailing family models, and the juncture of families and markets.

### **1.2.1 Welfare state principles, social policies and pension systems**

According to the traditional welfare state literature, Sweden represents a 'social democratic' welfare state, which is considered universalistic and egalitarian, and (West) Germany represents a 'conservative' welfare state, which is considered preserving and subsidiary in character (Esping-

Andersen, 1990).<sup>3</sup> While this distinction serves as a good starting point, it got criticised for neglecting the role of gender (O'Connor, 1993; Orloff, 1993; Sainsbury, 1999a). The typologies that include the role of gender and related family policies more explicitly define Sweden as the 'earner-carer model' as opposed to Germany as the 'traditional-family model' (Ferrarini & Duvander, 2010; Korpi, 2000) or the 'weak' as opposed to the 'strong' male breadwinner model (Lewis, 1992; Lewis & Ostner, 1994). Regardless of the typology chosen, Sweden supports a family model where both parents work full-time or close to full-time (Ferrarini & Duvander, 2010) and are encouraged to share care responsibilities (Lappegård et al., 2020). Although there have been shifts in the German family policies towards the Swedish model, often referred to as the *Scandinavisation* of social policies (Mätzke & Ostner, 2010), Germany is still at the stage of a modified breadwinner model, with a part-time working and part-time caring women (Trappe et al., 2015).

### **Policies supporting (and preventing) the 'earner-carer' model since the 1970s**

#### *Sweden*

Starting in the 1970s, Sweden turned away from the male breadwinner model and steadily expanded its individual and gender egalitarian policies. These included broad access to education and targeted policies, such as a gender-neutral and earnings-related parental leave system, subsidised public childcare, and women's active recruitment into the labour market (Duvander & Ferrarini, 2013). From 1974, parental leave was paid for six months and was extended to one year in 1980. From 1995, one month of earnings-related leave was reserved (i.e., non-transferable) for each parent (Duvander & Ferrarini, 2013). At the same time, the introduction of individual taxation in 1971 further promoted married women's employment and the presence of 'dual-earner households', improving women's economic autonomy (Gunnarsson, 2016; Gustafsson, 1992; Selin, 2014). Until the mid-1980s, female employment rates had increased to around 80 %, however, often on a long part-time basis (Gonäs & Tyrkkö, 2015) (see section 1.2.3). Furthermore, in line with the concept of 'individualisation of rights', marriage and divorce laws were reformed in 1974 (see section 1.2.2), leading to a decline in social, legal or economic benefits due to marriage (Hoem, 1991; Perelli-Harris & Gassen, 2012). This also entailed that if ex-spousal alimony is provided, it can only be for a short 'adaptation' period as individuals are expected to be self-reliant after divorce, just as they were during marriage.

#### *West Germany – Federal Republic of Germany*

Although the 1970s marked the end of the 'golden age of the family' in West Germany, the policies supporting the male breadwinner model continued to exist (Pfau-Effinger & Smidt, 2011).

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<sup>3</sup> This typology was limited to capitalist welfare states and thus, excluded the former East Germany as a post-socialist system (see, e.g., Andreß and Heien, 2001).

The major marriage and family law reforms by the end of the 1970s (see section 1.2.2) brought some changes, such as replacing the female homemaker norm ('housewife marriage') with the principle of partnership. As a result, wives could decide without their husband's consent to be in paid employment. However, the system of joint taxation and derived social security entitlements due to marriage (e.g., health insurance) continued to exist and provided the most significant benefit for couples with an unequal division of labour (Gottschall & Schröder, 2013; Trappe et al., 2015). Another change was the extension of maternity leave for working mothers up to four months, but additional policies supporting the compatibility of work and family were scarce, especially childcare for children under the age of three (Aisenbrey et al., 2009). Nevertheless, women's labour market participation continued to increase (section 1.2.3), and, especially after the family formation phase, women started to return to the labour market (Ziefle, 2009). Pronounced part-time or marginal employment, however, continued to limit women's, especially married women's, possibility of economic autonomy. Different from Sweden and in line with West Germany's male breadwinner model, in the event of divorce, women were covered by generous alimony and maintenance payments from their former husbands.

#### *East Germany – German Democratic Republic*

For East Germany, women's labour force participation was indispensable right after WWII, and by 1949, women already had the legal right to decide about their paid employment within the principle of 'equal pay for equal work' in the constitution of the GDR (Trappe, 1996). While women first mainly participated in part-time work as they still took over most of the family responsibilities, policies were enacted starting in 1960 throughout the 1980s to enable women to be workers and mothers at the same time, which made them economically independent of their partners (Trappe et al., 2015). These policies included further education, reconciliation policies such as (almost) free public childcare as well as after-school care, and paid maternity leave for 26 weeks, which got extended to one year for parents with two children in 1976 and to all parents in 1986 (Heisig & Zierow, 2019). Concerning family laws, marriage was still valued (see section 1.2.2), but a liberal divorce law was in place that aimed at ex-spouses being economically independent of each other after divorce through their employment (Engelhardt et al., 2002). Therefore, East German policies, like Swedish policies, favoured 'dual-earner' households, but contrary to the Swedish approach, they never attempted to change men's roles within the family (Trappe et al., 2015).

### **Work-family reconciliation policies in Sweden and Germany as of today**

#### *Sweden*

Sweden continued its policy approach by institutionalising the issue of gender equality by extending its policies and introducing new policies (Florin & Nilsson, 1999; SCB, 2020b). According

to the Gender Equality Index 2022, Sweden ranks first in the European Union (EIGE, 2022). In 2002, the reserved month for each parent got extended to two months. Since 2016, parental leave has a total length of 16 months, of which 13 are subject to an earning-related replacement rate of 80 % (up to a ceiling) and of which three months are reserved for each parent (Duvander & Vi-klund, 2019). Subsidised public childcare is used by the majority of children starting at age two (Mörk et al., 2013; Swedish National Agency for Education, 2010). Parents with children under the age of eight have the right to reduce their working hours by up to 25 % of regular hours – known as ‘long part-time work’ when applied to a 40-hour work week (SCB, 2020b). In case of divorce and separation, the rule of individual responsibility continues to apply. If parents separate, however, the non-resident parent is obliged to pay child maintenance, and both parents have, by default, joint legal custody (Turunen et al., 2021). Although Sweden ranks among the first concerning the prevalence of shared physical custody arrangements after parental separation, this arrangement is more frequent among parents with higher socioeconomic status, and most children still reside with their mothers (Fransson et al., 2018; Garriga et al., 2021; SCB, 2014).<sup>4</sup> Still, shared physical custody had increased from 1 % in the 1980s to 28 % in 2018 (Turunen et al., 2021).

#### *Germany after reunification*

With German reunification, the institutional system of West Germany was extended to East Germany. Thus, the former policies of the GDR, which encouraged women’s employment and ‘dual-earner’ households, were again replaced with policies that rather supported the male breadwinner model (Pfau-Effinger & Smidt, 2011). Together with the economic turmoil in the years following reunification, fertility declined in the former East, the number of public childcare facilities for children below three years was reduced, and full-time employment rates of women declined while part-time work was on the rise in former East Germany (Pfau-Effinger & Smidt, 2011; Trappe et al., 2015). It took until the 2000s that united Germany launched major policy shifts towards gender equality and equal sharing of care responsibilities. In 2007, the parental leave benefit reform was introduced, largely resembling the Swedish system. The new parental leave system replaced the previous flat-rate benefit of 300 euros (paid for two years) with an earnings-related benefit based on the net earnings in the year before childbirth, which had only been paid for one year (Kreyenfeld, 2021). As of 2022, parental leave amounts to 14 months, of which two months are reserved for each parent and which are replaced by 65 % of previous income (up to a ceiling) (Unterhofer & Wrohlich, 2017). Since 2009, public childcare provision, especially for children below age three, got expanded and in 2013, a legal right to a public childcare place was introduced

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<sup>4</sup> Joint physical custody means that, in addition to legal joint custody, there is a care arrangement in which the child lives with both parents for an equal or almost equal amount of time after the separation or divorce of the parents (Bernadi & Mortelmans, 2021).

(Müller & Wrohlich, 2014; Samtleben et al., 2019). Together with labour market reforms (e.g., ‘Part-time and Temporary Employment Act’ in 2001), these reforms led to an increase in maternal employment rates, especially in former West Germany (Trappe et al., 2015). Following these shifts, also spousal maintenance following divorce got reformed. Until a reform in 2008, spousal maintenance was granted to the ‘resident parent’, assuming that mothers could not work full-time before the youngest child reached age 15 (Bröckel & Andreß, 2015). The 2008 reform changed the situation radically based on the assumption that women can be self-reliant once the youngest child turns three (Geisler & Kreyenfeld, 2019a; Radenacker & Kreyenfeld, 2018). Still, while most divorced parents have joint legal custody (default for divorced parents since 1998), it is primarily the mothers who have sole physical custody of the child, which reflects the traditional family roles about the gendered division of paid and unpaid work (Walper et al., 2021).

### **Pension systems and family-related pension regulations in Sweden and Germany**

The Swedish and German public pension systems have undergone far-reaching reforms but can be described as a three-pillar (public, occupational, private) and strongly lifetime earnings-related pension system. In addition to the earnings centrality of both pension systems, they include additional pension qualifying periods, such as schooling, care periods and unemployment (DRV, 2021a; Swedish Pensions Agency, 2018). Concerning risks arising from the loss of a spouse, whether through death or divorce, there are significant differences between Sweden and Germany, which align with each country’s welfare and gender regime.

#### *Sweden*

In Sweden, almost all residents are covered by the public pension and an occupational pension scheme (OECD, 2019a). The public pension scheme’s first pillar has three subsystems: the income pension, the premium pension and the guarantee pension. The latter provides the means-tested basic security for individuals with little or no pensionable income starting from age 65. The income and premium pension are earnings-related with a flexible retirement age (Ministry of Health and Social Affairs, 2010). Pension withdrawal is permitted starting from age 61, and individuals can decide if they would like to take out 25, 50, or 75 % of their pension in relation to income from employment or the total pension amount (Kridahl, 2017a).

Concerning family-related pension regulation, the Swedish pension system provides childcare credits to account for the time out of paid employment. For the first four years after childbirth, the parent with the lower income is credited with entitlements based on the most favourable option, i.e., either based on 1) earnings the year before childbirth, 2) 75 % of average earnings in Sweden, or 3) a fixed amount equivalent to a basic income amount (Jankowski, 2011). In 2018, four percent of women’s allocated pension entitlements were due to childcare credits, while they accounted for only 0.8 % of men’s (Swedish Pensions Agency, 2018).

The widow's pension was abolished in Sweden in 1990, but the survivor's pension provides a replacement. This pension applies to the surviving partner of previously married couples and registered partnerships and to cohabiting couples that have, had or are expecting a child together (Swedish Pensions Agency, 2022b). However, the survivor's pension is regarded as an adjustment pension and is usually paid for 12 months after the partner's death. In Sweden, scaling down survivor benefits was introduced within the framework of gender equality: a derived pension right was seen as an incomplete recognition of women's autonomy, and at the same time, there should not be any incentive for women not to build up their own pension income (OECD, 2018). Due to the assumptions about the economic independence of women and men, there are no explicit pension regulations regarding divorce.<sup>5</sup>

### *Germany*

In the German public pension system, the mandatory retirement age for any old-age pension gradually increases from age 65 to 67 until 2029. Besides civil servants and certain professions (e.g., farmers, self-employed), approximately 90 % of the residents in Germany have an account in the public pension insurance, and it is by far the most important income source in old age (Wagner et al., 2017).

In Germany, unless notified differently, a parent – by default the mother – receives three pension points for each child born after 1 January 1992 and 2.5 pension points for each child born earlier. One 'pension point' is equivalent to the average earnings of all insured persons in a given year. Before a reform in 2019, only two pension points were granted for children born before 1992. If a woman is employed during the first three years after childbirth, pension points for childcare and pension points from employment are summed, but only up to the contribution assessment ceiling. In 2016, childcare credits accounted, on average, for 14 % of women's public pension entitlements, showing their importance to entitlements from gainful employment. Of the small fraction of men who claimed them, they accounted for 7 % (Wagner et al., 2017).

In line with the welfare and gender regime, the German pension system includes various measures to mitigate the risks arising from the loss of a spouse, whether through death or divorce, to account for the gendered division of paid and unpaid work during the years of marriage. The 'small' survivor's pension is an adjustment pension and is only paid for two years in case of the loss of the partner prior to age 47. The 'large' survivor's pension intends to support the surviving spouse until the end of her/his life and accounts for 55 % of the pension that the deceased spouse would have or has received (DRV, 2020). Since the grand divorce reform in 1977 (see section 1.2.2), the 'divorce splitting' mechanism (*Versorgungsausgleich*) has been in place in West Germany

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<sup>5</sup> Since 1989, the option exists to include private pensions into the equal property division after divorce (Brattström, 2007).

(since 1992 in East Germany) to protect the economically ‘weaker part’ of a marriage in the event of divorce (Schmähl, 2018). In the case of divorce, the accrued pension entitlements during the years of marriage, including childcare credits, are summed up and divided equally between the ex-spouses upon divorce. This mechanism is mandatory by law and results mainly in an increase in pension entitlements for divorced women – by approximately 20 % compared to married women (Kreyenfeld et al., 2018), whereas it decreases divorced men’s pension entitlements.<sup>6</sup>

## **1.2.2 Marriage and divorce trends**

The following section portrays marriage and divorce trends in Sweden, East and West Germany. The main statistics used to compare the trends in each country are the crude marriage and the crude divorce rate. Both rates are calculated by dividing the number of marriages or divorces occurring among each country’s (average) population size in a given year. Crude rates are limited in how they reflect changes in marriage and divorce patterns as they do not relate the number of marriages and divorces to the population at risk but to the total population. Hence, changes in patterns may be attributed to compositional differences in the total population. In the case of the crude divorce rate, for example, the population at risk would only consist of married individuals. Nevertheless, the crude marriage and divorce rates give an indication of the developments in each country and are supplemented below by further country-specific statistics to give a comprehensive overview.

### **Marriage trends**

#### *Sweden*

Figure 1.2 shows the crude marriage rates for Sweden, East and West Germany from 1970 until 2020. From the 1970s onwards, marriage rates declined in Sweden until the late 1990s. There were two exceptions during these years: The first occurred in the mid-1970s, most likely due to the reforms of the Swedish divorce law. The reforms facilitated divorce, thereby increasing the number of divorcees re-entering the marriage market while simultaneously changing the appearance of marriage from a strict to a more modern family form (Ohlsson-Wijk et al., 2020). The second exception was a dramatic but temporary increase in the crude marriage rate in 1989. This increase was a response to the transitional provisions accompanying the abolition of the national widow's pension scheme. Especially for women who lived in cohabitation and were born in or before 1944, hence were 45 and older, the transitional provisions created an economic incentive to marry their partners before the end of 1989 (i.e., the right to a national widow’s pension)

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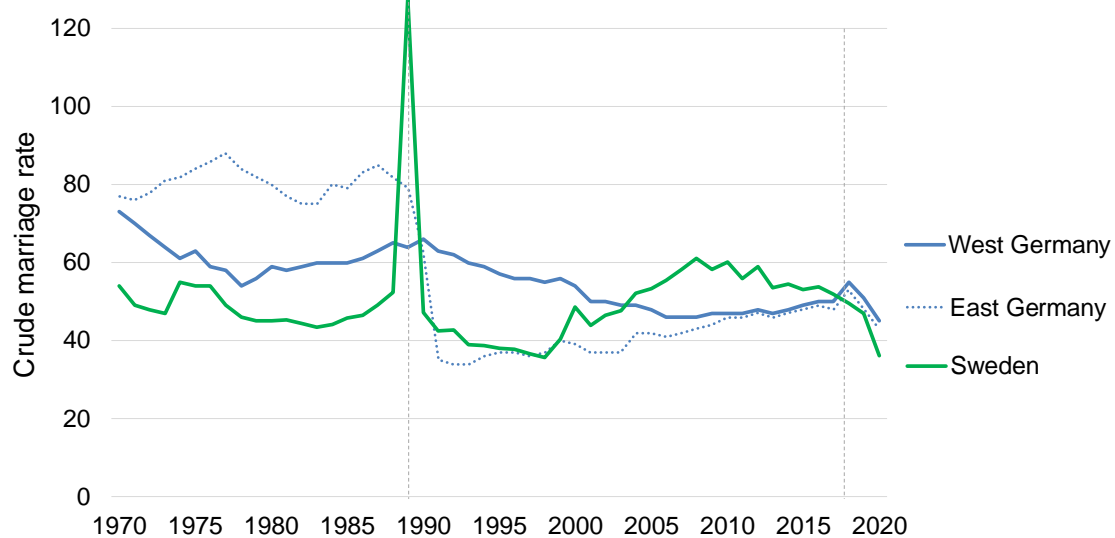
<sup>6</sup> There are certain grounds for exclusion: marriages of a duration shorter than three years, equal earnings of spouses during the years of marriage, or marital contracts (Keck et al., 2020; Radenacker et al., 2019).



(Hoem, 1991). The turn of the millennium further marked a tipping point in the crude marriage rates: they started to rise again until around 2008 and then declined again.

In addition to the crude marriage rate, it is essential to consider other characteristics of the marriage population to get a comprehensive picture of the developments. While in 1990, the mean age at first marriage was 28 years for women and 30 years for men; it increased to almost 35 and 38 years, respectively, in 2020 (OECD, 2022b). Hence, women and men get married later in life. This is also in line with Swedish fertility behaviour, which often precedes marriage (Andersson, 1998; Holland, 2013). Marriage is not a prerequisite for starting a family in the Swedish context (Ohlsson-Wijk, 2011), and the high prevalence of cohabitation increased while marriage rates declined. In Sweden, the share of births outside of marriage amounted to 54.5 % in 2019 but was already 18.9 % in 1970 (OECD, 2022d). Concerning legal regulations, there are almost no differences between marriage and cohabitation, also for regulations when they get dissolved (Ohlsson-Wijk et al., 2020; Perelli-Harris & Gassen, 2012). Only some inheritance rules still exist that favour marriage over cohabitation.

Figure 1.2: Crude marriage rate in Sweden, West- and East Germany



*Note:* The dashed lines indicate the reform of the widow's pension in Sweden 1989 and the introduction of same-sex marriage in Germany 2017.

*Source:* BiB, 2021; SCB, 2022; own illustration.

### *East and West Germany*

In West Germany, there has been a continuous decrease in crude marriage rates since the 1970s. The slight increase during the 80s and 90s was mainly due to the strong birth cohorts reaching 'marriage age', and the little peak in 2018 can possibly be attributed to the introduction of same-sex marriages in October 2017, which became part of the marriage statistics. In East Germany, crude marriage rates developed differently than in West Germany as they increased until the mid-70s and then stayed relatively stable at a higher level until 1989. These higher crude marriage rates in the former East compared to the West are often explained by different support services provided for young married couples in the GDR, such as more straightforward access to dwellings and interest-free marriage loans (Engelhardt et al., 2002; Hill & Kopp, 2000; Kopp & Diefenbach, 1994). The crude marriage rates drastically dropped and got cut in half around the years of reunification, a time characterised by uncertainty (Dorbritz, 2008). After that, they slowly started to increase again at a low level and are, since the early 2000s, comparable to the crude marriage rates in West Germany.

As in Sweden, the age at first marriage also increased in united Germany. While in 1990, the mean age at first marriage was 26 years for women and 28 years for men; it increased to 31 and 34 years, respectively, in 2020 (OECD, 2022b). Further, there have been persistent differences between East and West Germany before and after reunification regarding the link between marriage and fertility. While non-marital childbearing was very prevalent in the East, couples usually got married before the first birth in West Germany (Dorbritz, 2008; Klüsener & Goldstein, 2016). Although there is an increasing trend in first births outside of marriage in Germany, differences between the former East and West are still marked (Konietzka & Kreyenfeld, 2002; Schnor, 2014). In 1990, they accounted for 35 % of all births in East and 10 % in West Germany, while in 2021, they accounted for 55 % and 29 %, respectively (Destatis, 2022b).

### **Divorce trends**

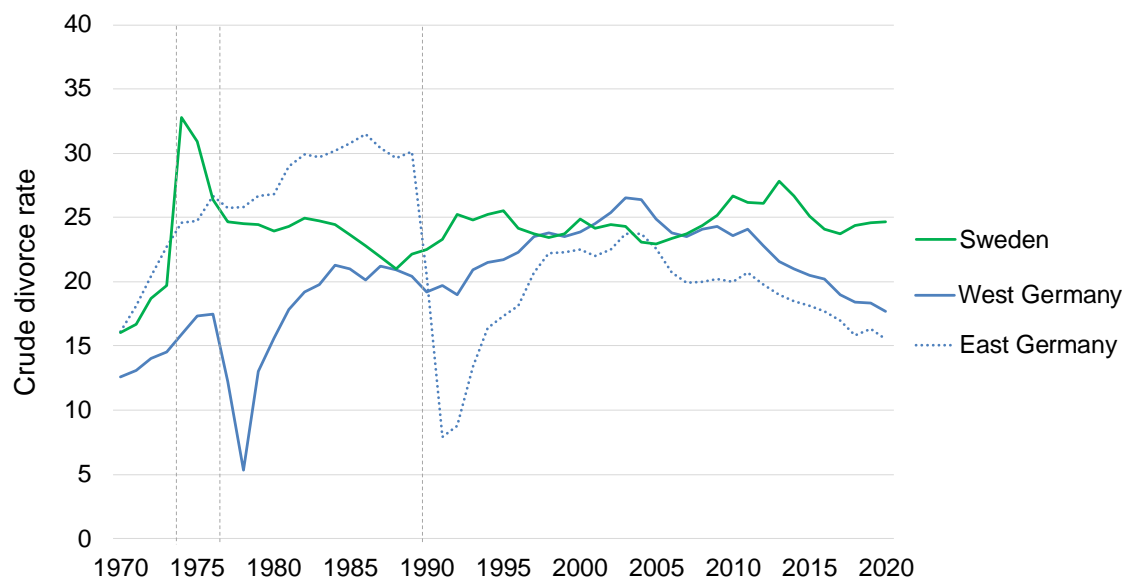
#### *Sweden*

Over the past decades, divorce rates have been rising in Europe or plateaued at a high level (Eurostat, 2022b). For Sweden, West- and East Germany, similar developments are witnessed (Figure 1.3). In Sweden, crude divorce rates were already on the rise during the 1960s, usually referred to as the 'onset of the second demographic transition' (Lesthaeghe, 2011; Ohlsson-Wijk et al., 2020) and one of the highest among Western societies (Garriga et al., 2021). Divorces peaked in 1974 after a reform of the divorce law. The liberalisation of the divorce law facilitated divorce and made it possible to divorce after a waiting period of six months, even if one of the spouses did not agree to get a divorce (Justitiedepartementet, 2013). As stated in the marriage code for the time being married, the divorce law also emphasises the economic independence of spouses after

divorce. After the peak in 1974, crude divorce rates stayed at a high level and even slightly increased until around 2015. After that, crude divorce risks started to decline again slowly.

There are additional studies for Sweden which have cast a nuanced light on divorce patterns. While the increase in the divorce rates prior to 1974 was mainly driven by childless women (Andersson, 1997), the latter increase can be mainly attributed to the increased risk of divorce among parents (Andersson & Kolk, 2016). Further, Sweden is known for its strong negative educational gradient in the risk of divorce (Härkönen & Dronkers, 2006; Hoem, 1997). Concerning different age groups, divorces at age 60 and older, so-called ‘grey divorces’, are on the rise in Sweden (Öberg & Bildtgård, 2021). The divorce rates at higher ages, for couples with longer marriage durations, have increased and doubled since the millennium (SCB, 2000, 2020b). Comparable to divorce rates also separation rates from cohabiting unions are high (Gähler et al., 2009; Henz & Jonsson, 2003). In line with results from other countries, there is evidence that the separation rates of cohabiting couples are higher than those of marital couples (Liefbroer & Dourleijn, 2006).

Figure 1.3: Crude divorce rate in Sweden, West- and East Germany



*Note:* The dashed lines indicate reforms of the divorce law in each country.

1974: Liberalisation of Swedish divorce law; 1977: Reform of West German divorce law (separation year, post-marital alimony, pension equalisation scheme); 1990: Reunification and changes in the work of the family courts in former East Germany.

*Source:* BiB, 2021; SCB, 2022; own illustration.

#### *East and West Germany*

As shown in Figure 1.3, the rising divorce rates in West Germany were shortly interrupted through the reforms of the divorce law in 1977 but continued afterwards. The newly introduced divorce law was part of the fundamental reorganisation of marriage and family law. A significant change

was the removal of the principle of fault by the principle of the breakdown of a marriage and the introduction of a ‘separation year’ in which the spouses were supposed to live apart before the divorce was finalised (Keck et al., 2017). This resulted in a temporary decline in divorce rates. The new grounds for divorce also entailed changes in the maintenance regulations of the ex-spouses. While previously, maintenance was based on the principle of fault, the new regulation based it on the economic situation of the ex-spouses and the idea of post-marital solidarity. Hence, the economically weaker part, usually the one devoted to childcare during and after marriage, should get support from the economically stronger part (Radenacker et al., 2019). In line with the idea of post-marital solidarity and to give compensation in old age for the unequal distribution of paid and unpaid work during the marriage, the previously mentioned divorce splitting mechanism was introduced. After a steady increase, the crude divorce rate peaked in 2004 and gradually declined. As the total period divorce rate suggests, eventually, every third marriage will end in divorce (BiB, 2021b).

In East Germany, crude divorce rates were already higher than in West Germany in 1970. Several factors may have contributed to the early increase in divorce. In East Germany, the prevalence of religious ties was lower, accompanied by higher female employment and different incentives to get married with a liberal divorce law (Böttcher, 2006; Engelhardt et al., 2002). In East Germany, ‘no-fault’ divorce has already existed since 1955, there was no legally prescribed separation period, and ex-spousal maintenance only existed for the short-term (Engelhardt et al., 2002). While divorce rates in East Germany peaked in the mid-1980s, they drastically dropped around 1990, hence the years around reunification. As with the marriage rates, this can be traced back to times of uncertainty, but also changes in the work of the family courts in former East Germany, which delayed divorces (Dorbritz, 2008; Grünheid, 2013). Crude divorce rates started to increase again and, since around the 2000s, are following similar patterns as for West Germany, albeit at a slightly lower level.

As for Sweden, there is also a shift in the average age at divorce in Germany. The average age at divorce increased from 36 years for women and 39 years for men in 1990 to 44 and 47 years in 2021, respectively (Destatis, 2016, 2022b). This increase is partly due to the postponement of marriage in the life course and an increase in divorces at higher marriage durations (BiB, 2022). While in 1990, divorces were, on average, preceded by 11.5 years of marriage, in 2021, the duration increased to 14.5 years.

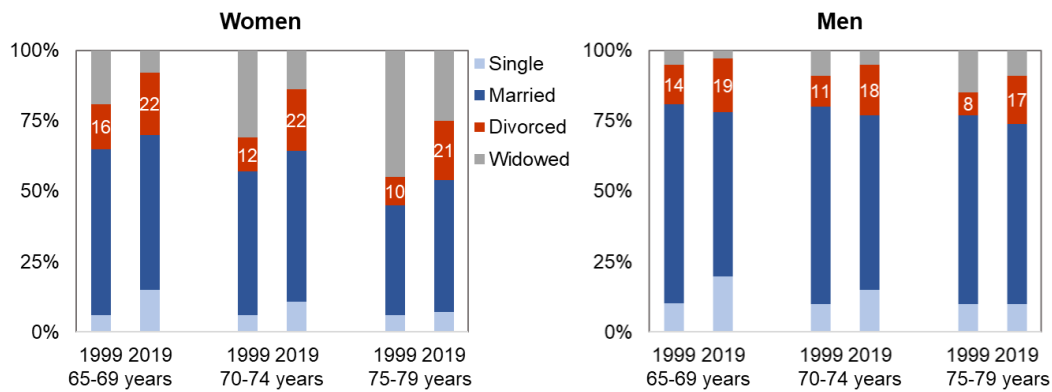
### **Family status of women and men at older ages**

The outlined developments in marriage and divorce trends are visible in the distribution of family status in the age groups 60-79 (Figure 1.4). These age groups are relevant in the context of this dissertation, as an increase in divorced women and men in older age entails an increased share of

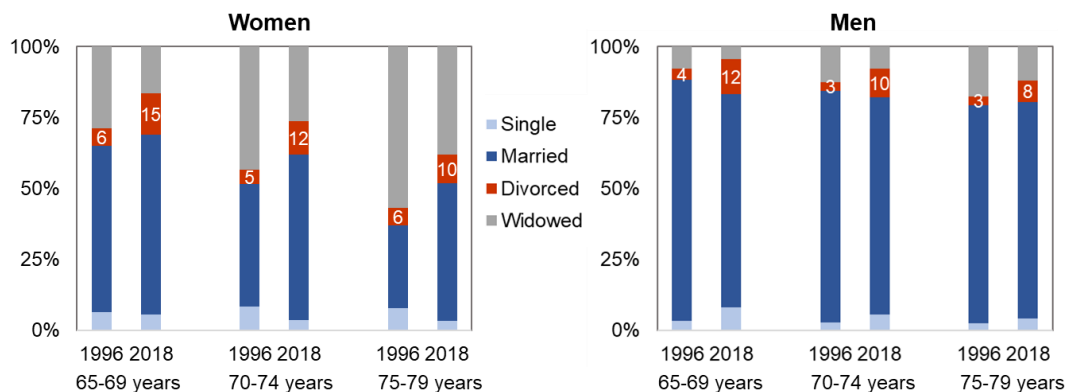
people who are at risk of being economically disadvantaged in old age due to their experience of divorce. Across the age groups 65-69, 70-74, and 75-79 years a strong increase in the share of divorced compared to married, widowed and single can be observed for Sweden from 1999 to 2019 and for Germany from 1996 to 2018. For both countries, the share of divorced women at older ages is higher than for men. In line with the crude divorce rate, the share of divorced women and men was and still is higher in Sweden than in Germany. For instance, the share of divorced women aged 70-74 was 12 % in 1999 and increased to 22 % in 2019, while in Germany, the share was 5 % in 1996 and 12 % in 2018. For Swedish men, the share of divorced in the same age group was 11 % in 1999 and 18 % in 2019. In Germany, the share increased from only 3 % in 1996 to 10 % in 2018.

Figure 1.4: Women and men aged 65-79, by marital status and age, Sweden (1999 and 2019) and Germany (1996 and 2018)

### Sweden



### Germany



Source: SCB, 2000, 2020b; Mikrozensus, 1996, 2018; own illustration.

### 1.2.3 Employment behaviour and the gender pension gap

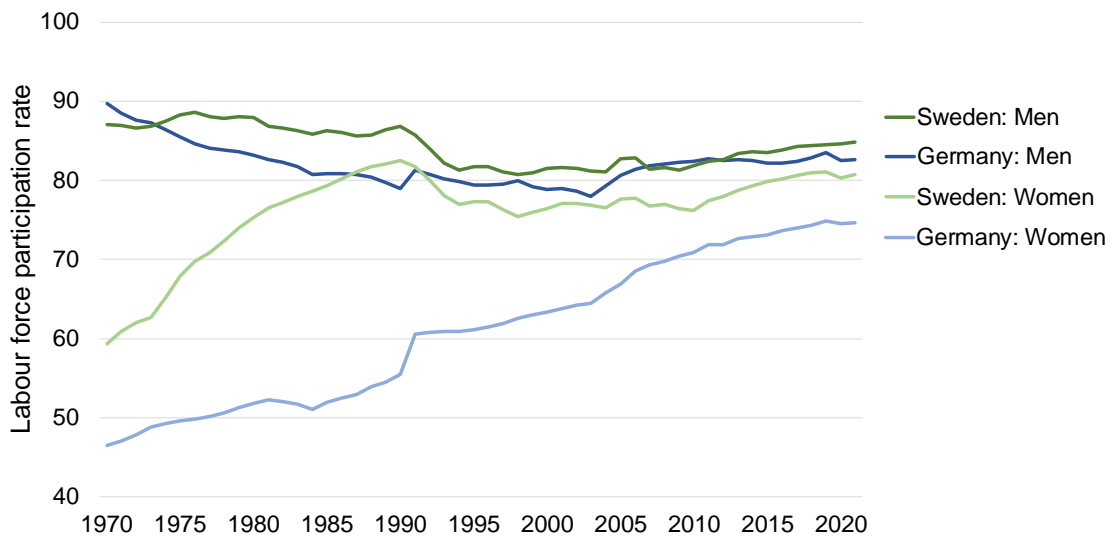
Women's employment behaviour has changed since the 1970s in both countries. Employment behaviour and related labour market income define to a large extent women's and men's individual economic wellbeing during the life course and public pension income once retirement age is

reached. In case of divorce, having an individual labour market income might ease the economic consequences following divorce, especially for women. In old age, the level of public pension income largely defines a person's living standard and ability to sustain a single household.

### Sweden

As shown in Figure 1.5, there were still significant differences in the labour force participation rates (LFP) of women and men aged 15-64 in Sweden and (West) Germany in 1970, reflecting each country's gender regime. In Sweden, men had high labour force participation rates, around 90 % in 1970, while for women, the LFP rate was around 60 %. As a result of the shifts in Swedish welfare state policies, the female LFP rate increased drastically from 1970 until the mid-1980s to around 80 %, almost reaching the same level as the male LFP rate. Thus, women increasingly had their own labour market income and gained economic autonomy. During the economic crisis in 1990-1994, Sweden experienced a massive increase in unemployment (Bergmark & Palme, 2003), and LFP rates of women and men declined. They stabilised after the crisis, although at a lower level than before, until they dropped again during the second economic crisis in 2007-2008. Since then, LFP rates have started to increase again. In 2020, women and men showed comparable labour force participation rates, with 81 % and 85 %, respectively.<sup>7</sup>

Figure 1.5: Labour force participation rate of women and men aged 15-64, from 1970 until 2020, in Germany and Sweden



*Note:* The statistic is based on data from former West Germany until reunification, after which they include both East and West Germany.

*Source:* OECD.Stat, 2022b.

<sup>7</sup> In the age bracket 15-64 years, labour force participation rates are slightly lower than if the age bracket included only those at prime working age (i.e., excluding those still in education and those who may have retired early). For example, the LFP rate for men aged 25-54 was 92 % in Germany and 94 % in Sweden in 2021 (OECD.Stat, 2022b).

### *(East and) West Germany*

Figure 1.5 shows women's and men's labour force participation rates for West Germany until reunification and for united Germany after that date. Comparable figures for East Germany for the time prior to reunification were not available. However, from various sources, we know that women and men had comparable high LFP rates in East Germany (Rosenfeld et al., 2004). In West Germany, there was a massive difference between women's and men's labour force participation rates in 1970. Women's LFP rates only slowly increased over time. At reunification, they reached around 55 %, while men's rates amounted to 80 %. The strong increase in women's LFP rates after reunification in Figure 1.5 can be mainly attributed to merge of the statistics of East and West Germany.<sup>8</sup> In 2020, women still lagged behind men, with a labour force participation rate of 75 % for women compared to 83 % for men.

At first glance, Figure 1.5 seems to give the impression that Sweden almost achieved its gender equality approach as LFP rates of women and men are of comparable levels and that the recent policy shifts in Germany increased the LFP rates of women. However, there are still marked gender differences when considering the share of full- and part-time employment (see Appendix, A1.2). While the share of part-time working men is stable-low in both countries, women in Germany have a high prevalence of working part-time. Even in Sweden, where policies are built on the assumption that women and men are both in full-time employment, women are still more likely than men to work part-time. Gender differences in part-time employment, where part-time employment is defined as a proportion of total employment, illustrate this even further: In 2021, 36 % of women worked part-time compared to 10 % of men in Germany (OECD, 2022a). In Sweden, 15.6 % of women worked part-time compared to 9.5 % of men. This limits women's earnings, career advancements and capacity for economic autonomy; in the long run, also in terms of pension income.

### **Employment behaviour of mothers**

Differences in both countries become particularly evident when looking at mothers' employment rates. Employment rates of women and men are usually comparable until they transition to parenthood, which often marks the onset of the motherhood penalty (Kleven et al., 2019). Against the background of divorce and separation, however, the mother's capacity for economic autonomy is crucial.

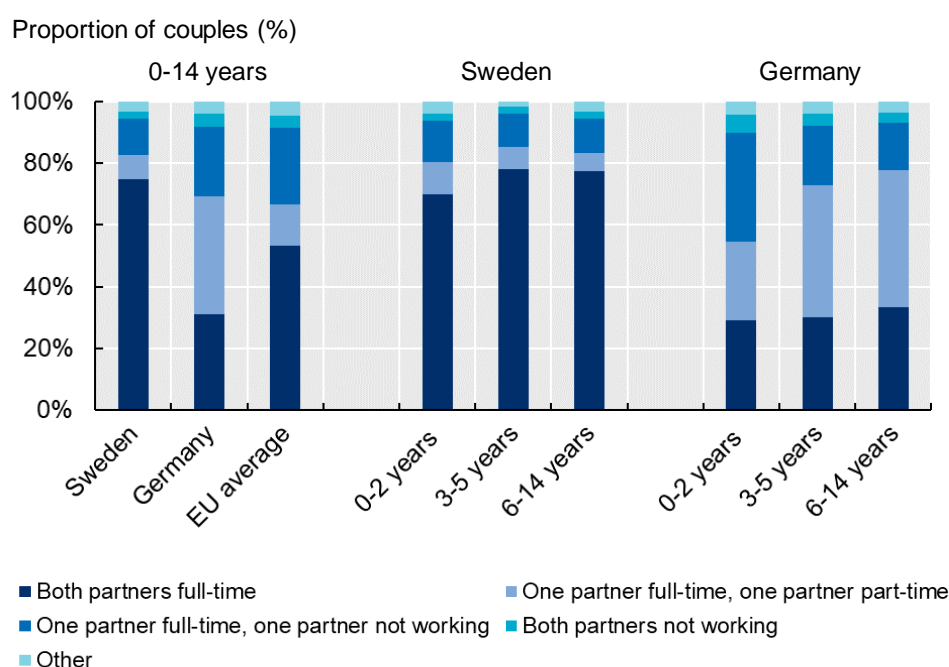
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<sup>8</sup> While the overall pattern for women seemed to increase and the pattern for men seemed to stay at a stable high level from the 1990s until 2020, the pattern looks slightly different when considering the separated statistics for East and West Germany (see Appendix, Figure A1.1). For women from East Germany, LFP rates dropped dramatically after reunification and then developed at a comparatively low level like those for women from West Germany. For men from East Germany, LFP rates dropped as well, reaching their lowest level in 2004 with 62 %, and then started to recover.

## Sweden

In 2019, the employment rate of mothers with at least one child aged 0-14 was 86 % in Sweden, of whom 77 % had a full-time job and about 9 % had a part-time job (Appendix, Figure A1.3). This pattern holds even when differentiated by the age category of the child. For example, the employment rate of mothers is 82 % when the child is aged 0-2 years and then rises steadily to 86 % (child 3-5 years) and 89 % (child 6-14 years). Examining the couple level, as in Figure 1.6, further confirms this picture: in 2019, for 75 % of Swedish couples with children aged 0-14 years (first column), both partners were employed full-time. Differentiated by the child's age (second column), the only exception in Sweden with a slightly lower number is when the child is between 0-2 years, with only 70 %.

Figure 1.6: Distribution (%) of employment patterns in couples with at least one child aged 0-14, total and according to different age categories, 2019, Sweden, Germany, EU average



*Note:* Part-time employment is defined as usual weekly working hours of less than 30 hours per week in the main job, and full-time employment as usual weekly working hours of 30 or more per week in the main job.

*Source:* OECD, 2022.

## Germany

In Germany, the employment rate of mothers with at least one child aged 0-14 was 73 % in 2019 (Appendix, Figure A1.3). Unlike in Sweden, the maternal employment rate is notably low, at 56 % when the child is still young (0-2 years). The older the child, the higher the employment rate of mothers. It increases to 76 % for children aged 3-5 years and 83 % for children aged 6-14. Another difference between mothers in Sweden and Germany is their employment situation. In



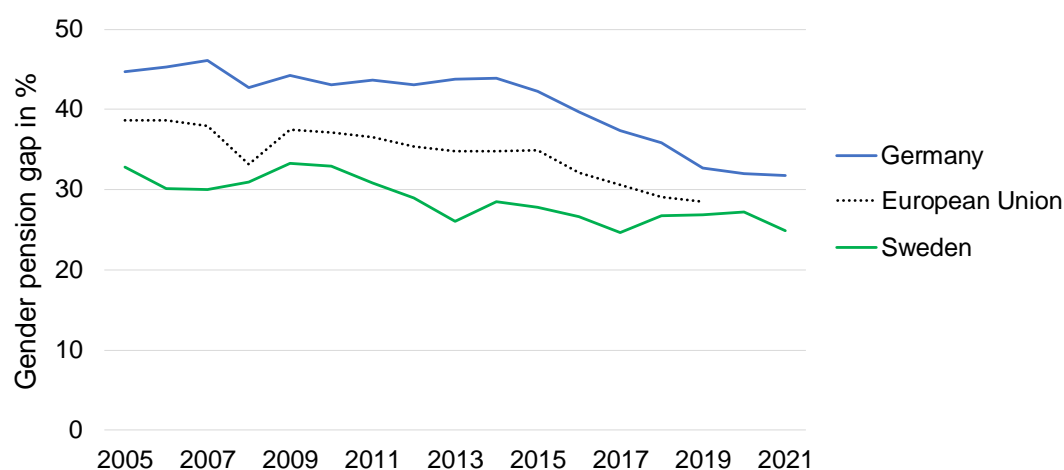
Germany, only about 36 % of mothers (child aged 0-14 years) were employed full-time, while about 38 % were employed part-time. This pattern is also evident when looking at the distribution of employment patterns among couples with children (Figure 1.6). In only 35 % of couples with a child aged below 14 years, both partners were employed full-time, which is even lower than the EU average of 53 % (first column). Divided by the child's age, the share of couples with both partners working full-time is around 30 % across all age groups (third column). However, the older the children, the higher the proportion of couples where one partner works full-time and one partner works part-time. As these statistics include both East and West Germany, it has to be mentioned that the figure would look different if the statistics were split. Although the full-time employment rate of mothers from East Germany decreased drastically since reunification, it is still higher than for mothers from West Germany (Barth et al., 2020).

## Gender Pension Gap

### Sweden

Changes over time in the labour market participation of women and men are also visible in the development of the gender pension gap (GPG), although at a slower pace (Figure 1.7).<sup>9</sup> In 2005, the gender pension gap for the cohorts born between 1930 and 1940 was around 33 % in Sweden and below the EU average. Following women's increased labour force participation rate, the GPG further declined to around 25 % in 2021. Still, that means that women, on average, receive 25 % lower pension incomes than men in 2021, which is a considerable factor of inequality in old age.

Figure 1.7: Gender pension gap from 2005 until 2021 in Germany, Sweden, and the EU



*Note:* The gender pension gap is calculated based on the age groups 65 until 74 years.

*Source:* eurostat, 2022a; own representation.

<sup>9</sup> The GPG also depends on the gender pay gap, which is lower in Sweden than in Germany. For example, the gender pay gap (at the median wage) was 19.5 % in Germany and 12.4 % in Sweden in 2000 and decreased to 14 % and 7.6 % respectively in 2019 (OECD.Stat, 2021a).

## *Germany*

The GPG was extremely high in Germany in 2005, at around 45 %. The noticeable decline started around 2014 (cohorts 1940-1950), and the GPG shrunk to around 32 % in 2021. Nevertheless, Germany has one of the highest GPGs within the EU and is always above the EU average, reflecting the strongly gendered division of paid and unpaid work for the older cohorts. The decline in 2014 is partly due to an increase in childcare credits within the public pension system but also a reflection of women's slowly changing labour market behaviour. In line with the previously presented statistics about differences in employment behaviour between women from East and West Germany, the GPG is also lower in East Germany (WSI, 2021).

Although the overall trend in the decline of the gender pension gap suggests that women increasingly have higher labour force participation rates and, thus, higher lifetime earnings, this trend has to be interpreted with caution. The gender pension gaps in Figure 1.7 do not differentiate by marital status. Once the gap is disentangled by marital status, it becomes evident that married women and men in both countries display the highest GPG (e.g., WSI, 2021 for Germany). Based on additional calculations for Chapter 4, Figure A1.4 in the appendix displays the GPG in monthly public pension income for married and divorced women and men from West Germany and Sweden between 2004 and 2018. In 2018, the estimated GPG for West German married women and men was around 40 % and around 10 % for divorced. In Sweden, married women and men showed a GPG of around 30 %, while it was below 20 % for divorced women and men.

### **1.2.4 Summary of the developments in Sweden and Germany**

#### *Sweden*

Overall, this section has outlined the development of the Swedish and German welfare states along with developments in marriage, divorce and employment trends since the 1970s. Both welfare states are based on different principles, which are visible in the outlined social policies governing the family and working life. Since the 1970s, the longstanding, individualising Swedish policies have led to comparable employment patterns between women and men, a high prevalence of 'dual-earner' households, earlier re-entry of mothers into the labour market and higher levels of full-time work after childcare breaks than in policy settings where women significantly reduce their labour supply after the birth of a child (Korpi et al., 2013).

The ideal of the 'earner-carer' model, however, has not been achieved yet. Mothers are still more likely to work reduced hours compared to fathers (see section 1.2.3), and vertical and horizontal segregation characterises the labour market: the 'feminisation' of the welfare state is mirrored in a public sector highly dominated by women, who tend to earn less, whereas the private sector is

characterised by men with higher earnings (Gunnarsson, 2016; Gustafsson & Kolam, 2008; Mandel & Semyonov, 2006). In case of divorce and separation, this especially puts single mothers at a high risk of poverty, although most are in full-time employment (Jaehrling et al., 2015; OECD, 2022a). Moreover, the high share of dual-earner households together with cutbacks in decommodification policies (e.g., unemployment benefits, social assistance) has put single parents in financially worse situations in at least two regards: first, they cannot reach the living standard defined by usually two earners and second, in case of unemployment, they lack the safety net usually provided by the income of a second earner and can only rely on a downsized safety net provided by the state (Alm et al., 2020; Maldonado & Nieuwenhuis, 2020; Nieuwenhuis, 2022). Likewise, there still exists a large gender pension gap which is only slowly decreasing for the retired population. This gap is due to differences in lifetime earnings between women and men and suggests that the Swedish social policy approach has not eliminated gender inequalities for these cohorts.

### *Germany*

Unlike Sweden, the German social policies governing the family and the working life are still centred largely around the married couple, and Germany can still be fairly described as a modified breadwinner model – a ‘one-and-a-half-earner’ model, with a full-time working man and a part-time working woman. While the policy shifts since the 2000s set strong work incentives for women and gave more weight to the individual, as in the Swedish system, they co-exist with other policies based on the household. ‘Famillising’ policies that continue to support the modified breadwinner model, such as joint taxation, are deeply engrained in the German welfare state and undermine, for instance, maternal employment during marriage and favour a gendered division of paid and unpaid work (Van Winkle, 2019). In the long-term, this leads to negative consequences for women’s employment biographies, possibilities for career advancement and economic autonomy. Despite these persisting incentive structures for married couples, the new policies (i.e., the 2008 alimony reform) put great emphasis on women’s economic independence in the event of divorce and the idea of a ‘clear cut’ between ex-spouses. This is one of many ‘inconsistencies’ in German family policies. Although women expand their employment and increase their earnings after divorce, they are still far from being economically independent (Radenacker, 2020; Radenacker & Kreyenfeld, 2018). In 2018, the poverty risk of single parents was four times as high as that of couples with children (BMFSFJ, 2021), and in 2020, more than 50 % of single-parent-households received social assistance (i.e., SGB II), of which 30 % were employed (Lenze, 2021). On the other hand, concerning pension regulations, the German welfare state still provides regulations to protect the economically weaker part of a marriage in case of divorce, such as the divorce splitting mechanism. This mechanism effectively increases divorced women’s public pension entitlements, however, only for the time married.

## **1.3 The Dissertation: Structure, summary of papers, data, methods, and conclusion**

### **1.3.1 Structure and summary of papers**

This cumulative dissertation investigates the relationship between divorce and economic wellbeing from a life course perspective, focusing on women and men in West Germany and Sweden. The introductory chapter outlined the theoretical framework of the thesis, gave insights into the social policy context of Germany and Sweden and provided a descriptive overview of developments in family and employment behaviour in both countries. The following section summarises the three core analytical chapters of the thesis (Chapters 2, 3, and 4) and places them in relation to each other within the theoretical framework. Separate subsections are then devoted to the data used and its limitations, the methods, and the concluding remarks.

#### *Summary*

Each of the three analytical chapters of the dissertation studies a different segment of the life course of individuals. Taken together, they illustrate how divorce relates to economic wellbeing during the life course, the development of path dependencies, and the interplay of family and working life in the respective socio-political context. Chapter 2 looks at divorce and separation in midlife and how it affects the earnings trajectories of mothers in West Germany and Sweden. The focus is on the labour market outcomes of mothers and their capacity for economic autonomy after separation within the two different social policy settings. This chapter sheds light on mothers' economic wellbeing during working life and their possibilities to accumulate individual pension entitlements. Chapter 3 concentrates on the end of the working history and the transition to retirement by studying the interplay of divorce, health and retirement trajectories in West Germany. This chapter analyses how employment histories of women and men develop at a time when divorce has often already taken place: it shows how divorce and marriage interact with employment biographies and channel women and men in the long-term into different retirement trajectories that define their economic wellbeing. Chapter 4 focuses on the time in retirement by analysing the relationship between divorce and public pension income in West Germany and Sweden. This chapter shows how social policies during the life course and pension regulations in both countries shape divorced women's and men's public pension entitlements. It considers the entire employment history across marital status groups and analyses how they, combined with different pension regulations, translate into economic wellbeing once individuals start withdrawing their public pension income in each welfare state.

Chapter 2 is a collaboration with Anna-Karin Nylin (Stockholm University), and we compare long-term earnings trajectories of separated mothers and partnered mothers in Sweden and western Germany. The focus is exclusively on women who were employed two years prior to their first child's birth, as this paper's interest lies in work-related adjustments following the transition to parenthood and separation. This cross-national study follows women who gave birth between 1992 and 2014 for eleven years, from one year before the birth of their first child until ten years after. Large-scale register data for the analyses come from the German pension and the Swedish population registers. Utilising OLS and fixed effects models, we calculate robust long-term estimates of the effect of separation on mothers' earnings trajectories. Results show that separation negatively affects mothers' earnings trajectories in Sweden while it positively affects them in western Germany. In Sweden, although the earnings of separated mothers lag behind those of partnered mothers by the end of the observation window, both groups can return to and even exceed their pre-birth earnings. However, in western Germany, partnered and separated mothers' earnings remain far below pre-birth levels. The findings for subgroups based on pre-birth earnings quartiles reveal that mothers with lower pre-birth earnings face the most precarious situations following separation in both countries. In western Germany, post-separation earnings increases are limited to mothers with the highest earnings positions before birth. Based on these findings, we emphasise the importance of social policies that promote female economic autonomy throughout the life course while avoiding cuts in welfare support that run the risk of pulling away mothers' economic safety net as they would hit single-headed families in lower earnings positions the hardest.

Chapter 3 investigates the retirement trajectories of women and men in West Germany. This chapter aims to explore how divorce is linked to retirement trajectories in West Germany and to understand whether and how patterns are gendered. Using German pension insurance data, I employ sequence and cluster analysis to map and group retirement trajectories of women and men who retired in 2018. Retirement trajectories are defined as the monthly insurance histories from age 50 to 65. I find nine distinct retirement trajectories, ranging from unemployment to stable low to high income trajectories and to an early retirement trajectory through the reduced-earnings-capacity pension, the latter representing 9.3 % of the sample. The identified retirement trajectories reflect the often gender-specific work and family lives of the West German cohorts studied: the higher income retirement trajectories are male-dominated – half of the men studied retire through them. The low-income, care-related retirement trajectories and the trajectory with no contract to the GRV are female-dominated. Based on multinomial logistic regression models, I analyse how marital status, distinguishing between divorced and (re)married, was related to different retirement trajectories. The results show that divorced women and men were more likely than married women and men to retire through unstable retirement trajectories characterised by an early exit

from the labour market and receipt of reduced-earnings-capacity pensions and/or unemployment benefits. About one third of divorced women and men experience an unstable transition to retirement, which is a considerable factor in inequality in later life. Whereas the relationship between divorce and retirement trajectories seems to be overall adverse for men, the results for women are more ambiguous. Some divorced women were also more likely to retire through a stable high-income trajectory than married women. Nevertheless, the results suggest that divorce is associated with an early retirement trajectory through the reduced-earnings-capacity pension for both women and men.

Chapter 4 is co-authored with Linda Kridahl (Stockholm University) and compares the gendered consequences of divorce on public pension income in West Germany and Sweden. As outlined in sections 1.2.1 and 1.2.2, both countries have had persistently high divorce rates in recent decades but were differently equipped to mitigate the economic consequences of divorce for individual security in old age: Sweden followed a gender-equal social policy approach to enable women and men to achieve economic autonomy over the life course, while West Germany, following the male breadwinner model, introduced the system of ‘divorce splitting’ to account for differences in women’s and men’s income. Under this system, the pension entitlements accumulated during marriage are combined and divided equally between the ex-spouses upon divorce. Against this background, this study uses large-scale pension register data to examine how divorce is related to women’s and men’s monthly public pension income in West Germany and Sweden. The main comparison groups are divorced and (re)married individuals who entered retirement from 2013 to 2018. We show annual income histories from age 20-65 and calculate monthly public pension income with respect to lifetime income and pension regulations, such as childcare credits and the supplements/deductions for ‘divorce splitting’. Using multiple ordinary least square regression models, we analyse how family status relates to monthly public pension income by gender. The results reveal that women and men in Sweden experience similar working histories, although women’s incomes are at a lower level. These differences in working histories are also reflected in women having lower pension incomes than men. Across marital status, women show comparable pension incomes, although divorced women have the lowest public pension incomes. For men, differences are more pronounced, with divorced men receiving approximately 26 % less pension income than married men. In West Germany, divorced women have significantly higher pension incomes than married women. The system of ‘divorce splitting’ increases women’s and decreases men’s pension incomes, which seems to equalise their pension incomes. However, both stay below a married man’s pension income. The findings indicate that there might be a large share of divorced pensioners at risk of being economically disadvantaged in old age in the years to come in both countries.

### 1.3.2 Data and methods

#### The German pension registers and the Swedish registers

For Germany, the data used is provided by the Research Data Centre of the German Pension Insurance (FDZ-RV), and for Sweden, the data is provided by Statistics Sweden (SCB). The German Pension Insurance covers about 90 % of the resident population of Germany who has at least one month of ‘contribution’ during their lifetime (Keck et al., 2020). ‘Contributions’ can be from gainful employment but also consist of pension qualifying periods such as education, unemployment, childcare and the divorce splitting mechanism. The data products offered by the FDZ-RV are monthly, individual-level data obtained from process-produced statistical data. These data sources combine employer reports to the pension insurance with administrative data on benefits to insured persons (FDZ-RV, 2022).

#### *Sample of Insurance Accounts (Versicherungskontenstichprobe, VSKT)*

The VSKT is one of the leading data products of the FDZ-RV. The yearly drawn scientific use file VSKT is a 25 % subsample of all individuals covered by the German Statutory Pension Insurance and aged between 15 to 67 years in the respective year. Among other pension-specific information, the data include the insured’s total monthly employment and earnings biographies (Keck et al., 2020). Further, socio-demographic variables, such as sex, age, place of residence, number of children, and dates of childbirth (mainly for women), are included (FDZ-RV, 2019). These variables are measured in the respective year.

#### *VSKT-VA 2015*

The dataset VSKT-VA 2015 combines two registers from the German public pension fund. The VSKT and the statistics on the equalisation of pension entitlements after divorce (*Versorgungsausgleichsstatistik – VA*). The VA includes information on marriage and divorce dates as it is a complete register of persons who have divorced since 1977 and whose pension entitlements were equalised after divorce (Keck et al., 2020). The scientific use file VSKT-VA is restricted to all insured persons of the birth cohorts 1948 to 1985 with German citizenship living in Germany in 2015. It includes 267,812 individuals, with more than 34,000 registered divorces. Next to the information from the VSKT, it includes the year and month of the first and second marriage as well as the date of the (first and second) effective divorce and additional variables in which information on the pension entitlements are stored that were part of the pension equalisation (for more information, see FDZ-RV, 2015). The VSKT-VA 2015 is used for Chapter 2.

#### *VVL 2013-2018*

The VVL combines two data sources – the VSKT and the statistics on completed insurance lives (*Vollendete Versichertenleben – VVL*). The scientific use file VVL is a yearly 25 % sample of all

insured persons who start withdrawing any first-time pension (old-age pensions; reduced-earnings capacity pension) in a given year. Hence, this data covers pension transitions and entitlements but also provides the longitudinal insurance history information from the VSKT. However, this data does not include longitudinal information on marital biographies as they are provided in the VA. Instead, the information on marital status is measured in the respective year of retirement. For Chapter 3, the scientific use file VVL2018 is used (FDZ-RV, 2018). It includes 208,342 persons who retired in the year 2018. For Chapter 4, access to the full VVL was provided by the FDZ-RV through the ‘controlled remote computing’. The analyses are based on the VVL2013-2018, i.e., on all persons who started withdrawing a pension for the first time within these six years.

### *Swedish registers*

The ‘Swedish registers’ are micro-data from different national administrative registers. The basis for both analytical samples used in this dissertation is the Total Population Register (*Registret över totalbefolkningen* – RTB). This register covers the Swedish population resident in the country at the end of each year (December 31) since 1968 and includes demographic variables, such as sex, dates of childbirth, changes in civil status and citizenship. Additional variables used, such as education, labour earnings and pension entitlements, are from the Longitudinal integrated database for health insurance and labour market studies (*Longitudinell integrationsdatabas för Sjukförsäkrings- och Arbetsmarknadsstudier* – LISA). This database combines different registers, for example, the Income and Taxation register (*Inkomst- och taxeringsregistret* – IoT) and the Pension register, to facilitate research and can be linked to the RTB. For the analysis in Chapter 4, the Dwelling register (*Lägenhetsregistret*), available since 2011, was further used. This register makes it possible to distinguish between cohabiting and marital unions without children.

### **Methods**

Throughout the three analytical chapters, different methods were used. The main analysis of Chapter 2 is based on ordinary least square regression models to estimate the effect of separation on mothers’ average annual earnings, followed by fixed effects regression models. While both modelling approaches consider the longitudinal data structure provided by the German VSKT-VA statistics and the Swedish registers, the fixed effects models account for possible time-constant unobserved heterogeneity that may have biased the OLS regressions. The time frame of the analyses covers one year prior until ten years after the first birth. The dependent variable is annual gross labour earnings from taxable employment, and the main variable of interest is a time-varying separation variable, which can occur from one year after birth until the child reaches the age of 10. Besides control variables, the sample is further divided into pre-birth earnings quartiles, measured two years before childbirth, as an exogenous factor to reduce the effect of selection into separation and to account for subgroup variation based on women’s socio-economic position.



In Chapter 3, sequence- and cluster analysis are used to map and group retirement trajectories, followed by multinomial logistic regression models to estimate the cluster affiliation of women and men with different marital statuses. Retirement trajectories are defined as a person's monthly insurance history from age 50 to age 65. The retirement trajectories enter the multinomial logistic regression as the dependent variable. The main variable of interest for estimating cluster affiliation is marital status, distinguishing between divorced, married and remarried. Further controls are education, citizenship, months spent in incapacity and unemployment before age 50.

Chapter 4 is based on a broad set of descriptive statistics and ordinary least square regression models to investigate how divorce is related to women's and men's monthly public pension income in West Germany and Sweden. Descriptively, annual income histories from age 20 until age 65 are displayed, together with a decomposition of the monthly public pension income in the contributions from lifetime income, childcare credits and, in the German case, the divorce splitting mechanism. The main variable of interest in the regression models is family status while further controlling for retirement year, education, and the number of children (female sample). Further, an interaction model of family status and retirement year is investigated as well as sensitivity analyses, considering information about the life course prior age 60 (e.g., months spent in sick leave/incapacity).

### **1.3.3 Limitations of the data**

One of the great advantages of using register data is a large number of individuals and observation points. Especially for empirical research, this increases the robustness of estimates and often allows to study subgroups. Furthermore, unlike (retrospective) survey data, earnings information is more reliable as it is not affected by recall or social desirability bias. On the other hand, compared to survey data, a downside with register data is that no information about values, attitudes or intentions is available. The data only cover 'hard' facts that each institution collects for specific administrative purposes, such as the Pension Insurance or the Tax office. Although the German pension registers have been widely used (e.g., Brüggmann, 2020b; Kreyenfeld et al., 2021; Mika & Krickl, 2020; Möhring & Weiland, 2022; Radenacker, 2020; Söhn & Mika, 2017), there are some limitations which have to be discussed.

#### *German public pension registers*

The German public pension registers cover around 90 % of the resident population in Germany, but some professions, such as farmers, lawyers and civil servants, are not included (Keck et al., 2020). The missing information on these persons is problematic in at least two points. First, it limits the representativity of the data. Second, and this is the more significant problem for data analyses, it is difficult to detect and distinguish individuals who dropped out of the GRV for any reason. As people do not lose their pension entitlements when moving into another pension

scheme, the registers still store their information until they leave. For example, in a longitudinal analysis, if a person moves to the Civil servant pension scheme at age 30, this person will have contributions stored in his/her pension account until that age but no new contributions afterwards. However, this person could also have dropped out of the GRV for other reasons, such as switching to self-employment or being a homemaker. Therefore, when studying the public pension incomes later, the low public pension income may be just a little extra for individuals who moved to the Civil servant pension scheme and are receiving an additional civil servant pension. However, for individuals who have left the GRV for other reasons, a low public pension income may be the only retirement pension they receive.

Further, concerning family histories, the data is limited. First, the family status reported in the pension registers is based on a legal marital status definition. Hence, a person can be (re)married, divorced or never married. This information does not allow to detect or distinguish other family groups, such as partnered/cohabiting or separated individuals. In light of changing family behaviour in Germany, the German pension registers might not cover the family forms of the younger cohorts to a full extent (Destatis et al., 2021). Another problem lies in the VA statistic: The statistics only include persons for whom a pension equalisation after divorce was carried out. Hence, these statistics do not register divorces without compensation between spouses or persons without contact with German pension insurance. The court statistic reveals that the VA was excluded in about a quarter of all settled divorce proceedings (Radenacker et al., 2019). There are several possibilities to opt out of the VA, such as a prenuptial or a divorce settlement agreement. In Germany, it was shown that about 5 % of couples have a marital contract (Nutz et al., 2022). Further, marriages shorter than three years are usually excluded as well as marriages in which both partners have similar incomes. Since the pension equalisation mechanism was not introduced in former East Germany until 1992, divorces that took place before that date are not recorded in the pension registers, which limits comparative analyses between East and West Germany. This entails that some persons are invisible in the pension registers and that the remaining group of divorcees is selective.

There are some specific limitations concerning marital status for each data source used. For instance, although the VSKT-VA includes longitudinal information on marital histories, it only includes them completely for divorcees but not for married. In the VVL, marital status is treated as time-constant and measured by a variable indicating if a person is married or not in the year of first-pension withdrawal. In addition, the missing option to link individual pension accounts to generate a couple-level makes analysis of the interplay of work-family lives difficult.

Another caveat in analysing divorce, employment, and retirement with the pension registers is routed in missing or incomplete control variables. For example, the pension registers include an

education variable. However, the information is usually reported by the employer, not the employee, and is often incomplete. Further, although monthly information on earnings is available, no variable indicates how many hours (full/part-time) an individual was working. Also, information is only available until old-age pension receipt or, at maximum, the age of 67. Hence, the pension registers are unsuitable for analysing developments beyond this age threshold. With respect to family biographies, dates of childbirth and related childcare credits are stored by default in the mother's account, which limits the possibility of analysing men's fertility and family biographies.

#### *Swedish register data*

The Swedish data comprises different population registers. A problem related to the Swedish register data is the problem of 'over-coverage' (Monti et al., 2020), which refers to emigrated individuals (e.g., migrant population) who are still registered as residing in Sweden. Usually, this can be traced back to individuals moving to another country without notifying the authorities, intended or unintendedly. This missing deregistration thus leads to an over-coverage in the population registers (Monti et al., 2020).

Another problem is grounded in the fact that not all registers can be traced back until 1968, which limits longitudinal analysis of specific variables. For example, the register covering sick leave and unemployment data is only available from 1990. This entails that when studying employment histories of the cohorts who recently reached retirement age (e.g., those born between 1945-1955), there is only additional information on employment histories starting from 1990 and thus when those individuals were around 40 years old (see for example, Chapter 4). Another caveat is that in the Longitudinal integrated database for health insurance and labour market studies (LISA), income information is stored on an annual basis. Hence, the data lacks monthly information on income, which would allow for more detailed analyses.<sup>10</sup> Related and comparable to the German pension registers, the Swedish register data does not include information on hours worked.

Further, family histories are limited in the Swedish data as well. As in the German registers, family status reported in the Swedish registers is based on a legal marital status/registered partnership definition. Hence, no variable indicates whether couples live in a cohabiting partnership, although this family form is common in Sweden (Thomson & Eriksson, 2013). Cohabiting couples are usually detected by linking individuals to each other that are having a common child and that have the same property number stored in the Total Population Register. However, as the property number can represent any kind of building, from a single house to a complex of apartment buildings, this approach does not allow to detect cohabiting couples without children in the data. Through

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<sup>10</sup> If data is ordered directly from the Swedish Pension Insurance, researchers can receive the data on a monthly basis.

the new dwelling register, available from 2011, individuals can be linked to each other based on their apartment-level address. This allows to identify cohabiting couples without children better, but still carries the risk that the individuals recorded as living together are, for example, only roommates.

### **1.3.4 Concluding remarks**

This dissertation studies the relationship between divorce and economic wellbeing. The overarching research question is how divorce is associated with women's and men's economic wellbeing during the life course in Sweden and West Germany. As theoretically outlined by the life course perspective, the introductory chapter and the three analytical chapters show that family and work life are intertwined, that they unfold gradually across the life course, and that the welfare state context shapes the interrelation of divorce and economic wellbeing. The event of divorce (and separation) not only directly impacts the employment biographies of mothers (Chapter 2) but is, in a long-term perspective, related to the retirement trajectories of women and men (Chapter 3), and their public pension incomes (Chapter 4).

In Chapter 2, which examines the most recent cohorts, we explore the question of how mothers' earnings trajectories develop after separation and whether there are differences according to mothers' socioeconomic status. The analyses show that mothers in western Germany are still far from reaching economic autonomy through their own earnings after childbirth. After childbirth, the incentive structure of the German welfare state still seems to channel married mothers into a gendered division of paid and unpaid work. Although women strongly increase their employment and earnings after divorce, they stay below their pre-birth earnings, which limits their economic wellbeing. Furthermore, the largest increases in earnings are limited to divorced mothers from higher socioeconomic positions. Through the welfare states policies provided in Sweden, women have better opportunities to maintain their economic autonomy throughout the transition to parenthood and after separation: partnered and separated mothers surpass their pre-birth earnings over time. Nevertheless, the earnings trajectories of separated mothers lag behind those of partnered mothers ten years after first childbirth. This limits their economic wellbeing in the years following separation but, in the long-term, also once they start withdrawing a pension. Apart from their relatively low individual earnings, they often lack the additional income and resources of a partner. Thus, the analyses echo prior investigations that show that single motherhood is an important risk factor for poverty in the Swedish case.

In Chapter 3, which focuses only on West Germany, I employ sequence analysis to examine the question of whether divorced women and men follow different retirement trajectories than married women and men and whether the patterns are gendered. The chapter shows that the retirement trajectories of women and men in 2018 reflect a strong division of paid and unpaid work among

the cohorts studied, especially for married women and men. The higher income retirement trajectories are male-dominated, and the low-income, care-related retirement trajectories are female-dominated. Divorced women and men are more likely than married to be in unstable retirement trajectories, characterised by receiving a reduced-earnings-capacity pension and unemployment. Unlike married women and men, for whom the gendered division of paid and unpaid work seems to persist into retirement trajectories, divorce appears to interfere with the health and employment behaviour of divorced women and men. Divorce seems to overwhelmingly channel men into downward retirement trajectories (i.e., unemployment, receipt of reduced-earnings-capacity pension). For divorced women, retirement patterns are more ambiguous. On the one hand, divorce channels some women into downward retirement trajectories like those of divorced men. However, another fraction of divorced women is channelled into upwards retirement trajectories. Although the causal direction is unclear for women – i.e., whether higher economic autonomy leads to divorce or vice versa – some divorced women retire through stable retirement trajectories with average high earnings that lead to comparatively high public pension entitlements. Still, about one third of divorced women and men experience an unstable transition to retirement, which is a considerable factor of inequality in later life in the West German context.

In Chapter 4, we address the question of how divorce is related to the monthly public pension income of women and men in two different policy settings. It reveals that the Swedish and German welfare states shape women's and men's life courses differently. In line with the Swedish approach of individual economic independence and social policies aimed at enabling everyone to participate in the labour market, women show similar income trajectories across marital status except for divorced women, whose income trajectories fall slightly after age 40. These income trajectories also result in public pension incomes for women that are, on average, above the poverty line but still considerably lower than men's public pension incomes. Therefore, the analyses show that the Swedish approach has not entirely eliminated gender differences in employment biographies and incomes of the cohorts studied. Women's public pension incomes are still lagging behind those of men. Within the group of women, the pension incomes of divorced women fell even further behind those of married women over time. This might entail that divorced women are economically disadvantaged in old age if they solely depend on their own pension income, as no compensation mechanisms are foreseen in the Swedish welfare state that would acknowledge differences in women's and men's income histories. In West Germany, where policies favour a gendered division of paid and unpaid work for married couples, income trajectories over the life course and public pension incomes once retired differ between women and men and between marital status groups. Following the male breadwinner model, married women and men have very different income trajectories and exhibit the largest gender gap in pensions. For divorced women

and men, the situation looks different. Divorced women show higher lifetime earnings than married women and additionally benefit from the divorce splitting mechanism. In line with the recognition of the imbalance in women's and men's income histories, the divorce splitting mechanism fulfils its aim by redistributing pension entitlements between the ex-spouses – it increases divorced women's and decreases divorced men's public pension incomes. Even though the divorce splitting mechanisms seems to be effective in 'equalising' public pension incomes of divorcees, it does not shelter them from the risk of being economically disadvantaged in old age. In 2018, public pension incomes of divorced women and men were around the poverty line of a single household.

#### *Limitations and avenues for future research*

Although this dissertation has generated important and policy-relevant findings, some limitations exist. A major limitation is related to the register data: marital status is not measured as a time-varying trait but only at retirement in the data used for Chapter 3 and Chapter 4. The data inhibited me from shedding more light on the feedback effects between family and working life. For example, knowing the date of divorce would have allowed to tease apart better whether divorce is the cause (i.e., low earnings after the event) or the consequences of low earnings (i.e., divorce due to low earnings). Moreover, it would have been possible to employ other longitudinal methods, such as event history models and multichannel sequence analysis, and to consider how the duration in each marital status (i.e., years being married and divorced) impacts women's and men's possibilities to increase labour earnings after separation and related public pension incomes. Future research would benefit from including this information to gain a better understanding of the mechanisms driving the associations identified in this dissertation.

Against this background, this work is limited in its scope and possibility of isolating causal effects with the given data. Clearly, there is selection into divorce, which is important to consider when studying labour earnings and public pension incomes. In Chapter 2, in which information on separation dates is available, I employ a fixed-effects approach that tries to eliminate time-constant heterogeneity. Further, the analytical sample for Chapter 2 is divided into pre-birth earnings quartiles as an exogenous factor to reduce the effect of selection into separation. In Chapter 3 and Chapter 4, which adopt more descriptive approaches, I have accounted for selection by controlling for important confounders, such as education or prior work history (i.e., months in unemployment). If the data allows, future research could try to get closer to answering the question of causal effects in divorce research. An interesting variable in the context of selection, divorce, and economic wellbeing is health status. Health impairments not only increase the risk of experiencing divorce and vice versa but also limit labour market participation. Unfortunately, the data used was limited in operationalising health status. The results from Chapter 3 showed that remarried women together with divorced women and men have the highest likelihood to receive a reduced-earnings-

capacity pension, and sensitivity analyses for Chapter 4 showed that it is the divorced and remarried women and men with the highest share of months spent in sick leave. Although it is challenging to disentangle treatment and selection effects, a promising avenue would be to take a closer look at longitudinal analysis focusing on different aspects of an individual's biography, such as employment, health, family life and the temporal order of events. Likewise, there is a need for research on the long-term effects of the interaction between divorce and these different aspects on women's and men's overall wellbeing during the life course.

Another limitation is the restriction to legally defined marital status groups in the German case, and thus, the neglect of cohabiting unions. The possibility to account for family diversity by studying cohabitations and separations from cohabitations would have provided gainful insights into family and work behaviour. In Germany, cohabiting unions are not covered by the same set of policies as marital unions. In case of separation, this puts women, especially mothers, who followed a gendered division of paid and unpaid work during their relationship at risk of being economically disadvantaged during the life course (Boertien & Lersch, 2020). Against the background of changing family patterns, 'divorce research' should broaden its focus, include separations of cohabiting unions, and analyse their labour market outcomes. While the focus of this dissertation was on divorce and mainly compared divorced women and men to married, an interesting but also often neglected group is remarried women and men. Against the background of high divorce (and separation) rates in both countries, remarriage and repartnering should be analysed in more detail in relation to employment behaviour of women and men and their economic wellbeing. Extending research on couples' levels would additionally generate valuable knowledge on the interplay of work-family lives in different social policy contexts.

Further, this dissertation was limited to West Germany and did not analyse how divorce is associated with women's and men's economic wellbeing in East Germany. In the German pension registers, divorces are only registered for East Germany since 1992, the year in which the divorce splitting mechanism (*Versorgungsausgleich*) came into place after reunification. Although marriage and divorce patterns differed in former East and West Germany, they have become more similar nowadays. Still, there are marked differences in family behaviour, such as cohabitation and non-marital childbearing, and also in employment behaviour (see sections 1.2.2 and 1.2.3). Studies indicate, for example, that the gender pension gap is lower in former East Germany than in West Germany (Kreyenfeld et al., 2018; WSI, 2021), but this can be partly attributed to East German men's lower incomes (Rasner, 2014). Future research could study both parts of Germany to analyse how family and employment patterns contribute to the economic wellbeing of women and men.

Additionally, future research could profit from paying more attention to subgroups that might be treated differently by social policies and that might as well respond differently to social policies. As shown in Chapter 2, mothers with high or low socioeconomic backgrounds were differently able to increase their earnings trajectories after separation. Moreover, as shown in Chapter 3, retirement trajectories differed across gender and marital status. Hence, opportunity structures provided by social policies might not be the same for everyone. As discussed in previous studies (Bonoli & Liechti, 2018; Nieuwenhuis & Maldonado, 2018; Pavolini & Van Lancker, 2018), there is the risk of ‘Matthew effects’ of social policies. Matthew effects describe the problem that although social policy measures aim to reduce inequalities, they sometimes benefit the already better off, such as the higher educated or the employed, while they do not reach the target group, the most disadvantaged. For example, it was shown that the major public childcare expansion during the 2000s was positively linked to maternal employment in West Germany but mainly for higher-educated mothers (Müller & Wrohlich, 2020; Zoch, 2020). Similar results were found for the parental leave reform introduced in 2007 in Germany. Mothers with higher pre-birth earnings, hence those already well established in the labour market, gained earnings increases after the reform, while the reform did not lead to increases in earnings for mothers with low pre-birth earnings (Frodermann et al., 2020; Wimbauer et al., 2008).

Finally, and in relation to the previous paragraph, this dissertation was limited in how it operationalised the policy context (i.e., welfare states). The comparison of different policy contexts was conducted by a country comparison, but no policy analysis was carried out. While this rather broad operationalisation of policy contexts is a viable starting point, it is still mainly based on assumptions about how each policy context shapes life courses. Future research would benefit from disentangling the individual effects of specific policies in each welfare state on work-family life courses. For example, the role of social assistance and child alimony could be analysed as they might play an important role in earnings adjustment processes after divorce. For a comprehensive picture of the relationship between divorce and economic wellbeing, future research could focus on the interplay of individual labour earnings with either income- or employment-related social policies and outweigh their short- and long-term benefits, as these might be different for women and men depending on their economic position. Additionally, concerning old age, different pension regulations and sources of income, such as occupational and private pensions, but also savings, could be analysed.

### *Policy conclusions*

There are important policy-relevant findings that can be derived from this dissertation. Through various policy shifts in both countries, the Swedish and the German welfare state might not be entirely in line with the typologies of welfare state literature (see section 1.2). However, each



welfare state still follows its long-standing internal logic, which is often described as “institutional-stickiness” (Neyer, 2021: 29). Both policy approaches have different supportive or restrictive effects on the employment of women (especially mothers) and men, prevailing family models, and the economic wellbeing of divorced women and men.

The Swedish policy approach has been the ‘gold standard’ for family policy reforms in many European countries, including Germany. Indeed, the comparison to the conditions in Germany reveals that women in Sweden can be more often ‘self-reliant’. The individualistic aspect of Swedish family policies – i.e., that policies are not directed at supporting specific family forms, such as marriage, but support the individual (Oláh & Neyer, 2021) – has made women’s economic wellbeing less reliant on having a married partner. Social policies in Sweden increased female employment rates, improved women’s economic autonomy more than in other policy settings, and established dual-earner families as the ‘new norm’. Still, economic wellbeing in Sweden hinges on family status and family context. Single parents were shown to be economically disadvantaged as they could not compete as a single earner in a dual-earner society (Jaehrling et al., 2015; Nieuwenhuis, 2022). Another explanation for the higher poverty risk among single parents are the additional cuts in Swedish redistribution policy since the 1990s, especially the reduction in unemployment benefits with a simultaneous increase in the eligibility criteria (Alm et al., 2020; Zagel et al., 2021). Therefore, there is a risk that if single mothers become unemployed, they will lack both a second income from their partner and an adequate safety net from the welfare state.

Since the ‘nordic turn’ in the 2000s, German family policy is no longer as strongly oriented towards the male breadwinner model as it used to be (Fleckenstein, 2011; Geisler & Kreyenfeld, 2019b). The policy measures introduced since the 2000s (e.g., the new parental leave scheme, extension of public child care) were policy shifts in the direction of more individualised policies aiming to enable mothers to keep their ties to the labour market. These measures were also shown to impact mothers employment positively (e.g., Frodermann et al., 2020; Spiess & Wrohlich, 2008). However, these policies are still within a setting where other policy measures and circumstances (e.g., marriage benefits and cultural norms) keep a large share of women, especially mothers, from being economically independent from their husbands. Thus, there is a *Scandinavisiation* of some social policies in Germany (Mätzke & Ostner, 2010) while otherwise ‘sticking’ with long-established male breadwinner policies (Neyer, 2021). In the literature, German family policy has therefore been criticised as inconsistent (BMFSFJ, 2021; Radenacker & Kreyenfeld, 2018; Trappe et al., 2015). However, policy measures that might be regarded as an ‘outdated legacy’ of the male breadwinner model, such as the divorce splitting mechanism in Germany, are rather effective in getting closer to reaching economic equality for divorced women (Kreyenfeld et al., 2021). This policy acknowledges an ‘economically weaker’ part and an imbalance in income between women and men during the years of marriage and, thus, rejects the individualistic approach.

Therefore, this policy measure could be regarded as a safety measure later in life in case policies do not completely eliminate gender differences during working life. Another example would be direct transfers after divorce, such as ex-spousal maintenance payments (which were heavily cut in Germany in 2008, though). They improve mainly women's economic wellbeing in the years following divorce and often shield them from falling into poverty (de Vaus et al., 2017; Uunk, 2004). However, these direct transfers do not generate any pension entitlements. Therefore, in the long-term, they do not protect divorced women from being economically disadvantaged in old age. Both examples reflect the dilemma of social policies in establishing a balance between adequate incentive structures, which simultaneously leaves freedom for individual choices and equally benefits all societal groups across gender and class.

This leads back to the internal logic of each welfare state, and the question of who steps in when the primary source of income to secure economic wellbeing – the labour market, the family, or the welfare state (Lewis & Hobson, 1997) – is no longer available. This question is essential in the case of divorce and separation. As outlined in the life course perspective, women's and men's economic wellbeing after divorce depends on their previous work-family lives, the decisions taken within the marriage, but also on the welfare state context and the opportunities provided to women and men after the divorce. As shown in this dissertation, it is therefore important that welfare states offer a wide range of policy measures across different life stages.

Given the increasing diversity of family forms in mid- and late life, as shown by the growing share of grey divorce (i.e., divorces after the age of 60), the question of how welfare states can support the economic wellbeing of different family forms is crucial. Ideally, policies should foster equality between women and men and enable both throughout their life course to gain and maintain economic autonomy. Thus, social policy should try to prevent inequalities from the onset. These policies can comprise work-family reconciliation measures, but also income protection measures in case women and men have periods out of employment. As indicated by the results of this dissertation, especially for women in both countries, periods out of employment due to child-care together with labour market inequalities still lower their earnings and pension entitlements compared to men. As necessary as it is to actively integrate women, especially mothers, into the labour market, it might also be necessary for policies to demand more care work from men and, thereby, distribute the economic risks associated with care work more equally between women and men (see, e.g., Seo, 2023). In addition, considering family diversity, policies could be decoupled from marital status to include those choosing a family form other than marriage adequately. Social policy measures should prevent the onset of 'ageing unequally' by reducing labour market, gender-, and marital status-related inequalities. At the same time, and this leads back to the dilemma of social policy, welfare states should also adopt a pragmatic social policy approach that steps in and cushions the consequences when inequalities cannot be eradicated in the first place.

## **Chapter 2**

## **2. Mothers' earnings trajectories after separation in western Germany and Sweden**

### **2.1 Introduction**

Economic autonomy refers to the capacity to support oneself and one's dependents (Orloff, 1993). At a time when single parenthood has become increasingly common (Bernadi et al., 2018), mothers' capacity for economic autonomy is crucial as they frequently face a drop in equalised household income (Andreß et al., 2006; Bayaz-Ozturk et al., 2018; Burkhauser et al., 1991; Hauser et al., 2016), increased poverty, and reliance on government assistance after separation (Nieuwenhuis & Maldonado, 2018; Zigel & Van Lancker, 2022). While there is relative consensus on measures that reduce the impacts of childbirth on women's employment, such as income-related parental leave and subsidised public childcare (Budig et al., 2012; Grimshaw et al., 2015; Halldén et al., 2016; Misra et al., 2007), there is less agreement on social policy measures that are effective in reducing the negative economic impacts of separation. It is generally believed that countries that effectively integrate women into the labour market are also better equipped to shelter them from the adverse economic effects of separation (Korpi et al., 2013; Zigel & Van Lancker, 2022).

Single mothers in Sweden and Germany have higher poverty risks than those in other European countries (Nieuwenhuis & Maldonado, 2018), despite the various policy reforms both countries have undertaken over the years to increase women's labour force participation. Sweden began introducing reforms in the 1970s, while Germany only began in the early 2000s, modelling its policies after Sweden's. Given that the two countries are at different stages of progress in their efforts to increase women's labour market participation, they make ideal cases to examine the interaction between social policy and women's economic autonomy after separation.

Studies focusing on earnings trajectories after separation as a measure of women's economic autonomy are rare. Most of those that do exist are confined to single countries and have a short-term focus (Tamborini et al., 2015). In this paper, we compare long-term earnings trajectories of separated mothers and partnered mothers in Sweden and western Germany. We focus exclusively on women who were employed two years prior to the birth of their first child, as our interest lies in work-related adjustments following the transition to parenthood and separation. The two countries differ in their assumptions about mothers' economic independence and, therefore, their overall policy regimes supporting the combination of care and paid work. Although Germany has enacted major policy reforms in recent years, the male breadwinner model is still deeply rooted, especially in western Germany (Geisler & Kreyenfeld, 2019a). The recent reforms have resulted in modest increases in maternal full-time employment, but married mothers still mainly work part-time or in marginal employment (BMFSFJ, 2020). Sweden, in contrast, is known for its longstanding

family policies that promote gender equality, the employment of both parents and the equal sharing of care work within couples (Ferrarini & Duvander, 2010). This has led to high female labour force participation rates, earlier re-entry of mothers into the labour market, and higher levels of full-time work after childcare breaks than in policy settings where women significantly reduce their labour supply after the birth of a child (Korpi et al., 2013).

While being widespread, parental separation is still understudied and deserves further attention due to the seriousness of the short- and long-term economic consequences, particularly for mothers. By comparing separated and partnered mothers' earnings trajectories in a cross-national setting, we study mothers' capacity for economic autonomy in two different social policy contexts. Using large-scale register data from the German pension insurance and Statistics Sweden along with OLS and fixed effects models, we produce robust estimates of the effect of separation on mothers' earnings trajectories over a period of ten years after first childbirth. Further, we shed light on subgroup variation based on pre-birth earnings quartiles. The analysis of subgroup variation within different policy settings reveals how social class differences interact with critical life-course events such as separation and points to the differing opportunities mothers might have within existing social policy contexts.

## **2.2 Determinants of separated mothers' labour market activity**

Research has long highlighted efforts to increase earnings as one of the most important strategies to offset severe economic outcomes after a separation (Mortelmans, 2020b). Hence, separation is possibly an important trigger for mothers to (re-)enter the labour market, increase working hours or seek for better-paying work (Jansen et al., 2009). Yet depending on women's labour market integration prior to separation, different mechanisms are likely to guide their labour market behaviour afterwards and thus, to affect their earnings trajectories. Financial needs may push separated women to increase earnings while other needs, such as the reconciliation of family and work life, may work in a constraining way.

### **2.2.1 Push factors**

After separation, economies of scale are lost, living expenses increase, and the previously pooled household income is split. These factors are often especially detrimental to women and can act as push factors, encouraging women to increase their labour earnings. The economic need is most urgent in cases where the woman was previously a homemaker or part-time worker, since this would mean she was contributing less to the shared household income. Even for women who worked full-time or 'long part-time' prior to separation, losing access to the former partner's income may be detrimental. Women are often in an economically weaker position due to the wage gap between women and men, which is exacerbated by the often gendered division of labour after

the birth of a child (Evertsson & Boye, 2016). In addition, children commonly reside with their mothers after separation. Part of the children's living expenses are covered by child maintenance paid by the non-resident parent. However, if child maintenance payments are low or the other parent fails to pay regularly, this may aggravate the precarious economic situation of the separated mother.

Another factor guiding women's labour market behaviour after separation is the different legal contexts relating to civil status. In countries where the male breadwinner model is predominant, marriage tends to be coupled with legal benefits (Sainsbury, 1999b). For example, health care coverage is often provided to the entire household when just one member, usually the man, is employed. Before separation, 'marriage benefits' may keep women out of employment as they are covered within the household in their role as dependent spouses, while after separation, the loss of these benefits increases their financial needs and can push them to seek work or increase their earnings. In contexts where a dual-earner model is predominant, access to social security and health care is decoupled from civil status and depends instead on the individual's own labour market participation (Lewis, 1992).

Earlier studies support the idea that economic need is a mechanism pushing women to increase their labour market participation (Jenkins, 2008; Van Damme et al., 2009) and earnings (Bradbury & Katz, 2002; Smock, 1994) following separation. Economic need is also connected to socio-economic status, as shown among women in the United States (Tamborini et al., 2012) and mothers in Israel (Herbst & Kaplan, 2016): In both countries, women with the lowest earnings in the year prior to divorce achieve the greatest gains afterwards, most likely as a result of switching from part- to full-time work. Moreover, separation has been found to have a positive impact on women's labour earnings in the long-term, especially if women do not remarry (Couch et al., 2013; Tamborini et al., 2015).

### **2.2.2 Constraining factors**

There are some studies that report long-term earnings penalties for women after divorce, contradicting the theoretical mechanisms outlined above. For example, in Israel, women gain more stable employment following a divorce yet suffer long-term earnings penalties (Raz-Yurovich, 2013). In Sweden, separated mothers initially show stronger earnings increases compared to partnered women, but eight years after first birth, their labour earnings show a lagged negative separation effect (Nylin, 2020). In Finland, research has found that single mothers have substantially lower annually measured mid-life earnings than married mothers (Jalovaara & Fasang, 2019). According to Jalovaara and Fasang (2019), their findings question whether 'family-friendly' policies are reducing gender inequalities and suggest that they may instead only be supporting indi-

viduals who adhere to normative models of the life course and maintain stable relationships. Selection effects into separation may play a part in explaining this, given the strong negative educational gradient in single parenthood (Härkönen & Dronkers, 2006). However, other mechanisms may be at play that constrain the employment and labour market success of separated mothers.

Mothers are often left with sole responsibility for their children after separation, as exemplified by the disproportionate share of children who live with their mothers (Bjarnason & Amarsson, 2011). The increased childcare obligations resulting from single parenthood can result in time allocation conflicts when trying to reconcile job and family. Research indeed shows that work-family conflict is high in settings like Sweden, where mothers' labour market participation is taken for granted (Grönlund & Öun, 2010). Because of these constraints, mothers may lack the time and energy necessary to increase their earnings and move ahead in their careers after separation. Those who are already employed may even have to reduce their labour market activity. Reductions in working hours result in lower earnings and a higher long-run risk of human capital depreciation (Aisenbrey et al., 2009; Budig et al., 2012) and, thus, poorer earnings trajectories than would otherwise be the case.

The degree to which mothers are constrained from increasing their earnings arguably depends on the extent to which mothers are employed, i.e. the 'baseline situation' from which they start after separation in terms of time availability and socio-economic position. With regard to time availability, mothers who are already working full-time or 'long part-time' cannot increase their earnings as much by increasing their working hours. For them, the only available option is the challenging path to seek a better-paying job. Thus, in social policy settings that promote women's economic autonomy through family-friendly policies, mothers start from a different baseline situation after separation compared to mothers in policy settings where female economic autonomy is less common.

Women's labour market behaviour after separation is also related to their socio-economic position. One indicator of socio-economic position is education. Fewer years in education often correspond to a low socio-economic position and act as a constraint on (re-)entering the labour market or switching to a better-paying job to increase earnings. Mothers who were not fully integrated into the labour market before the birth of their first child are likely to face greater constraints after separation. Research has shown that in western Germany, earnings almost stagnated two years after divorce among mothers with low pre-divorce earnings and increased mostly among mothers with higher pre-divorce earnings (Radenacker, 2020). In the latter group, despite this increase, earnings still averaged below levels of economic autonomy. In Sweden, earnings penalties eight years after separation were found to have the most severe impact on mothers with low socio-economic positions. Compared to partnered mothers, separated mothers with the lowest pre-birth

earnings showed the weakest earnings trajectories over time, pointing to an additional disadvantage they experience due to separation (Nylin, 2020). In Sweden, children of parents with a lower socio-economic position more often live with their mothers after separation (SCB, 2014), adding to the constraints faced by these women.

### **2.3 Differences between Sweden and western Germany**

Sweden and Germany have both passed reforms to increase women's labour force participation but have progressed to different degrees in achieving this goal. Sweden is considered to have an 'earner-carer' family model where both parents work full-time or close to full-time (Ferrarini & Duvander, 2010). The parental leave system guarantees financial security and subsidised public childcare, which is almost universally used by all children starting at the age of two (Swedish National Agency for Education, 2021), enables both parents to work. Furthermore, parents with children under the age of eight have the right to reduce their working hours by up to 25 % of regular hours (SCB, 2020b). Known as 'long part-time work' when applied to a 40-hour work week, this option is still mainly used by mothers.

Following Sweden's example, Germany has enacted major reforms over the last 15 years. Policies introduced since 2007 include earnings-related parental leave benefits to promote women's quicker return to the labour market, incentives for fathers to take a share of parental leave (Unterhofer & Wrohlich, 2017), as well as the expansion of public childcare available to children from age one, including a legal right to a childcare slot since 2013 (Bröckel & Andreß, 2015). Despite the reforms, access to public childcare is still limited, and western Germany is often described as a conservative country with policies that tend to support women's care work over their full-time employment. This traditional model is encouraged by the insurance system, in which married women are covered by their spouse's health insurance, and by the joint taxation scheme, which creates strong work disincentives for a second earner (Bröckel & Andreß, 2015). In contrast to Germany, Sweden has had a system of individualised taxation since the 1970s (Selin, 2014), which has helped to reduce the share of 'housewives' and women in marginal employment.

Although there has been an increase in joint physical custody arrangements in Sweden (SCB, 2014), most children reside with their mothers after parental separation, as is the case in Germany. In both countries, the non-resident parent is obliged to pay child maintenance. Whereas in Germany, the amount is determined by the court based on the non-resident parent's income, in Sweden, parents have been encouraged since the early 2000s to agree on the amount of child maintenance payments privately (ISF, 2019). In the Swedish system, spouses are, as a general rule, individually responsible for their livelihood following a divorce, while in Germany up to 2008, spousal maintenance was granted to the resident parent under the assumption that mothers were



unable to work full-time before the youngest child reached age 15. A reform in 2008 radically changed this situation by assuming that women can be ‘self-reliant’ once the youngest child turns three (Geisler & Kreyenfeld, 2019a).

In 2019, employment rates of mothers with children 0-14 years old were 73 % in Germany and 86 % in Sweden (OECD, 2020). It is important to note, however, that mothers in Germany work considerably fewer hours than mothers in Sweden. In Germany, 38 % of mothers work part-time, meaning fewer than 30 hours per week, whereas in Sweden, only 9 % of mothers work part-time, while the majority work full-time or ‘long part-time’ (OECD, 2020). In western Germany, young children are still an important factor inhibiting mothers from returning to work. This, in combination with the higher gender pay gap in Germany (OECD.Stat, 2021a), means that women in Germany are still far from economic autonomy. Swedish women are in a more advantageous economic position as mothers, but employment rates in Sweden are lower among single mothers than partnered mothers (SCB, 2020a). In Germany, full-time employment is more common among single than partnered mothers (Destatis et al., 2021). There, the overall impact of the aforementioned reforms has been moderate, the main effect being an increase in employment levels among highly educated mothers (Zimmert, 2019).

## **2.4 Hypotheses**

In the following, we outline how mothers’ earnings trajectories may vary after separation by comparing the earnings trajectories of separated and partnered mothers in Sweden and western Germany. At the point in time when separation occurs, earnings trajectories of mothers in the two countries are likely to differ already, as Swedish mothers return to the labour market sooner after childbirth than German mothers. Starting from these different baseline situations, push factors and constraining factors will affect mothers’ employment behaviour to varying degrees. Although mothers from Sweden and Germany are likely to be affected by both types of factors, we assume that German mothers are more affected by push factors and that Swedish mothers are more affected by constraining factors due to the respective policy contexts.

For Germany, we expect separated mothers to have steeper earnings trajectories than partnered mothers (H1a), as their imminent need to achieve economic autonomy as single mothers pushes them to increase their earnings. This need is intensified by the fact that marriage benefits such as health insurance are no longer available to them following separation, creating strong incentives to seek ‘regular’ employment or increase working hours.

In Sweden, push factors to increase earnings after separation are likely weaker, as women maintain their economic autonomy after the birth of a child by continuing to work full-time or ‘long part-time’. Compared to partnered mothers, however, separated mothers have to face high levels

of work-family conflicts alone while also bearing increased childcare obligations. Therefore, efforts to advance their careers may be constrained, and separated mothers may even be more prone to reduce their working hours. This could lead to direct reductions in earned income and have a long-run negative impact on future returns. For Sweden, we therefore expect separated mothers' earnings trajectories to be flatter than those of partnered mothers (H1b).

Given that initial socio-economic positions are likely to determine future employment and earnings trajectories, we assume that the patterns described above for the two countries in H1a/b will be more distinct depending on the economic starting position of the mother. For Germany, we expect that the stronger the pre-birth earnings position of separated mothers, the stronger their earnings growth after separation compared to partnered mothers (H2a). For Sweden, we expect that the weaker the pre-birth earnings position of separated mothers, the weaker their earnings growth after separation compared to partnered mothers (H2b).

## **2.5 Data, variables, and analytical strategy**

We use individual-level register data containing marital, fertility, and earnings histories for Sweden and Germany. The Swedish data cover the whole population and are provided by Statistics Sweden. The German data consist of a subsample from the public pension registers, the VSKT-VA 2015. About 90 % of all residents of Germany are covered by the public pension system, except for certain occupational groups such as civil servants (Keck et al., 2020). The analysis is restricted to western Germany. As family behaviour differs significantly between eastern and western Germany, including the eastern German situation would have gone beyond the scope of this paper.

For comparability, we restrict the Swedish and German data to women who I) gave birth to their first child between the years 1992 and 2014, excluding women with multiple births, II) were born before 1985 and were aged 18 to 50 at the event of first childbirth, III) who were nationals (with Swedish or German citizenship) and residents of the respective country in 2015 and, IV) had an income two years prior childbirth.<sup>11</sup> Restricting the data to women with labour earnings two years before the birth of their first child means that 30 % of the original German and 11 % of the Swedish sample is dropped, reflecting the varying degrees of labour market participation in the two countries. Women who become mothers without a partner or whose relationship ends within the year of childbirth are not the subject of this study. Therefore, we only follow women who were in a partnership at the end of the year in which the first child was born. We are able to follow 26,170 women (245,636 person-years) from western Germany and 688,713 women (7,075,656

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<sup>11</sup> Due to outlying earnings in the Swedish data, women who earned more than one million SEK during any given year in the study window were also excluded.

person-years) from Sweden. Our observation window starts one year before childbirth and ends when the first child turns 10 years old, or in 2015 at the latest.

#### *Dependent variable*

The dependent variable is *annual gross labour earnings* from taxable employment. For both countries, earnings were converted into euros using 2014 as a reference year. Although earnings are often transformed to a log scale, we keep absolute euro amounts to capture all mothers over our 10-year observation window, even if they have no earnings in a given year.

#### *Independent variable*

The main variable of interest is the time-varying measure of *separation*, which can occur from one year after birth until the child reaches the age of 10. For Sweden, the date of separation is defined as the year in which the previously co-resident partners move into separate households. This includes both married and cohabiting couples, as childbirth often precedes marriage in Sweden. Further, in Sweden, legal differences between divorce and union dissolution are small, while rights and benefits are the same for all parents regardless of civil status (Perelli-Harris & Gassen, 2012). Additional analysis of separations of married women versus separations of cohabiting women shows that results are driven by separations of cohabiting women, which we will address again in the discussion. The German data only contain information on the dates when married couples filed for divorce. We therefore define separation as this date and cannot identify the separation dates of unmarried couples. However, this is a relatively small fraction of the western German population, where non-marital birth ratios are low, and most cohabiting mothers marry shortly after childbirth (Konietzka & Kreyenfeld, 2002; Schnor, 2014). Generally, more mothers separate in Sweden than in Germany, especially in the first years after birth (Appendix, Figure A2.1).

We use *pre-birth earnings quartiles* (Q1-Q4), measured two years before childbirth, as an exogenous factor to reduce the effect of selection into separation and to account for subgroup variation based on women's socio-economic position.<sup>12</sup> As this variable is formed on the earnings distribution in each country, cut-points differ for Sweden and Germany. Further, we are interested in the *age of the first child*, measured in single years, as a time frame over which we follow the mother's earnings development. We also control for the *age of the mother at first childbirth* (categorical) and a time-varying covariate for whether a *second* or *third child* was born, as both are expected to impact the earnings development. Changes in *macroeconomic developments* are controlled for by annual national female unemployment rates (IAB, 2017; SCB, 2020a), and period effects such

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<sup>12</sup> To ensure that pre-birth earnings quartiles reflect the economic position of mothers, they were also calculated at other time points (e.g., one year before), generating similar results.

as economic recessions or policy changes are included by a categorical time period variable (1991-1999, 2000-2006, and 2007-2015).

Table A2.1 in the Appendix shows the average earnings and socio-demographic characteristics for the total sample as well as for each pre-birth earnings quartile at the start of our observation window. Women's pre-birth earnings differ between the samples. German women have higher annual earnings on average (26 847 euros) compared to Swedish women (22 309 euros), which is due to the restriction of the samples to employed women. On average, women have their first child at age 29 in both countries and separate when the child is around five years old in Sweden and six in western Germany. Likewise, the average age at birth increases from age 27 to 32 over the pre-birth earnings quartiles, pointing to longer participation in the labour market prior to birth and/or to a postponement of first birth. With regard to the timing of separation after childbirth, there are few to no differences between the women in the different pre-birth earnings quartiles. However, within the observation period, the share of women who separate decreases from Q1 to Q4 in both countries, and Swedish women tend to have more second and third childbirths than German women (Appendix, Figure A2.2).

### *Analytical strategy*

We start with a descriptive analysis of average earnings over our observation window, comparing trajectories of separated and partnered mothers in Sweden and western Germany. Using separate OLS regression models for both countries, we first estimate the effect of separation on mothers' average annual earnings. We then separately interact the age of the first child and the pre-birth earnings with the separation variable to identify time trends and subgroup variation. In the next step, we conduct a three-way interaction of these variables to shed light on the long-term earnings developments of subgroups of separated and partnered mothers. Since our data contain repeated measures of earnings for each woman over time, we estimate robust standard errors that account for the clustering of individuals in our data. As a final step, we compare the main OLS results with estimations from fixed effects models as a robustness check to account for possible time-constant unobserved heterogeneity that may have biased the OLS regressions. All results of the full OLS and FE models can be found in the Appendix.

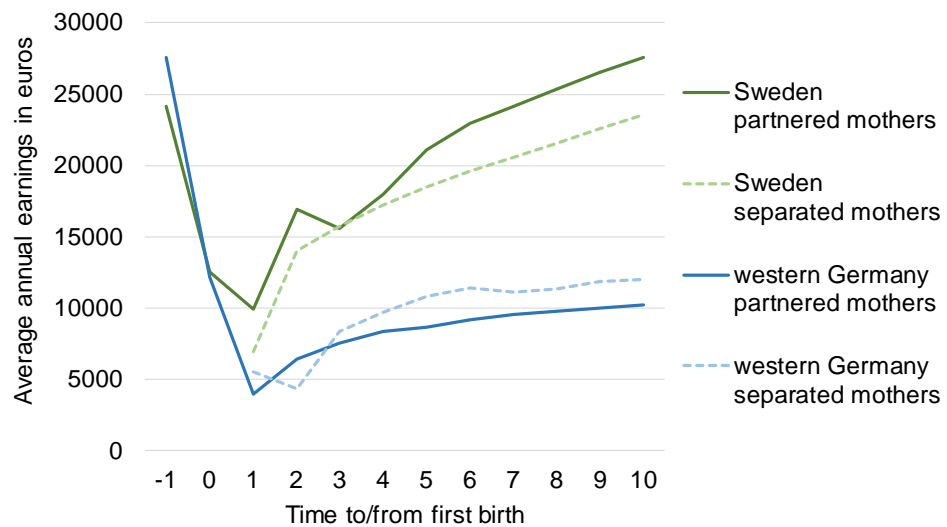
## **2.6 Empirical findings**

### **2.6.1 Descriptive results**

Our descriptive findings indicate large differences in women's earnings before and around childbirth in both countries (Figure 2.1). Although all mothers experience a sharp decline in earnings around childbirth, the decline is much stronger in western Germany. After childbirth, most mothers increase their labour market participation, which shows up as a continuous increase in average

earnings. The only exception is a second earnings dip among partnered mothers in Sweden. This dip may be due to the compressed timing of second births in the country. Ten years after child-birth, partnered and separated mothers in Sweden are able to return to the level of their pre-birth earnings, whereas German mothers remain far below their pre-birth earnings, reflecting the different labour market participation of mothers in the two countries. However, while separated mothers earn less than partnered mothers in Sweden, separated mothers in Germany earn more than their partnered counterparts over time.

Figure 2.1: Average annual labour earnings of partnered and separated mothers by the age of the first child



Source: FamChange database and VSKT-VA 2015; own calculations.

### 2.6.2 Regression results

Similar to the descriptive statistics, our regression results show a clear negative correlation between separation and annual earnings for mothers in Sweden but a positive correlation for mothers in western Germany (Table 2.1). The estimation of the effect of separation indicates that separated Swedish mothers earn on average 1922 euros less per year than partnered mothers. In comparison, separated western German mothers earn, on average, 1844 euros more than partnered mothers.

Table 2.1: OLS regression results with annual earnings as dependent variable

	western Germany		Sweden
<b>Separation</b>	No	ref.	ref.
	Yes	1 844***	-1 922***
<b>Person-years</b>	245 636		7 075 649
<b>R-square</b>	0.383		0.383

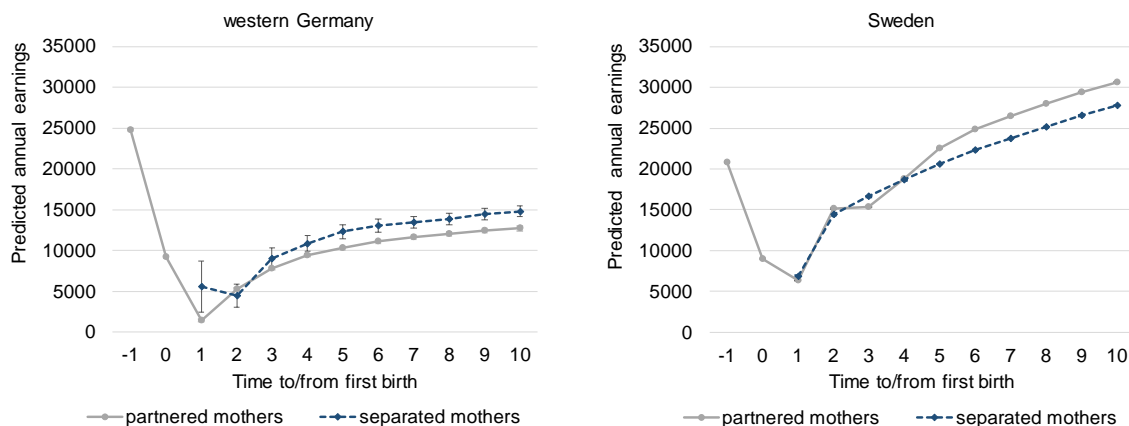
legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

*Controlled for:* Age of the first child, age at first childbirth, birth order, pre-birth earnings quartiles, calendar year, national unemployment rate. Results rounded.

*Source:* FamChange database and VSKT-VA 2015; own calculations.

The results of the interaction models by age of the first child and pre-birth earnings quartiles are graphically presented by plotting the estimates of the average marginal effects. Figure 2.2 reveals that the observed effect of separation on earnings starts a few years after birth and seems to persist over time in both countries. After initially similar earnings trends for all mothers in western Germany, earnings trajectories diverge, with separated mothers having on average steeper earnings trajectories up to the end of our observation window, which is in line with H1a. It seems that separated mothers are either returning to the labour market or increasing their work hours more quickly, which is reflected in their stronger earnings growth, which, however, remains below pre-birth earnings. Swedish mothers show relatively rapid earnings increases after birth, exceeding their pre-birth earnings, reflecting the normally high maternal employment rate in Sweden. From four years after birth, partnered mothers' earnings are steeper, leaving separated mothers behind, as expected in H1b.

Figure 2.2: Predicted values from OLS regression; interaction models of age of the first child and separation

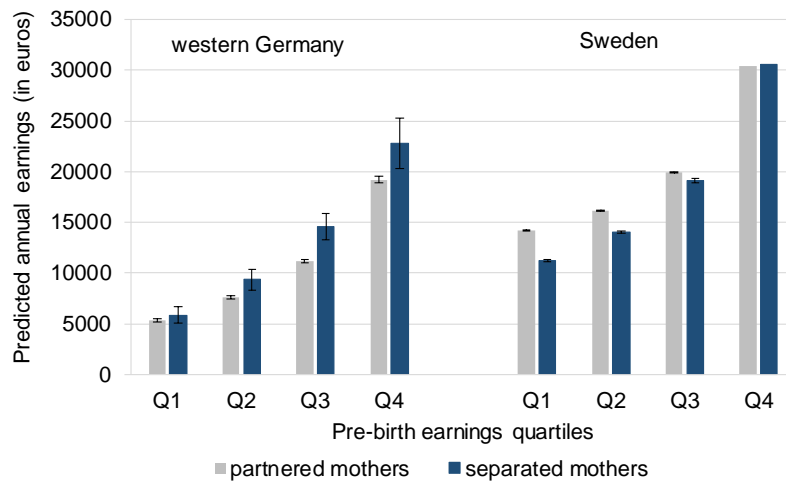


*Controlled for:* Pre-birth earnings quartiles, calendar year, age at first childbirth, birth order, period and female unemployment rate.

*Source:* FamChange database and VSKT-VA 2015; own calculations.

Figure 2.3 shows the interaction effect of pre-birth earnings quartiles and the separation variable on mothers' annual earnings averaged over the study period. In both countries, results indicate that earnings increase with the level of pre-birth earnings, but that the increase differs between separated and partnered mothers. Separated mothers from western Germany show higher earnings in all four pre-birth earnings quartiles and the most pronounced increases in the two highest quartiles (Q3-Q4). However, there is no significant difference between partnered and separated mothers from the lowest pre-birth earnings quartile (Q1) in Germany. In Sweden, earnings are generally higher for partnered mothers, which is most evident in the two lowest pre-birth earnings quartiles (Q1-Q2). However, in the highest pre-birth earnings quartile (Q4), partnered and separated mothers show relatively similar earnings that are also substantially higher than earnings of all other mothers.

Figure 2.3: Predicted values from OLS regression; interaction model of pre-birth earnings quartiles and separation



*Controlled for:* Calendar year, age at first childbirth, birth order, period and female unemployment rate.

*Source:* FamChange database and VSKT-VA 2015; own calculations.

The results of the three-way interaction, shown in Figure 2.4, disentangle the subgroup variation by pre-birth earnings quartiles with respect to the observed trends shown in the previous interaction models. Looking at the subgroup-specific trajectories, the clear pattern of steeper earnings trajectories among separated mothers compared to partnered mothers in western Germany is only evident for those in the higher pre-birth earnings quartiles (Q3-Q4). Partnered and separated mothers in the lowest earnings quartile (Q1) both show equally flat earnings trajectories, indicating that women who already had a low economic position prior to the birth of their first child face greater difficulty increasing their earnings afterwards. Since only separated mothers from the higher pre-birth earnings quartiles show steeper earnings growth than partnered mothers, while this is not the case for separated mothers from the lowest group, we find only partial support for

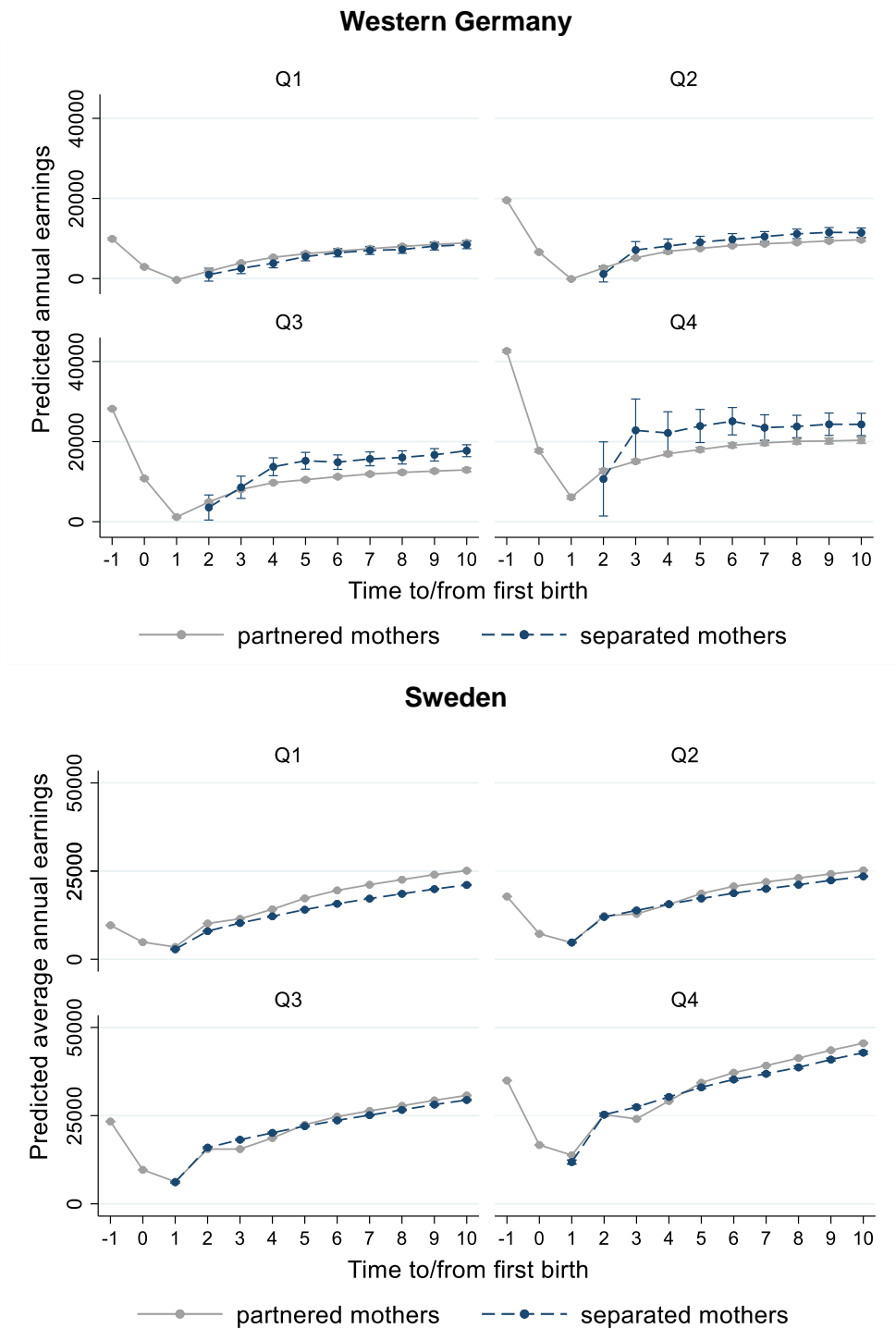
H2a. In Sweden, partnered mothers have higher earnings over time than separated mothers, even when distinguished by pre-birth earnings quartiles, although the difference is smaller than indicated by the two-way interaction results. The largest gap in earnings exists for separated mothers in the lowest earnings group (Q1). However, separated mothers in the highest pre-birth earnings group (Q4) also experience comparatively flatter earnings trajectories than the partnered mothers, at least starting at five years after birth. Thus, although we find partial support for H2b, as separated mothers coming from the lowest earnings quartile (Q1) have flatter earnings trajectories compared to partnered mothers, this support is challenged by the results for mothers in the highest earnings quartile (Q4). Finally, fixed effects models confirm the long-term patterns found between partnered and separated mothers for both countries (Appendix, Table A2.9, Figure A2.3-A2.4). Overall, they estimate slightly higher earnings trajectories for all women in both countries.<sup>13</sup>

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<sup>13</sup> Further sensitivity checks (e.g. sample restrictions, definition of separation variable) are available on request.



Figure 2.4: Predicted values from OLS regression; three-way interaction model of pre-birth earnings quartiles, separation, and age of the first child



*Note:* Scales differ for both countries. Separated mother's estimates for the first year after birth are not presented for Germany due to low case numbers. *Controlled for:* Calendar year, age at first childbirth, birth order, period and female unemployment rate.

*Source:* FamChange database and VSKT-VA 2015, own calculations.

## 2.7 Discussion

By comparing the effect of separation on mothers' earnings trajectories in western Germany and Sweden, we have shown how mother's capacity for economic autonomy differs between the two policy settings. In line with our expectations, we found that separation positively affects mothers' earnings in western Germany, but that the opposite occurs over time in Sweden.

Since separation takes away the possibility for women to rely on their partners' earnings, as practised within male breadwinner policies, it means that women need to increase their labour market participation to secure their financial welfare. The stronger earnings trajectories that separated mothers display compared to partnered mothers in our results for western Germany support this mechanism. However, economic autonomy is far from achieved, as earnings remain considerably below pre-birth levels. Further, when the results are disentangled by pre-birth economic positions, post-separation earnings increases are limited to mothers with the highest earnings positions before birth. Still, the higher earnings of separated mothers do not match the support partnered women gain from their partners' earnings, given earlier research on household income (Bröckel & Andreß, 2015). Despite showing an earnings increase after separation, our results still highlight the importance and necessity of spousal and child maintenance, as well as social assistance to families headed by single mothers in western Germany – at least until policy measures succeed in better integrating women into the labour market.

In Sweden, thanks to family-friendly policies that encourage labour market participation, women have better opportunities to maintain their economic autonomy throughout the transition to parenthood and after separation. This is reflected in our results showing that both partnered and separated mothers surpass their pre-birth earnings over time. However, our results also show that the earnings trajectories of separated mothers lag behind those of partnered mothers at the end of our observation window. This is mainly of concern among mothers with the lowest economic positions pre-birth. As outlined above, push factors to increase earnings after separation may be less relevant in policy settings where mothers continue to engage in paid work, but they also face greater difficulty increasing their earnings. In such settings, efforts to balance care work and paid work take centre stage. Resulting time allocation conflicts may negatively impact mothers' labour market behaviour and earnings, especially for those mothers starting from a lower economic position. Hence, due to the different baseline situations after separation, the question seems to be 'how much can I work' in Sweden compared to 'going back to work at all' in western Germany.

Building on previous research, we have outlined push factors and constraining factors in different policy settings that guide mothers' post-separation behaviour in the cross-section of care work and paid work. As previous research suggests, the lower earnings of separated mothers in Sweden could result from the time allocation problem these women face (Amilon, 2010; Roman, 2017), but we have unfortunately not been able to control for that. Future research disentangling separated mother's adjustments in

working hours, job switches, and sick leave would offer valuable pieces to solve this puzzle. We already know that mothers trade wages for shorter work days as well as shorter commuting distances (Skora et al., 2020), but less is known about whether these strategies are used by separated mothers in particular. While we have relied on mothers' labour earnings to measure their economic autonomy, other studies have focused on household income. Future research should try to include and differentiate between detailed income types to fully understand the mechanisms that drive post-separation earnings. It is known that transfer reliance increases after separation (Nieuwenhuis & Maldonado, 2018) and that mothers from low-income households are often left to rely on welfare support as an alternative to employment when their children are very young (Konietzka & Kreyenfeld, 2005). Still, the question of how individual labour earnings interact with either income- or employment-related social policies and how this varies not only by economic position but also by policy setting needs further attention. For instance, the amount of child maintenance received by separated parents in Sweden is largely unknown: Transfers are often settled privately after separation, which could be an additional disadvantage for low-income mothers. Despite dissimilarities between Germany and Sweden, low-income mothers in both countries have a hard time increasing their earnings after separation, and separations are especially prevalent in this group. Keeping in mind that only women who were employed prior to birth are included in this study, the question of how mothers without prior labour market attachment fare is a pressing concern. Additional analysis for Germany showed that a large percentage of mothers in the lower income groups drop out of the labour market. For Sweden, the results indicate a high risk of in-work poverty, as other studies have pointed out as well (Nieuwenhuis & Maldonado, 2018). While the present work has focused mainly on work-related adjustments of mothers following separation, future research could examine what keeps some women out of the labour market in the first place.

A limitation of our study is that in the case of Germany, we can only examine the consequences of marital separation but not separation from cohabitation. Although non-marital childbearing ratios are low in western Germany, some mothers cohabit before separation, and since they are indistinguishable from partnered mothers in our data, we do not know if their earnings trajectories differ. Sensitivity analyses have indeed shown that even in Sweden, where there are few legal differences between marriage and cohabitation, mothers who have experienced marital separation do better than mothers who have separated after non-marital cohabitation (Appendix, Figure A2.5). Although we included pre-birth earnings quartiles to address the social gradient in separations, selection into marriage seems to affect earnings trajectories.

This two-country comparative study indicates that social policy measures that facilitate the reconciliation of work and family life have a positive effect on the employment behaviour of mothers. Based on our results, we would like to emphasise the importance of social policies that promote female economic autonomy throughout the life course. The Swedish setting, which combines 'active labour market policies' with accessible and affordable public childcare, clearly allows mothers to continue to

achieve upward earnings trajectories even after a separation. Still, as separated mothers' earnings lag behind those of partnered mothers over time, policies do not seem to be providing separated mothers the same opportunities as partnered mothers. This is of concern as the *Scandinavianisation* of social policies across Europe has the downside of leading to general cuts in welfare support. The reforms of spousal alimony in Germany are an example of such cuts as they are based, among other things, on the assumption of increased female labour market participation. However, such cuts run the risk of pulling away a financial safety net that mothers often urgently need, even if they were previously in full-time employment.

The Swedish results pose the important question of why 'family-friendly' policies do not adequately protect all women, including mothers, from the adverse effects of separation and what additional measures should be taken. As the Nordic countries' family policies often serve as a model for the rest of Europe, the disadvantage separated mothers face irrespective of their economic position pre-birth is striking and points to a structural problem. Broad sets of social policies are needed to address the specific needs and situations of separated mothers. Regulated child maintenance, social benefits, and assistance are essential to ensure the economic wellbeing of single-parent families, together with work arrangements and childcare support systems that ease time allocation problems while simultaneously enabling mothers to make a living. As it is now, given the results of this study, being a single 'earner-carer' in a 'dual-earner' context seems to lead inevitably to poorer economic outcomes for women.

# Chapter 3

### **3. Retirement trajectories in West Germany: Does divorce matter?**

#### **3.1 Introduction**

Retirement is a major life course transition, especially in ageing societies with a growing risk of old-age poverty, most notably for women (OECD, 2019b). Retirement is commonly viewed as a single event that marks the end of working life (Kohli, 2000) and one that can be operationalised using the effective age at retirement (see, e.g., OECD, 2019b). This view of retirement relies on several implicit assumptions: first, that there is a direct and non-recurrent transition from work to retirement, and second, that the transition from employment to non-employment at that age coincides with the receipt of an old-age pension. However, research has identified more complex patterns of transition (Fasang, 2010, 2012). Retirement, hence, should rather be seen as a ‘multidimensional process’ (Ebert & Trischler, 2012) in which the receipt of retirement benefits is often preceded by spells of unemployment, disability, precarious employment, or complete absence from the labour market (Engstler & Romeo Gordo, 2017; Kuhn et al., 2021; Radl, 2006).

Indirect transitions to retirement, as opposed to the ideal of a direct transition from employment to retirement, may have implications for economic security in old age. In countries with earnings-related public pension systems, such as Germany, an indirect retirement transition may result in lower pension entitlements and an increased risk of old-age poverty. People who retire early spend fewer years in the labour force and usually face deductions for retiring before the statutory retirement age. At the same time, they are unable to contribute to other old-age pension schemes, such as private or occupational pensions (Kurz et al., 2013; Romeo Gordo & Simonson, 2016). Research in the German context has shown that the use of reduced-earnings-capacity pensions (*Erwerbsminderungsrente*; EM pension) to bridge this gap can be seen as an accumulation of health- and income-related risks (Söhn & Mika, 2017).

In addition to the developments in work and retirement trajectories, family structures have changed dramatically in recent years. In Germany, the share of divorcees aged 65 to 69 increased from 6 % to 18 % for women and from 4 % to 12 % for men from 1996 to 2018 (Mikrozensus, 1996, 2018). This indicates increasing numbers of people entering retirement whose employment trajectories may have been affected by divorce (BiB, 2021b). Studies show that divorce is a disruptive event with severe immediate and long-term economic consequences (Boertien & Lersch, 2020; Mortelmans, 2020b) and negative implications for health and wellbeing (Leopold, 2018). Life course researchers have shown that divorce can lead to changes in employment patterns, with women often increasing (Couch et al., 2013; Tamborini et al., 2015; Van Damme et al., 2009) and men decreasing their labour market activity (Brüggmann et al., 2018; Brüggmann & Kreyenfeld, 2020; Kalmijn, 2005), which is also reflected in their pension incomes (Fasang et al., 2013; Möhring, 2021).

The aim of this paper is to bridge the two strands of literature and examine how divorce relates to retirement trajectories in West Germany. We raise the question of whether divorced women and men follow different retirement trajectories than married women and men and whether the patterns are gendered. Given the growing share of divorced people in the older workforce, research is needed to ascertain whether divorced women and men are a particularly vulnerable group in retirement, especially in the context of pension reforms that raise the statutory retirement age while simultaneously reducing options for early retirement (Radl & Himmelreicher, 2014; Riekhoff & Kuitto, 2022).

In this study, we use pension register data on West German women and men who retired in 2018 (FDZ-RV, 2020). The analysis is conducted in two steps. First, we use sequence and cluster analysis to group individuals by their retirement trajectories, defined according to their insurance histories from age 50 to 65. Second, we use multinomial logistic regression models to examine how marital status and gender are related to retirement trajectories. The aim is less to examine the determinants of retirement trajectories than to show the relationship between divorce and (a)typical and (un)stable retirement trajectories. Based on the finding that work-family trajectories unfold gradually across the life course (Aisenbrey & Fasang, 2017), we assume that the interplay between family and working life might extend to and be evident in retirement trajectories. Two important limitations of this study should be noted at the outset. First, marital status enters the investigation as a time-constant covariate measured in the year of retirement. Second, the study focuses only on divorced, married, and remarried women and men. Never married and widowed were excluded from the analysis. The used pension register data do not allow us to distinguish between women and men who had never been married and those who were widowed as the identification variable, the survivors' pension, is stored in a different register.

### **3.2 The life course approach and retirement trajectories**

The life course perspective posits that risks and advantages accumulate over the life course (Bernardi et al., 2019; Dannefer, 2003; O'Rand, 1996). This is especially evident in case of old-age pensions, which in Bismarckian systems like the German one, are related to prior earnings. The life course perspective also emphasises the notion of linked lives and the interdependence of different spheres of the life course. A transition in the family life course trajectory can thus shape the working life trajectory, and vice versa: The event of divorce not only marks a transition from 'married' to 'divorced' in family biographies but may also have an impact on work trajectories. Decisions between spouses about the (gendered) division of labour within their marriage might no longer be in effect once the marriage is dissolved, and if a divorce has health consequences, individuals might go on sick leave for long periods of time. Conversely, unemployment might place couples under pressure and increase their risk of divorce.

Combining the life course perspective with the concept of cumulative (dis)advantage, events and developments in midlife can extend into old age due to an accumulation of (dis)advantages over the life course (Dannefer, 2003; Ferraro et al., 2009). Divorce, considered as a disruptive life course event, has been

shown to have detrimental economic consequences for women (Andreß & Bröckel, 2007; Leopold, 2018; Mortelmans, 2020b) and to be negatively linked to health outcomes such as depression (Amato, 2010) and to work disability (Brüggmann, 2020a; Couch et al., 2015). For men, divorce is also associated with an increased risk of unemployment (Covizzi, 2008; Kalmijn, 2005). If accumulated over years, these consequences can have long-lasting implications for work histories, the accumulation of lifetime earnings, and, thus also, retirement trajectories.

Not only the consequences following divorce itself but also the possible selection into divorce can have a cumulative character. Lower education (Härkönen & Dronkers, 2006; Raley & Sweeney, 2020), unemployment (Solaz et al., 2020), and poorer health (Mortelmans, 2021) increase the risk of divorce. There is also evidence that divorced individuals often have poorer mental health prior to the event of divorce (Wade & Pevalin, 2004). The observed consequences related to divorce could therefore also be due to selection processes that channel individuals into disadvantaged trajectories even before the actual divorce. Although it is difficult to unravel the causal relationships, divorce is clearly a turning point that affects both women's and men's employment patterns.

How individual employment patterns translate into retirement trajectories also depends on the institutional setting (Madero-Cabib & Fasang, 2016; Möhring, 2015). Pension entitlements and pension amounts are often tied to conditions such as the number of years of pension contributions and whether the individual reached the statutory retirement age. In earnings-related pension systems such as Germany's, the amount of a pension also depends on lifetime earnings. To meet the conditions, divorced women who had a gendered division of labour during their marriage might have to work longer to retire with a sufficient pension. Pension systems also regulate the options available when someone does not reach the statutory retirement age due, for instance, to health issues. Alternatives such as early retirement due to unemployment or disability provide possibilities to bridge the gap to retirement.

### **3.3 Institutional regulations in Germany and prior research**

#### **3.3.1 Old-age pensions and the reduced-earnings-capacity pension**

The way women and men transition into retirement – whether directly, indirectly by way of disability or unemployment, or early by way of early retirement schemes – depends heavily on the institutional setting (Romeu Gordo & Simonson, 2016). The German pension system has undergone several reforms since the 2000s that began to gradually increase the retirement age to 67 by 2029. Simultaneously, early exit routes such as early retirement schemes for women aged 60 and early retirement due to unemployment and after partial retirement for those born in 1952 or later were gradually closed (Schröber et al., 2015).

The reforms were carried out with the aim of 'activating' potential employees (Brussig et al., 2016). So far, it has been assumed that the effects of the reforms vary by pension wealth in the sense that "the



poorest prolong employment and postpone retirement by more than those with higher pension wealth” (Riphahn & Schrader 2021: 5). With respect to gender effects, studies indicate that men have been more likely to follow alternative retirement trajectories (e.g., disability retirement) since the reforms (Riphahn & Schrader, 2021), while women have been less likely to seek alternatives (Geyer et al., 2019). For the cohorts studied in this paper, most of these early exit routes were no longer available. The most common pension types available in the German pension system in 2018 are presented in the following.

#### *Old-age pensions*

While exiting the labour force is not subject to extensive regulations, qualifying for a pension is. Three factors are decisive for entitlement to a specific pension type: year of birth, insurance history, and age. The prerequisite for receiving a *regular old-age pension* in Germany is being 65+ and contributing to the system for five years for the cohorts born before 1964 (for a detailed overview, see Appendix, Table A3.1). Contributions, stored as ‘earnings points’, can be either from employment subject to social security or from other periods such as childrearing (e.g., three earnings points for each child born after 1 January 1992 and 2.5 pension points for each child born earlier), unemployment, or voluntary contributions (Mika & Krickl, 2020). In addition, in the event of divorce, individuals can receive earnings points from their former spouse through the pension equalisation scheme (VA) (Keck et al., 2020). The pension amount depends on the accumulated earnings points, with one earnings point being equivalent to the average earnings of all insured people in a given year.<sup>14</sup> All other pension types that allow to retire earlier, such as the *old-age pension for (particularly) long-term insured individuals* or *for severely disabled individuals*, have additional prerequisites. To be eligible for the old-age pension for the long-term insured, individuals born before 1964 must contribute for 35 years to retire before the age of 65+ without deductions. To be eligible for the old-age pension for particularly long-term insured, individuals born before 1964 must contribute for 45 years to retire before the age of 63+ without deductions.

#### *Reduced-earnings-capacity pensions*

Especially the transition to retirement through the *reduced-earnings-capacity pension* (EM pension) is of importance in the context of this paper. This pension is part of the system of social security protections against the risk of being unable to work and is therefore only available to individuals who were previously employed (at least 36 months of the last five years) (Aurich-Beerheide et al., 2018). Since a reform of the EM pension in 2001, individuals are considered ‘fully incapacitated for work’ if they are able to

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<sup>14</sup> The monthly public pension entitlement is calculated using the pension formula: Monthly pension amount = earnings points \* access factor (e.g., early retirement) \* current pension value (West Germany: €32.03 in 2018) \* pension type (e.g., regular old-age pension).

Since 1 January 2021, pensioners have a statutory right to the basic pension supplement to improve pension income (see DRV, 2021a). All persons who have at least 33 years of basic pension periods with earnings of at least 30% of the average earnings of all insured persons in Germany are entitled to the supplement (2021: monthly about 1040 euros gross). If eligible, the allowance is paid automatically. On average, the monthly supplement is about 75 euros; the maximum amount is 418 euros (Bundesregierung, 2021).

work for fewer than three hours per day for an unforeseeable period of time due to health reasons. Individuals receive half an EM pension if they can work on the general labour market, hence not necessarily in their previous occupation, for three to less than six hours a day (Bäcker, 2013). When the statutory retirement age is reached, the EM pension is automatically converted into an old-age pension. The EM pension is temporary in principle – it is granted for a maximum of three years and must then be extended – and has the goal of facilitating the reintegration of individuals into working life through rehabilitation measures. Nevertheless, only a very small percentage of recipients return to employment thereafter (Zink & Brussig, 2022). In recent years, many recipients of reduced-earnings-capacity pensions have gone through preceding periods of (long-term) unemployment (Mika, 2019) and/or social assistance (Bäcker, 2013).

### **3.3.2 Prior research on the interrelation of family, working life, and retirement**

There is consistent empirical evidence that divorce, employment and pension entitlements are strongly intertwined, especially for women (Aisenbrey & Fasang, 2017; Möhring & Weiland, 2022; Rowold et al., 2022). Divorce and separation can affect the timing of retirement (Madero-Cabib et al., 2015; Radl & Himmelreicher, 2014), pension entitlements (Fasang et al., 2013; Trischler & Kistler, 2011), and accumulated wealth (Kapelle & Vidal, 2022). Research has also shown that divorced women are more likely to work full-time before retirement (Olivetti & Rotz, 2016), to prolong working life (Couch et al., 2013; Damman et al., 2015; Radl & Himmelreicher, 2014), or to even work after retirement (Dingemans & Möhring, 2019; Hokema & Scherger, 2016). Such strategies are used mainly by women who do not remarry as they often have to offset the economic consequences of divorce. For men, the relationship between family and work life is generally weaker (Chłoń-Domińczak et al., 2018; Fasang & Aisenbrey, 2022). Because of this, the results are more mixed, with some studies indicating no significant relationship between family status and working after retirement (Dingemans & Möhring, 2019) and others showing that divorce can be an obstacle to early retirement (Damman et al., 2011; Madero-Cabib et al., 2015). However, studies analysing working histories have found that divorced men are more likely than married men to experience unemployment and disability after a divorce (Brüggmann, 2020a; Kalmijn, 2005) and more likely to have work disabilities even years later (Couch et al., 2015). This was corroborated by a study by Möhring (2021) showing that each year of being married increased men's individual retirement income by 0.5 %, while each year of divorce decreased it. The pattern was reversed for women.

Most of the studies investigating retirement transitions have focused on the impact of pension policy reforms, such as the elimination of specific pension types (Geyer et al., 2019; Rasner & Etgeton, 2014) or changes in eligibility requirements, such as increasing the retirement age (Kuitto & Helmdag, 2021; Riphahn & Schrader, 2021; Romeu Gordo & Simonson, 2016). There are several studies in the German context that have examined women's and men's retirement trajectories by looking at their employment histories up to ten years preceding retirement (Brussig, 2010; Ebert & Trischler, 2012; Fasang, 2010,

2012; Hofäcker et al., 2022; Madero-Cabib & Fasang, 2016; Rasner & Etgeton, 2014; Schröber et al., 2015; Trischler, 2014; Zähle et al., 2009) or their entire employment biographies (Söhn & Mika, 2017). Most of these studies employed sequence and cluster analysis, usually identifying five to eight retirement trajectories (Appendix, Table A3.2 for detailed overview). Commonly, the studies found that mid-life working histories were transmitted into retirement pathways: individuals with unstable employment histories, for instance, were more likely to have had lower labour market participation prior to retirement. The reduction of early retirement possibilities led to a greater divide at the end of working life, with those already expecting higher pension entitlements tend to prolong their working life, while it entails longer unemployment periods for others. Although the German public pension system is founded on the idea of ‘stable employment up to retirement’, Söhn and Mika (2017) showed that this retirement trajectory accounted for only 24 % of their sample (retirement years 2004, 2007, 2010, and 2014) and mainly applied to men. The most frequent trajectory found was ‘regular employment with later unemployment’, which also results in lower pension entitlements (Söhn & Mika, 2017). Although most of the studies investigated women and men separately, they often did not include family status as an additional determinant of working behaviour and retirement transitions. An exception is a study by Madero-Cabib and Fasang (2016), which identified joint work-family trajectories up to retirement using multichannel sequence analysis. In their analysis, divorced women and men appeared in the gender-mixed work-family trajectory, which was characterised by full-time employment and comparatively small pension penalties compared to the classic male-breadwinner trajectory.

While some studies (e.g., Rasner & Etgeton, 2014; Schröber et al., 2015) have identified reduced-earnings-capacity pensions as an independent retirement trajectory alongside old-age pensions, others have analysed EM pension recipients in more detail (e.g., Hofäcker et al., 2022; Söhn & Mika, 2017). The latter revealed that there is great heterogeneity within the group of EM pension recipients in terms of employment biographies – whether recipients were in regular or unstable employment up to age 50 – and in terms of whether they transitioned to an EM pension before age 50 or after.

### **3.3.3 Research question**

Research has shown a strong link between work history and retirement trajectories, yet there is evidence that the interplay between work and family life – divorce in particular – has long-lasting implications for the timing of retirement, especially for women. Still, only a few studies to date (e.g., Madero-Cabib et al., 2015; Madero-Cabib & Fasang, 2016) have combined these two strands of research and analysed how divorce shapes the retirement trajectories of women and men. The different findings for women and men on the interplay between divorce and work histories – with women increasing employment after divorce and men decreasing employment – might entail that these developments could translate over time into more stable retirement trajectories for divorced women and more volatile, insecure retirement trajectories for divorced men in comparison to married individuals. This paper contributes to the literature by providing a descriptive overview of the relationship between marital status and retirement

trajectories in West Germany. Central to this study is the question of whether divorced women and men follow different retirement trajectories than married women and men. We also investigate whether the relationship between divorce and retirement trajectories differs by gender. By addressing these research questions, we aim to expand knowledge about the possible disadvantages of retirement trajectories on the wellbeing of divorced women and men.

### 3.4 Data, sample, and analytical strategy

#### *Data*

For this study, the subsample ‘biographical data on completed insured lives (SUF\_VVL 2018)’ from the German public pension (GRV) register is used (FDZ-RV, 2020). The SUF\_VVL2018 is a 25 % subsample (208,342 individuals) of all people entering retirement in 2018 with an old-age or reduced-earnings-capacity pension. Around 90 % of the German population has an account in the public pension system. Only certain professions, such as farmers and civil servants, are not included. Besides individual-level data on monthly records of earnings and employment histories from age 14 to 65, the data also contain demographic characteristics and information on pension entitlements in the year of retirement.

#### *Analytical Sample*

The data were restricted to women and men aged 50-67 years in 2018. This rather broad age bracket was chosen to ensure that, in addition to old-age pensions, reduced-earnings-capacity pensions are also part of the investigation (see Söhn & Mika, 2017). Further, the sample is restricted to women and men who were either divorced, married, or remarried in 2018. Unfortunately, individuals who were never married and individuals who were widowed cannot be distinguished in the data, and the exclusion of this group resulted in a loss of roughly 20 %.<sup>15</sup> The sample is additionally limited to former West Germany.<sup>16</sup> Due to differences in family behaviour and different treatment of retirement contributions between the former East and West, including East Germany would have gone beyond the scope of this paper. After restrictions, the dataset includes 121,996 persons (53 % women, 47 % men). Due to computational limitations, a randomly selected 10 % sample was drawn, which resulted in a final sample size of 12,200 individuals (and 21,959,280 person-months).

#### *Variables*

The *retirement trajectories* are defined as the sequence of monthly ‘social employment situations’, e.g., the (expected) insurance history of the last fifteen years before age 65. The sequence includes 12 months per year in which a person could have different social employment situations. The original variable consists of 15 different states that were reorganized and reduced to ten: 1) no contact to GRV (informal

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<sup>15</sup> A detailed overview of the sample restrictions and related case numbers can be found in the Appendix, Table A3.3.

<sup>16</sup> Defined as having maximum 10 % of their insurance histories from age 14-65 in the former East Germany.

unemployment, homemaker, living abroad), 2) voluntary/else (voluntary contributions by self-employed people), 3) care (qualifying periods for childrearing or caregiving), 4) incapacity to work, 5) unemployment (Unemployment Benefit I, Unemployment Benefit II, or the previously existing unemployment assistance and qualifying periods in the case of reported unemployment without benefit receipt), 6) employment low/marginal (below 60 % of average income or marginally employed), 7) employment average low (between 60 %–100 % of average income), 8) employment average high (from 100 %–150 % of average income), 9) employment high (more than 150 % of average income), and 10) pension receipt/qualifying period (expected time to age 65 in case of early retirement).

Another key variable, in addition to *gender*, is *marital status*, which indicates whether a person was divorced, married, or remarried in the year of retirement (2018). As the focus of this study is on the link between divorce and retirement trajectories, these marital status groups still seem appropriate to compare within the data restrictions even though they do not represent all family forms.

Control variables are *education* (no information, lower secondary, higher secondary, and tertiary education)<sup>17</sup> and *citizenship* (Germany, other EU country, non-EU country), as they have been shown to impact retirement transitions (Märtin, 2017). Further, to account for previous working life characteristics, the *number of months in which a person was registered on sick leave/incapacity to work and unemployment* are included. The *number of children* (none, one, two, three or more) is recorded in women's pension accounts by default. Therefore, this variable is only used for robustness checks of the female sample but is not included in the main model. To describe the retirement trajectories, we use the *average age at retirement*, the *monthly public pension income* (in euros), and the *pension type* received in the year of retirement, distinguishing between old-age pensions and reduced-earnings-capacity pensions (see section 3.3.1).

The sample statistics are displayed separately by gender and marital status in Table 3.1. The vast majority of women and men, around 76 %, were married in the year of retirement. There were slightly more divorced women (14.4 %) than men (11.7 %) and more remarried men than women. The sample statistics indicate educational differences, with men being higher educated than women, especially married men. However, the variable contains a large amount of missing information and should therefore be treated with caution. The average age at retirement was around 64 years for married women and men, while it was one year earlier for divorced women and men. The majority of individuals had German citizenship. There were differences with respect to pension types received, indicating that women in these cohorts spent more years in care work. Almost half of the married women received a regular old-age pension, while only around 33 % of married men received this pension form. In contrast, 35 % of married men but only around 22 % of married women received an old-age pension for the particularly long-term insured. This was also reflected in the average monthly public pension income, which

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<sup>17</sup> Unfortunately, the information about education is incomplete in the registers and should be treated with caution.

amounted to 645 euros for married women and 1196 euros for married men on average. Divorced women and men and remarried women stand out, as around 24 % received a reduced-earnings-capacity pension. Divorced women and men spent the highest number of months in unemployment and incapacity, followed by remarried women.

Table 3.1: Descriptive sample statistics (in % and average values) for women and men according to marital status in the year of retirement (2018)

		Women			Men		
		Divorced	Married	Remarried	Divorced	Married	Remarried
<b>Citizenship</b>							
	Germany	95.9	91.6	97.5	95.8	91.6	96.2
	EU country	3.0	6.9	1.6	2.5	5.7	2.7
	Non-EU country	1.1	1.5	0.9	1.7	1.1	2.7
<b>Education</b>							
	no information	49.1	56.2	52.4	41.8	43.6	41.3
	lower secondary education	43.9	36.8	42.5	46.6	41.8	45.6
	higher secondary education	3.8	3.2	2.6	4.9	5.2	5.3
	tertiary education	3.2	3.7	2.6	6.7	9.5	7.8
<b>Number of children</b>							
	none	11.1	15.6	12.2	-	-	-
	one child	30.7	21.3	27.9	-	-	-
	two children	37.0	42.3	39.1	-	-	-
	three or more children	21.3	20.8	20.8	-	-	-
<b>Pension type</b>							
	EM pension	24.0	10.3	23.6	24.4	11.3	12.8
	Regular old-age pension	32.3	46.2	25.8	30.5	32.8	35.1
	Old-age pension for disabled	6.7	5.6	9.0	6.3	6.6	8.3
	OA p. for long-term insured	14.5	16.4	17.5	11.8	11.9	11.8
	for particularly long-term insured	22.6	21.6	24.2	26.9	35.0	34.3
	Other	-	0.02	-	-	-	-
<b>∅ age at retirement</b>		62.9	63.9	62.4	62.9	63.7	63.6
<b>∅ monthly public pension income</b>		910	645	871	996	1 196	1 169
<b>∅ months spent in ... &lt; age 50</b>							
	incapacity to work	0.8	0.3	0.8	1.4	0.6	0.8
	unemployment	13.8	6.8	11.1	15.3	5.1	8.7
<b>N (persons)</b>		930	4 929	624	668	4 347	702
		14.4%	76%	9.6%	11.7%	76%	12.3%
		6 483 (53%)			5 717 (47%)		

Source: SUF\_VVL2018, own calculations.

### Methods and research strategy

To map retirement trajectories, we use sequence analysis (Liao et al., 2022; Raab & Struffolino, 2022). Sequence analysis makes it possible to model whether and when patterns occur in individual sequences of categorical states and is therefore the intersection of qualitative and quantitative methodology: It is the quantitative analysis of trajectories that are composed of qualitative states. To examine similarities between retirement trajectories, a distance matrix using optimal matching (OM) with constant substitution costs is calculated. This distance matrix is further used for hierarchical cluster analysis (Ward) to identify different but internally homogeneous clusters. In line with several cluster cut-off criteria (Appendix, Figure A3.1), nine clusters were found to be the best grouping. They also displayed an average silhouette width of 0.5, satisfying the criterion of construct validity (Studer, 2013). Sensitivity analyses with different distance measures (e.g., DHD) yielded substantially similar results. Both analyses were

conducted using R, along with the libraries *TraMineR* for the sequence analysis (Gabadinho et al., 2011) and *WeightedCluster* for the cluster analysis (Studer, 2013).

To investigate how marital status relates to retirement trajectories (cluster affiliation), multinomial logistic regression models are used as the clusters are an unordered categorical dependent variable. The cluster affiliation is estimated separately for women and men. The model includes the main variable of interest, *marital status*, controls for *education* and *citizenship*, and, following the idea of cumulative (dis)advantage, controls for information on past employment history that is said to impact late-life employment and is linked to divorce, such as the *number of months in which a person was registered on sick leave/incapacity to work* and *unemployment before the age of 50*.<sup>18</sup>

#### *Robustness analysis (Appendix)*

Robustness checks, such as removing individuals with cluster-specific silhouette values below 0 (Jalovaara & Fasang, 2019), were conducted to account for possible errors in classifying individuals into retirement clusters. Further, cluster affiliation was estimated using an interaction of gender and marital status and by including the number of children for the female sample, with results remaining qualitatively similar as well. All steps of the analytical strategy were additionally conducted with larger sample sizes for women (12,822) and men (11,577) separately, which led to substantively similar results.

## **3.5 Results**

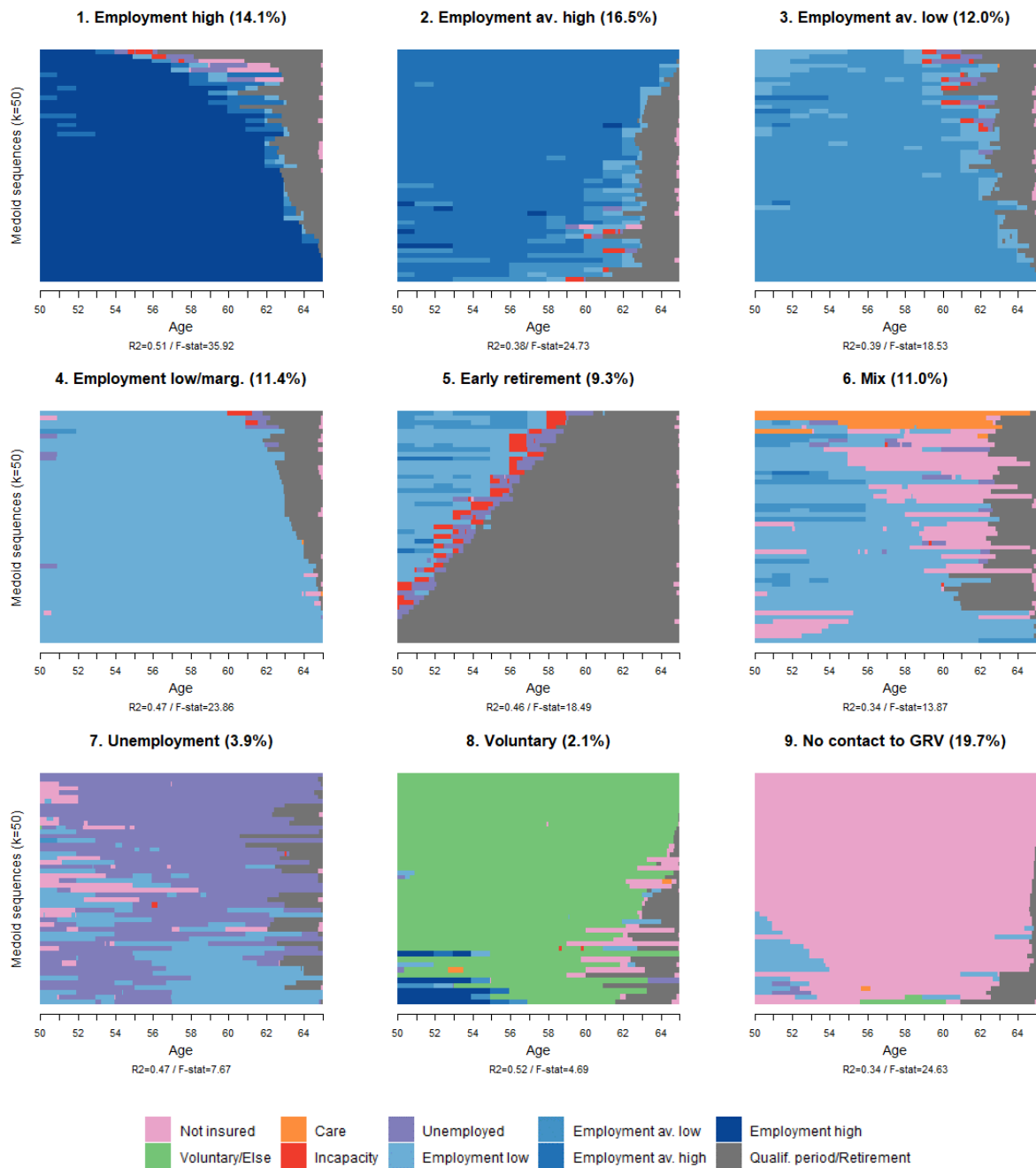
### **3.5.1 Retirement trajectories**

The nine retirement trajectories for women and men displayed in Figure 3.1 are named according to the representative sequences in each cluster (Appendix, Figure A3.2). They are visualized with relative frequency sequence plots that display a set of 50 representative sequences (medoids) of women's and men's retirement trajectories (Fasang & Liao, 2014; Raab & Struffolino, 2022). The x-axis displays the timeline from age 50 to age 65.

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<sup>18</sup> The models were estimated stepwise: The first model (M1) included the main variable of interest, marital status; M2 controlled additionally for education and citizenship; M3 added the *number of months in which a person was registered on sick leave/incapacity to work* and *unemployment before the age of 50*.

Figure 3.1: Relative frequency sequence plots across retirement trajectories of women and men in West Germany, 2018



Note: Medoid sequences displayed; dissimilarities from medoids are shown in the appendix, Figure A3.3.

Source: SUF\_VVL2018, own calculations.

There are four employment retirement trajectories that represent more than 50 % of the sample and are characterised by relatively stable insurance histories from age 50 to retirement, but with varying income levels. Of the four trajectories, the *employment average high* trajectory is the largest (16.5 %), followed by the *employment high* (14.1 %), the *employment average low* (12.0 %) and the *employment low/marginal* (11.4 %) trajectory. The *early retirement* (9.3 %) trajectory is distinctive in that exit from the labour market has already occurred at the age of 50, combined with a transition to the qualification



period/retirement. The *mix* (11 %) trajectory is defined by caregiving or marginal employment until individuals leave the German pension insurance. Although rather small, *unemployment* (3.9 %) is a unique trajectory in which individuals are mainly registered unemployed over the 15 years. The *voluntary* (2.4 %) trajectory consists of individuals who probably switched to self-employment during working life and continued to pay voluntary contributions (see Söhn & Mika, 2017). The *no contact to GRV* trajectory is relatively large at 19.7 %. As shown in other studies (e.g., Söhn & Mika, 2017), this retirement trajectory must be treated with caution as it consists of individuals with different insurance histories before age 50: individuals who moved into the pension scheme for civil servants, individuals who dropped out of the labour market after midlife (e.g., after childbirth), and individuals who started self-employment without paying voluntary contributions.

Table 3.2 displays the share of the different ‘social employment situations’ that define each retirement trajectory, together with the gender distribution and other descriptive covariates. Starting again with the employment retirement trajectories, the *employment average high* and the *employment high* trajectory are male-dominated retirement trajectories, with 67.5 % and 85.7 % shares of men, respectively. Despite some status changes after around the age of 58, individuals in both trajectories display stable high-income employment careers and retire on average at age 64. This is also reflected in around half of the individuals receiving an old-age pension for the particularly long-term insured averaging 1422 euros and 1951 euros, for the two trajectories respectively. The *employment low/marginally* trajectory, in contrast, can be described a ‘female trajectory’ with 90 % women. Women who retire through this trajectory seem to have different employment histories prior to age 50, with about 34 % receiving a regular old-age pension (454 euros), 32 % receiving a pension for the particularly long-term insured (768 euros), and 26 % receiving a pension for the long-term insured (589 euros). The share of women and men is almost equal in the *employment average low* trajectory. Half of the women and men who retire through this trajectory have a pension for the particularly long-term insured of 1112 euros on average. However, some women and men who retire through this trajectory also face unemployment before retirement.

The *early retirement* trajectory shows slightly more women (58 %) than men (42 %). Through the early exit from the labour market at age 56 on average, qualifying periods/pension receipts are recorded for most months. Especially in the months before the transition into qualifying period/pension receipt, women and men in this trajectory show a comparatively high share of months of incapacity and unemployment. This is also reflected in the fact that almost all individuals in this trajectory (97 %) receive a reduced-earnings-capacity pension, which is only granted if a person is considered ‘incapacitated for work’ due to health reasons. On average, the EM pension amounts to 762 euros.

Table 3.2: Sample statistics by retirement trajectory (in % and average values)

	Employment high	Employment av. high	Employment av. low	Employment low/marg.	Early retirement	Mix	Unemployment	Voluntary	No contact to GRV
<b>Months spent in ... from age 50 to 65 in %</b>	100	100	100	100	100	100	100	100	100
Employment low	2	4	11	87	13	49	21	3	4
Employment av.-low	1	10	70	2	7	10	2	1	0
Employment av.-high	7	69	5	0	5	2	0	1	0
Employment high	76	5	0	0	0	0	0	3	0
Unemployment	2	1	3	2	7	4	58	1	1
Care	0	0	0	1	1	7	1	0	2
Incapacity	0	1	1	0	3	1	0	0	0
Voluntary / else	0	0	0	0	0	1	0	81	1
Qualification period / retirement	10	9	9	7	63	8	6	5	1
Gaps	2	1	1	1	1	19	12	4	88
<b>Gender</b>									
Women	14.3	32.5	56.6	90.2	57.9	75.1	51.8	16.5	64.5
Men	85.7	67.5	43.4	9.8	42.1	24.9	48.2	83.5	35.5
<b>Pension type</b>									
EM pension	4.6	6.1	7.1	3.2	96.5	9.4	9.4	4.6	0.1
Regular OA pension	20.9	16.0	21.2	33.9	0.6	43.0	62.7	55.2	91.9
OA pension for disabled	8.4	9.2	8.1	5.1	1.9	10.6	10.1	2.7	1.8
OA pension for long-term insured	22.0	11.3	13.0	25.6	0.8	22.8	17.4	11.9	6.2
OA pension for particularly long-term insured	44.2	57.5	50.6	32.2	0.2	14.3	0.2	25.7	0.0
<b>∅ age at retirement</b>	63.9	63.9	64.0	64.3	55.8	64.1	64.8	64.8	65.5
<b>∅ public pension income</b>	1829	1343	1003	602	772	633	430	873	392
<b>∅ public pension income by pension type</b>									
EM pension	1384	1016	805	496	762	623	330	743	371
Regular OA pension	1859	1314	907	454	942	470	345	828	362
OA pension for disabled	1712	1278	956	656	979	712	653	809	692
OA pension for long-term insured	1694	1215	872	589	1162	689	658	939	755
OA pension for particularly long-term insured	1951	1422	1112	769	1475	983	847	972	0
<b>N (persons)</b>	1724	2010	1469	1390	1128	1343	477	261	2398

Note: Values in grey are for n < 50.

Source: SUF\_VVL2018, own calculations.

The *mix* retirement trajectory is female-dominated as well, with 75 % women. The two most common pension types are the regular old-age pension (43 %), which amounts to 470 euros, and the pension for the long-term insured (23 %), which is around 690 euros. The share of women and men is almost equal in the *unemployment* trajectory. While for some, unemployment seems to be permanent (Unemployment Benefit II), others move in and out of unemployment over the 15-year period. This is also reflected in the different pension types received and indicates that women and men in this trajectory probably had unstable working careers throughout their life course. More than 60 % receive a regular old-age pension (345 euros), 17 % a pension for the long-term insured, 10 % a disability pension, and around another 10 % a reduced-earnings-capacity pension. The *voluntary* trajectory consists of more than 80 % men. More than half receive a comparatively high average regular old-age pension of 828 euros. The *no contact to GRV* trajectory consists of 65 % women and 35 % men. As expected from the absence of insurance history, 92 % receive a low regular old-age pension of 362 euros and retire at age 66 on average. However, as mentioned earlier, for some individuals, this low old-age pension is probably only a 'supplement' to their civil servant's pension or other old-age provisions. For others, however, the low old-age pension will probably be their main source of income.

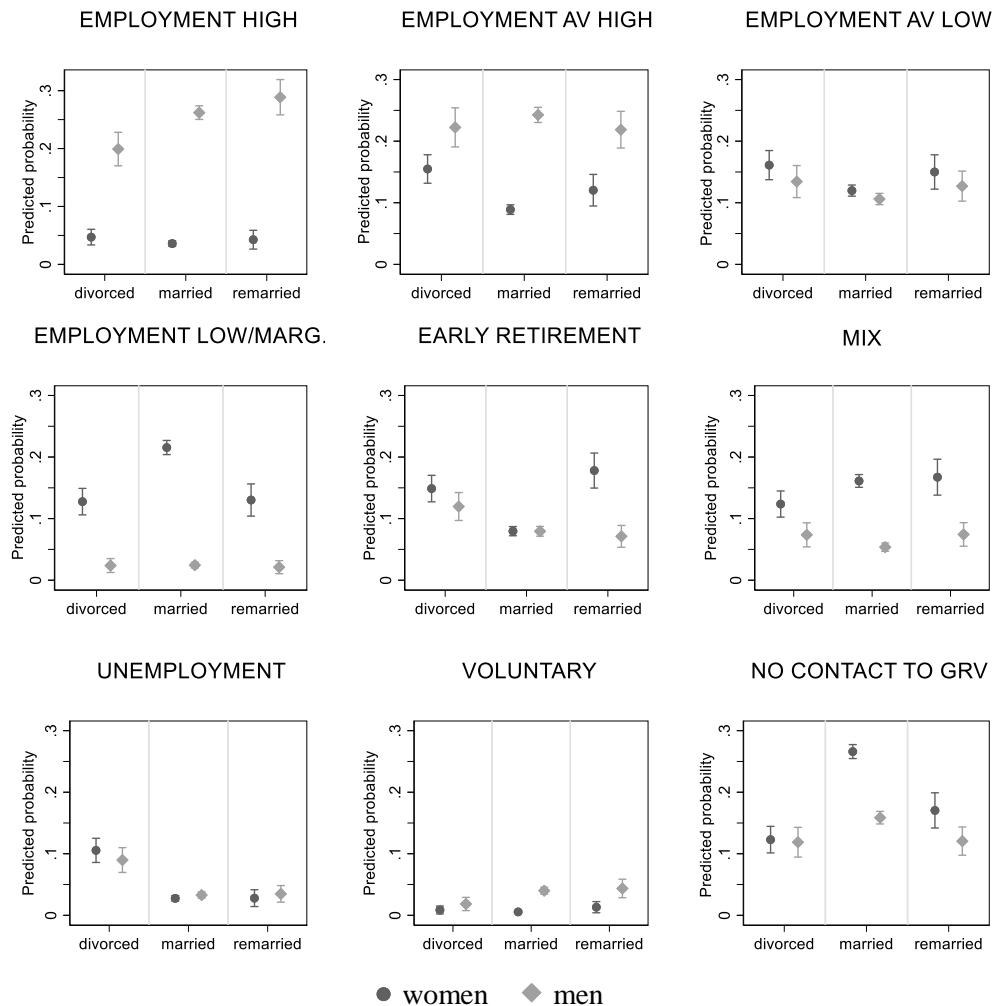
### 3.5.2 Marital status and retirement trajectories

Figure 3.2 displays the model results where the dependent variable is the probability of belonging to one of the nine retirement trajectories. The results are displayed as predicted probabilities (full models, see Appendix, Tables A3.4–A3.5). While the results do not indicate strong differences by marital status for most of the retirement trajectories, there is a difference with respect to the *early retirement* and the *unemployment* trajectories: For both clusters, results show that divorced women and men have a higher predicted probability of retiring through these two trajectories than married women and men. Interestingly, remarried women show the highest predicted probability of being in the *early retirement* trajectory. Hence, it seems that divorced women and men, and to some extent remarried women, are more likely than married to retire through unstable and indirect retirement trajectories.

There are furthermore clear gender-specific patterns in the employment retirement trajectories. Women are more likely to be in the low-income trajectory compared to men. Conversely, men are more likely to be in the high-income trajectory compared to women. Against this overall trend, however, there are clear differences by marital status. Divorced women have the highest predicted probability within the group of women to be in the *employment average high* trajectory and, together with remarried women, the lowest probability of being in the *employment low/marginal* trajectory. This suggests that some of the divorced and remarried women have a direct transition to retirement through stable employment with high earnings in contrast to an indirect transition to retirement. Divorced men, on the other hand, are less likely than married men to be in the *employment high* trajectory. This indicates that for men, the relationship between divorce and retirement trajectories is mainly adverse. Finally, married women are

radically more likely than divorced and remarried women to be in the *no contact to GRV* trajectory. These may be the classical ‘homemakers’ but also women who became civil servants.

Figure 3.2: Predicted probabilities from the stepwise MNL models for cluster affiliation of women and men



*Note:* Models are estimated separately for women and men.

*Controlled for:* Education, citizenship, months spent in incapacity and in unemployment.

*Source:* SUF\_VVL2018, own calculations.

### 3.6 Summary and discussion

By linking marital status to retirement trajectories for women and men who retired in the year 2018 in West Germany, this study contributes to a better understanding of the relationship between divorce and retirement behaviour. The findings reveal that divorce is related to receipt of a reduced-earnings-capacity pension and/or unemployment benefits before receiving an old-age pension in West Germany.

Nine retirement trajectories were found, which are in line with previous research and reflect the often gender-specific work and family lives of the West German cohorts studied. The higher income retirement trajectories are male-dominated – half of the men studied retire through them. The low-income,

care-related retirement trajectories and the trajectory with no contract to the GRV are female-dominated. This gender difference is reflected especially in the very low individual public pension incomes of married women, which were not sufficient for a single household to live above the poverty line in 2018 (WSI, 2019).

The paper examined whether divorced women and men take different retirement trajectories than married women and men. Aside from general gender differences, there are no major differences between divorced and married women and men for most of the retirement trajectories. There are two exceptions, however: Divorced women and men are more likely than married women and men to be in a retirement trajectory characterised by receiving a reduced-earnings-capacity pension (*early retirement*) and by long-lasting unemployment (i.e., receipt of Unemployment Benefit II). These two retirement trajectories strongly diverge from the ideal of ‘stable employment up to retirement’. They fall into the category of indirect retirement transitions, that is, retirement trajectories in which the gap between labour market exit and old-age pension receipt must be bridged. Within the group of divorced people, around 17 % follow the *early retirement* and 10 % the *unemployment* trajectory, which totals to almost 30 %. Thus, about one third of divorced women and men experience an unstable transition to retirement.

Further, the paper investigated whether the relationship between divorce and retirement trajectories differs by gender. For men, the association between divorce and retirement trajectories seems mainly negative, characterised by unstable retirement trajectories and lower chances of being in the high-income retirement trajectory. However, the association seems to be both negative and positive for women, as divorced women are also more likely than married women to be in the stable, high-income retirement trajectory. Previous research shows that increasing employment is one of women’s main strategies to offset the negative economic consequences of divorce (see section 3.3.2). While the results of the paper support this finding, they also highlight that a significant fraction of divorced women leaves the labour market over unstable retirement trajectories. There are many possible explanations for the patterns found, such as selection effects of divorced women into different employment histories. Increasing employment could be difficult for women who must reconcile work and family after divorce, especially when their children are young or whose health is deteriorating after divorce. Further, a lower socio-economic position could be a barrier to switching to a more lucrative job or pursuing better career prospects, which could lead to women remaining in insecure employment.

The findings for remarried individuals must be discussed as well. It seems that remarriage or the factors that lead to remarriage are positively linked to retirement trajectories for men as they retire through the same stable, high-income trajectories as married men. Remarriage, however, does not seem to shield women from relying on EM pensions. In this study, remarried women and divorced men and women have the highest shares of months spent in unemployment prior to age 50, and divorced men also have the highest shares of months spent in incapacity to work prior to the age of 50 (Appendix, Tables A3.6–A3.7). The cumulative chains that lead to unstable retirement trajectories in these groups could therefore

already strive from selection effects to divorce. Remarried people are often equated with married people and classified in the same category. However, in line with research on selectivity into remarriage for women and men (Raley & Sweeney, 2020), the results of this study highlight the importance of considering marital history.

Divorce research has also shown that divorce is associated with decreases in mental health (Zhang et al., 2016; Zulkarnain & Korenman, 2019) which may be an additional explanation for the higher risks divorced women and men face of receiving an EM pension. In 2018, the share of mental-health-related EM pensions within all EM pensions was 47.7 % (Meschede et al., 2020). Particularly for women from West Germany, more than every second EM pension can be attributed to mental health disorders (Hagen & Himmelreicher, 2020). Hence, it appears that there could indeed be cumulative chains that link divorce, health, and adverse retirement trajectories. Although further research is needed to establish a clear link, the higher prevalence of remarried women receiving an EM pension could also be related to these cumulative chains.

### *Limitations*

There are several caveats to this investigation. First, marital status was treated as a time-constant characteristic, measured in the year of retirement. The average age at divorce in 2000 was 39 years for women and 41 for men (Statistisches Bundesamt, 2021). Hence, it can be assumed that for most divorced individuals, measuring marital status at retirement covered the previous fifteen years. Methodically, the analytical strategy does show an association between divorce and retirement. Still, the missing information on the life course before this time, especially on family life, does not allow for any causal conclusions. Second, widowed individuals and individuals who had never been married were removed from the sample. Related to this, we focused on divorce and did not examine the ramifications of separation from cohabitation. Although most West German women aged 65-69 were married in 2018 (Mikrozensus, 2018), as in this study, the inclusion of never married and cohabiting women might reveal more diverse trajectories and a different gender distribution for the trajectories. Even for the cohorts studied, women who had never been married or women who had been cohabiting with their partners might have been more active on the labour market. Analysing separations from cohabitation would have been of great value to see if separation has the same association with retirement trajectories as divorce. Third, we did not fully account for selection into divorce. Although some variables that may explain the selection into divorce were included in the model (such as education or health status, measured through work incapacity prior age 50), there may be other unobserved factors that channel people into a divorce. The link between divorce and receiving an EM pension could be due to disadvantaged women and men being more likely to divorce. Further research could use longitudinal data and competing risk models to more precisely assess the link between divorce and EM pensions.

### *Policy Implications*

Despite these limitations, the higher prevalence of divorced people and remarried women exiting the labour force early and bridging the gap with a reduced-earnings-capacity pension is a cause of concern. Around 24 % of divorced women and men received an EM pension in this study. Receiving an EM pension is conditional on having a chronic health condition that prevents people from participating fully or partially in the labour market and often follows a previous period of unemployment (Mika, 2019) and/or receipt of social assistance (Bäcker, 2013). Due to the early exit from the labour force, EM pension recipients are often unable to build up additional savings or pay into a private pension scheme (Mika, 2019), which is a considerable factor in inequality in later life. The same applies to the long-term unemployed. This makes divorced women and men who retire through the *early retirement* or the *unemployment* trajectory a particularly vulnerable group, as divorced people tend to have less wealth accumulated by the time they retire given that assets are usually split (Kappelle, 2022) and more often rent than own their home (Lersch & Vidal, 2014).

In Germany, policymakers appear to have become more aware of the problem of receiving the reduced-earnings-capacity pension. The latest reform in 2022 might mitigate the income losses of those women and men who started receiving a reduced-earnings-capacity pension between 2001 and 2018 by providing a flat-rate supplement ranging from 4.5 % (retired after 2014) to 7.5 % (retired before 2014) (BMAS, 2022). While this policy might provide some relief in terms of retirement income, it does not compensate for the years individuals spend unable to work for health reasons or the years spent in unstable employment. In light of this, working conditions need to be improved to prevent unstable employment biographies, to promote women's economic autonomy, and to meet the needs of older workers (Brussig et al., 2019). Similarly, the possibility of returning to work after periods of illness, as in the case of EM pensions, should be further expanded and promoted through prevention and rehabilitation. There will be a large share of women and men who have been divorced at least once in their lives and will soon reach the statutory retirement age. The findings of this study point to the need for research on the long-term effects of the interaction between divorce, health, and employment on women's and men's overall wellbeing in old age.





# Chapter 4

## **4. Who receives most? Gendered consequences of divorce on public pension income in West Germany and Sweden**

### **4.1 Introduction**

The amount of public pension reflects, to a large extent, lifetime earnings (Betti et al., 2015), particularly in earnings-related pension systems such as those in Germany and Sweden. As the employment behaviour of women often overlaps with their family histories, women may be disadvantaged compared to men and accumulate only low pension entitlements of their own. Consequently, this puts women at higher risk of old-age poverty (Haitz, 2015; Klerby et al., 2020). Gender gaps in pensions illustrate these inequalities in the biographies; although the gap has narrowed over the years, Germany still performed exceptionally poorly in 2019, with women's pensions being on average 36 % lower than men's pensions. Despite Sweden being generally considered a more gender-equal society, women's pensions were also 28 % lower than men's in the same year (Eurostat, 2022a).

Differences in the pension entitlements of women and men have long been of less concern, as they were taken for granted as a result of the gendered division of work and family within couples in classic 'male breadwinner' settings (Bonnet & Geraci, 2009). Hence, in most welfare states, marriage was considered an economically secure institution at retirement, as within a household, the wife's often lower pension income could be offset by the higher pension income of the 'male breadwinner'. Even in the case of the loss of a partner, women were usually protected from old-age poverty by the survivor's pension, calculated as a certain percentage of the deceased husband's previous pension income. Persistently high divorce rates during recent decades, however, have called the rationale of that system into question (Bonnet & Hourriez, 2012). The loss of a partner through divorce is often not covered by social policy, although it entails similar economic consequences as the death of a partner. After divorce, neither being able to pool pension entitlements nor receiving a supplementary pension while solely depending on one's own pension entitlements puts economic wellbeing at risk, particularly for women.

This study analyses how divorce is related to the monthly public pension income of women and men in two different policy settings, West Germany and Sweden. Research has shown that family biographies are related to income sources at retirement (McDonald & Robb, 2004) and associated poverty risks (Peeters & De Tavernier, 2015), but most studies were mainly conducted on single countries. Only a few studies have investigated country differences (Evandrou et al., 2009; Fasang et al., 2013; Kreyenfeld et al., 2018) and examined how welfare states impact the individual accumulation of pension entitlements (Uunk, 2004). By using pension register data from Germany and Sweden for women and men who retired between 2013 and 2018, this study contributes to the literature on the economic security of divorcees in old age. The large sample sizes and precise longitudinal income information allow for

comparisons of income histories across the life course and robust estimates of public pension income by gender and family status.

In Sweden, the share of divorcees aged 65 to 69 increased from 16 % to 22 % for women and from 14 % to 19 % for men between 1999 to 2019 (SCB, 2000, 2020b). In Germany, the share increased from 6 % to 18 % and 4 % to 12 %, respectively, from 1996 to 2018 (Mikrozensus, 1996, 2018). In both countries, therefore, a large proportion of people of retirement age have been divorced at least once in their lifetime. At the time of the emergence of ‘new social risks’ (Bonoli, 2005), stemming from changes in the labour market and increasing family diversity, such as rising divorce rates, the Swedish and the German welfare state started to follow different policy approaches (Lewis, 1992; Meyer, 2014). During the 1970s, Sweden adopted an approach of individual economic independence and has therefore long pursued policies to promote gender equality in the labour market, such as individual taxation and work-family reconciliation policies, thereby increasing individual employment irrespective of family status. In contrast, in West Germany, a family model characterised by a gender-specific division of labour for married couples was the norm and incentivised by the tax and transfer policies (e.g., joint taxation, health insurance). This was accompanied by the introduction of the system of ‘divorce splitting’ in 1977 to protect the economically ‘weaker part’ of a marriage in the event of divorce (Schmähl, 2018). Under this system, the accumulated pension entitlements during marriage are divided equally between the spouses upon divorce. Hence, while the Swedish welfare state combined different policies to enable women and men to achieve economic autonomy over the life course, the West German welfare state took the imbalance between women’s and men’s employment and related earnings as given and emphasis was placed on ‘equalisation payments’ in case of divorce.

In this study, monthly public pension income is defined as all entitlements that an individual receives as a result of previous employment, other pension qualifying periods, such as education, childcare or unemployment, and in the German case, the divorce splitting mechanism. Drawing on large-scale pension register data, we address the question of how divorce is related to the economic security in old age of women and men in West Germany and Sweden. Analysing the pension incomes of divorced women and men in two different welfare states allows us to contribute to the discussion on the role of social policies in ensuring ‘pension adequacy’. The main comparison groups are divorced and (re)married women and men, whereby family status is measured in the year of retirement (time constant). We are aware that there are other family forms in both countries that deserve attention, such as cohabiting and separated individuals. This is especially true in the Swedish case, where cohabitation is common and research has long shown a strong negative social gradient in separations (Härkönen & Dronkers, 2006). However, separation is difficult to fully identify in the registers. Since Sweden first introduced a dwelling register in 2012 (Thomson & Eriksson, 2013), many separations may disappear ‘under the radar’ for the cohorts studied here. Due to further data limitations, especially in the German registers, and the intended comparability of the two countries, we cannot adequately account for the importance of possible selection

effects or concurrent life course events (e.g., unemployment, illness, occupation) on different family status groups until retirement. As the aim of this study is to comparatively analyse how the social policies of the German and the Swedish welfare state may shape the relationship between divorce and public pension income, focusing on divorced and (re)married individuals still seems rational and adequate.

## **4.2 Life course perspective, social policies, and prior research**

Following the life course perspective, pension entitlements can be seen as the late-life outcome of intersecting life course developments within institutional settings (Elder et al., 2003). A central assumption is that life course transitions not only affect one domain of the life course and its related trajectory but can also have an impact on other domains of the life course. Divorce not only channels women and men into a different family trajectory (i.e., from ‘being partnered’ to ‘being single’) but can also shape their working trajectory and vice versa. Welfare states, as institutional settings, further shape these trajectories as social policies structure the relationship between the labour market and the family (Lewis, 1992). Therefore, social policies can play an important role throughout working life in shaping women’s and men’s accumulation of individual pension entitlements. Similarly, pension regulations can compensate for previous labour market or gender-related inequalities at retirement.

### **4.2.1 Interrelation between social policies and work-family trajectories**

Lifetime earnings are strongly linked to labour market participation, which often differs between women and men (Kail et al., 2009). Women tend to have lower incomes than men, and they are also more often subject to interrupted careers due to childbirth and family obligations, which impacts their career advancement and their total years in employment (Chłoń-Domińczak et al., 2018). Hence, gendered work-family lives are shown to be more detrimental to the pension income of women, as they often cannot build up adequate lifetime earnings during their working lives (Möhring & Weiland, 2022; Sefton et al., 2011), while men are usually less affected (Möhring, 2015). These path dependencies, following the intersection of work and family life, are stressed by the concept of cumulative (dis)advantage (Dannefer, 2003). Negative events, such as periods out of employment (e.g., unemployment, illness, care), elevate the possibility of future disadvantages, e.g., re-entry into the labour market or lower earnings. This usually marks the onset of ‘ageing unequally’ (OECD, 2017), as the inequality of such (dis)advantages often accumulates over time.

During working life, social policies that strengthen women’s economic autonomy and help reconcile work and family life can mitigate the economic consequences of absent periods from the labour market, such as the years of childrearing (McDonough et al., 2015). Individual taxation and extensive childcare availability aim, for example, to support women in their roles as full-time workers. These policies are also believed to shelter women from the adverse effects of divorce, as women acquire their own income and are not solely dependent on their husbands. Policies to ensure gender equality within care and paid

work, however, vary by welfare regime (Möhring, 2016). In male breadwinner settings, policies such as joint taxation schemes and other marriage benefits are in favour of supporting women as care providers, which can lower their time spent in paid work. As comparative studies have shown, the institutional context impacts the extent of gendered work-family lives and thus also the economic consequences following divorce (Andreß et al., 2006; Uunk, 2004). Although social welfare and alimony payments can mitigate the economic consequences of divorce to a certain extent in the short run (Uunk, 2004), employment-related measures help women maintain their ties to the labour market, which will be reflected in their individual pension entitlements in the long run.

#### *Life course events and transitions*

A frequently overlooked event that can direct women and men into different working trajectories is divorce. As divorce mostly occurs at a time when women's and men's economic situation is already shaped by their previous work-family life arrangements (SCB, 2022a; Statistisches Bundesamt, 2021), it often represents a turning point in the life course. By analysing 12 European countries, Möhring (2021) showed that for women, each year of marriage decreased their individual retirement income, whereas each year of divorce without repartnering increased it. For men, she found a reversed pattern. Similar results were shown for the U.S., where being continuously married was found to increase the odds of receiving a private pension for men, whereas it lowered the odds for women (Yabiku, 2000). Family history therefore had opposite effects for women's and men's acquisition of pension entitlements. For women, gendered work-family lives during marriage are often assumed to be the underlying mechanism that increases the dependence on a male breadwinner pension in old age (Fasang et al., 2013), while having to be self-reliant after divorce is associated with gains in women's individual pension income (Möhring, 2021). 'Marriage premiums' for men, however, are often discussed as being driven by selection (Killewald & Lundberg, 2017; Ludwig & Brüderl, 2018).

#### *Selection into marriage and divorce*

Selection arguments state that it is not the marriage itself that leads to higher pension incomes for men. Instead, the association is driven by the selection of individuals with different characteristics into specific family life courses. Men who have favourable traits (e.g., higher education, better earnings tracks) are also more likely to have so-called normative life courses, such as a stable marriage, which will be rewarded the most (e.g., higher pension incomes) (Jalovaara & Fasang, 2019). Following the same argument, men who have unfavourable traits (e.g., lower education, unstable employment, illness), are more likely to 'deviate' from the normative life course by getting divorced or separated. This is supported by studies showing that men's wages were already falling prior to divorce (Killewald & Lundberg, 2017) and that unemployment (Solaz et al., 2020), lower education (Härkönen & Dronkers, 2006) and poorer health (Mortelmans, 2021) increase the risk of getting divorced for men. In this context, research on intergenerational transmission of divorce has to be mentioned (Diekmann & Schmidheiny, 2013). This research also predicts unfavourable outcomes among children whose parents have

divorced, for example on health and education (Auersperg et al., 2019; Devor et al., 2018), and a higher likelihood of such children eventually being divorced themselves (Bergvall & Stanfors, 2022). Although selection arguments are commonly used for men, they also apply for women, albeit to a lesser extent in some instances (e.g., unemployment). However, there are also studies showing that the event of divorce can lead to further penalties for men (Kalmijn, 2005), such as an increased risk of invalidity (Brüggemann, 2020a), unemployment and/or downwards social mobility (Covizzi, 2008). In the long run, both channels of work-family trajectories – a poorer earnings trajectory leading to divorce or divorce leading to an increased risk of adverse health effects and/or unemployment – could have a negative impact on the accumulation of lifetime earnings and thus on the pension income for divorced men.

#### **4.2.2 Work-family trajectories and pension regulations**

Pension incomes are not only ‘life course sensitive’ in terms of lifetime earnings but also in terms of pension regulations. In line with the welfare state context, pension regulations account for individual life course developments by granting credits for (non)contribution periods and pension rights. Comparable to social policies during working life, pension regulations can therefore alleviate the risk of old-age poverty entailed by biographies deviating from the ‘standard full-time worker’ (Möhring, 2015).

Pension regulations that address gendered work-family lives are, for example, childcare credits, survivors’ pensions and divorce splitting mechanisms. Their existence or absence likely shapes how divorce is related to women’s and men’s pension incomes. Childcare credits, for example, aim to compensate parents, mostly mothers, for the income loss they have due to childcare-related career interruptions (Janowski, 2011). Despite increasing women’s pension entitlements, however, they do not fully compensate for the income loss following childbirth (Lis & Bonthuis, 2020; Möhring, 2018).

Survivors’ pensions are designed to mitigate the survivor’s loss of income after the partner’s death and are usually calculated as a certain percentage of the deceased partner’s pension (Bonnet et al., 2012). Especially for women who lived a gendered work-family life, survivors’ pensions play an important role in their old-age security, as they were often dependent on their husbands’ income before retirement (Fasang et al., 2013). Once the marriage is dissolved, the entitlement to such a derived right is often forfeited, at the latest after remarriage (for exceptions, see OECD, 2018). Compared to divorced women, widowed women usually show higher pension entitlements as they benefit from the survivor’s pension (Peeters & De Tavernier, 2015; Sefton et al., 2011).

The risk of losing a partner through divorce is not ameliorated in most welfare states (Bonnet & Hourriez, 2012), although divorced women usually face similar low pension entitlements as married women (McDonald and Robb 2004). This is further supported by the higher likelihood of divorced women who do not repartner, to continue to work after retirement or to postpone retirement to compensate for their insufficient pension entitlements, while this is not the case for divorced men (Dingemans & Möhring,

2019; Finch, 2014; Kridahl, 2017b). Only a few countries, such as the UK, Canada and Germany, explicitly account for divorce in their pension regulations with a pension-splitting mechanism (Choi, 2006). Under this mechanism, the acquired pension entitlements during years of marriage are summed and split between the former spouses to acknowledge possible differences in earned incomes of women and men during the years of marriage.

### **4.3 Institutional differences between Sweden and West Germany**

#### **4.3.1 Policies supporting the compatibility of work and family**

Starting in the 1970s, Sweden turned away from the male breadwinner model and steadily expanded its individual and gender egalitarian policies. These included broad access to education and targeted policies, such as a parental leave system, subsidized public childcare and the active recruitment of women into the labour market. As a result, female employment rates started increasing to approximately 80 % until the mid-1980s, however, often on a long part-time basis (Gonäs & Tyrkkö, 2015). Thus, while the older cohorts of women in this study were part of the transition phase of female labour market participation, the younger cohorts had increasingly similar labour market participation rates to those of men. At the same time, the introduction of individual taxation in 1971 further promoted women's employment and the presence of 'dual-earner households', improving the accumulation of individual pension rights for women, albeit at a lower level than for men (Gunnarsson, 2016; Swedish Pensions Agency, 2018). By 1995, the income gap between women and men was still around 35 % (Government Offices of Sweden, 2021). In line with the concept of 'individualisation of rights', marriage and divorce laws were reformed starting in 1973, leading to a decline in social, legal or economic benefits due to marriage (Hoem, 1991; Perelli-Harris & Gassen, 2012). This also entailed that if ex-spousal alimony is provided, it can only be for a short 'adaptation' period as individuals are expected to be self-reliant. Previous research has shown that being self-reliant is difficult for divorced women, as they have lower incomes than (re)married women (Gähler, 1998).

In West Germany, until reforms started in the 2000s, policies supported the 'male breadwinner-female carer' model in the tax and transfer system (Trappe et al., 2015). Particularly, the system of joint taxation together with derived social security entitlements due to marriage (e.g., health insurance) and high marginal tax rates that penalize second earners encouraged a gendered division of labour (Gottschall & Schröder, 2013; Sainsbury, 1999b). Although parental leave benefits were introduced in 1976, additional policies supporting the compatibility of work and family were scarce, especially childcare for children under the age of three (Aisenbrey et al., 2009). While the average labour force participation rate for women was comparatively high until women were in their mid-20s, it dropped with the family formation phase and did not rebound significantly thereafter. This pattern slowly changed with the economic upswing of the 1960s and the educational expansion that mainly women gained from. Beginning with women born in the 1940s, employment rates started to increase after the family formation phase

(Ziefle, 2009), although pronounced part-time or marginal employment continued to limit women's possibilities of accumulating sufficient pension entitlements. However, acknowledging the imbalance in income between women and men, women in the cohorts studied were covered in the event of divorce by quite generous alimony and maintenance payments from their former husbands. Until a reform in 2008, spousal maintenance was granted to the 'resident parent' under the assumption that mothers were unable to work full-time before the youngest child reached age 15 (Bröckel & Andreß, 2015). Nevertheless, women in Germany lose all their social security entitlements previously derived from the marriage, which leads them to a different 'legal reality' after a divorce compared to women in Sweden. As previous research has indicated, this new situation has a positive effect on women's labour force participation, as they have to increase their income to provide for themselves and to compensate for the negative economic consequences following divorce (Kreyenfeld et al., 2018).

#### **4.3.2 Pension policies and gendered work-family lives**

The Swedish and the German public pension systems have undergone far-reaching reforms but can both be described as strongly lifetime earnings-related pension systems. In Sweden, almost all people are covered by the public pension and an occupational pension scheme (OECD, 2019a). Although the public pension is the most important pension source for women and men, occupational pension income is often higher for men than women and has, for instance, increased the gender pension gap by 13 % in 2019 (Swedish Pensions Agency, 2022a). A guaranteed pension is additionally provided for individuals who had no or only little pensionable income during life. Retirement age is flexible, and starting from age 61, individuals can decide what percentage of their income pension they want to withdraw while continuing to work until age 67. In the German public pension system, the mandatory retirement age for any old-age pension is gradually being increased from age 65 to 67 until 2029. Besides civil servants and certain professions (e.g., farmers), approximately 90 % of the residents in Germany have an account in the public pension insurance, and it is by far the most important income source in old age (Wagner et al., 2017).

In addition to the earnings centrality of the Swedish and the German pension systems, they both include additional pension qualifying periods, such as schooling, care periods and unemployment (DRV, 2021a; Swedish Pensions Agency, 2018). In both systems, childcare credits exist. In Sweden, for the first four years after childbirth, the parent with the lower income is credited with entitlements based on the most favourable option, i.e., either based on 1) earnings the year before childbirth, 2) 75 % of average earnings in Sweden, or 3) a fixed amount equivalent to a basic income amount (Jankowski, 2011). In 2018, four percent of women's allocated pension entitlements was due to childcare credits, while they accounted for only 0.8 % of men's (Swedish Pensions Agency, 2018).

In Germany, a parent (by default the mother) receives three pension points for each child born after 1 January 1992 and 2.5 pension points for each child born earlier. One 'pension point' is equivalent to the



average earnings of all insured persons in a given year. Before a reform in 2019, only two pension points were granted for children born before 1992. If a woman is employed during the first three years after childbirth, pension points for childcare and pension points from employment are summed, but only up to the contribution assessment ceiling. In 2016, childcare credits accounted on average for 14 % of women's public pension entitlements, showing their importance in relation to entitlements from gainful employment. For the small fraction of men who claimed them, they accounted for 7 % (Wagner et al., 2017).

With respect to risks arising from the loss of a spouse, whether through death or divorce, there are major differences between Sweden and Germany in line with each country's welfare and gender regime. In Sweden, the survivor's pension applies to the surviving partner irrespective of whether the couple was married and is usually paid for 12 months as an adjustment pension (Swedish Pensions Agency, 2022b). In Sweden, scaling down survivor benefits was introduced within the framework of gender equality: a derived pension right was seen as an incomplete recognition of women's autonomy, and at the same time, there should not be any incentive for women to not build up their own pension income (OECD, 2018). Different from Sweden, the German pension system includes the 'small' survivor's pension (paid for two years prior to age 47), and the 'large' survivor's pension that supports the surviving spouse until death (55 % of the deceased spouse's pension) (DRV, 2020).

As one of few countries, the German public pension system attempts to ameliorate negative economic consequences following divorce for the economically 'weaker spouse'. Since the grand divorce reform in 1977, the 'divorce splitting' mechanism has been in place in West Germany (since 1992 East Germany). In the case of divorce, the accrued pension entitlements during the years of marriage, including childcare credits, are summed up and divided equally between the ex-spouses upon divorce. This mechanism is mandatory by law and results mostly in an increase in pension entitlements for divorced women – by approximately 20 % compared to married women (Kreyenfeld et al., 2018), whereas it decreases divorced men's pension entitlements.

### **4.3.3 Expectations**

In the following, we outline four expectations on how divorce is related to public pension entitlements in the two different welfare states by comparing divorced and (re)married women's and men's public pension incomes in West Germany and Sweden (see summary table in the Appendix, Table A4.1). Depending on the institutional context, women and men face different social policies that shape gendered work-family lives and, thus, the possibility of accumulating individual pension entitlements during working life. Similarly, different pension regulations function as a continuation of social policies by providing credits for previous life course developments. Hence, the outlined mechanisms that link divorce to pension entitlements might vary by welfare state context.

In Germany, social policies and pension regulations are built upon the idea of the ‘male breadwinner-female carer’ model, and emphasis is placed on ‘equalisation payments’ to account for the gendered division of labour during the years of marriage. After divorce, women in Germany not only face different work incentives but also benefit on average from the divorce splitting mechanism, which aims to protect them from the ‘loss of the male breadwinner’. Regarding the relationship between divorce and public pension income, we therefore expect divorced women to have higher public pension incomes than (re)married women in West Germany (Exp 1). Regarding men, we expect divorced men to have lower public pension incomes than (re)married men, as they have to face, on average, a deduction by the divorce splitting mechanism (Exp 2).

In Sweden, social policies and pension regulations are built upon the idea of gender equality and economic independence throughout the life course. Hence, divorce hardly entails any policy-related consequences, as it is assumed that women and men are both self-reliant and have accumulated sufficient individual pension incomes, regardless of family status. We therefore expect more comparable public pension incomes between divorced and (re)married women (Exp 3) and between divorced and (re)married men (Exp 4). Prior research has indicated a strong negative social gradient in separations and divorce in Sweden, which may entail stronger differences in working histories. These differences in working histories may be reflected in pension incomes, especially in those of divorced men. Nonetheless, from a theoretical perspective, there is no distinction in how social policies impact divorced and married women’s and men’s pension incomes in Sweden.

#### **4.4 Data, variables, and analytical strategy**

##### *Swedish and German data*

For Germany, we draw on the subsample ‘biographical data on completed insured lives (VVL)’ from the German public pension registers. For Sweden, we utilize data from a large collection of registers, covering the entire Swedish population registered in Sweden since 1960. Both data sources include individual-level data on public pension entitlements, demographic characteristics and earning histories.

For comparability, we restrict the Swedish and German data to women and men who i) retired between 2013 and 2018, ii) were aged between 60-67 in the year of retirement and iii) received a public old-age pension. This age bracket was chosen based on each countries’ pension regulations together with the statistics on the effective labour market exit age (OECD.Stat, 2022c) to cover the majority of the retired population in both countries. There are few that continue to work past age 67 (e.g., self-employed) (Kridahl, 2017a). For Sweden, drawing an old-age pension is defined as taking out 100 % of the public pension entitlement in relation to the income from employment (if any) (Kridahl, 2017b). For Germany, it is defined as receiving any kind of old-age pension, which in practice corresponds to the Swedish definition. The German sample is restricted to people living in West Germany. East Germans in the

cohorts under scrutiny are not considered, as they were subject to a different policy context before reunification. Our final datasets include 3,278,808 individuals (51 % women, 49 % men) for Germany and 446,145 individuals (52 % women, 48 % men) for Sweden, reflecting the population size in each country after restrictions. All analyses are conducted separately by country and gender.

#### *Dependent variable*

The dependent variable is the *monthly public pension income* in euros. Hence, we do not consider occupational or private pensions and assets. All measures, particularly the occupational pension, usually increase gender inequalities in pension incomes even further (Birman et al., 2017). This suggests that differences in economic security in old age should be larger if other measures are factored in. In the Swedish pension registers, pension entitlements are stored in Swedish Kroner (SEK), while in the German registers, pension entitlements are stored as ‘pension points’. Swedish pension income is calculated using the consumer price index, and pension incomes of both countries are analysed in euros, using 2018 as a reference year (SCB, 2021; SGB VI, 2019). Public pension income in both countries is mainly acquired through gainful employment but also consists of other pension qualifying periods such as education, unemployment, childcare and, in the case of Germany, divorce splitting. We further calculate the monthly public pension income *without childcare credits* and, for the German sample, *without the supplements/deductions for the ‘divorce splitting’*.

#### *Independent variables*

The main variable of interest is *family status*, measured in the year of retirement (implying it is time constant). In the Swedish data, *family status* indicates whether women and men were *married, remarried, divorced, widowed, cohabiting* or *never married/single*. We do not distinguish between previously widowed and/or divorced individuals in the cohabiting group. Thus, this group may include a fraction of women and men who have been divorced and/or widowed before moving together with their new partner. In the German data, *family status* has only the four categories *married, remarried, divorced* or *widowed/never married*. Unfortunately, widowed and never married individuals cannot be distinguished. This is a rather small problem for widowed individuals, as we would expect them to have similar individual public pension incomes as married individuals (Kreyenfeld et al., 2021). However, we do not know how never married individuals’ income histories develop and if they might have lower or higher pension incomes compared to the remaining sample. As the focus of this study is on the relationship between divorce and public pension incomes, it seems reasonable to focus on groups associated with divorce, such as (re)married individuals.

For the descriptive part, we display *annual income histories* from pensionable income (reference year 2018) from age 20 until age 65 by family status (see documentation FDZ-RV, 2020; SCB, 2016). Pensionable income also includes replacement payments such as parental leave and times of unemployment. In the regression models, the *year of retirement* is included, as we use pooled data over the period 2013-

2018. Further controls that were shown to have an effect on retirement income are the *age at retirement* and *education* (Möhring, 2015). For Germany, *education* can only be measured by whether or not an individual has completed more than the regular years of schooling after age 17, as there is no information available on the individuals' obtained educational qualifications. For Sweden, education is categorised into nine/fewer than nine years of education, 12 years, or higher education/PhD studies. For the female samples, the *number of children* (childless, one, two, three or more) is also included. As the German pension registers mainly store this information in the pension accounts of women, we cannot include this variable for men.

The sample statistics for women and men (Appendix, Table A4.2) show an even distribution across retirement years in both countries. While most people in the German sample were born between 1949 and 1953, the majority in the Swedish sample were born slightly earlier, between 1947 and 1952. In line with prevailing retirement regulations, this is reflected in the average age at retirement, which is approximately 65.2 years in Sweden and 64.4 years in Germany. With respect to family status, the large share of almost 15 % of divorcees in the year of retirement in Sweden stands out, as this group amounts to only 9 % in the German sample. Conversely, the German sample shows a large group of married people, with more men (69.3 %) being married than women (63.1 %), while in Sweden, this group is 48.4 % for both genders. The share of remarried women and men is slightly higher in Sweden than in Germany. In both countries, men in the cohorts studied have slightly higher education levels than women. While there are no large differences in the descriptive statistics by family status for women in Germany, divorced men seem to be less educated than married men. In Sweden, this holds true for divorced women as well as men, and both additionally tend to retire later compared to married women and men (Appendix, Tables A4.3-A4.4).

### *Analytical strategy*

For most of the analysis, we focus on the groups of divorced and (re)married women and men in the year of retirement. For the descriptive part, we construct annual income histories from age 20 until age 65, as they are the most relevant determinant of individual public pension income. To disentangle the impact of social policies and pension regulations on individual pension income, we calculate the monthly public pension income of women and men across family status with respect to lifetime income, childcare credits, and divorce splitting for Germany. The analytical part consists of bivariate and multiple ordinary least squares regression models in each country. The aim is to analyse how monthly public pension income relates to family status without and with adjusting for sociodemographic covariates that have been shown in previous research to be related to pension incomes. In a last step, we include an interaction term of family status and the year of retirement to take into account the pooled data structure and to rule out major variations in public pension incomes over the six retirement years.

### *Sensitivity analysis (upon request)*

Sensitivity analysis for Sweden showed that the results were stable when accounting for the time spent divorced. Compared to married individuals, only those getting divorced within five years prior to retirement seemed to be the most economically disadvantaged. Due to limitations in the German data, we can only measure family status as a time-constant variable in the year of retirement and do not have equivalent analysis for the German sample. In 2000, the average age for divorce in Germany was approximately 39 for women and 41 for men (Statistisches Bundesamt, 2021). Hence, it could be assumed that the majority in the German sample was already divorced for some years before retirement. Moreover, to account for the positive skewedness of pension income, models with log-transformed pension income were conducted for both countries, showing comparable and robust results. Although we could not include further variables that might be correlated with the risk of getting divorced, we did adjust our models for the mentioned sociodemographic confounders. We also conducted sensitivity analysis controlling for months spent incapacitated (Germany) and on sick leave (Sweden) prior to age 60, as these variables are likely correlated with the risk of getting divorced and at the same time with expected pension income, showing comparable results. As the variable information was available only from age 40 to age 59 in Sweden, while it covered the whole working history in the German data, we did not include them in the main models due to comparability reasons.

## **4.5 Results**

### **4.5.1 Descriptive results**

#### *Annual income histories*

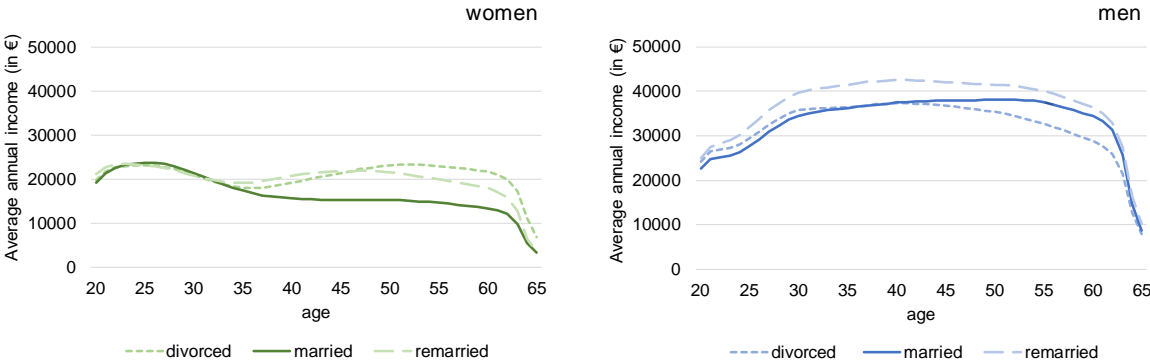
The descriptive analyses show large differences in women's and men's annual income histories in both countries (Figure 4.1). In Germany, women's annual income always remains below 25,000 euros and starts declining after the age of 25, most likely due to their family formation phase. While the average annual income of divorced and remarried women starts to rise again, married women's incomes stay at a low level. In contrast, (re)married men in Germany show stable annual incomes throughout their working lives, averaging over 30,000 euros from the age of 25. Only the annual income of divorced men starts to decline from approximately age 40, suggesting that there might be gendered consequences following divorce on income histories in Germany.

In Sweden, the annual incomes of women plateau around the family formation years but increase afterwards to approximately 25,000 euros. There are almost no differences in women's annual income histories across family status. Only divorced women's annual incomes fall slightly behind after age 40 until retirement. Men in Sweden show continuously increasing incomes, but they differ across family status. While (re)married men's incomes reach a maximum of approximately 40,000 euros, divorced men's annual incomes start lagging behind at approximately age 25 and continue to fall behind until retirement.

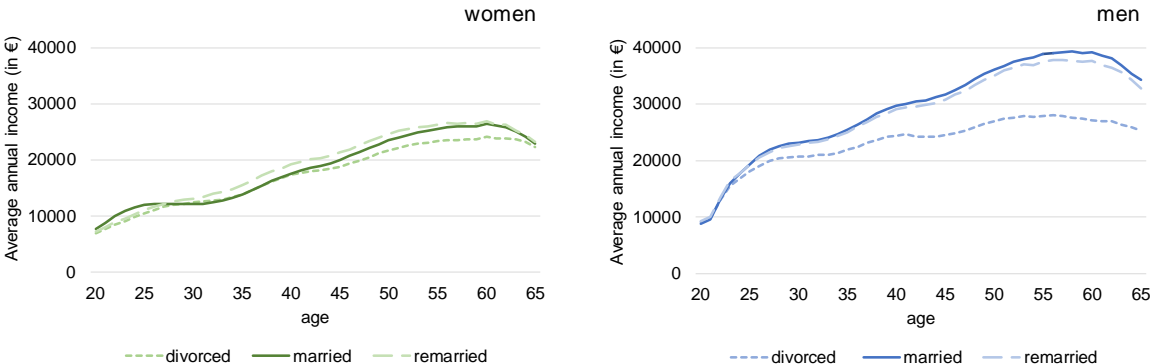
While income histories seem to differ by women’s family status only slightly in Sweden, divorced men show very different income histories than (re)married men. However, it is difficult to disentangle the mechanisms that select women and men into being divorced or (re)married in the year of retirement. As in the case of divorced men, the more successful ones could have entered a new marriage and thus end up in the remarried group. Given that divorce is associated with other concurrent life course events for men, such as invalidity or unemployment (see section 4.2.1), the observed patterns could also be related to divorced men already being negatively selected in terms of their health and socioeconomic status.

Figure 4.1: Average annual income histories from pensionable income for married, remarried and divorced women and men in the year of retirement, West Germany and Sweden

West Germany



Sweden



*Note:* The scales differ, as income histories reflect the earning distribution in each country. Due to one pension point being equivalent to the average income in a given year, we do not observe the same upward trend for Germany as for Sweden. Base year for earning deflation: 2018.

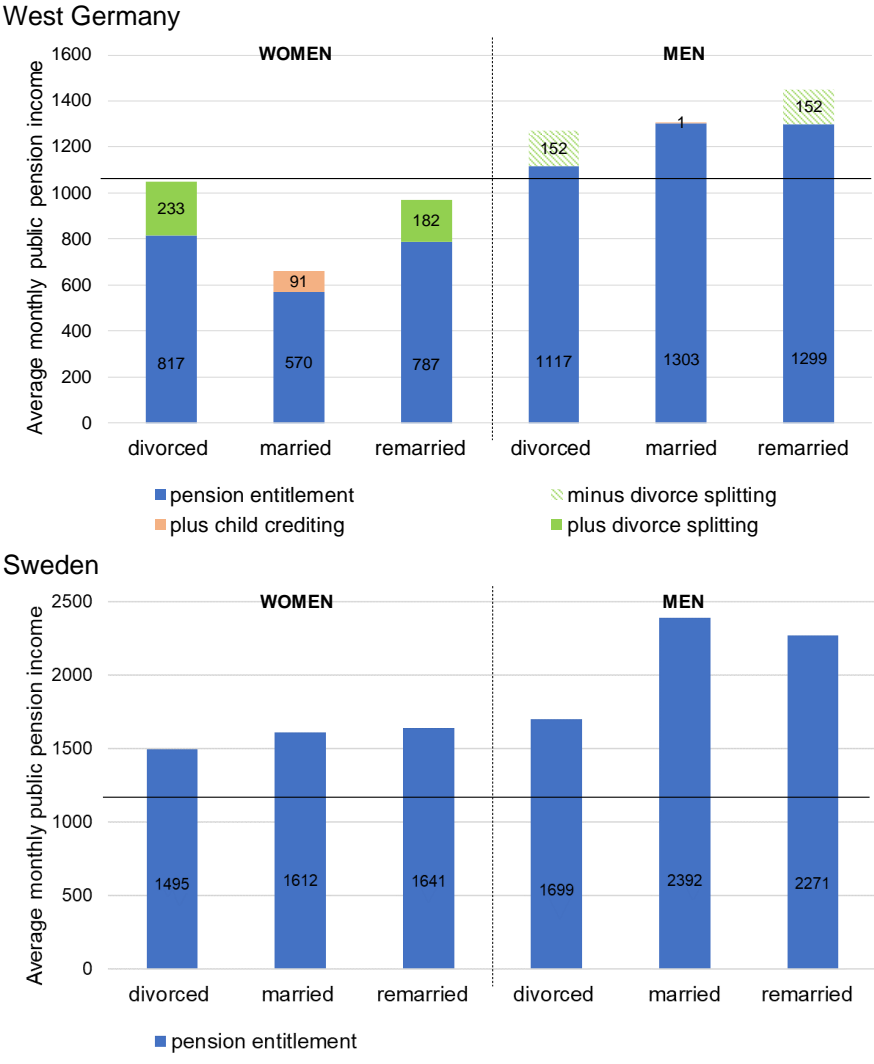
*Source:* RTZN-VVL2013-2018 & Swedish registers; authors’ own calculations.

*Monthly public pension incomes*

Figure 4.2 shows the average monthly public pension income of women and men by family status and source of the pension entitlement (overview of full statistics across family status groups, Appendix, Table A4.5). In Germany, women have lower pension incomes than men. Divorced and remarried women have on average a pension income of approximately 1000 euros. This is largely due to the divorce splitting mechanism, which increases their pensions on average by 200 euros, but also by their comparatively higher lifetime income, as expected from the annual income histories. Although married

women’s pension incomes increased by 91 euros due to childcare credits, which correspond to 14 %, they still received the lowest pension of 661 euros. Married men in Germany receive the highest pension income of 1304 euros, followed by remarried men, and divorced men receive the lowest pension income of 1117 euros. The divorce splitting mechanism reduces the monthly pension income of divorced and remarried men by approximately 150 euros. It seems that this mechanism aligns the pension incomes of divorced women and men, while married and remarried women show a greater gender pension gap. In 2018, the poverty line for a single-person household in West Germany, calculated as 60 % of the median income, was 1062 euros (WSI, 2019). Both divorced women and men receive public pension incomes that are on average close to this threshold.

Figure 4.2: Average monthly public pension income for divorced, married and remarried women and men in the year of retirement, West Germany and Sweden



Note: The scales differ for both countries. Childcare credits are included in the divorce splitting mechanism. Poverty line West Germany (2018): 1062€; Sweden (2017): 1200€.

Source: RTZN-VVL2013-2018 & Swedish registers; authors’ own calculations.

In Sweden, (re)married women show comparable pension incomes averaging 1600 euro. However, divorced women's pension income is 117 euros less on average than married women's but above the poverty line (EAPN, 2019). Compared to women's earnings, childcare credits play a minor role in women's public pension income (Appendix, Figure A4.3). Men in Sweden also have higher pension incomes than women, especially (re)married men with an average pension income of approximately 2300 euros. Divorced men receive the lowest pension income, 1699 euros. However, different from Germany, where the divorce splitting mechanism contributes to lower pensions for the male divorcees, this low value for men in Sweden is mainly related to their lower lifetime income. While differences in women's and men's pension incomes are also the smallest for divorcees in Sweden, it seems that this is mainly driven by divorced men doing worse during working life (see Figure 4.1).

#### 4.5.2 Regression results

The estimates of family status on monthly public pension income obtained from the bivariate and multiple regression models separately for women and men by country are shown in Table 4.1 (full models, Appendix, Tables A4.6-A4.7). Even after adjusting for sociodemographic confounders, such as education and age at retirement, the results reveal that the monthly public pension income varies by family status for women and men in both countries. For women in Germany, compared to being married, being divorced increases the public pension income by 350 euros, which is equal to 34 % (Appendix, Table A4.8). For men, an opposite pattern is observed, with divorced men receiving 186 euros (14 %) less per month than married men.

Table 4.1: Regression results with monthly public pension income in euros as the dependent variable for West Germany and Sweden

West Germany	WOMEN						MEN								
	M1	95% CIs			M2	95% CIs			M1	95% CIs			M2	95% CIs	
<b>Family status</b>															
divorced	391	389	394	350	348	352	-187	-191	-184	-186	-189	-182			
married	ref.			ref.			ref.			ref.					
remarried	309	306	312	231	229	234	-6	-9	-2	-15	-18	-12			
widowed/never married	146	144	148	109	107	111	-288	-291	-285	-247	-250	-245			
<b>N</b>			1,678,306						1,600,502						
<b>Sweden</b>															
<b>Family status</b>															
divorced	-116	-127	-106	-96	-106	-86	-692	-712	-673	-606	-624	-587			
married	ref.			ref.			ref.			ref.					
remarried	29	16	42	51	39	63	-121	-144	-99	-124	-145	-103			
widowed	50	35	66	124	110	138	-49	-93	-6	11	-31	52			
cohabiting	11	-2	23	58	47	70	-368	-388	-349	-280	-299	-261			
never married/single	-73	-86	-60	1	-12	14	-839	-857	-821	-689	-707	-672			
<b>N</b>			233,517						212,628						

*Controlled for:* M1 = no controls; M2 = retirement year, education, age at retirement and female models for number of children. Results rounded.

*Source:* RTZN-VVL2013-2018 & Swedish registers; authors' own calculations.



For women in Sweden, family status seems to play a minor role in differences in pension income. Only divorced women are expected to have public pension income that is 96 euros (6 %) less than that of married women. For men in Sweden, a similar pattern as in Germany is observed, with married men receiving the highest public pension income. However, there is a clear divide between the comparison groups: While remarried men show only a comparatively small difference of 124 euro (5 %) from married men, and cohabiting men a difference of 280 euro (12 %), divorced and never married men show a large difference in expected public pension income: 606 euro (26 %) and 689 euro (29 %) less, respectively.

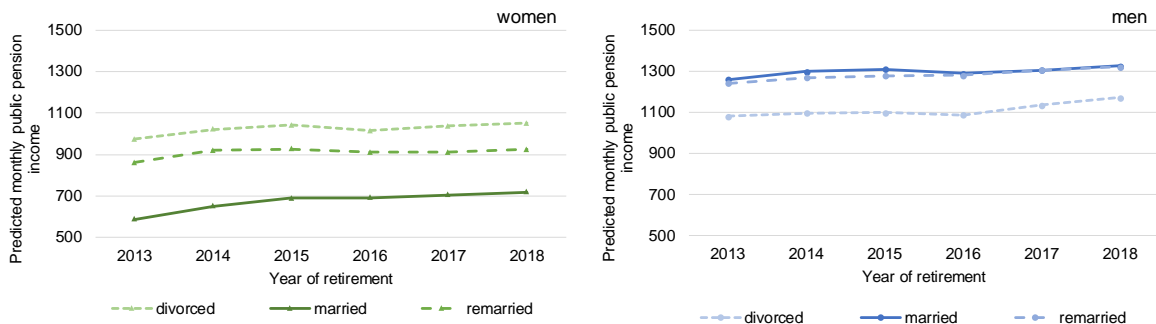
#### *Results from interaction models*

To account for the pooled data structure and to examine whether estimates of pension incomes are stable over time, interaction models of family status and retirement year are analysed. The results are displayed as predicted values from these models for divorced, married and remarried women and men in both countries (full results, Appendix, Tables A4.9-A4.10, Figure A4.6). As expected for women in West Germany (Exp 1), there are persistent differences in their public pension income, as shown in Figure 4.3. Divorced women receive a pension income of 1050 euros by the end of the observation window, while married women receive a lower pension income of 719 euros in 2018. For men, we observe an opposite result, with divorced men's pension incomes being significantly lower than married men's, which is in line with our expectations (Exp 2).

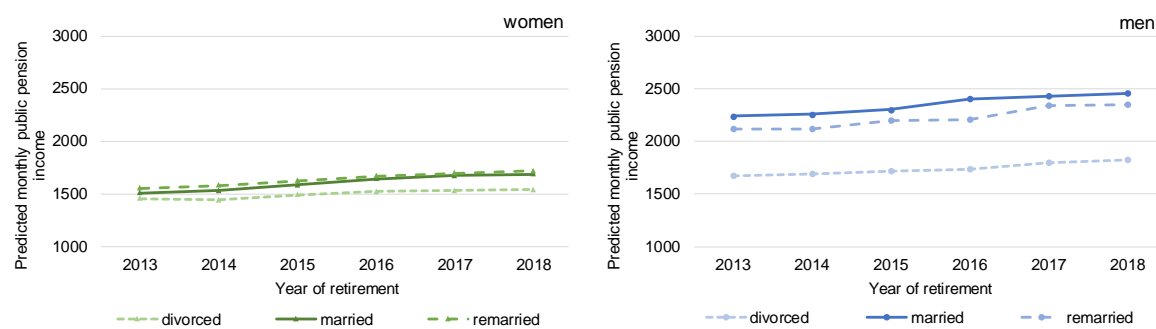
For women in Sweden, pension incomes seem more comparable by family status across retirement years. However, over time, the difference between divorced and (re)married women's pension incomes increases slightly. Divorced women who retired in 2013 only show on average a difference of 54 euros less of pension income compared to married women. For divorced women who retired in 2018, the difference increased to 149 euros less of pension income on average. This difference translates into a pension gap of 9 % in 2018, which, together with its increasing pattern across retirement years, challenges the expectation about comparable retirement incomes among women with a different family status (Exp 3). For men in Sweden, patterns look similar to those of men in West Germany, although we expected comparable public pension incomes across family status. The persistently much lower pension incomes of divorced men thus force us to reject Exp 4. In 2018, the pension of a divorced man was on average 633 euros lower, which is almost 26 % lower than that of a married man and far from comparable. However, divorced men still have higher pension entitlements than women of any family status in Sweden. Although women seem to have a relatively stable income level until retirement (see e.g., Figure 4.1), their public pension incomes still do not reach the same level as that of men.

Figure 4.3: Predicted monthly public pension income by gender and family status over the years 2013-2018 for West Germany and Sweden

### West Germany



### Sweden



Note: The scales differ for the countries. *Controlled for*: education, age at retirement and female models for number of children. Results rounded.

Source: RTZN-VVL2013-2018 & Swedish registers; authors' own calculations.

## 4.6 Summary and discussion

By comparing the public pension incomes for women and men who retired between 2013 and 2018 in West Germany and Sweden, this study has contributed to a better understanding of how divorce is related to economic security in old age in two different welfare states. The findings partly support the outlined theoretical assumptions about how each welfare state may mitigate the possible consequences following divorce. In Germany, the divorce splitting mechanism 'equalises' pension entitlements by increasing women's and decreasing men's public pension incomes. In Sweden, social policies seem to enable women comparatively similar and independent of their family status to acquire individual pension entitlements, although not yet to the same extent as men.

The results reveal different income histories for women and men by family status in both countries, which are, together with the prevailing pension regulations, also reflected in their public pension incomes. In Germany, divorced women have pension incomes of approximately 350 euros higher than married women, while divorced men's pension incomes lag behind married men's by approximately 180 euros. This is mainly due to the divorce splitting mechanism but also due to the higher lifetime incomes of divorced women and lower incomes of divorced men. For Sweden, divorced women have,

on average, slightly lower pension incomes compared to married women, which seem to start falling behind over retirement years. Divorced men, however, show a persistently large difference, with 600 euros less per month on average compared to married men.

In line with the recognition of the imbalance in women's and men's working lives, the divorce splitting mechanism in West Germany fulfils its aim by redistributing pension entitlements between the ex-spouses. Nonetheless, compared to married men, both divorced women and men have lower public pension entitlements of approximately 1100 euros on average. In 2018, this was slightly above the poverty line (WSI, 2019) and hence can be considered below adequate. Although this study did not take a couples' perspective, the results indicate that only splitting up the 'male breadwinner pension' seems insufficient to sustain two separate households, especially if the ex-spouses practised a gendered division of labour during marriage. This gendered division of labour seems to be the root of the problem. Even cohabiting women still reduce their working hours after the birth of a child in Germany and in the case of separation are additionally disadvantaged, as the 'divorce splitting' does not apply to them. As pointed out in previous studies, these women are at particularly high risk of experiencing old-age poverty (Kreyenfeld et al., 2021).

Following the Swedish approach of individual economic independence over the life course, we did not expect pension income to vary strongly across family status, as social policies aim at enabling everyone to be part of the labour market. This partly holds for women, as they display more comparable annual income trajectories and pension incomes across family status. In comparison to previous research (e.g., Möhring, 2021) and the findings for West Germany that show higher pension incomes for divorced women than for married women, it seems that social policies in Sweden achieved a stronger labour market participation of women regardless of family status. However, women's pension entitlements are still lower than those of divorced men, which are the lowest among men in Sweden. Occupational segregation and the gender pay gap might explain parts of this difference (Hustad et al., 2020). However, it appears that even the gender equality policies in Sweden did not manage, at least for the cohorts in this study, to completely eliminate gendered work-family lives, and the existing childcare credits do not compensate for these differences. The gap between women's and men's pension entitlements is especially of concern for divorced women, as they may have to be self-reliant in old age, especially if they do not repartner and share pension entitlements. The significantly lower pension incomes of divorced men are also alarming. This pattern cannot be explained as easily as in the German case, since there are no pension-related measures in place that would lower their pension income after divorce.

A limitation of this study is that family status in the German data is available only in the year of retirement, and thus, it is not possible to account for the time spent in each family status (e.g., years being divorced) or the timing and occurrence of other factors that may be related to that status (e.g., unemployment, health). As previous research has shown (e.g., Andreß et al., 2006), the results of this study also indicate that men face economic consequences following divorce. However, as we cannot consider

the life course history, these consequences may already be caused by other factors that lead men to divorce in the first place and some men to repartner afterwards. Particularly in Sweden, divorced men's incomes lag behind relatively early in the life course, pointing to possible disadvantages that already existed before the divorce, which then translate into lower pension incomes. Poorer health and lower education are related to a higher risk of divorce (Mortelmans, 2021) and at the same time negatively to earnings, as both lower the chances of being employed. Hence, treatment and selection effects are hard to disentangle (Jalovaara & Fasang, 2019), and we can only speculate about mechanisms. As there are only small differences in pension incomes between married and remarried men, even in West Germany, where the divorce splitting mechanism will on average decrease men's pensions to some extent, it seems that those men selecting into (re)marriage are on more advantageous tracks. This is further supported by the results for never married men in Sweden, who receive even lower pension incomes than divorced men (Appendix, Figure A4.2). Future studies may investigate potential life course differences during the adolescence and young adulthood of divorced and married men and the process of selection into marriage (and later divorce).

An important finding of this study is that both countries, although following different policy paths, do not seem to be able to shelter both women and men from the consequences related to divorce on economic security in old age. This finding is corroborated by other studies, which have shown that divorced women in Sweden (Kridahl, 2017b) and Germany (Radl & Himmelreicher, 2014) tend to postpone retirement together with a general increase in the share of working pensioners over recent years (Eurostat, 2022c). Hence, 'ageing unequally' does not stop around retirement but possibly continues to older ages. In 2017, the expected time spent in retirement was approximately 22 years for women and approximately 19 years for men in both countries (OECD, 2019d). As witnessed by the rise of late-life divorce, it is likely that family status may still change after retirement (Öberg, 2017), while at this point in the life course, opportunities to adjust retirement income are limited.

Given these trends, the findings of this study indicate that there may be a large share of divorced pensioners at risk of being economically disadvantaged in old age in the years to come. Although the analyses only included public pension incomes, earlier research has shown that gender inequalities increase when adding occupational or private pension incomes (Birman et al., 2017). Furthermore, divorced women and men tend to have less wealth accumulated at retirement, as assets are often split upon divorce. Unstable careers and/or part-time employment further act as an obstacle for investments in occupational and private pension schemes. This is of concern in light of reforms strengthening the role of private and occupational pensions (Frericks et al., 2009), as they contribute to 'ageing unequally' in a way that those in already advantageous positions can build up complementary entitlements more easily.

The results show that both welfare state approaches – preventing inequality from the onset, as in Sweden, and compensating for inequality afterwards, as in Germany – have their advantages and disadvantages. Given the growing diversity of family forms, social policies should aim to address both issues:

they should aim to mitigate the onset of ‘ageing unequally’ in the first place to reduce labour market and gender-related inequalities. Concurrently, they should aim to put in measures that compensate for existing inequalities, such as childcare credits, and decouple policies from marital status and extend them to cohabiting unions, as they will otherwise exclude those following ‘nonnormative’ family life courses. Future studies could evaluate different pensions types (public, occupational, private) by family status to examine who benefits and who loses with different pension regulations, thereby also considering (equivalised) household income. They could also compare similar family risk-related pension arrangements across countries to assess how effective they are in each social policy context, for instance, using harmonised survey data including information on pension income, benefits and other income compensations.



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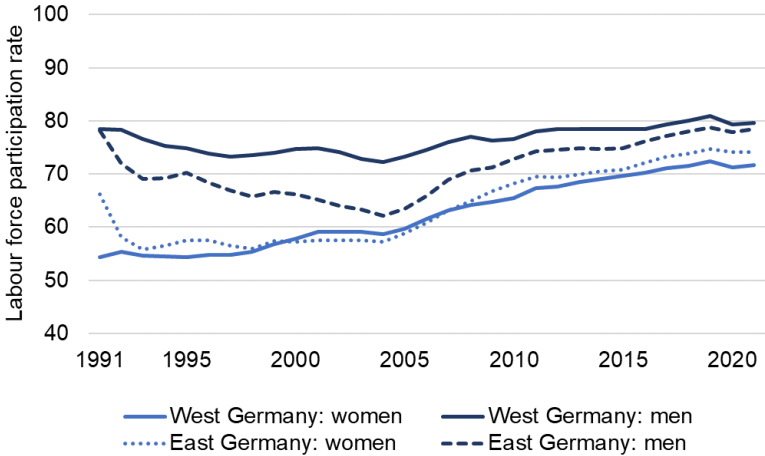




# Appendix

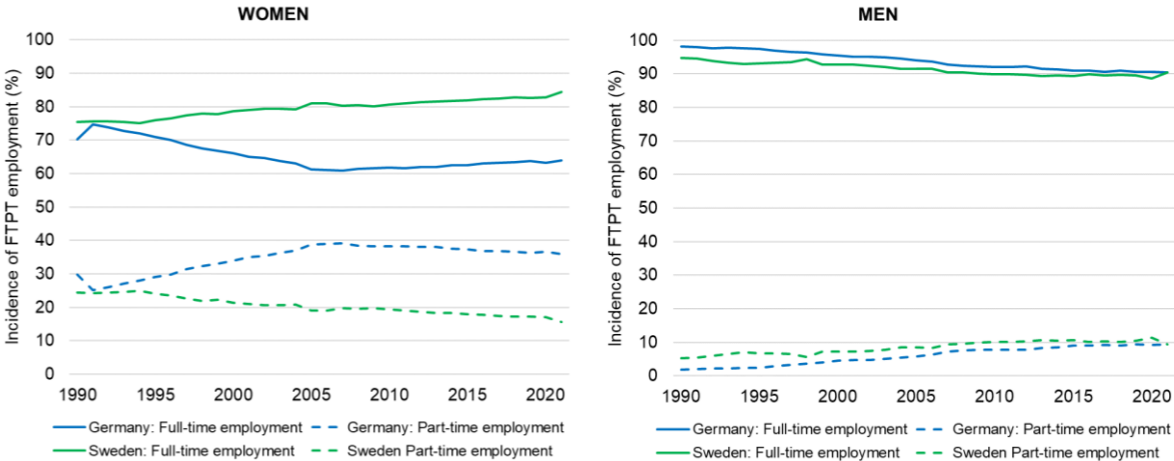
## Appendix Chapter 1

Figure A1.1: Labour force participation rate of women and men, age 15-65, from 1991 until 2020, former East and West Germany



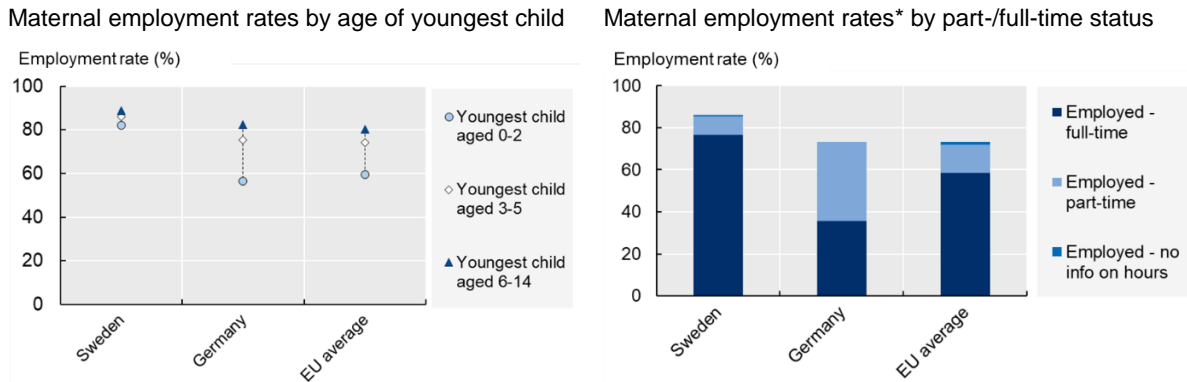
Source: Destatis, 2022; own illustration.

Figure A1.2: Incidence of FTPT employment for women and men, 1990-2020, Sweden and Germany



Source: OECD.Stat, 2021; own illustration.

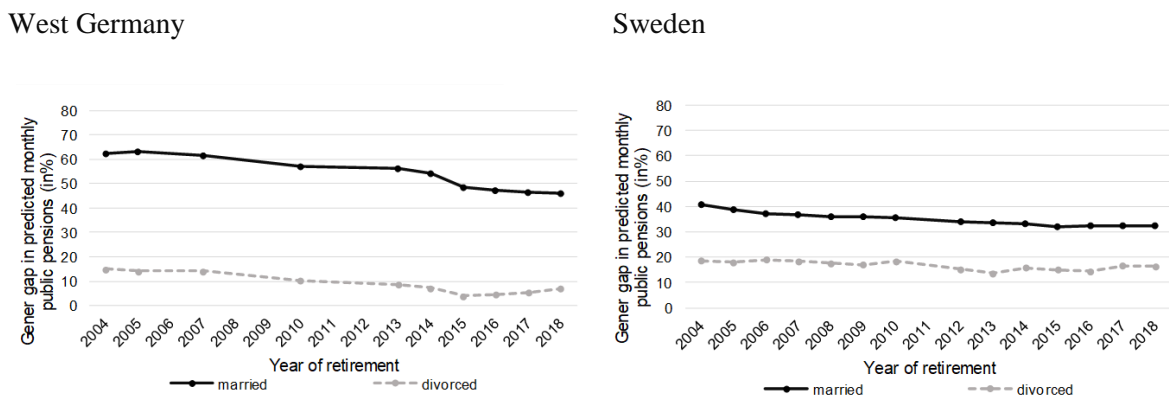
Figure A1.3: Maternal employment rates by age of child and part-/full-time status, 2019, Sweden, Germany, EU average



Note: \*At least one child aged 0-14. Part-time employment is defined as usual weekly working hours of less than 30 hours per week in the main job, and full-time employment as usual weekly working hours of 30 or more per week in the main job.

Source: OECD, 2022a.

Figure A1.4: Gender pension gap for divorced and married women and men, 2004-2018, West Germany and Sweden

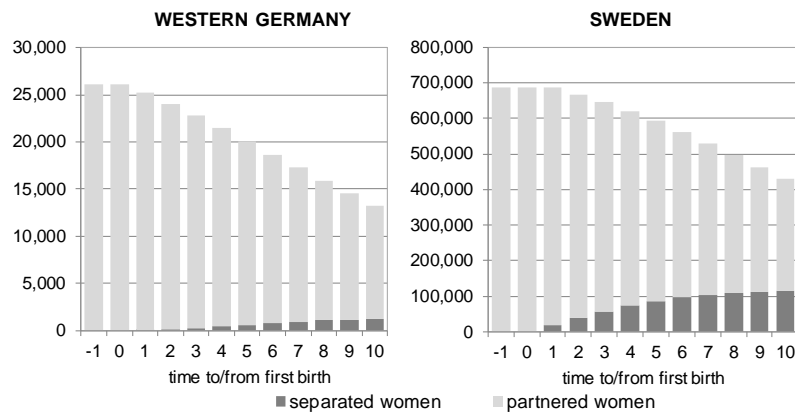


Note: West Germany N = 3,655,194; Sweden N = 1,134,739.

Source: RTZN-VVL2013-2018 & Swedish registers; own calculations.

## Appendix Chapter 2

Figure A2.1: Number of women by the age of the first child



*Note:* Scales differ in relation to the size of the respective datasets. Women who had their first child after 2005, cannot be followed for full set of 10 years why the number of women decrease over time.

*Source:* FamChange database and VSKT-VA 2015; own calculations.

Table A2.1: Sample statistics for the total sample and for each pre-birth earnings quartile at the start of the observation window

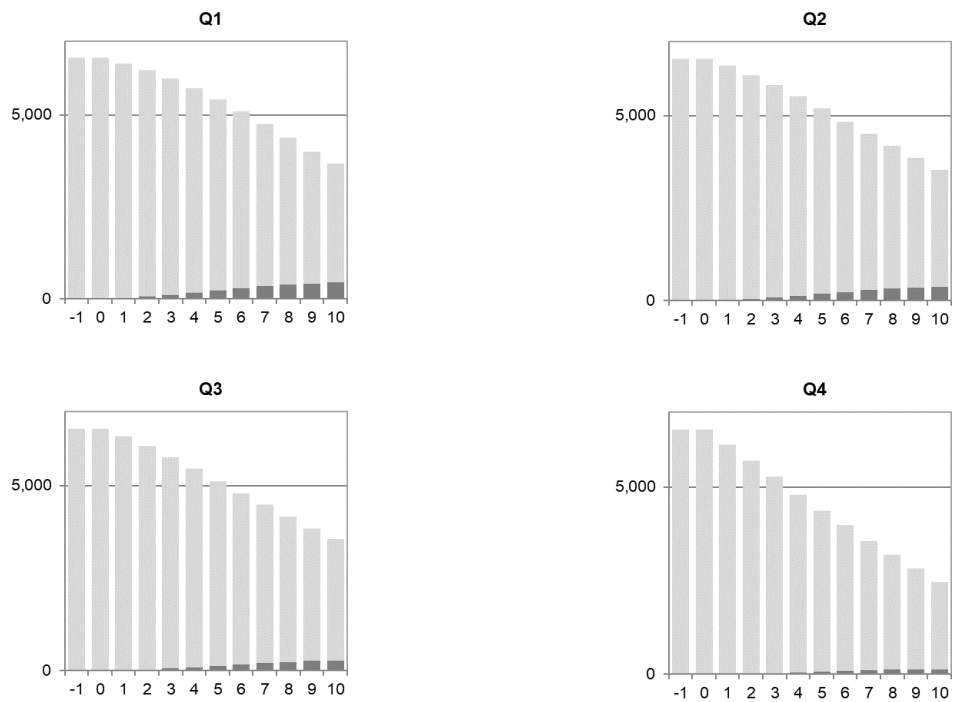
	total	Q1	Q2	Q3	Q4
<b>Ø earnings two years prior birth</b>					
western Germany	26 847€	8 716€	22 150€	30 822€	45 683€
Sweden	22 309€	6 058€	18 485€	26 011€	38 684€
<b>Ø age of mother at first birth</b>					
western Germany	29	27	28	29	32
Sweden	29	27	28	30	32
<b>Ø age of first child at separation</b>					
western Germany	6	6	6	6	6
Sweden	5	4	5	5	5
<b>% of women according to birth order</b>					
western Germany					
one child	43.3	40.6	42.1	42.1	48.3
two children	45.6	43.8	46.6	47.7	44.6
three children	11.1	15.6	11.4	10.3	7.1
Sweden					
one child	16.3	14.3	15.0	17.3	18.6
two children	59.9	54.4	60.0	63.1	65.4
three children	23.8	34.4	25.3	19.6	16.0

*Note:* In the Swedish registers, earnings are recorded in Swedish Krona. In the German pension registers, earnings are recorded as 'pension points', with one pension point being equivalent to the average annual gross earnings in a given calendar year. Results rounded. Cut-points for Germany: Q1>0; Q2> 16.852€; Q3> 26.703€; Q4> 35.180€; for Sweden: Q1>0; Q2>13.176€; Q3>22.342€; Q4>30.019€.

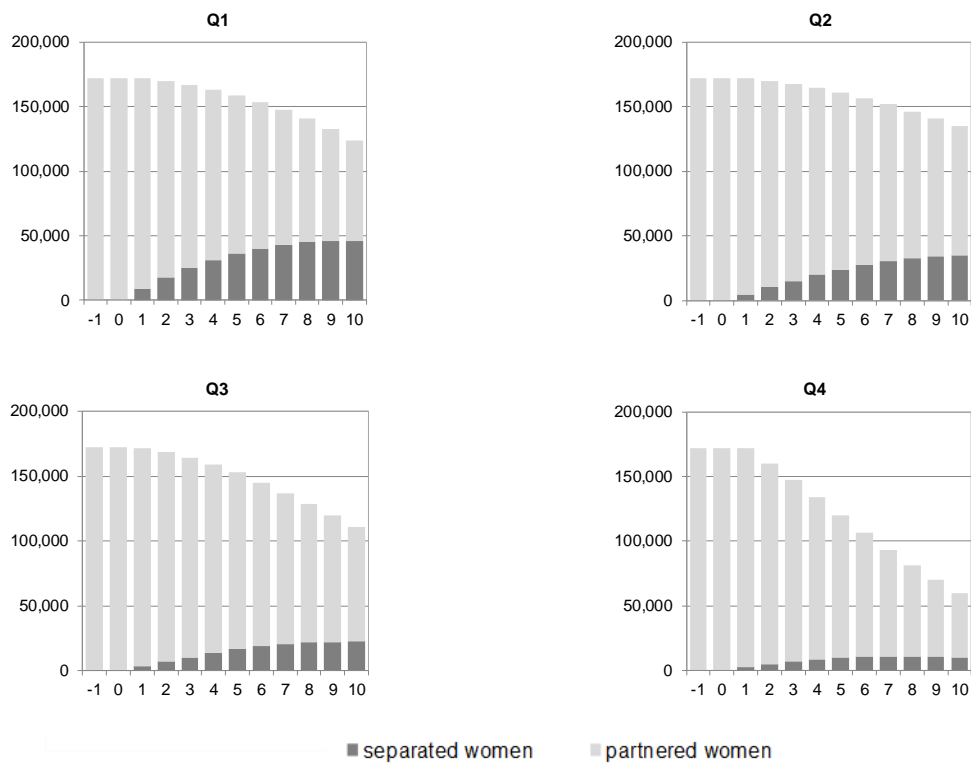
*Source:* FamChange-database and VSKT-VA 2015; own calculations.

Figure A2.2: Number of partnered and separated mothers over observation window, for western Germany and Sweden (in person-years)

### Western Germany



### Sweden



Source: FamChange-database and VSKT-VA 2015; own calculations.

Table A2.2: OLS regression results with annual earnings as dependent variable

	Western Germany	Sweden
<b>Separation</b>		
No	ref.	ref.
Yes	1844***	-1922***
<b>Age of first child</b>		
Pregnancy (year before birth)	ref.	ref.
Age 0	-15 559***	-11 840***
Age 1	-23 342***	-14 332***
Age 2	-19 553***	-5 517***
Age 3	-17 005***	-5 078***
Age 4	-15 367***	-1 745***
Age 5	-14 504***	1 795***
Age 6	-13 715***	4 029***
Age 7	-13 150***	5 566***
Age 8	-12 742***	6 990***
Age 9	-12 380***	8 425***
Age 10	-12 075***	9 635***
<b>Birth order</b>		
One child (including pregnancy)	ref.	ref.
Two children	-7 248***	-5 834***
Three and further children	-10 433***	-11 748***
<b>Age of mother at first birth</b>		
18-22	ref.	ref.
23-27	-67	2 165***
28-32	-578***	3 727***
33-37	843***	3 784***
38-42	1 223**	2 928***
43 +	-882	1 508***
<b>Pre-birth earnings quartiles</b>		
Q1	ref.	ref.
Q2	2 298***	2 092***
Q3	5 877***	5 952***
Q4	13 897***	16 462***
<b>Calendar year</b>		
1991-1999	-674***	-1 270***
2000-2006	ref.	ref.
2007-2015	1 601***	2 379***
<b>National unemployment rate</b>		
	-290***	163***
<b>Constant</b>	24 372***	13722***
<b>Person-years</b>	245 636	7 075 649
<b>R-square</b>	0.382	0.3831

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Note: Results rounded.

Source: FamChange-database and VSKT-VA 2015; own calculations.

*Interaction between age of the first child and separation*

Table A2.3: OLS regression with annual earnings as dependent variable and interaction effect between age of first child and separation

	Western Germany	Sweden
<b>Age of first child * Separation</b>		
Pregnancy (year before birth)*No	ref.	ref.
Age 0*No	-15 559***	-11 840***
Age 1*No	-23 345***	-14 402***
Age 2*No	-19 537***	-5 606***
Age 3*No	-16 997***	-5 392***
Age 4*No	-15 358***	-1 992***
Age 5*No	-14 509***	1 760***
Age 6*No	-13 720***	4 106***
Age 7*No	-13 145***	5 687***
Age 8*No	-12 736***	7 146***
Age 9*No	-12 398***	8 613***
Age 10*No	-12 098***	9 843***
Pregnancy (year before birth)*Yes	.	.
Age 0*Yes	.	.
Age 1*Yes	-19 239***	-13 887***
Age 2*Yes	-20 307***	-6 368***
Age 3*Yes	-15 752***	-4 175***
Age 4*Yes	-13 937***	-2 134***
Age 5*Yes	-12 487***	-197***
Age 6*Yes	-11 736***	1 509***
Age 7*Yes	-11 355***	2 949***
Age 8*Yes	-10 960***	4 341***
Age 9*Yes	-10 319***	5 757***
Age 10*Yes	-9 994***	6 991***
<b>Birth order</b>		
One child (including pregnancy)	ref.	ref.
Two children	-7 250***	-5 779***
Three and further children	-10 432***	-11 740***
<b>Age of mother at first birth</b>		
18-22	ref.	ref.
23-27	-67	2 176***
28-32	-578***	3 740***
33-37	843***	3 800***
38-42	1222**	2 949***
43 +	-883	1 534***
<b>Pre-birth earnings quartiles</b>		
Q1	ref.	ref.
Q2	2298***	2 097***
Q3	5877***	5 955***
Q4	13897***	16 471***

Table A2.3 continued

<b>Calendar year</b>			
	1991-1999	-673***	-1280***
	2000-2006	ref.	ref.
	2007-2015	1600***	2380***
<b>National unemployment rate</b>		-290***	160***
<b>Constant</b>		24 372***	13 733***
<b>Person-years</b>		245 636	7 075 649
<b>R-square</b>		0.3820	0.3838

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Note: Results rounded.

Source: FamChange-database and VSKT-VA 2015; own calculations.

Table A2.4: Average Marginal effects from the two-way interaction of age of first child and separation

Time to/ from birth	Western Germany		CI		CI	
	partnered mothers	separated mothers	partnered mothers	separated mothers	separated mothers	
-1	24 877		24 706	25 047		
0	9 232		9 071	9 393		
1	1 447	5 524	1 303	1 591	2 404	8 643
2	5 234	4 458	5 093	5 375	3 030	5 885
3	7 758	9 014	7 612	7 905	7 776	10 252
4	9 419	10 830	9 249	9 589	9 850	11 810
5	10 252	12 308	10 063	10 441	11 443	13 172
6	11 063	13 052	10 856	11 270	12 237	13 867
7	11 613	13 338	11 387	11 839	12 591	14 086
8	11 986	13 810	11 740	12 232	13 101	14 520
9	12 351	14 505	12 086	12 616	13 800	15 210
10	12 673	14 767	12 389	12 956	14 069	15 466

Time to/ from birth	Sweden		CI		CI	
	partnered mothers	separated mothers	partnered mothers	separated mothers	separated mothers	
-1	20 793		20 761	20 832		
0	8 956		8 920	8 993		
1	6 394	6 910	6 360	6 428	6 788	7 031
2	15 190	14 428	15 163	15 217	14 326	14 531
3	15 404	16 621	15 374	15 435	16 531	16 710
4	18 804	18 663	18 769	18 839	18 578	18 747
5	22 557	20 599	22 518	22 596	20 517	20 681
6	24 902	22 305	24 859	24 945	22 223	22 387
7	26 483	23 745	26 436	26 529	23 663	23 828
8	27 942	25 137	27 892	27 993	25 053	25 221
9	29 409	26 553	29 354	29 464	26 466	26 641
10	30 639	27 788	30 579	30 699	27 697	27 878

Note: Results rounded.

Source: FamChange-database and VSKT-VA 2015; own calculations.

*Interaction between pre-birth earnings quartiles and separation*

Table A2.5: OLS regression with annual earnings as dependent variable and interaction effect between separation and pre-birth earnings quartiles

	Western Germany	Sweden
<b>Pre-birth earnings quartiles * Separation</b>		
Q1*No	ref.	ref.
Q2*No	2 255***	1 957***
Q3*No	5 793***	5 696***
Q4*No	13 826***	16 179***
Q1*Yes	472	-2 956***
Q2* Yes	3 974***	-205***
Q3* Yes	9 231***	4 898***
Q4* Yes	17 413***	16 351***
<b>Age of first child</b>		
Pregnancy (year before birth)	ref.	ref.
Age 0	-15 559***	-11 842***
Age 1	-23 343***	-14 332***
Age 2	-19 556***	-5 519***
Age 3	-17 009***	-5 082***
Age 4	-15 373***	-1 753***
Age 5	-14 511***	1 783***
Age 6	-13 726***	4 015***
Age 7	-13 160***	5 549***
Age 8	-12 754***	6 970***
Age 9	-12 394***	8 405***
Age 10	-12 090***	9 616***
<b>Birth order</b>		
One child (including pregnancy)	ref.	ref.
Two children	-7 240***	-5 830***
Three and further children	-10 413***	-11 738***
<b>Age of mother at first birth</b>		
18-22	ref.	ref.
23-27	-99	2 029***
28-32	-609***	3 592***
33-37	817***	3 651***
38-42	1 206.**	2 786***
43 +	-899	1 356***
<b>Calendar year</b>		
1991-1999	-678***	-1 309***
2000-2006	ref.	ref.
2007-2015	1 606***	2 366***
<b>National unemployment rate</b>	-288***	164***
<b>Constant</b>	24 435***	14 029***
<b>Person-years</b>	245 636	7 075 649
<b>R-square</b>	0.3822	0.3836

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01. Results rounded.

Source: FamChange-database and VSKT-VA 2015; own calculations.



Table A2.6: Average Marginal effects from the two way-interaction of pre-birth earnings quartiles and separation

		Margin		95 % conf.-interval			
		partnered	separated	partnered		separated	
<b>western</b>							
<b>Germany</b>	<b>Q1</b>	5 382	5 854	5 208	5557	5 052	6 657
	<b>Q2</b>	7 637	9 357	7 477	7797	8 342	10 372
	<b>Q3</b>	11 175	14 613	10 991	11359	13 297	15 930
	<b>Q4</b>	19 208	22 796	18 874	19542	20 290	25 302
<b>Sweden</b>	<b>Q1</b>	14 225	11 268	14 182	14 267	11 177	11 359
	<b>Q2</b>	16 182	14 020	16 148	16 216	13 922	14 118
	<b>Q3</b>	19 920	19 122	19 886	19 955	18 994	19 251
	<b>Q4</b>	30 404	30 575	30 341	30 467	30 327	30 824

*Note:* Results rounded.

*Source:* FamChange-database and VSKT-VA 2015; own calculations.

*Interaction between age of the first child, pre-birth earnings quartiles and separation*

Table A2.7: OLS regression with annual earnings as dependent variable and interaction effect between age of first child, separation and pre-birth earnings quartiles

	Western Germany	Sweden
<b>Age of first child*Separation*Q1-Q4</b>		
Pregnancy (year before birth)*No*Q1	ref.	ref.
Age 0*No*Q1	-6 996***	-4 853***
Age 1*No*Q1	-10 251***	-6 209***
Age 2*No*Q1	-8 068***	442***
Age 3*No*Q1	-6 038***	1 768***
Age 4*No*Q1	-4 619***	4 472***
Age 5*No*Q1	-3 737***	7 571***
Age 6*No*Q1	-3 070***	9 830***
Age 7*No*Q1	-2 456***	11 434***
Age 8*No*Q1	-1 896***	12 861***
Age 9*No*Q1	-1 395***	14 292***
Age 10*No*Q1	-997***	15 415***
Pregnancy (year before birth)*No*Q2	9 633***	8 089***
Age 0*No*Q2	-3 296***	-2 482***
Age 1*No*Q2	-10 022***	-4 996***
Age 2*No*Q2	-7 285***	2 585***
Age 3*No*Q2	-4 737***	3 171***
Age 4*No*Q2	-3 120***	5 840***
Age 5*No*Q2	-2 382***	8 924***
Age 6*No*Q2	-1 678***	10 973***
Age 7*No*Q2	-1 224***	12 219***
Age 8*No*Q2	-905***	13 341***
Age 9*No*Q2	-515**	14 489***
Age 10*No*Q2	-227	15 504***
Pregnancy (year before birth)*No*Q3	18 280***	13 615***
Age 0*No*Q3	894***	-70***
Age 1*No*Q3	-8 749***	-3 442***
Age 2*No*Q3	-4 994***	5 812***
Age 3*No*Q3	-1 835***	5 817**
Age 4*No*Q3	-175	8 959***
Age 5*No*Q3	572**	12 714***
Age 6*No*Q3	1 336***	15 024***
Age 7*No*Q3	1 991***	16 636***
Age 8*No*Q3	2 401***	18 082***
Age 9*No*Q3	2 730***	19 625***
Age 10*No*Q3	3 025***	21 022***
Pregnancy (year before birth)*No*Q4	32 710***	25 221***
Age 0*No*Q4	7 829***	6 985***
Age 1*No*Q4	-3 810***	4 084***
Age 2*No*Q4	2 799***	15 582***
Age 3*No*Q4	5 183***	14 371***

Table A2.7 continued

Age 4*No*Q4	7 054***	19 453***
Age 5*No*Q4	8 103***	24 637***
Age 6*No*Q4	9 175***	27 479***
Age 7*No*Q4	9 774***	29 481***
Age 8*No*Q4	10 158***	31 606***
Age 9*No*Q4	10 242***	33 838***
Age 10*No*Q4	10 436***	35 814***
Pregnancy (year before birth)*Yes*Q1		
Age 0*Yes*Q1		
Age 1*Yes*Q1	-7 726***	-6 878***
Age 2*Yes*Q1	-8 944***	-1 731***
Age 3*Yes*Q1	-7 375***	569***
Age 4*Yes*Q1	-6 086***	2 470***
Age 5*Yes*Q1	-4 433***	4 366***
Age 6*Yes*Q1	-3 465***	6 027***
Age 7*Yes*Q1	-2 894***	7 489***
Age 8*Yes*Q1	-2 659***	8 852***
Age 9*Yes*Q1	-1 813***	10 194***
Age 10*Yes*Q1	-1 464***	11 361***
Pregnancy (year before birth)*Yes*Q2		
Age 0*Yes*Q2		
Age 1*Yes*Q2	-9 101***	-4 933***
Age 2*Yes*Q2	-8 786***	2 288***
Age 3*Yes*Q2	-2 786***	4 142***
Age 4*Yes*Q2	-1 812**	5 955***
Age 5*Yes*Q2	-853	7 521***
Age 6*Yes*Q2	-138	9 037***
Age 7*Yes*Q2	576	10 275***
Age 8*Yes*Q2	1 240**	11 422***
Age 9*Yes*Q2	1 616**	12 668***
Age 10*Yes*Q2	1 553**	13 803***
Pregnancy (year before birth)*Yes*Q3		
Age 0*Yes*Q3		
Age 1*Yes*Q3	-9 178***	-3 579***
Age 2*Yes*Q3	-6 365***	6 232***
Age 3*Yes*Q3	-1 319	8 461***
Age 4*Yes*Q3	3 806***	10 417***
Age 5*Yes*Q3	5 299***	12 311***
Age 6*Yes*Q3	4 957***	13 943***
Age 7*Yes*Q3	5 770***	15 429***
Age 8*Yes*Q3	6 133***	16 919***
Age 9*Yes*Q3	6 780***	18 422***
Age 10*Yes*Q3	7 813***	19 735***
Pregnancy (year before birth)*Yes*Q4		
Age 0*Yes*Q4		
Age 1*Yes*Q4	6 943	2 131***
Age 2*Yes*Q4	760	15 583***

Table A2.7 continued

Age 3*Yes*Q4	12 900***	17 725***
Age 4*Yes*Q4	12 246***	20 605***
Age 5*Yes*Q4	13 981***	23 319***
Age 6*Yes*Q4	15 174***	25 553***
Age 7*Yes*Q4	13 571***	27 154***
Age 8*Yes*Q4	13 862***	28 979***
Age 9*Yes*Q4	14 418***	31 188***
Age 10*Yes*Q4	14 375***	33 148***
<b>Birth order</b>		
One child (including pregnancy)	ref.	ref.
Two children	-7 202***	-5 733***
Three and further children	-10 525***	-11 675***
<b>Age of mother at first birth</b>		
18-22	ref.	ref.
23-27	47	1 996***
28-32	-411**	3 540***
33-37	978***	3 599***
38-42	1 338***	2 774***
43 +	-844	1 374***
<b>Calendar year</b>		
1991-1999	-512***	-1 571***
2000-2006	ref.	ref.
2007-2015	1 460***	2 318***
<b>National unemployment rate</b>	-361***	108***
<b>Constant</b>	15 163***	8 822***
<b>Person-years</b>	245 636	7 075 649
<b>R-square</b>	0.4129	0.3967

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Note: Results rounded.

Source: FamChange-database and VSKT-VA 2015; own calculations.

Table A2.8: Average Marginal effects from the three-way OLS interaction of age of first child, pre-birth earnings quartiles and separation

western Germany		Margin		95 % conf.-interval			
		partnered	separated	Partnered		separated	
Q1	-1	9919		9648	10189		
	0	2923		2710	3135		
	1	-334	2193	-505	-163	-2515	6900
	2	1851	974	1656	2045	-635	2584
	3	3881	2544	3673	4089	1234	3854
	4	5300	3833	5071	5529	2682	4983
	5	6182	5486	5921	6443	4438	6534
	6	6848	6454	6565	7132	5417	7491
	7	7462	7025	7144	7781	6019	8032
	8	8022	7260	7675	8370	6297	8223
	9	8524	8105	8138	8910	7129	9082
10	8922	8455	8508	9336	7454	9456	
Q2	-1	19552		19341	19762		
	0	6623		6403	6843		
	1	-103	818	-277	71	-3165	4802
	2	2634	1133	2431	2836	-847	3113
	3	5182	7133	4973	5391	5033	9233
	4	6799	8107	6560	7038	6331	9882
	5	7537	9065	7274	7800	7576	10555
	6	8240	9781	7950	8530	8339	11223
	7	8695	10495	8382	9008	9264	11726
	8	9013	11159	8672	9355	9965	12352
	9	9404	11535	9035	9774	10332	12737
10	9692	11472	9298	10086	10311	12634	
Q3	-1	28199		28007	28391		
	0	10813		10553	11073		
	1	1169	741	953	1386	-5020	6502
	2	4924	3554	4674	5175	431	6676
	3	8084	8600	7826	8341	5820	11380
	4	9743	13725	9462	10025	11494	15957
	5	10491	15218	10186	10795	13124	17312
	6	11255	14876	10922	11587	13070	16681
	7	11909	15689	11553	12266	13958	17420
	8	12320	16052	11940	12699	14404	17701
	9	12648	16699	12243	13054	15153	18244
10	12944	17731	12513	13374	16243	19219	
Q4	-1	42629		42329	42930		
	0	17747		17373	18122		
	1	6109	16862	5735	6483	2302	31421
	2	12718	10679	12270	13166	1421	19936
	3	15102	22819	14651	15553	15005	30634
4	16973	22165	16480	17465	16882	27448	

Table A2.8 continued

	<b>5</b>	18021	23900	17490	18553	19763	28036
	<b>6</b>	19093	25093	18530	19657	21674	28511
	<b>7</b>	19693	23490	19089	20297	20291	26689
	<b>8</b>	20077	23781	19427	20726	20989	26573
	<b>9</b>	20161	24337	19467	20856	21544	27129
	<b>10</b>	20354	24294	19591	21118	21513	27075
<hr/>							
<b>Sweden</b>							
<b>Q1</b>	<b>-1</b>	9 712		9 658	9 767		
	<b>0</b>	4 859		4 811	4 908		
	<b>1</b>	3 503	2 834	3 459	3 547	2 708	2 961
	<b>2</b>	10 155	7 982	10 104	10 205	7 849	8 114
	<b>3</b>	11 480	10 281	11 428	11 533	10 158	10 405
	<b>4</b>	14 184	12 183	14 123	14 246	12 062	12 303
	<b>5</b>	17 283	14 078	17 213	17 354	13 957	14 199
	<b>6</b>	19 542	15 740	19 466	19 619	15 618	15 862
	<b>7</b>	21 146	17 202	21 063	21 230	17 079	17 325
	<b>8</b>	22 573	18 565	22 483	22 664	18 439	18 691
	<b>9</b>	24 004	19 906	23 905	24 103	19 776	20 036
	<b>10</b>	25 127	21 073	25 020	25 234	20 937	21 209
	<b>Q2</b>						
	<b>-1</b>	17 801		17 753	17 850		
	<b>0</b>	7 231		7 183	7 278		
	<b>1</b>	4 716	4 780	4 673	4 760	4 583	4 976
	<b>2</b>	12 297	12 001	12 253	12 342	11 823	12 178
	<b>3</b>	12 883	13 854	12 836	12 930	13 699	14 009
	<b>4</b>	15 553	15 668	15 499	15 606	15 523	15 812
	<b>5</b>	18 636	17 233	18 577	18 695	17 095	17 372
	<b>6</b>	20 685	18 749	20 623	20 748	18 613	18 885
	<b>7</b>	21 932	19 987	21 866	21 998	19 853	20 122
	<b>8</b>	23 053	21 134	22 983	23 123	20 999	21 269
	<b>9</b>	24 201	22 381	24 127	24 275	22 243	22 518
	<b>10</b>	25 217	23 515	25 138	25 295	23 376	23 654
	<b>Q3</b>						
	<b>-1</b>	23 328		23 287	23 368		
	<b>0</b>	9 642		9 594	9 691		
	<b>1</b>	6 271	6 133	6 226	6 316	5 853	6 414
	<b>2</b>	15 524	15 945	15 479	15 570	15 705	16 185
	<b>3</b>	15 529	18 174	15 479	15 579	17 972	18 376
	<b>4</b>	18 672	20 130	18 615	18 729	19 942	20 318
	<b>5</b>	22 426	22 023	22 365	22 488	21 842	22 204
	<b>6</b>	24 736	23 655	24 670	24 802	23 477	23 834
	<b>7</b>	26 349	25 141	26 277	26 420	24 961	25 321
	<b>8</b>	27 794	26 631	27 716	27 871	26 451	26 811
	<b>9</b>	29 338	28 134	29 253	29 423	27 949	28 319
	<b>10</b>	30 735	29 448	30 642	30 827	29 257	29 639
	<b>Q4</b>						
	<b>-1</b>	34 934		34 876	34 992		
	<b>0</b>	16 697		16 628	16 766		
	<b>1</b>	13 796	11 844	13 725	13 867	11 284	12 404

Table A2.8 continued

<b>2</b>	25 294	25 295	25 219	25 370	24 860	25 731
<b>3</b>	24 084	27 438	24 000	24 168	27 063	27 812
<b>4</b>	29 166	30 317	29 070	29 261	29 969	30 665
<b>5</b>	34 349	33 031	34 245	34 453	32 693	33 369
<b>6</b>	37 191	35 266	37 077	37 306	34 927	35 604
<b>7</b>	39 193	36 867	39 066	39 320	36 518	37 215
<b>8</b>	41 319	38 691	41 176	41 461	38 335	39 048
<b>9</b>	43 550	40 901	43 388	43 712	40 522	41 279
<b>10</b>	45 526	42 860	45 341	45 711	42 454	43 266

*Note:* Results rounded.

*Source:* FamChange-database and VSKT-VA 2015; own calculations.

Fixed-effects models

Table A2.9: Comparison of single effect of separation in the OLS and FE-model

Western Germany				
		FE	OLS	OLS
			(w/o pre-birth earnings control)	
<b>Separation</b>	No	ref.	ref.	ref.
	Yes	2 400***	1 844***	1 333
<b>Person-years</b>		245 636	245 636	245 636
<b>R-square</b>		0.2311	0.3820	0.2645
Sweden				
		FE	OLS	OLS
			(w/o pre-birth earnings control)	
<b>Separation</b>	No	ref.	ref.	ref.
	Yes	-1 089***	-1 922***	-2 537***
<b>Person-years</b>		7 075 649	7 075 649	7 075 649
<b>R-square</b>		0.1407	0.383	0.2645

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Controlled for: age of the first child, birth order, period, national unemployment rate. OLS additionally for pre-birth earnings quartiles, age at first childbirth. Results rounded.

Source: FamChange-database and VSKT-VA 2015; own calculations.

Table A2.10: Average Marginal effects from the two-way FE interaction model of age of first child and separation, separately by pre-birth earnings

		Margin		95 % conf.-interval				
		partnered	Separated	Partnered		separated		
<b>western Germany</b>	<b>Q1</b>	-1	10 050	9 769	10 330			
		0	3 185	2 943	3 427			
		1	-89	3 732	-294	117	1 497	5 966
		2	1 795	2 687	1 635	1 955	1 346	4 027
		3	3 503	4 252	3 363	3 642	3 295	5 209
		4	4 760	5 188	4 615	4 904	4 385	5 991
		5	5 604	6 617	5 442	5 766	5 822	7 411
		6	6 237	7 307	6 050	6 424	6 554	8 060
		7	6 892	7 684	6 668	7 117	6 916	8 451
		8	7 532	7 996	7 272	7 792	7 230	8 762
	9	8 097	8 779	7 795	8 398	7 954	9 605	
	10	8 592	9 205	8 262	8 922	8 382	10 028	
	<b>Q2</b>	-1	19 035		18 764	19 305		
		0	6 314		6 039	6 590		
		1	-341	1 034	-558	-125	-2 657	4 725
		2	2 258	2 507	2 089	2 427	428	4 586
		3	4 705	7 306	4 560	4 850	5 624	8 989
		4	6 341	8 359	6 177	6 506	7 055	9 663



Table A2.10 continued

		<b>5</b>	7 186	9 351	7 007	7 365	8 306	10 397
		<b>6</b>	8 051	10 467	7 845	8 256	9 342	11 592
		<b>7</b>	8 767	10 955	8 539	8 995	9 968	11 942
		<b>8</b>	9 351	11 831	9 084	9 618	10 840	12 821
		<b>9</b>	9 971	12 424	9 676	10 266	11 437	13 412
		<b>10</b>	10 431	12 584	10 108	10 755	11 632	13 537
	<b>Q3</b>	<b>-1</b>	26 834		26 534	27 133		
		<b>0</b>	9 626		9 292	9 960		
		<b>1</b>	139	-3 585	-120	398	-14 519	7 348
		<b>2</b>	4 097	4 186	3 896	4 299	945	7 427
		<b>3</b>	7 549	8 451	7 372	7 725	6 203	10 698
		<b>4</b>	9 528	13 254	9 333	9 722	11 527	14 981
		<b>5</b>	10 575	15 219	10 369	10 781	13 711	16 727
		<b>6</b>	11 646	15 145	11 417	11 875	13 681	16 609
		<b>7</b>	12 604	16 106	12 351	12 857	14 762	17 451
		<b>8</b>	13 396	17 115	13 114	13 678	15 834	18 397
		<b>9</b>	13 987	18 070	13 673	14 301	16 783	19 358
		<b>10</b>	14 566	18 884	14 220	14 912	17 609	20 159
	<b>Q4</b>	<b>-1</b>	40 078		39 666	40 490		
		<b>0</b>	15 411		14 934	15 888		
		<b>1</b>	4 126	19 546	3 757	4 496	2 965	36 128
		<b>2</b>	11 935	11 293	11 649	12 221	3 621	18 964
		<b>3</b>	15 678	21 838	15 404	15 952	17 185	26 491
		<b>4</b>	18 497	22 075	18 204	18 790	19 260	24 891
		<b>5</b>	20 215	24 138	19 900	20 530	21 618	26 657
		<b>6</b>	21 961	26 434	21 614	22 309	24 137	28 731
		<b>7</b>	23 173	26 824	22 781	23 565	24 376	29 272
		<b>8</b>	24 161	27 574	23 712	24 609	25 456	29 692
		<b>9</b>	24 890	28 739	24 392	25 388	26 769	30 710
		<b>10</b>	25 498	29 375	24 931	26 066	27 327	31 423
<b>Sweden</b>	<b>Q1</b>	<b>-1</b>	6 559		6 506	6 613		
		<b>0</b>	2 115		2 065	2 166		
		<b>1</b>	986	3 929	938	1 034	3 745	4 112
		<b>2</b>	7 998	8 988	7 954	8 042	8 859	9 117
		<b>3</b>	9 714	11 293	9 671	9 758	11 185	11 402
		<b>4</b>	12 789	13 263	12 743	12 835	13 166	13 360
		<b>5</b>	16 229	15 192	16 180	16 277	15 102	15 282
		<b>6</b>	18 794	16 916	18 742	18 846	16 831	17 002
		<b>7</b>	20 805	18 629	20 749	20 860	18 545	18 712
		<b>8</b>	22 721	20 374	22 661	22 782	20 291	20 458
		<b>9</b>	24 489	21 917	24 424	24 554	21 833	22 002
		<b>10</b>	26 011	23 364	25 941	26 081	23 278	23 450
	<b>Q2</b>	<b>-1</b>	14 401		14 351	14 451		
		<b>0</b>	4 129		4 083	4 176		
		<b>1</b>	1 918	5 101	1 873	1 962	4 871	5 331
		<b>2</b>	10 281	12 297	10 242	10 321	12 141	12 453

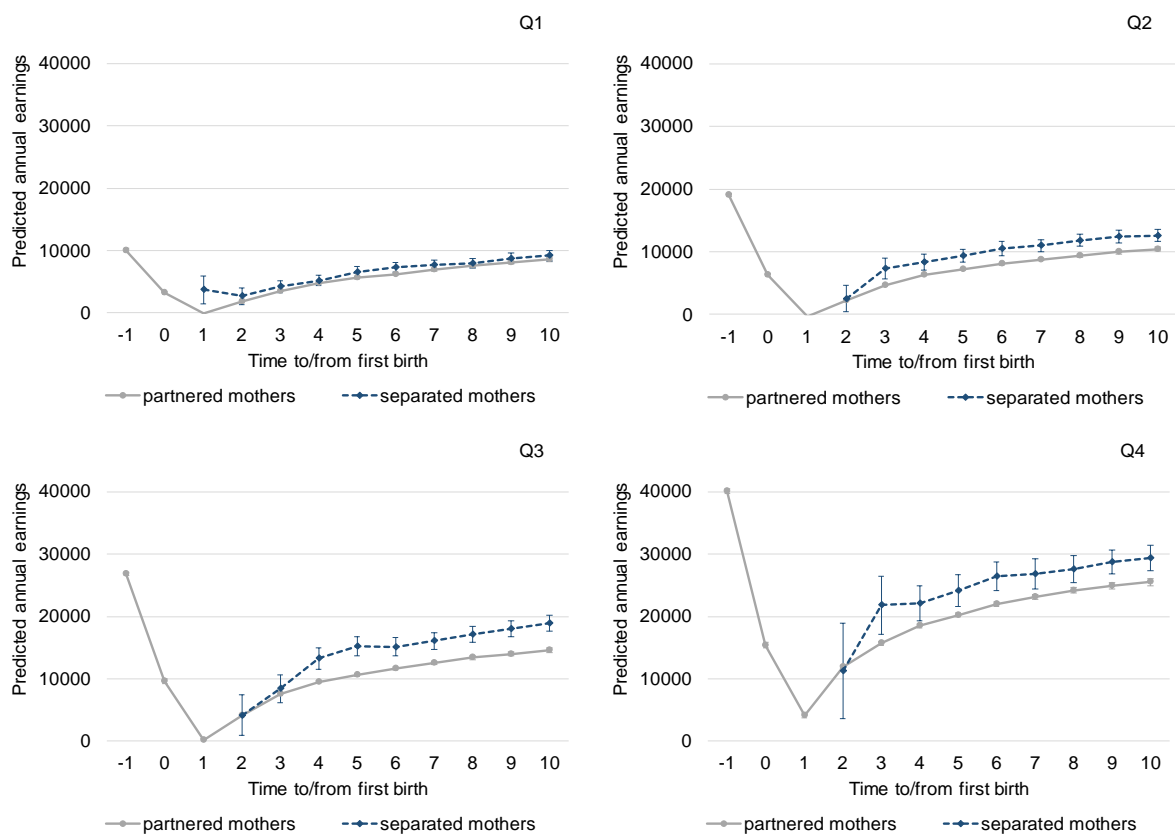
Table A2.10 continued

	<b>3</b>	11 579	14 253	11 540	11 618	14 124	14 381
	<b>4</b>	14 757	16 147	14 716	14 797	16 034	16 259
	<b>5</b>	18 200	17 802	18 157	18 242	17 700	17 904
	<b>6</b>	20 592	19 392	20 548	2 063	19 297	19 487
	<b>7</b>	22 282	20 929	22 234	22 329	20 838	21 020
	<b>8</b>	23 905	22 510	23 853	23 957	22 421	22 600
	<b>9</b>	25 286	23 903	25 231	25 341	23 815	23 991
	<b>10</b>	26 571	25 260	26 512	26 630	25 172	25 349
<b>Q3</b>	<b>-1</b>	20 503		20 449	20 557		
	<b>0</b>	7 103		7 052	7 154		
	<b>1</b>	4 155	7 579	4 108	4 203	7 269	7 890
	<b>2</b>	14 758	17 338	14 716	14 800	17 126	17 550
	<b>3</b>	15 948	19 676	15 906	15 991	19 505	19 848
	<b>4</b>	19 810	21 825	19 766	19 854	21 675	21 975
	<b>5</b>	24 009	23 880	23 963	24 055	23 745	24 016
	<b>6</b>	26 708	25 738	26 659	26 757	25 611	25 865
	<b>7</b>	28 680	27 445	28 627	28 733	27 323	27 567
	<b>8</b>	30 516	29 242	30 458	30 574	29 123	29 362
	<b>9</b>	32 286	30 959	32 224	32 348	30 841	31 077
	<b>10</b>	33 902	32 489	33 836	33 969	32 371	32 607
<b>Q4</b>	<b>-1</b>	31 871		31 798	31 943		
	<b>0</b>	13 924		13 855	13 993		
	<b>1</b>	11 651	12 913	11 586	11 717	12 412	13 413
	<b>2</b>	25 758	27 497	25 699	25 817	27 147	27 846
	<b>3</b>	26 875	30 574	26 812	26 937	30 282	30 866
	<b>4</b>	33 145	34 184	33 077	33 213	33 923	34 446
	<b>5</b>	39 059	37 458	38 985	39 132	37 214	37 702
	<b>6</b>	42 480	40 348	42 399	42 560	40 114	40 583
	<b>7</b>	44 959	42 477	44 870	45 048	42 247	42 708
	<b>8</b>	47 523	44 796	47 425	47 621	44 564	45 027
	<b>9</b>	50 052	47 348	49 944	50 160	47 114	47 581
	<b>10</b>	52 278	49 651	52 159	52 397	49 413	49 890

*Note:* Results rounded.

*Source:* FamChange-database and VSKT-VA 2015; own calculations.

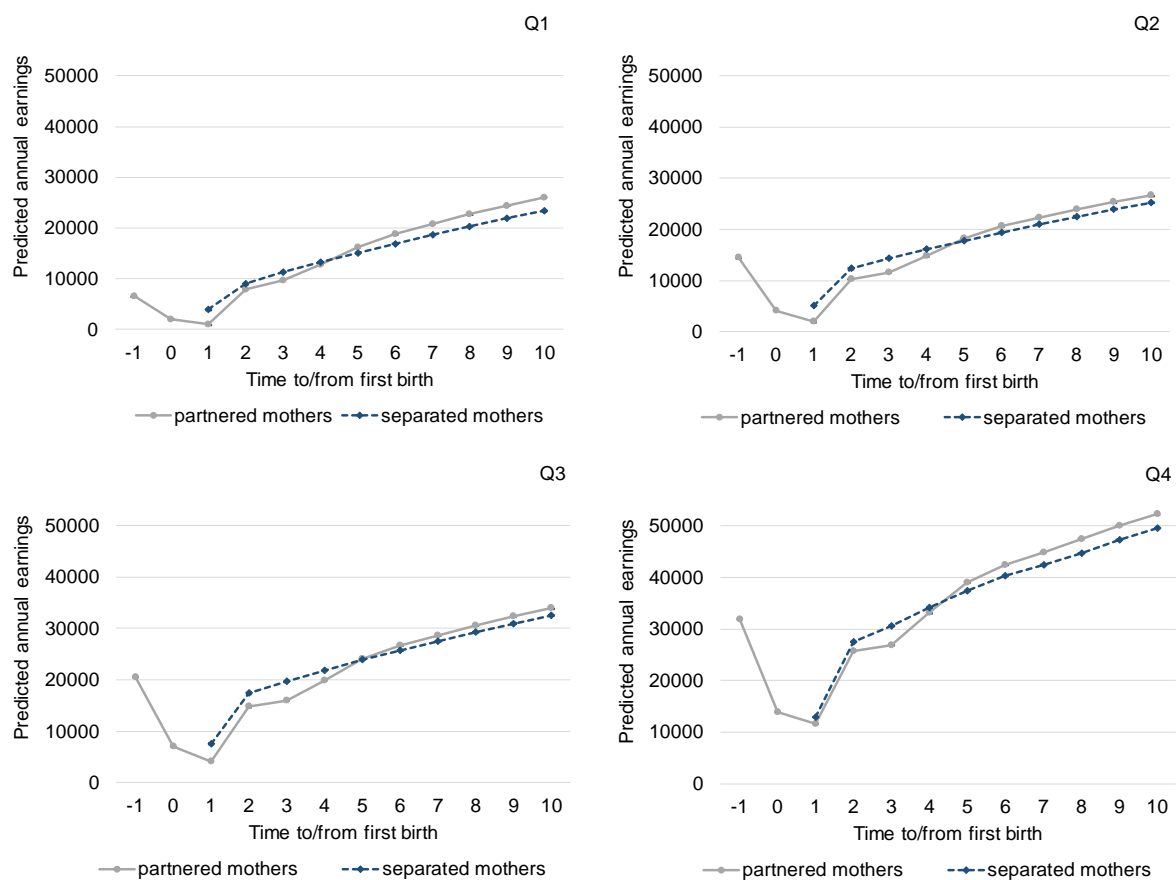
Figure A2.3: Predicted values from FE interaction model, by the age of the first child and separation, for each pre-birth earnings quartile, western Germany



*Note:* Separated mothers' estimates for the first year after birth are not presented due to the low case numbers. *Controlled for:* calendar year, birth order, period and female unemployment rate.

*Source:* VSKT-VA 2015; own calculations.

Figure A2.4: Predicted values from FE interaction model, by the age of the first child and separation, for each pre-birth earnings quartile, Sweden

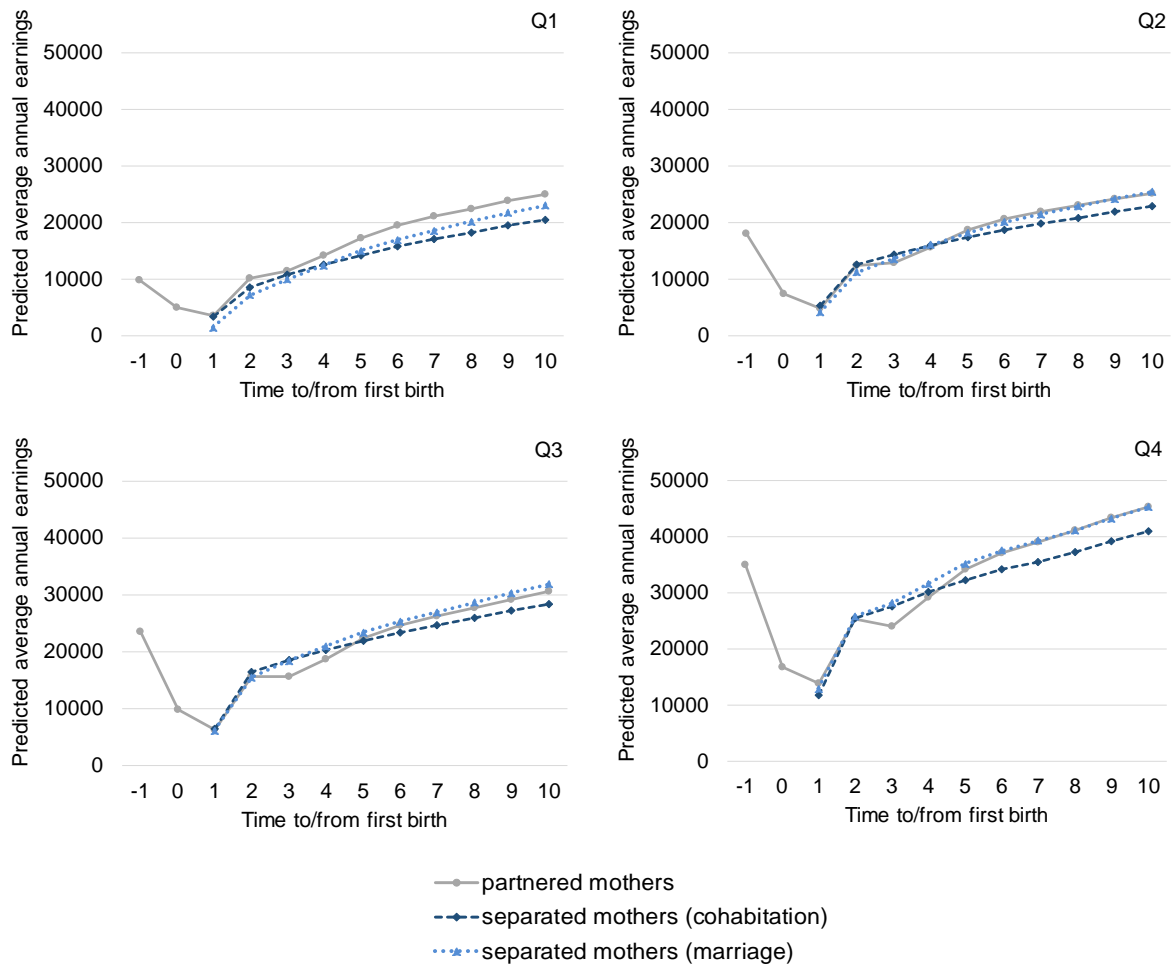


*Controlled for:* calendar year, birth order, period and female unemployment rate.

*Source:* FamChange-database; own calculations.

*Sensitivity analyses*

Figure A2.5: Predicted values from the OLS interaction model, by pre-birth earnings quartiles, separation (divided into separation from marriage and separation from cohabitation) and age of the first child



*Note:* As marriage is more common among partnered mothers and entered over time, marital status has been added as an additional control variable to make partnered mothers comparable to separating mothers who are now divided between those who separate from a cohabitation vs. marriage.

*Controlled for:* pre-birth earnings quartiles, calendar year, age at first childbirth, birth order, period, female unemployment rate and marital status.

*Source:* FamChange-database; own calculations.

## Appendix Chapter 3

Table A3.1: Pension types - current and former

Pension type	Requirements	Retirement age	
currently in place			
		Earliest; with deductions	Without deductions
Regular old-age pension	Five contribution years		67 (1964 +)
Old-age pension for long-term insured individuals	35 contribution years	63 (-3,6% monthly, max. - 14,4%)	67 (1964 +)
Old-age pension for particularly long-term insured individuals	45 contribution years	-	63 (< 1953) 63+ (1954-1963) 65 (1964 +)
Old-age pension for severely disabled individuals	35 contribution years, degree of disability is at least 50	60+ (- 0,3% monthly) 62 (- 0,3% monthly)	63+ (1952-1963)  65 (1964 +)
Reduced-earnings capacity pension	Five contribution years of which three have to be from contributions subject to social security directly prior pension recipe, health related disability to work (full pension) or min. three until less than six hours per day (partial pension)	Not yet reached age for regular old-age pension (-0,3% monthly, max. -10,8% if pension is taken before age 63+)	
former pension types (not in place starting with people born 1952 or younger)			
Old-age pension after unemployment	Fifteen contributions years of which min. eight should be within the last ten years prior to pension recipe, min. one year in unemployment after the age of 58	63	65
Old-age pension due to partial retirement	Fifteen contributions years of which min. eight should be within the last ten years prior to pension recipe, min. two years of old-age part-time work after the age of 55	63	65
Old-age pension for women	Fifteen contributions years of which min. ten should be from employment subject to social security after the 40 <sup>th</sup> birthday	60	65

Source: Following Brussig, 2015 and Mika and Krickl, 2020, own illustration.

Table A3.2: Overview of previous studies about retirement trajectories

Author, year	Cohort, time frame, data source, method	Retirement trajectories
Fasang, 2008	1932-1940, age 58-66, GSOEP, sequence and cluster analysis	<ul style="list-style-type: none"> <li>• Ft employment</li> <li>• Unemployment, early retirement</li> <li>• Early entrance, disability</li> <li>• Self-employment</li> <li>• Pt employment</li> <li>• Widow pension</li> <li>• No own income</li> </ul>
Fasang, 2010	age 58-65 (between 1990-2005), GSOEP, sequence and cluster analysis (+ Britain)	<ul style="list-style-type: none"> <li>• Traditional</li> <li>• Disability</li> <li>• Early entrance: unemployment</li> <li>• Non-standard employment: self employment</li> <li>• Non-standard employment: part time</li> <li>• Non-employment: no own income</li> <li>• Non-employment: widow pension</li> </ul>
Zähle et al., 2009	1937-1941, age 55-65, SOEP, sequence and cluster analysis	<ul style="list-style-type: none"> <li>• Regular employment</li> <li>• Early retirees from regular employment</li> <li>• Inactive</li> <li>• Retirement from unemployment</li> <li>• Retirement from part-time work</li> <li>• Self-employed</li> </ul>
Brussig, 2010	retired in 2007, FDZ-RV - SU-FRTZN07XVSB, pre-defined	<ul style="list-style-type: none"> <li>• Direct pension entry from stable employment</li> <li>• Long-term unemployment before pension entry</li> <li>• transitional-unemployment before pension entry</li> <li>• else</li> </ul>
Ebert & Trischler, 2012	1910-1941 (divided in seven cohort groups), age 66-64, SOEP, cluster analysis	<ul style="list-style-type: none"> <li>• Early leavers without retirement</li> <li>• Pension after part-time employment</li> <li>• Early retirement</li> <li>• Full-time employees with early retirement</li> <li>• Full-time employees with late retirement</li> <li>• Pension after inactive work</li> </ul> <p>Couple clusters:</p> <ul style="list-style-type: none"> <li>• Early leavers with a partner in employment</li> <li>• Dual employment with early retirement</li> <li>• Employment with non-working partner</li> <li>• Inactivity and employed partner with early retirement</li> <li>• Early retirement of both partners</li> <li>• Single person households</li> </ul>
Rasner & Etgeton, 2014	1932-1947, age 58-65, SOEP, sequence and cluster analysis	<ul style="list-style-type: none"> <li>• gainful employment up to the standard retirement age</li> <li>• work until early retirement,</li> <li>• pension after unemployment,</li> <li>• pension after inactivity and early retirement,</li> <li>• reduced earning capacity pension before age 60</li> </ul>
Trischler, 2014	55-64, VSKT2009/SOEP, sequence and cluster analysis	<ul style="list-style-type: none"> <li>• Dropouts</li> <li>• marginally employed</li> <li>• Employed</li> <li>• Employed with transitional unemployment</li> <li>• Early retirees</li> <li>• Unemployed</li> <li>• Early retirement</li> </ul>
Schröder, Micheel & Cihlar, 2015	1942-1951, age 60-70, TOP 2013, pre-defined	<p>Direct transition</p> <ul style="list-style-type: none"> <li>• Employed until pension recipe</li> </ul> <p>Indirect transition</p> <ul style="list-style-type: none"> <li>• Partial retirement until pension recipe</li> <li>• Early retirement</li> <li>• Unemployment until pension recipe</li> <li>• Reduced-earnings capacity</li> <li>• Homemaker</li> <li>• Else</li> </ul>
Cabib-Madero & Fasang, 2016	1920-1950, age 20-59, SHARELIFE, sequence and cluster analysis	<p>Typical male</p> <ul style="list-style-type: none"> <li>• full-time employed/2+ children</li> <li>• full-time employed/1 child</li> </ul> <p>Typical female</p> <ul style="list-style-type: none"> <li>• out of labour force/2+ children</li> </ul>

Table A2.10 continued		<ul style="list-style-type: none"> <li>• part-time employed/2+ children</li> <li>• out of labour force &amp; part-time employed/1 child</li> </ul>
		Gender-mixed <ul style="list-style-type: none"> <li>• full-time employed/divorce</li> <li>• full-time employed/married childless</li> <li>• full-time employed/unmarried childless</li> </ul>
Söhn & Mika, 2017	1939-1994 (EM pension)/ 1942-1948 (OA pension), age 17-first time pension received, VVL2004, 2007, 2010, 2014, sequence and cluster analysis	<p>OA pension</p> <ul style="list-style-type: none"> <li>• Regular employment biography</li> <li>• Regular employment biography with later unemployment</li> <li>• Precarious with a lot of unemployment, low income, gaps</li> <li>• Gainful employment after child phase</li> <li>• Hardly any return after child phase</li> <li>• Transition to self-employment</li> <li>• More non-contributory periods from mid-40s onwards</li> <li>• Early transition to non-contributory periods</li> </ul> <p>EM pension</p> <ul style="list-style-type: none"> <li>• Regular biography up to the mid-50s</li> <li>• Very short regular employment biography, increased unemployment in the late 40s</li> <li>• massively unemployed from 30s</li> <li>• from 20s precarious</li> <li>• many missing contribution periods and unemployed</li> <li>• much family work and low pay</li> </ul>
Weiland & Möhring, 2020	1917-1967, age 18-50, SHARE, sequence and cluster analysis	<p>Couple cluster</p> <ul style="list-style-type: none"> <li>• Dual earner (private)</li> <li>• Dual earner (public)</li> <li>• Dual earner (mixed)</li> <li>• Earner</li> <li>• Male breadwinner</li> <li>• Dual earner (self-employed)</li> <li>• Partner atypical</li> <li>• Both atypical</li> </ul>
Hofäcker, Seitz & Auer, 2022	1951-1957, age 50-67, VSKT2018, sequence and cluster analysis	<p>EM pension</p> <ul style="list-style-type: none"> <li>• Early retirement (from EM-pension)</li> <li>• Early retirement with parallel labour market attachment</li> <li>• EM-pension starting in mid-50s</li> <li>• EM-pension around age 60 after 'else'</li> <li>• EM-pension until age 50 after employment</li> <li>• EM-pension after unemployment</li> <li>• EM-pension around age 60 after employment</li> </ul>

Source: Listed authors, own illustration.

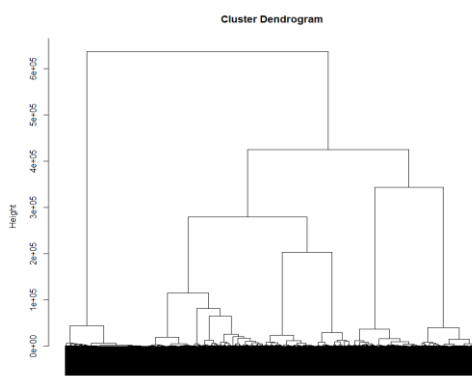
Table A3.3: Sample restrictions

Restrictions	Deleted cases	N
Total sample		208,342
Age >= 50	9,936	198,406
Age <= 67	2,293	196,113
Birthyear >= 1938 (VA)	0	196,113
Widowed/never married	38,163	157,950
No info on family status	0	157,950
<= 12 months of SES information	124	157,826
> 10% of working history from East Germany	35,705	122,121
No information of citizenship	125	121,996
10% sample		12,200

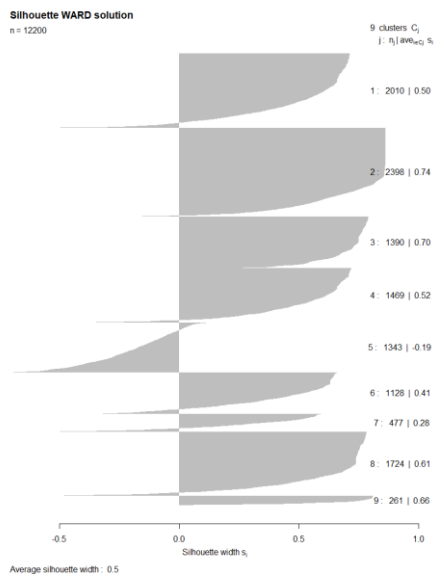
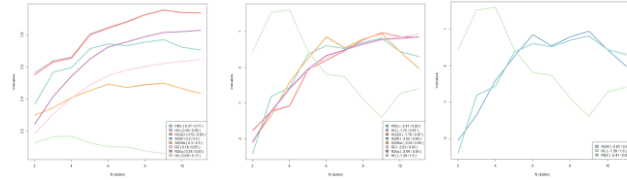
Source: SUF\_VVL2018, own calculations.



Figure A3.1: Different cluster cut-off criteria



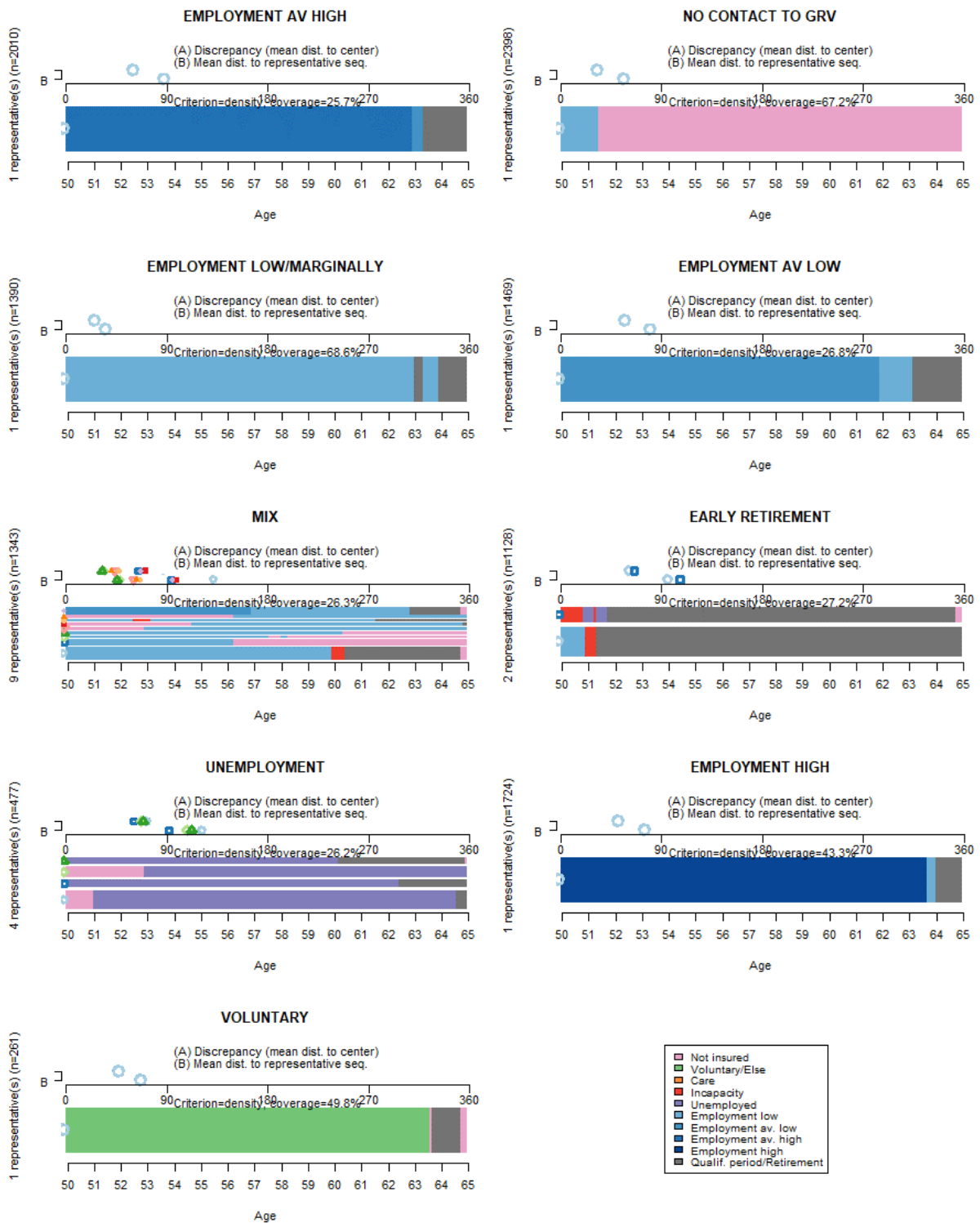
	PBC	HG	HGSD	ASW	ASWw	CH	R2	CHsq	R2sq	HK
cluster2	0.37	0.56	0.55	0.30	0.30	2753.46	0.18	3910.36	0.24	0.
cluster3	0.57	0.64	0.63	0.35	0.35	2703.70	0.31	4334.38	0.42	0.
cluster4	0.60	0.66	0.65	0.41	0.41	2785.84	0.41	4818.39	0.54	0.
cluster5	0.71	0.80	0.80	0.45	0.45	2897.56	0.49	5618.99	0.65	0.
cluster6	0.74	0.84	0.84	0.49	0.49	2934.38	0.55	6384.36	0.72	0.
cluster7	0.73	0.88	0.88	0.47	0.47	2800.61	0.58	6247.55	0.75	0.
cluster8	0.75	0.93	0.92	0.49	0.49	2644.48	0.60	6457.86	0.79	0.1
cluster9	0.77	0.95	0.95	0.50	0.50	2503.38	0.62	6640.82	0.81	0.1
cluster10	0.72	0.94	0.94	0.46	0.47	2349.58	0.63	6115.89	0.82	0.1
cluster11	0.70	0.93	0.93	0.43	0.44	2222.60	0.65	5805.55	0.83	0.1



NINE CLUSTER								
1	2	3	4	5	6	7	8	9
2010	2398	1390	1469	1343	1128	477	1724	261
Average silhouette widths:								
0.5006623	0.7442387	0.6982871	0.5247981	-0.1937148	0.4109682	0.2769189	0.6065333	0.6590531
Min.	1st Qu.	Median	Mean	3rd Qu.	Max.			
-0.7047	0.3453	0.6365	0.4988	0.7481	0.8625			

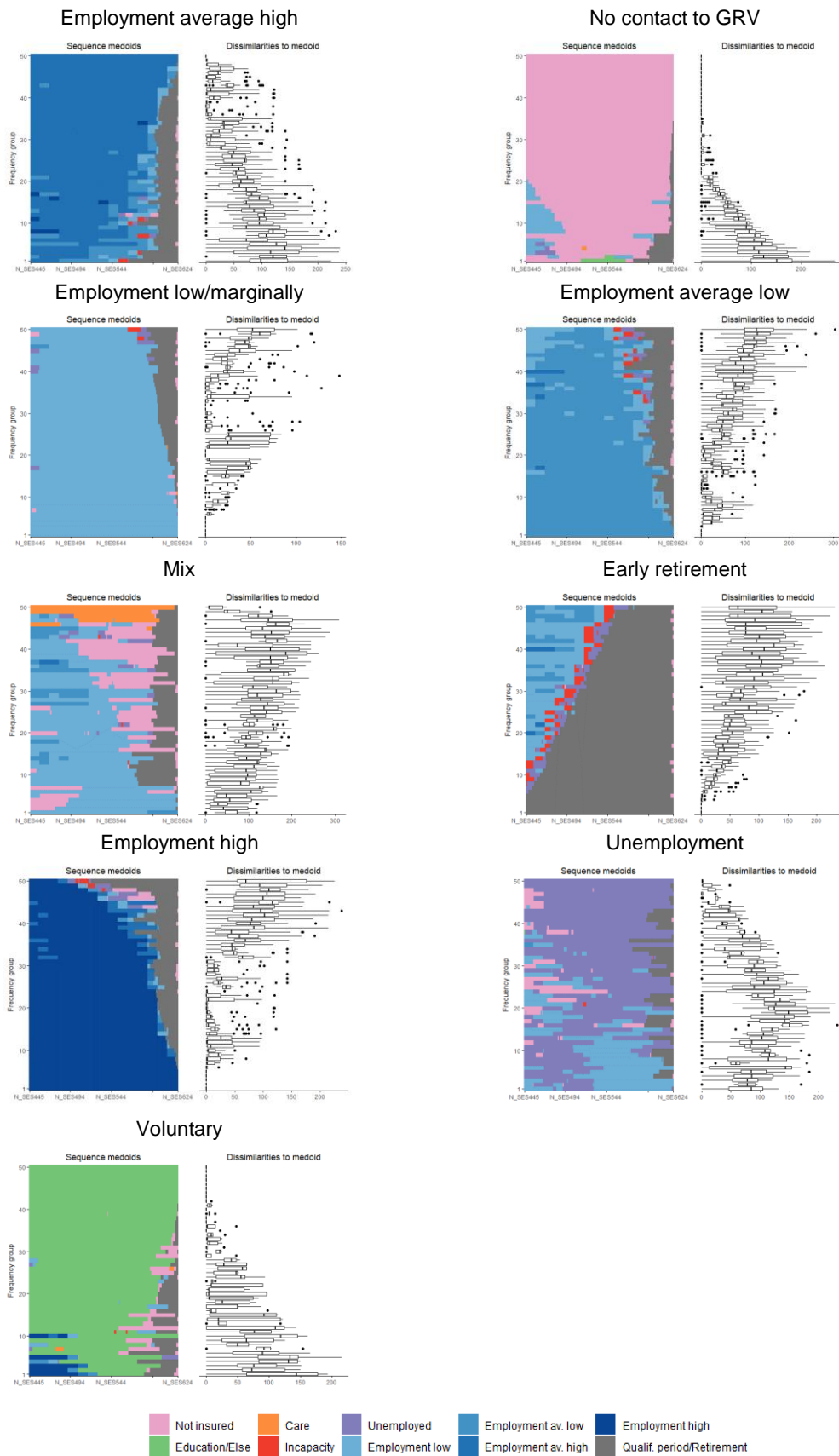
Source: SUF\_VVL2018, own calculations.

Figure A3.2: Representative sequence plot for each retirement trajectory



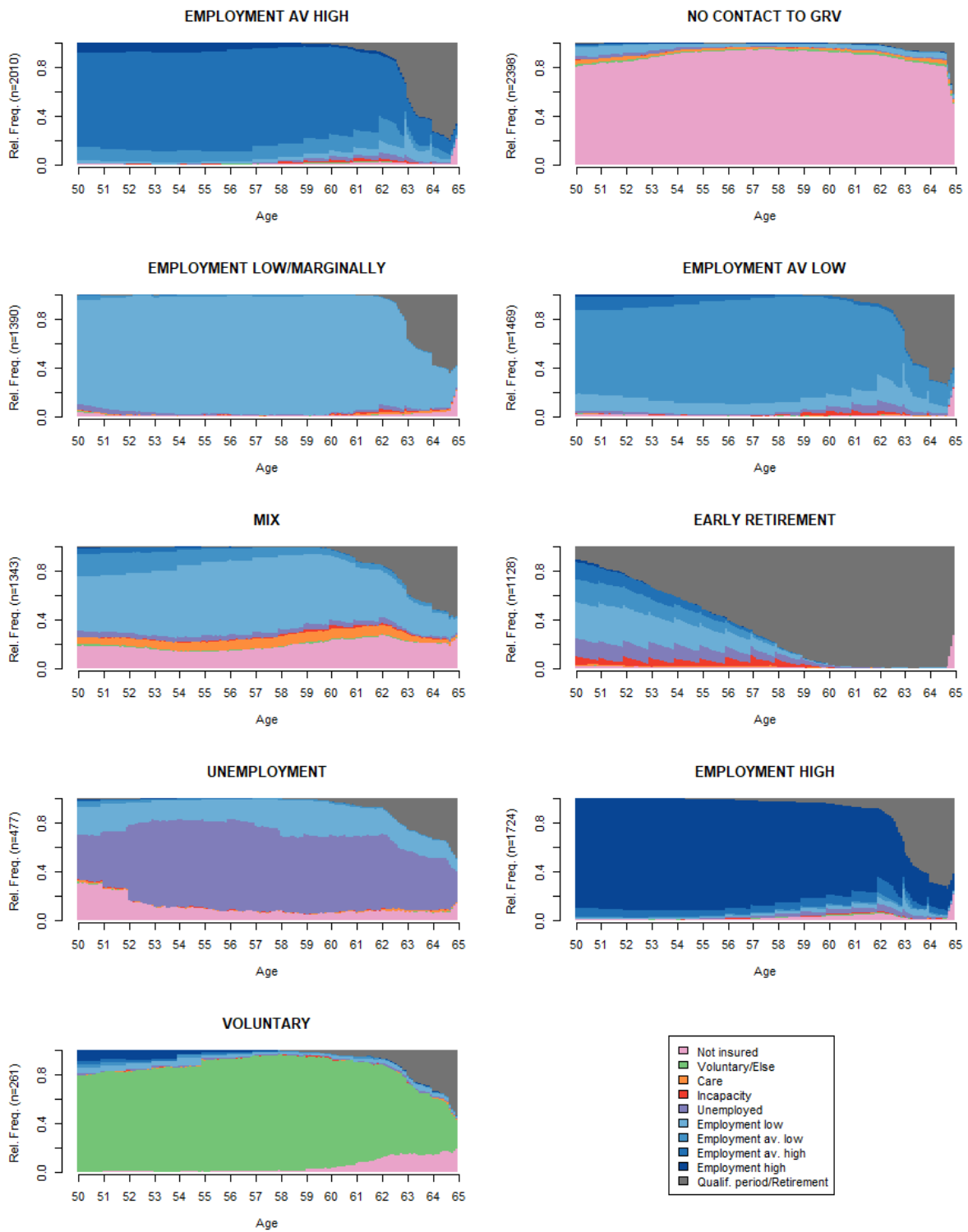
Source: SUF\_VVL2018, own calculations.

Figure A3.3: Relative frequency and the dissimilarity from the medoid, for each cluster



Source: SUF\_VVL2018, own calculations.

Figure A3.4: State distribution plots by retirement trajectory



Source: SUF\_VVL2018, own calculations.

Table A3.4: Multinomial logistic regression results for cluster affiliation, women (relative risk ratios)

Ref.: No contact to GRV	Employment av. high			Employment low/marg.			Employment av. low			Mix		
	M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3
<b>Family status</b>												
divorced	4.25***	4.30***	4.45***	1.50**	1.48**	1.42*	3.40***	3.38***	3.33***	1.94***	1.94***	1.85***
married	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
remarried	2.15***	2.28***	2.40***	1.04	1.04	1.02	2.11***	2.16***	2.17***	1.77***	1.80***	1.76***
<b>Education</b>												
no information		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
lower secondary		14.12***	14.06***		6.92***	6.95***		10.50***	10.49***		6.49***	6.51***
upper secondary		36.59***	36.96***		6.38***	6.29***		15.89***	15.84***		7.13***	7.06***
tertiary		11.33***	11.36***		1.34	1.34		3.71***	3.72***		1.92*	1.93*
<b>Citizenship</b>												
German		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
EU		1.07	1.07		0.88	0.87		0.88	0.88		1	0.98
non-EU		1.46	1.49		1.7	1.68		2.68**	2.69**		2.71**	2.68**
<b>Months spent in ... prior age 50</b>												
incapacity			1			0.96			0.99			1
unemployment			0.99**			1.01***			1			1.01**
<b>Constant</b>	0.33***	0.11***	0.12***	0.78***	0.46***	0.44***	0.44***	0.19***	0.19***	0.59***	0.34***	0.32***

Table A3.4 continued

Ref.: No contact to GRV		Early retirement			Unemployment			Employment high			Voluntary		
		M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3
<b>Family status</b>													
	divorced	5.87***	6.16***	4.90***	8.90***	11.24***	9.83***	3.00***	3.16***	3.45***	3.32**	3.17**	3.28**
	married	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
	remarried	4.32***	4.71***	4.09***	1.42	1.87*	1.73	1.66*	1.91*	2.14**	3.76**	3.54**	3.66**
<b>Education</b>													
	no information		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
	lower secondary		7.73***	8.05***		3.17***	3.25***		14.18***	14.17***		0.97	0.97
	upper secondary		13.26***	13.13***		1.65	1.69		62.56***	63.99***		0	0
	tertiary		1.82	1.93		0.82	0.86		50.55***	50.98***		0	0
<b>Citizenship</b>													
	German		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
	EU		2.26***	2.02***		6.20***	5.79***		0.55	0.53		0	0
	non-EU		4.08***	3.92***		17.21***	16.65***		0.59	0.63		2.44	2.46
<b>Months spent in ... prior age 50</b>													
	incapacity			1.09***			1			0.99			1.02
	unemployment			1.03***			1.02***			0.95***			0.99
<b>Constant</b>													
		0.27***	0.13***	0.10***	0.10***	0.06***	0.05***	0.14***	0.03***	0.04***	0.02***	0.02***	0.02***

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Source: SUF\_VVL2018, own calculations.

Table A3.5: Multinomial logistic regression results for cluster affiliation, men (relative risk ratios)

Ref.: No contact to GRV	Employment av. high			Employment low/marg.			Employment av. low			Mix		
	M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3
<b>Family status</b>												
divorced	1.21	1.15	1.24	1.51	1.63	1.42	1.79***	1.82***	1.79***	2.10***	2.11***	1.93**
married	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
remarried	1.18	1.16	1.23	1.17	1.27	1.15	1.58**	1.63**	1.62**	1.93***	1.97***	1.86**
<b>Education</b>												
no information		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
lower secondary		12.47***	12.45***		3.69***	3.73***		8.06***	8.01***		5.91***	5.88***
upper secondary		3.63***	3.77***		3.20*	3.20*		1.78	1.78		2.68**	2.66*
tertiary		1.58*	1.61*		0.93	0.96		0.59	0.59		1.66	1.71
<b>Citizenship</b>												
German		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
EU		2.53***	2.66***		6.15***	5.76***		4.33***	4.31***		2.95**	2.86**
non-EU		1.42	1.43		4.11**	3.92**		5.02***	4.97***		2.96*	2.92*
<b>Months spent in ... prior age 50</b>												
incapacity			0.99			1.02			1.01			1.03
unemployment			0.98***			1.01***			1			1.01*
<b>Constant</b>	1.54***	0.59***	0.63***	0.15***	0.09***	0.08***	0.66***	0.32***	0.32***	0.33***	0.18***	0.17***

Table A3.5 continued

Ref.: No contact to GRV	Early retirement			Unemployment			Employment high			Voluntary		
	M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3
<b>Family status</b>												
divorced	2.95***	3.11***	2.34***	4.29***	6.00***	4.64***	0.93	0.87	0.95	0.57	0.56	0.6
married	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
remarried	1.38	1.46*	1.2	1.26	1.70*	1.42	1.39*	1.42*	1.53**	1.38	1.35	1.44
<b>Education</b>												
no information		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
lower secondary		7.42***	7.63***		3.79***	3.94***		11.71***	11.71***		1.82**	1.80**
upper secondary		3.48***	3.69***		1.29	1.37		18.48***	19.65***		0.69	0.72
tertiary		0.57	0.66		1.16	1.39		15.22***	15.79***		1.08	1.13
<b>Citizenship</b>												
German		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
EU		7.05***	6.54***		20.87***	19.65***		0.78	0.87		0.56	0.61
non-EU		3.57**	3.40**		19.57***	18.69***		0.77	0.78		0	0
<b>Months spent in ... prior age 50</b>												
incapacity			1.05**			1.05**			0.99			1.03
unemployment			1.02***			1.02***			0.95***			0.97**
<b>Constant</b>	0.46***	0.22***	0.17***	0.21***	0.09***	0.07***	1.68***	0.48***	0.54***	0.26***	0.24***	0.26***

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Source: SUF\_VVL2018, own calculations.



*Sensitivity analyses*

Table A3.6: Months spent in different ‘social employment situations’ in %, by family status and age category, women

<b>DIVORCED WOMEN</b>					
	age 16-29	age 30-39	age 40-49	age 50-65	total
Employment low	31	25	31	25	28
Employment average-low	21	16	21	17	19
Employment average-high	4	9	13	13	10
Employment high	0	1	3	4	2
Unemployment	2	3	6	10	5
Care	18	33	8	1	14
Incapacity	0	0	0	1	0
Education / voluntary	12	1	1	1	4
Retirement	0	0	0	17	5
Gaps	11	12	16	12	13
Months from age 16-65	100	100	100	100	100
<b>MARRIED WOMEN</b>					
	age 16-29	age 30-39	age 40-49	age 50-65	total
Employment low	29	23	30	32	29
Employment average-low	24	13	15	12	16
Employment average-high	6	9	9	7	7
Employment high	0	2	3	3	2
Unemployment	1	2	2	3	2
Care	16	36	11	3	15
Incapacity	0	0	0	1	0
Education / voluntary	13	2	1	1	4
Retirement	0	0	0	10	3
Gaps	12	14	28	28	21
Months from age 16-65	100	100	100	100	100
<b>REMARRIED WOMEN</b>					
	age 16-29	age 30-39	age 40-49	age 50-65	total
Employment low	33	28	31	27	30
Employment average-low	21	18	23	15	19
Employment average-high	5	9	13	9	9
Employment high	0	1	4	3	2
Unemployment	2	3	4	4	3
Care	20	29	9	3	14
Incapacity	0	0	0	1	0
Education / voluntary	11	2	2	1	4
Retirement	0	0	0	19	6
Gaps	9	10	14	18	13
Months from age 16-65	100	100	100	100	100

Source: SUF\_VVL2018, own calculations.

Table A3.7: Months spent in different 'social employment situations' in %, by marital status and age category, men

<b>DIVORCED MEN</b>						
	age 16-29	age 30-39	age 40-49	age 50-65	total	
Employment low	24	10	10	13	15	
Employment average-low	27	21	16	14	19	
Employment average-high	17	39	30	17	24	
Employment high	1	14	20	15	12	
Unemployment	1	4	7	10	6	
Care	0	0	0	0	0	
Incapacity	0	0	1	1	1	
Education / voluntary	18	2	2	2	7	
Retirement	0	0	0	17	5	
Gaps	11	10	12	12	11	
Months from age 16-65	100	100	100	100	100	
<b>MARRIED MEN</b>						
	age 16-29	age 30-39	age 40-49	age 50-65	total	
Employment low	21	9	6	9	12	
Employment average-low	24	16	12	11	16	
Employment average-high	18	36	31	20	25	
Employment high	1	20	27	22	17	
Unemployment	1	1	2	4	2	
Care	0	0	0	0	0	
Incapacity	0	0	0	1	0	
Education / voluntary	21	3	4	4	9	
Retirement	0	0	0	11	4	
Gaps	14	15	16	17	15	
Months from age 16-65	100	100	100	100	100	
<b>REMARRIED MEN</b>						
	age 16-29	age 30-39	age 40-49	age 50-65	total	
Employment low	22	9	8	11	13	
Employment average-low	27	17	13	13	18	
Employment average-high	22	39	30	19	26	
Employment high	2	23	30	23	19	
Unemployment	1	3	3	5	3	
Care	0	0	0	0	0	
Incapacity	0	0	0	1	0	
Education / voluntary	18	3	4	4	8	
Retirement	0	0	0	12	4	
Gaps	8	6	10	13	10	
Months from age 16-65	100	100	100	100	100	

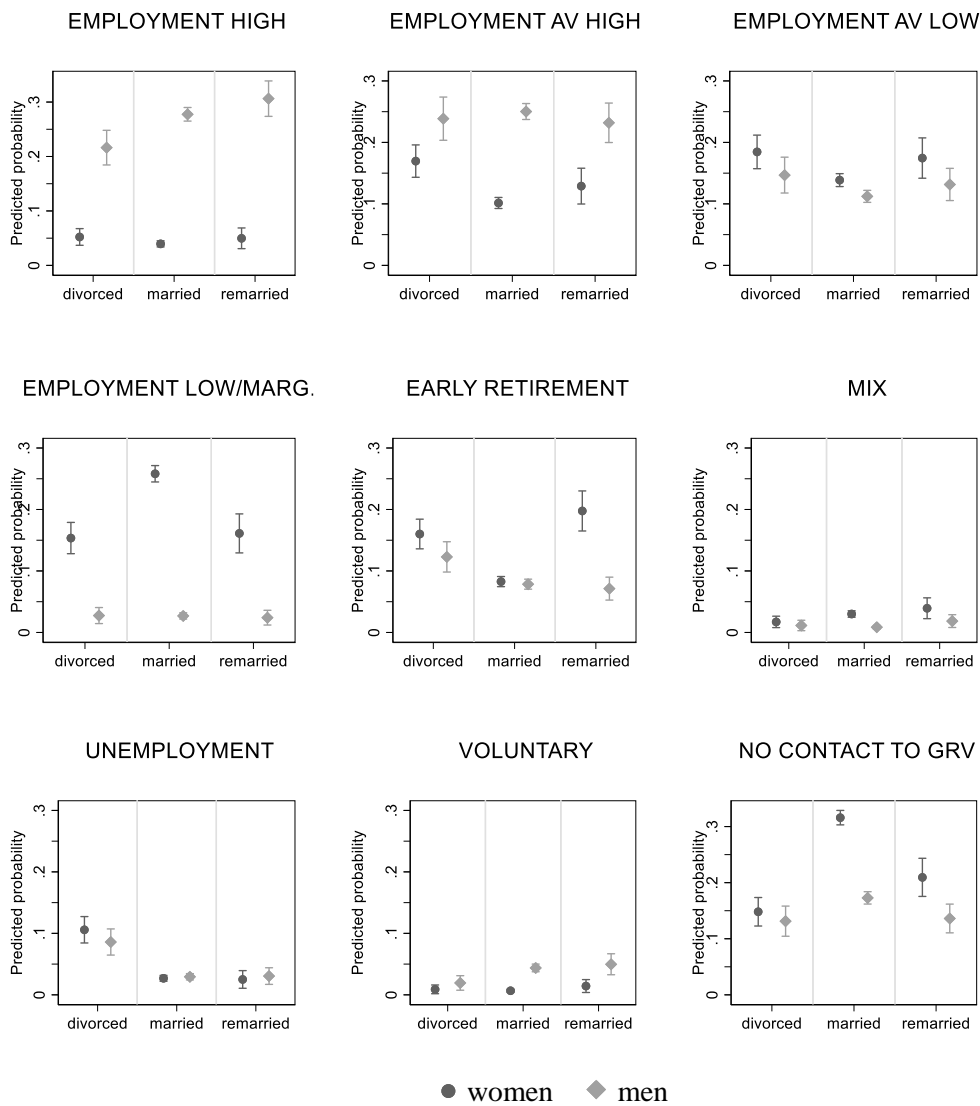
Source: SUF\_VVL2018, own calculations.

Table A3.8: Cluster size before and after removing negative silhouette values

Cluster	Original		drop if silh < 0	
	N	%	N	%
EMPLOYMENT AV HIGH	2010	16.48	1881	17.83
NO CONTACT GRV	2398	19.66	2376	22.52
EMPLOYMENT LOW/MAR	1390	11.39	1390	13.17
EMPLOYMENT AV LOW	1469	12.04	1407	13.34
MIX	1343	11.01	208	1.97
EARLY RETIREMENT	1128	9.25	1001	9.49
UNEMPLOYMENT	477	3.91	389	3.69
EMPLOYMENT HIGH	1724	14.13	1642	15.56
VOLUNTARY	261	2.14	257	2.44
Total	12200	100	10551	100

Source: SUF\_VVL2018, own calculations.

Figure A3.5: Predicted probabilities from the multinomial logistic regression model for cluster affiliation of women and men, after removal of negative silhouette values



*Note:* Models are estimated separately for women and men.

*Controlled for:* Education, citizenship, months spent in incapacity and in unemployment.

*Source:* SUF\_VVL2018, own calculations.

Table A3.9: Multinomial logistic regression results for cluster affiliation, interaction between gender and family status

Ref.: No contact to GRV	Employment av. High			Employment low/marg.			Employment av. Low			Mix			Early retirement		
	M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3	M1	M2	M3
<b>Family status</b>															
men * married	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
women * divorced	-0.1	-0.08	0	2.06***	2.08***	2.02***	0.80***	0.85***	0.84***	1.24***	1.27***	1.21***	1.25***	1.34***	1.21***
women * married	-1.54***	-1.53***	-1.50***	1.65***	1.67***	1.65***	-0.42***	-0.39***	-0.39***	0.58***	0.60***	0.59***	-0.52***	-0.49***	-0.43***
women * remarried	-0.78***	-0.73***	-0.64***	1.69***	1.73***	1.69***	0.33*	0.40*	0.40*	1.15***	1.20***	1.16***	0.95***	1.07***	1.01***
men * divorced	0.19	0.11	0.17	0.41	0.37	0.3	0.58***	0.55**	0.53**	0.74***	0.71***	0.64**	1.08***	1.11***	0.78***
men * remarried	0.17	0.14	0.19	0.16	0.15	0.1	0.45**	0.46**	0.45**	0.66***	0.66***	0.60**	0.32	0.36	0.13
<b>Education</b>															
no information		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
lower secondary		2.60***	2.59***		1.85***	1.86***		2.24***	2.24***		1.84***	1.84***		2.03***	2.07***
upper secondary		2.39***	2.41***		1.27***	1.26***		1.79***	1.79***		1.39***	1.38***		1.91***	1.92***
tertiary		1.35***	1.36***		-0.09	-0.08		0.50*	0.50*		0.46*	0.47*		0.04	0.14
<b>Citizenship</b>															
German		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.		ref.	ref.
EU		0.26	0.29		0.29	0.27		0.47**	0.46**		0.3	0.27		1.17***	1.08***
non-EU		0.25	0.26		0.74*	0.71*		1.30***	1.29***		1.04***	1.02***		1.30***	1.27***
<b>Months spent in ... prior age 50</b>															
incapacity			-0.01		-0.02			0			0.01				0.06***
unemployment			-0.02***		0.01***			0			0.01***				0.02***
<b>Constant</b>	0.43***	-0.58***	-0.52***	-1.90***	-2.44***	-2.48***	-0.41***	-1.21***	-1.21***	-1.11***	-1.68***	-1.73***	-0.77***	-1.53***	-1.84***

Table A3.9 continued

Ref.: No contact to GRV	Unemployment			Employment high			Voluntary		
	M1	M2	M3	M1	M2	M3	M1	M2	M3
<b>Family status</b>									
men * married	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
women * divorced	1.50***	1.85***	1.72***	-1.42***	-1.39***	-1.25***	-1.31**	-1.34***	-1.24**
women * married	-0.68***	-0.60***	-0.57***	-2.52***	-2.51***	-2.46***	-2.51***	-2.51***	-2.47***
women * remarried	-0.33	0.05	-0.02	-2.01***	-1.89***	-1.72***	-1.18**	-1.22**	-1.12**
men * divorced	1.46***	1.74***	1.50***	-0.07	-0.17	-0.09	-0.56	-0.61	-0.54
men * remarried	0.23	0.49	0.31	0.33*	0.34*	0.41**	0.32	0.28	0.34
<b>Education</b>									
no information		ref.	ref.		ref.	ref.		ref.	ref.
lower secondary		1.25***	1.29***		2.54***	2.54***		0.56**	0.55**
upper secondary		0.47	0.48		3.61***	3.66***		0.12	0.14
tertiary		0.14	0.24		3.27***	3.29***		0.4	0.42
<b>Citizenship</b>									
German		ref.	ref.		ref.	ref.		ref.	ref.
EU		2.20***	2.12***		-0.84***	-0.76**		-1.43*	-1.37*
non-EU		2.88***	2.84***		-0.39	-0.37		-1.31	-1.26
Months spent in ... prior age 50									
incapacity			0.04**			-0.01			0.03
unemployment			0.02***			-0.05***			-0.03**
Constant	-1.58***	-2.37***	-2.60***	0.52***	-0.76***	-0.65***	-1.36***	-1.41***	-1.36***

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Source: SUF\_VVL2018, own calculations.

Table A3.10: Months spent in different 'social employment situations' in % in retirement trajectory 'No contact to GRV', by age category and gender

<b>WOMEN</b>						
	age 16-29	age 30-39	age 40-49	age 50-65	total	
Employment low	26	12	12	5	14	
Employment average-low	19	7	3	0	8	
Employment average-high	5	4	2	0	3	
Employment high	0	1	1	0	0	
Unemployment	1	2	2	1	1	
Care	21	47	17	3	20	
Incapacity	0	0	0	0	0	
Education / voluntary	14	2	1	1	5	
Retirement	0	0	0	1	0	
Gaps	13	24	61	88	49	
Months from age 16-65	100	100	100	100	100	

<b>MEN</b>						
	age 16-29	age 30-39	age 40-49	age 50-65	total	
Employment low	21	9	5	3	10	
Employment average-low	19	9	3	1	8	
Employment average-high	11	13	4	1	7	
Employment high	1	13	9	1	5	
Unemployment	0	1	3	2	1	
Care	0	1	1	0	0	
Incapacity	0	0	0	0	0	
Education / voluntary	27	7	6	2	11	
Retirement	0	0	0	1	0	
Gaps	20	46	69	90	57	
Months from age 16-65	100	100	100	100	100	

Source: SUF\_VVL2018, own calculations.

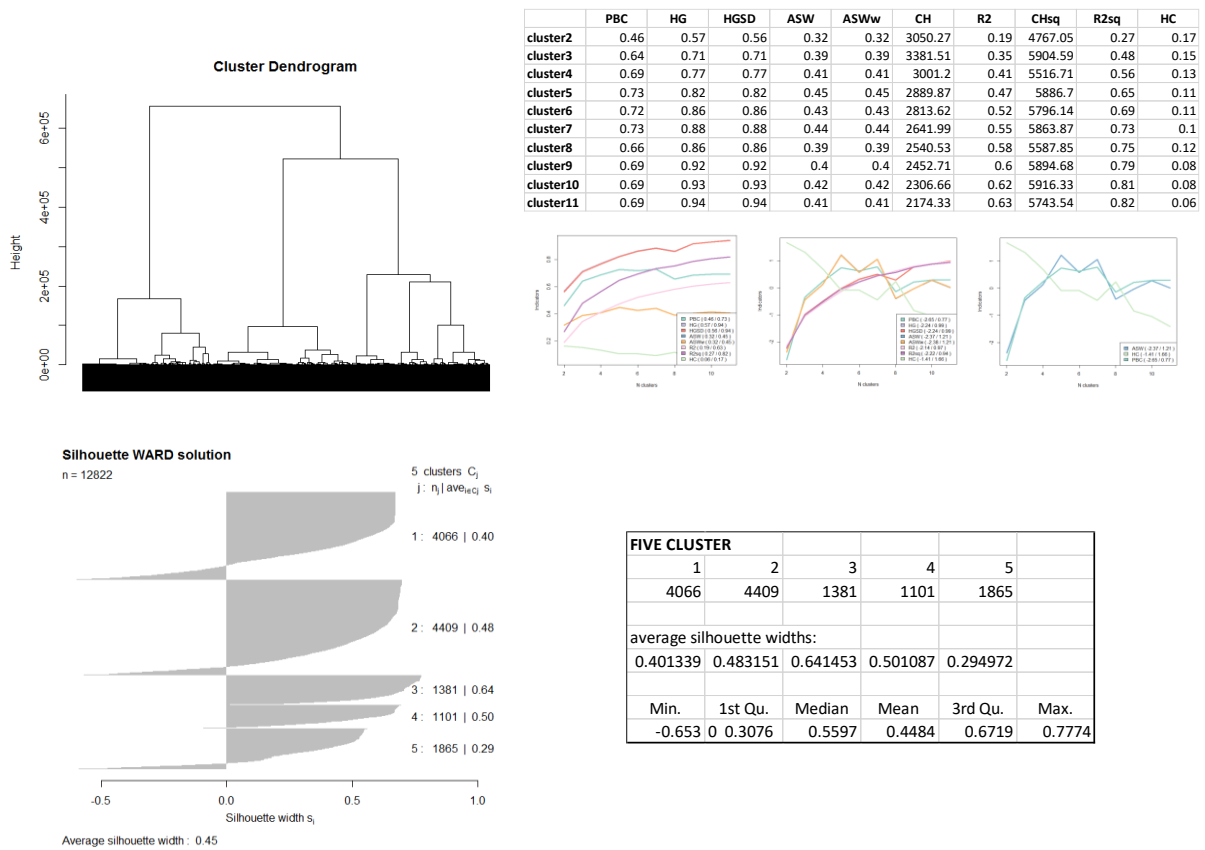
*Analysis separately for women and men*

Table A3.11: Descriptive sample statistics (in % and average values) for women and men across family status

		WOMEN			MEN		
		Divorced	Married	Remarried	Divorced	Married	Remarried
<b>Citizenship</b>							
	German	95.9	91.6	97.5	95.5	92.4	96.4
	EU country	3.0	6.9	1.6	3.6	5.8	2.6
	non EU country	1.1	1.5	0.9	1.0	1.9	1.0
<b>Pension type</b>							
	EM-pension	23.2	10.3	19.9	24.8	10.4	13.4
	Regular old-age pension	31.6	45.4	26.3	29.1	34.5	31.4
	Old-age pension for disabled	8.8	5.0	8.4	7.0	6.7	9.9
	OA-p. for long-term insured	13.4	17.0	21.0	13.0	12.5	13.0
	for particular long-term insured	23.1	22.3	24.5	26.1	36.0	32.3
	Else	-	0.02	-	-	-	-
<b>Education</b>							
	no information	50.0	55.4	49.0	44.0	44.1	43.5
	lower secondary education	43.3	37.6	44.6	45.4	40.6	44.8
	higher secondary education	3.8	3.2	3.3	5.0	5.0	5.0
	tertiary education	3.0	3.8	3.1	5.7	10.6	6.8
<b>Age at retirement</b>							
	∅	62.8	63.9	62.7	62.8	63.7	63.6
<b>∅ months spent in ... prior age 50</b>							
	Incapacity	0.9	0.4	0.8	1.5	0.6	1.1
	unemployment	14.5	6.8	10.2	16.4	5.0	7.0
<b>∅ public pension income</b>							
		1027	724	971	1108	1332	1260
	<b>N</b>	1899	9617	1306	1381	8818	1378
			12822			11577	

Source: SUF\_VVL2018, own calculations.

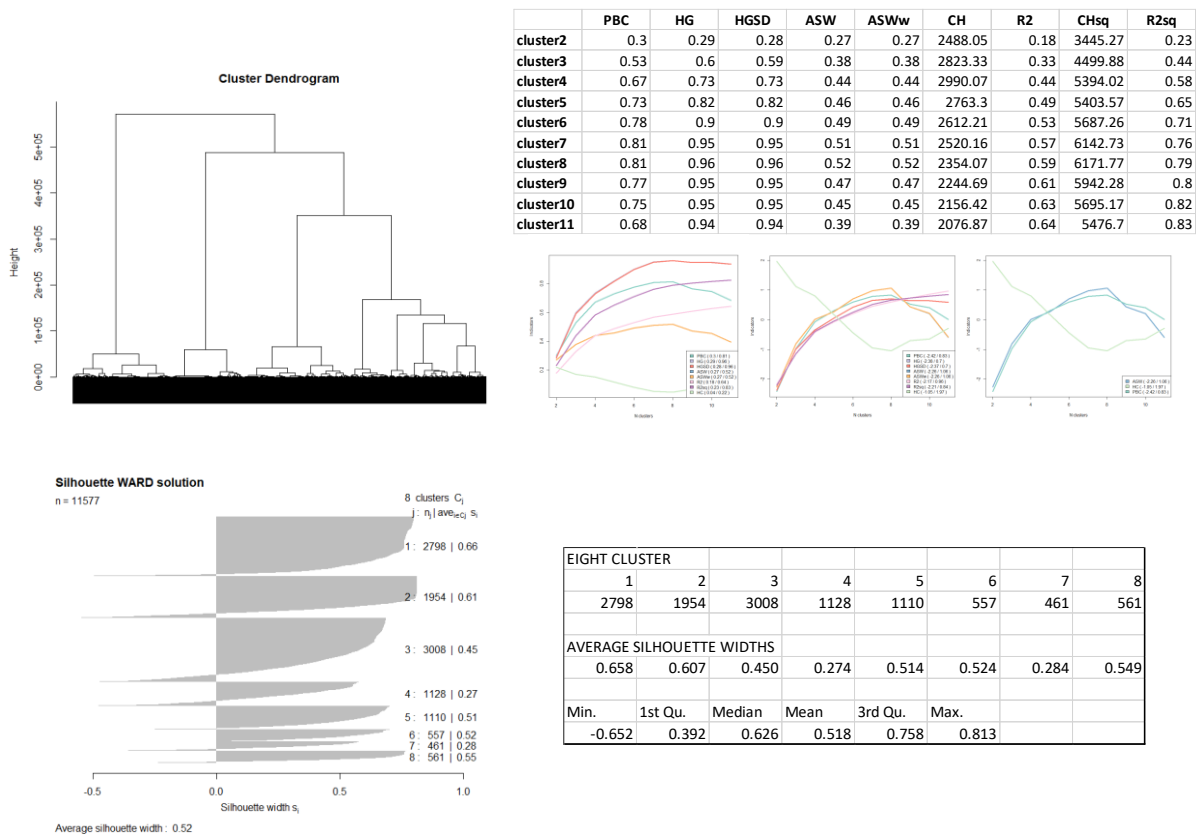
Figure A3.6: Different cluster cut-off criteria, women



Source: SUF\_VVL2018, own calculations.

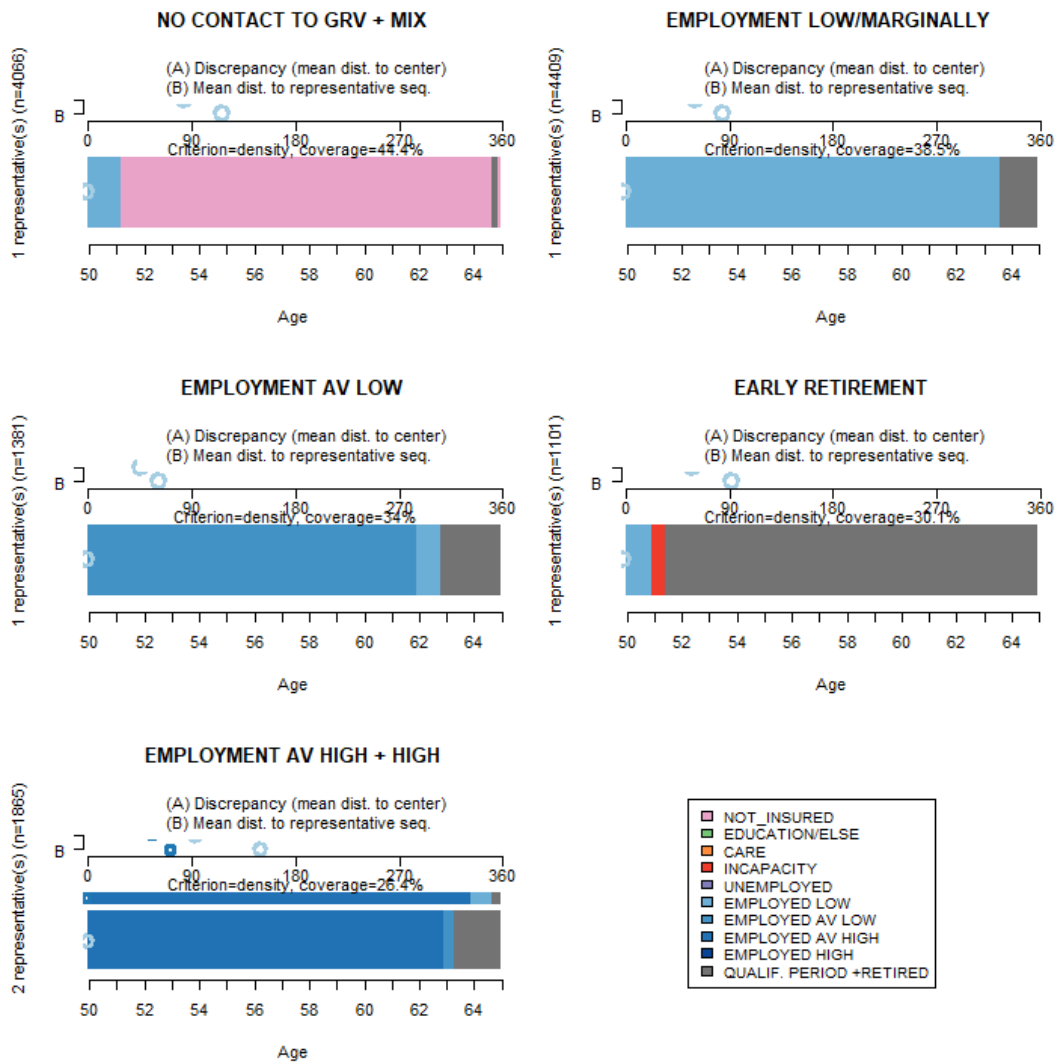


Figure A3.7: Different cluster cut-off criteria, men



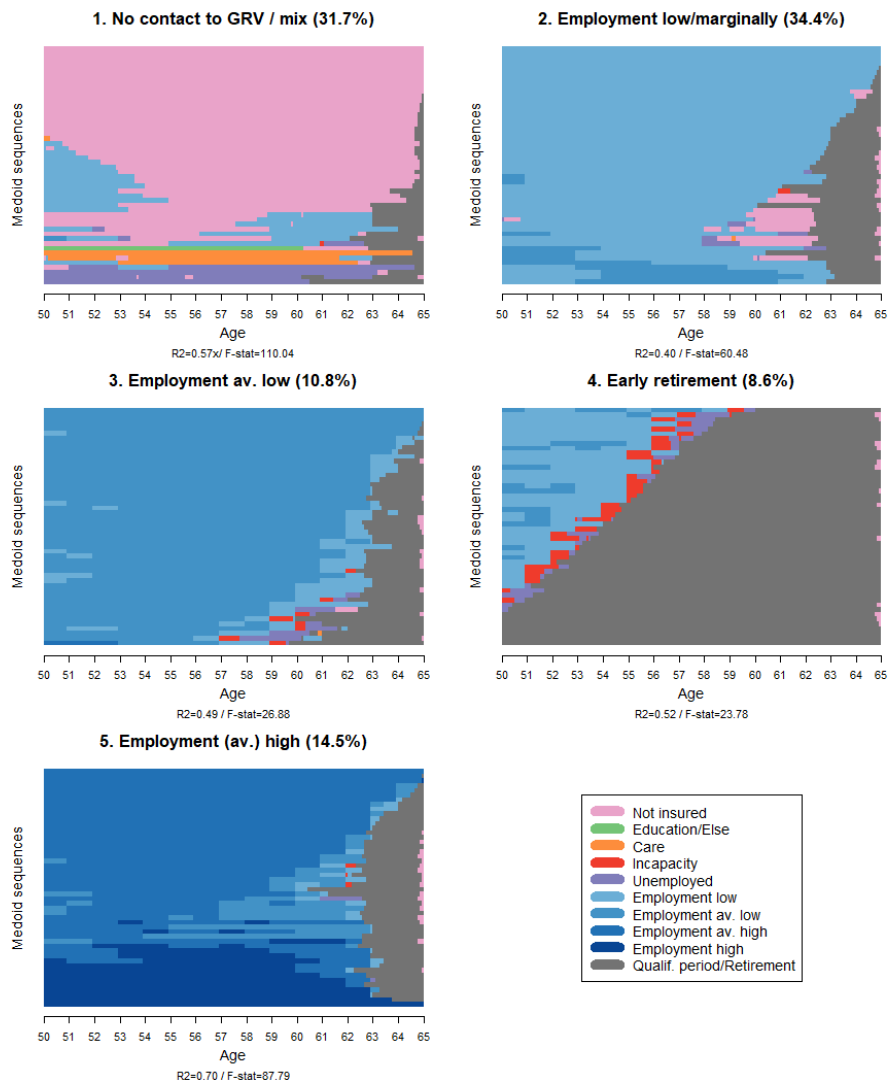
Source: SUF\_VVL2018, own calculations.

Figure A3.8: Representative sequence plot for each retirement trajectory, women



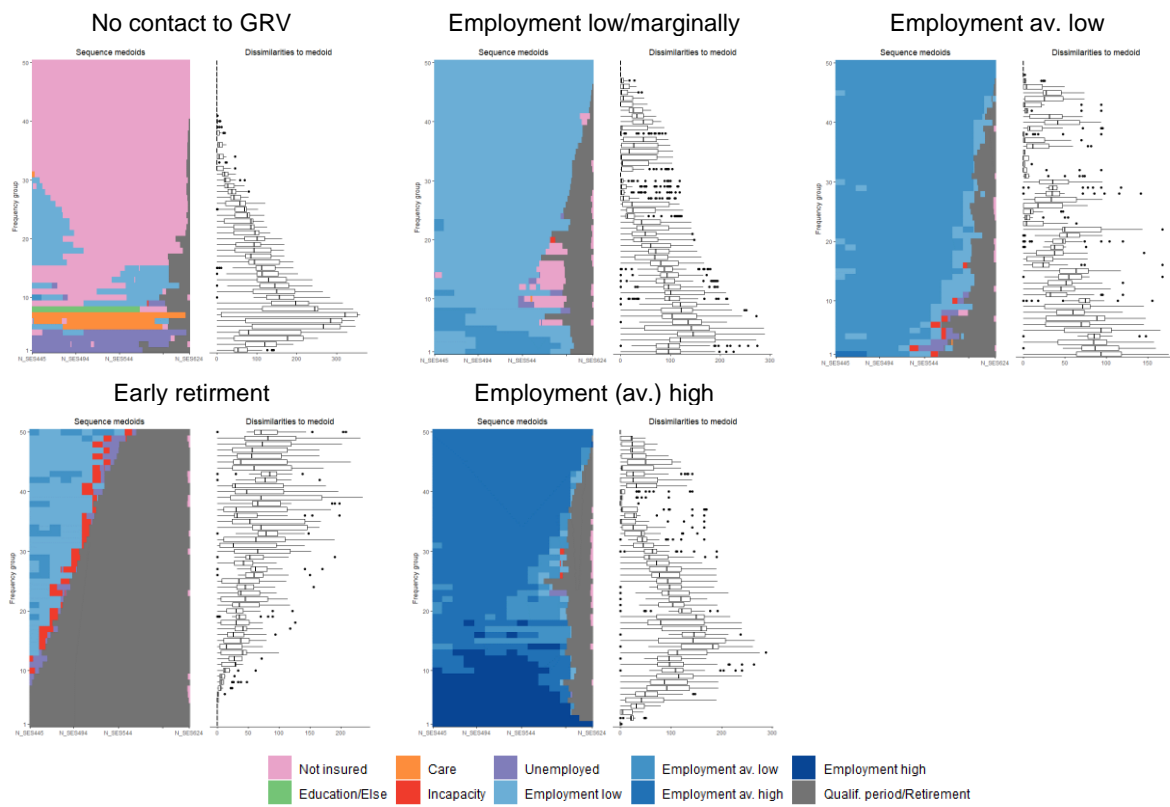
Source: SUF\_VVL2018, own calculations.

Figure A3.9: Relative frequency plots (k=50) for retirement clusters, women



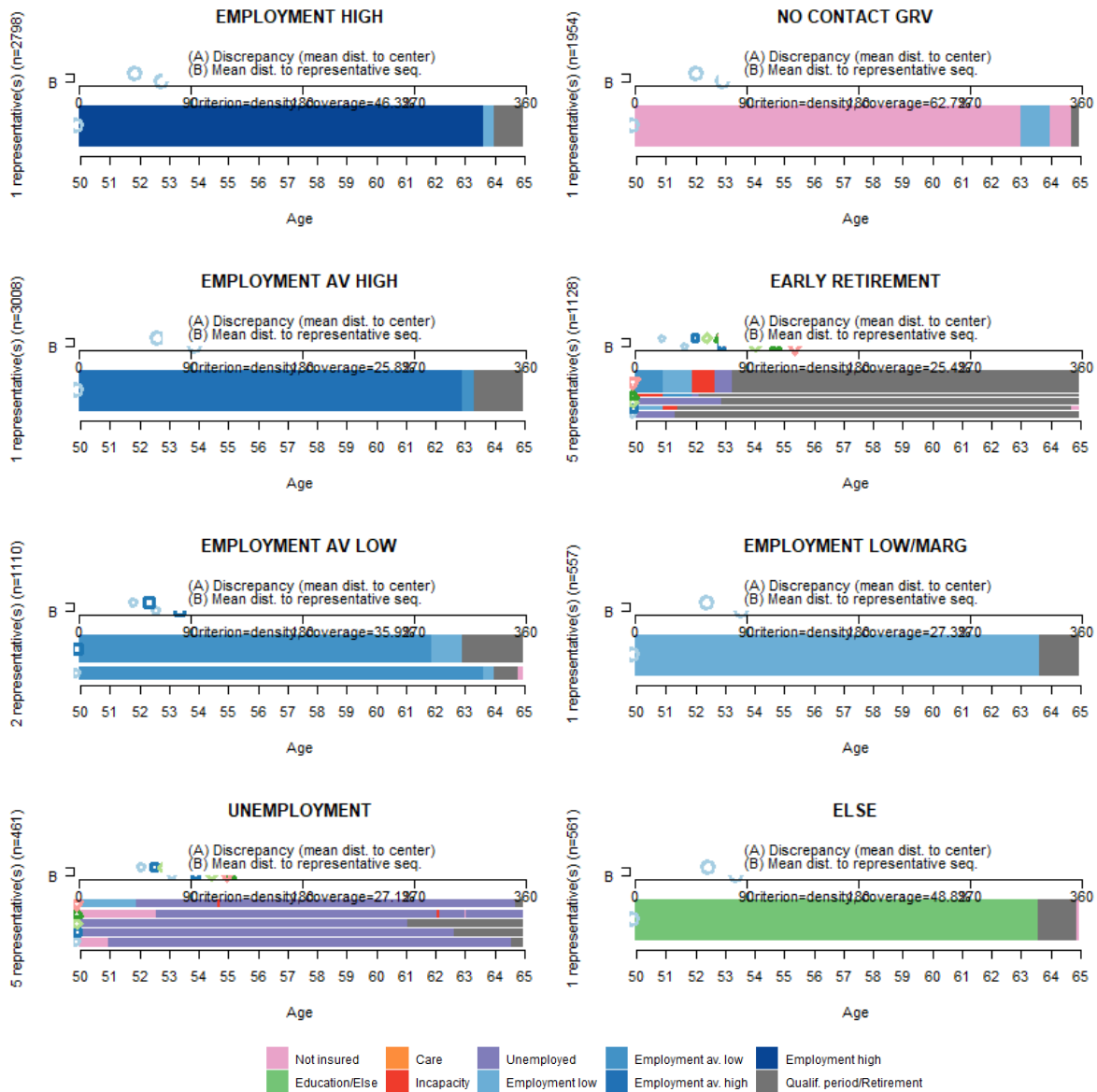
Source: SUF\_VVL2018, own calculations.

Figure A3.10: Relative frequency and the dissimilarity from the medoid, for each cluster, women



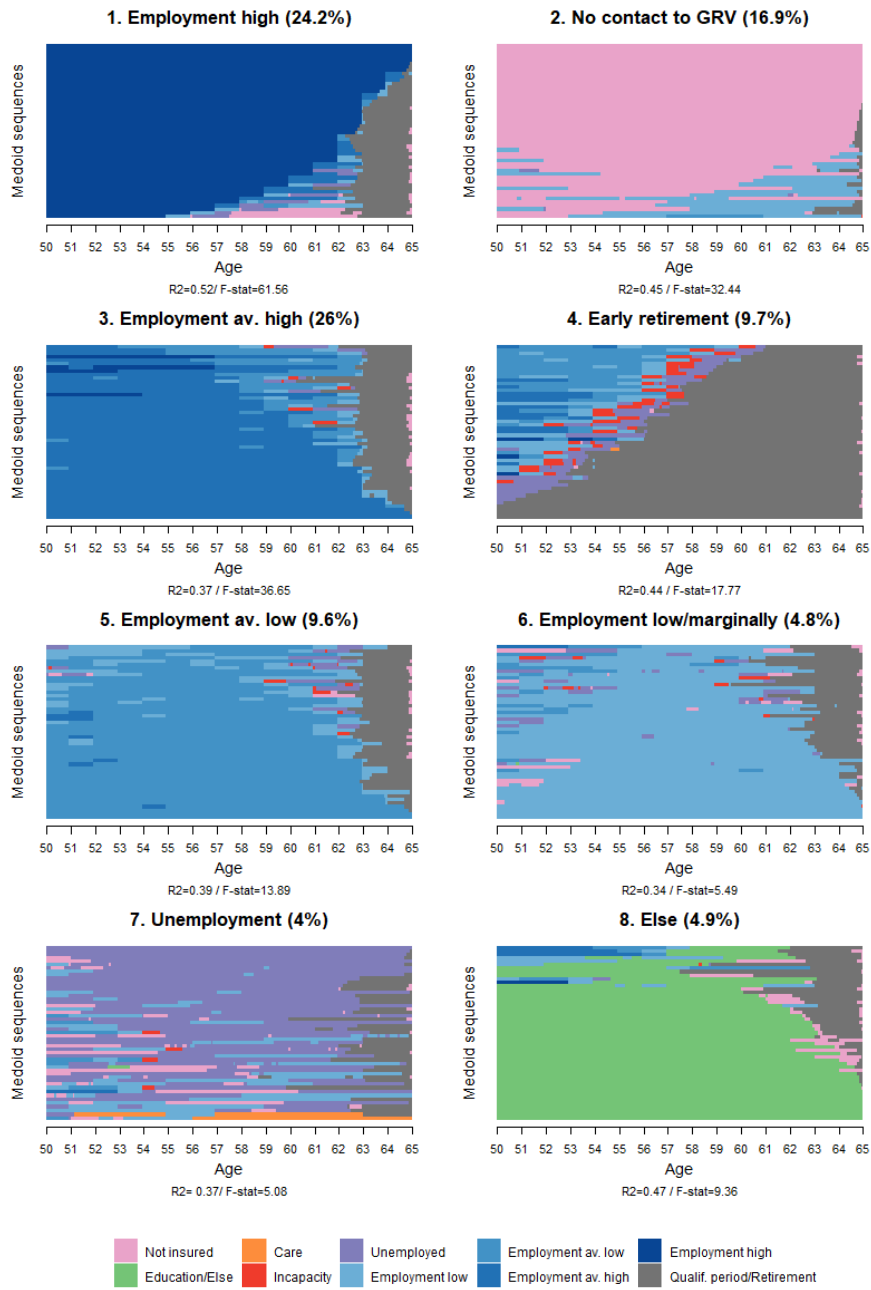
Source: SUF\_VVL2018, own calculations.

Figure A3.11: Representative sequence plot for each retirement trajectory, men



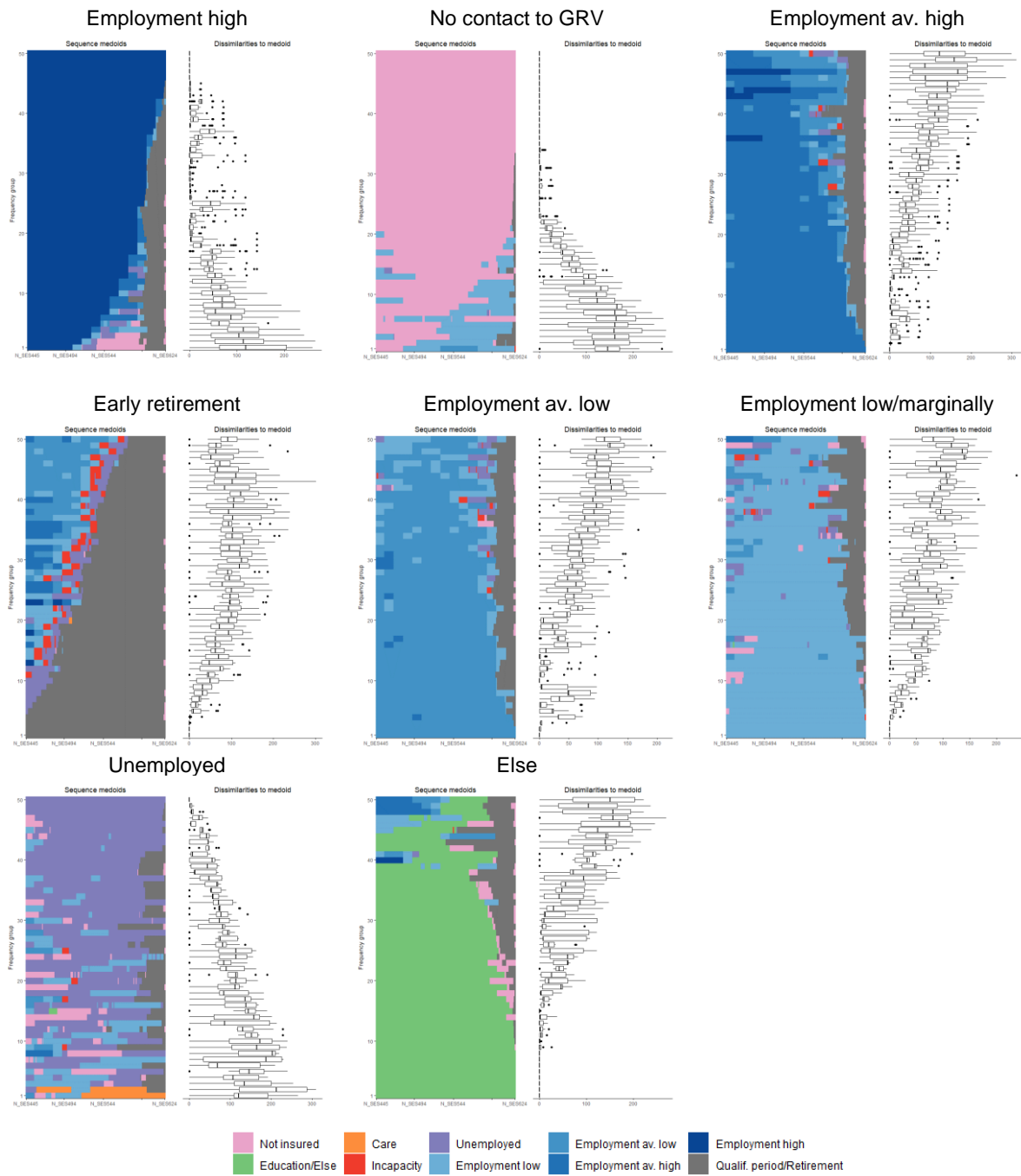
Source: SUF\_VVL2018, own calculations.

Figure A3.12: Relative frequency plots (k=50) for retirement clusters, men



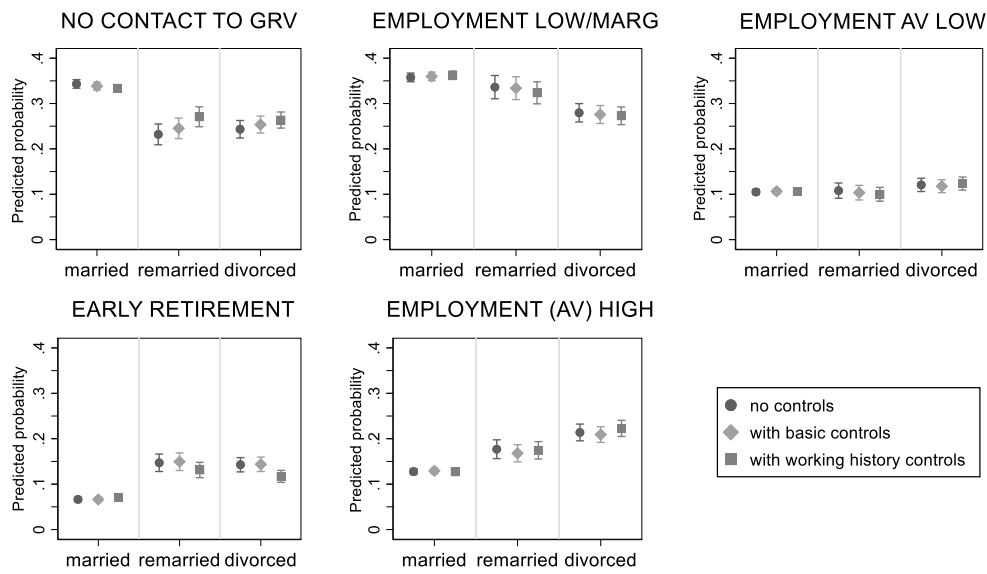
Source: SUF\_VVL2018, own calculations.

Figure A3.13: Relative frequency and the dissimilarity from the medoid, for each cluster, men



Source: SUF\_VVL2018, own calculations.

Figure A3.14: Predicted probabilities from the stepwise multinomial logistic regression models, women

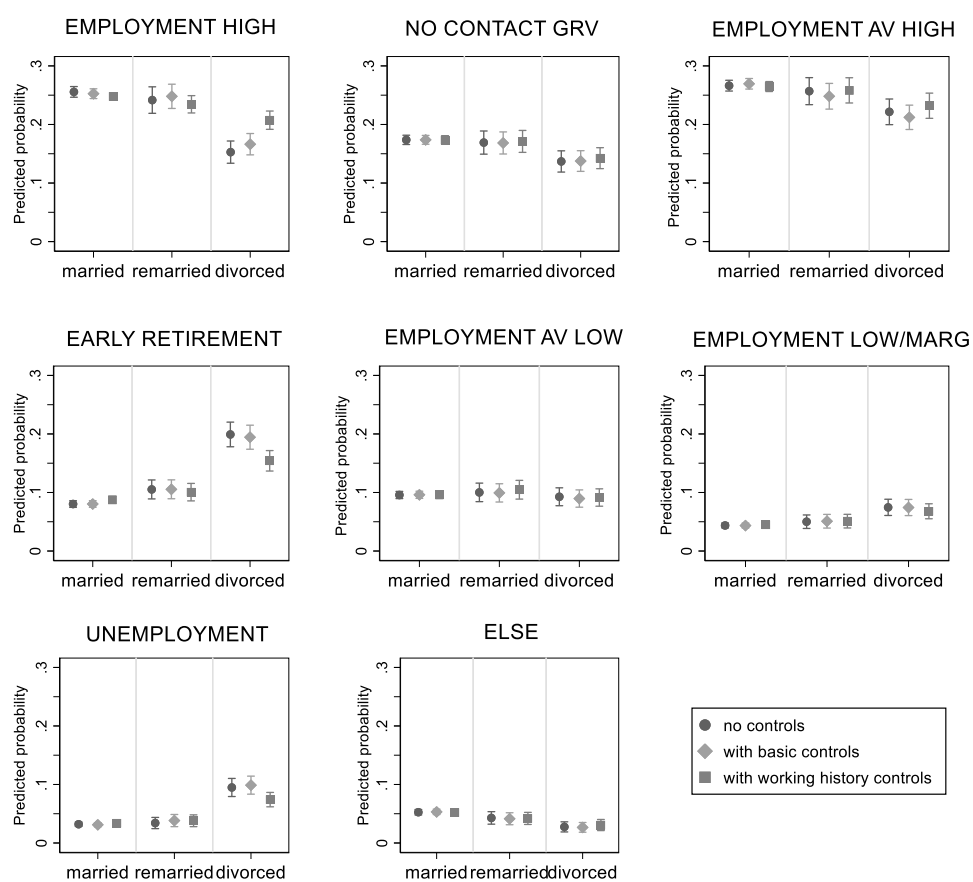


*Note:* M1 ● no controls; M2 ◆ + education, citizenship, number of children; M3 ■ + months spent in incapacity, unemployment, employment low/marginally.

*Source:* SUF\_VVL2018, own calculations.



Figure A3.15: Predicted probabilities from the stepwise multinomial logistic regression models, men



Note: M1 ● no controls; M2 ◆ + education, citizenship; M3 ■ + months spent in incapacity, unemployment, employment high.

Source: SUF\_VVL2018, own calculations.

## Appendix Chapter 4

Table A4.1: Outlined expectations

How does divorce relate to the public pension income of women and men in West Germany and Sweden?				
		Social policy perspective		Outcome, compared to (re-)married
		working life	retirement	
West Germany	Women	Different (legal reality)	Divorce splitting	Higher pension income
	Men	Equal	Divorce splitting	Lower pension income
Sweden	Women	Equal	Equal	More comparable
	Men	Equal	Equal	More comparable

Source: Own illustration.

Table A4.2: Sample statistics for women and men in West Germany and Sweden, column percentages and mean values

	West Germany			Sweden			
	women	men	total	women	men	total	
<b>Year of retirement</b>							
	2013	13.8	14.8	14.3	18.4	17.7	18.1
	2014	15.5	17.9	16.7	17.6	17.5	17.6
	2015	17.9	18.3	18.1	16.8	16.7	16.8
	2016	17.4	16.4	16.9	16.1	16.6	16.3
	2017	17.3	16.1	16.7	15.7	15.9	15.8
	2018	18.2	16.6	17.4	15.4	15.7	15.5
<b>Birth year</b>							
	1946	0.1	0.1	0.1	1.9	2.3	2.1
	1947	1.7	1.5	1.6	11.7	10.4	11.1
	1948	10.2	9.2	9.7	14.4	13.2	13.9
	1949	12	11.6	11.8	15.1	14.2	14.7
	1950	14.1	15.4	14.8	15.2	14.9	15
	1951	15.4	16.5	15.9	14.9	14.7	14.8
	1952	19.3	17.9	18.6	13.3	13.3	13.3
	1953	12.9	12.9	12.9	6.5	7.5	7
	1954	8.8	9.4	9.1	3.5	4.3	3.8
	1955	4.6	4.5	4.6	2	2.7	2.3
	1956	0.6	0.6	0.6	1.1	1.7	1.4
	1957	0.4	0.3	0.4	0.4	0.8	0.6
	1958	0	0	0	0.1	0.2	0.1
<b>Family status</b>							
	married	63.1	69.3	66.1	49.2	47.6	48.4
	remarried	6.2	8.7	7.4	9.3	9.3	9.3
	widowed/never married	20.7	13.8	17.3	6.5	2.1	4.4
	divorced	10	8.2	9.1	15.3	13.5	14.4
	cohabiting	-	-	-	10.6	12.5	11.5
	never married/single	-	-	-	9.1	15.0	11.9

Table A4.2 continued

<b>Number of children</b>							
	no child	18.3	-		13.8	-	
	one child	24.8	-		16.0	-	
	two children	38.2	-		42.6	-	
	three or more children	18.7	-		27.7	-	
<b>Age at retirement</b>							
	∅	64.4	64.3	64.4	65.1	65.3	65.2
	60	0.3	0.3	0.3	0.6	1.1	0.8
	61	2.3	2.1	2.2	1.9	3.5	2.6
	62	2.9	3.7	3.3	3.7	4.5	4.2
	63	23.5	27.4	25.4	5.6	6.8	6.2
	64	12.4	15.5	13.9	8.9	9.5	9.2
	65	36.8	32.2	34.6	18.3	18.6	18.3
	66	21.1	17.9	19.5	49.8	42.6	49.8
	67	0.8	0.9	0.8	11.2	13.2	12.2
<b>Education</b>							
	no additional year (DE)/ 9 years or less (SE)	73.5	66.4	70	28.5	25.7	27.3
	additional years(DE)/ 12 years (SE)	26.6	33.6	30	47.6	45.5	46.6
	PhD studies + higher	-	-	-	24	28.8	26.3
<b>N</b>		1,678,306	1,600,502		233,517	212,628	
<b>%</b>		51.2	48.8		52.3	47.7	
<b>Total</b>			3,278,808			446,145	

Source: RTZN-VVL2013-2018 & Swedish registers; own calculations.

Table A4.3: Sample statistics for women and men in West Germany by family status, column percentages and mean values

	<b>WOMEN</b>			<b>MEN</b>			
	<b>divorced</b>	<b>married</b>	<b>remarried</b>	<b>divorced</b>	<b>Married</b>	<b>remarried</b>	
<b>Year of retirement</b>							
	2013	13.5	13.9	11.4	13.8	15.1	13.5
	2014	15.5	15.6	13.3	17.2	18.2	16.8
	2015	17.7	18.0	17.4	17.8	18.5	17.8
	2016	17.7	17.4	17.9	17.2	16.2	16.5
	2017	17.4	17.2	19.0	16.8	15.8	17.1
	2018	18.2	18.0	21.1	17.3	16.2	18.3
<b>Birth year</b>							
	1946	0.0	0.1	0.0	0.1	0.1	0.0
	1947	1.1	1.8	0.8	1.4	1.5	1.2
	1948	8.6	10.6	6.3	8.5	9.3	7.9
	1949	11.1	12.3	8.4	11.1	11.7	10.6
	1950	14.0	14.2	11.4	14.6	15.7	14.5
	1951	16.1	15.3	13.8	16.4	16.5	16.2
	1952	19.3	19.3	20.1	18.4	17.8	18.5
	1953	14.2	12.6	16.4	13.9	12.8	13.9
	1954	9.8	8.4	13.1	9.9	9.4	10.7
	1955	4.6	4.5	7.6	4.8	4.5	5.2
	1956	0.7	0.6	1.3	0.8	0.6	0.8

Table A4.3 continued

	1957	0.4	0.4	0.9	0.4	0.3	0.4
	1958		0.0	0.0	0.0	0.0	0.0
<b>Number of children</b>							
	no child	13.4	14.5	13.7	-	-	-
	one child	29.3	23.7	30.0	-	-	-
	two children	37.5	42.0	36.8	-	-	-
	three or more children	19.8	19.8	19.5	-	-	-
<b>Age at retirement</b>							
	∅	64.3	64.5	64.0	64.2	64.3	64.2
	60	0.3	0.3	0.6	0.4	0.3	0.4
	61	2.4	2.2	4.5	2.4	1.9	2.5
	62	2.9	2.8	4.1	3.6	3.8	4.1
	63	25.9	22.7	33.3	28.0	27.7	28.3
	64	16.6	11.3	15.4	16.3	15.8	16.5
	65	34.6	37.7	27.4	31.1	32.4	31.2
	66	16.9	22.1	14.4	17.3	17.3	16.4
	67	0.5	0.8	0.3	0.9	0.8	0.7
<b>Education</b>							
	no additional year	73.8	73.6	78.6	71.6	65.1	69.3
	additional years	26.2	26.4	21.4	28.4	34.9	30.7
	N	167,715	1,058,443	104,576	131,718	1,109,253	138,726

Source: RTZN-VVL2013-2018; own calculations.

Table A4.4: Sample statistics for women and men in Sweden by family status, column percentages and mean values

	WOMEN			MEN			
	divorced	married	remarried	divorced	married	remarried	
<b>Year of retirement</b>							
	2013	18.6	18.7	19.3	17.7	18.2	18.5
	2014	17.5	17.8	18.2	17.2	17.9	17.3
	2015	17.2	16.8	16.7	17.2	16.9	16.7
	2016	16.2	16.0	15.6	16.4	16.4	16.4
	2017	15.3	15.6	15.5	15.5	15.4	15.9
	2018	15.3	15.0	14.7	15.9	15.1	15.2
<b>Birth year</b>							
	1946	2.3	1.9	1.8	1.9	2.6	2.7
	1947	13.9	10.8	12.3	11.3	10.6	10.9
	1948	15.8	13.9	14.6	14.3	13.6	13.4
	1949	15.6	15.0	14.9	15.1	14.7	13.9
	1950	15.6	15.1	15.0	15.9	15.2	14.8
	1951	14.8	14.9	14.3	15.7	14.5	14.7
	1952	13.0	13.3	12.3	14.5	12.7	12.9
	1953	4.7	7.3	6.5	0.8	7.4	7.3
	1954	1.9	4.0	4.1	4.3	4.1	4.2
	1955	1.1	2.2	2.3	3.0	2.4	2.7
	1956	0.7	1.2	1.3	1.9	1.4	1.5
	1957	0.4	0.4	0.5	1.0	0.6	0.7
	1958	0.1	0.1	0.1	0.2	0.1	0.2

Table A4.4 continued

**Number of children**

no child	9.4	8.5	8.6	-	-	-
one child	19.2	12.4	15.2	-	-	-
two children	40.1	49.5	40.3	-	-	-
three or more children	31.3	29.6	35.9	-	-	-

**Age at retirement**

∅	64.7	64.5	64.0	64.2	64.3	64.2
60	0.6	0.6	0.6	1.1	0.9	1.0
61	1.4	2.0	2.3	4.2	2.8	3.2
62	2.2	4.3	4.1	5.0	4.4	4.8
63	3.1	6.7	6.6	6.1	6.9	7.1
64	4.7	10.9	9.4	7.7	10.3	9.7
65	15.3	20.0	17.0	18.8	19.0	17.9
66	60.2	44.5	49.3	46.5	40.4	41.0
67	12.6	11.0	10.8	10.6	15.3	15.3

**Education**

Higher education/Phd studies	27.0	30.8	29.0	22.9	29.5	29.4
12 years of education	48.4	47.3	49.5	47.8	44.3	45.9
9 years or less	24.6	21.9	21.5	29.3	26.2	24.7

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N	35,697	114,844	21,710	28,692	101,168	19,774
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*Source:* Swedish registers; own calculations.

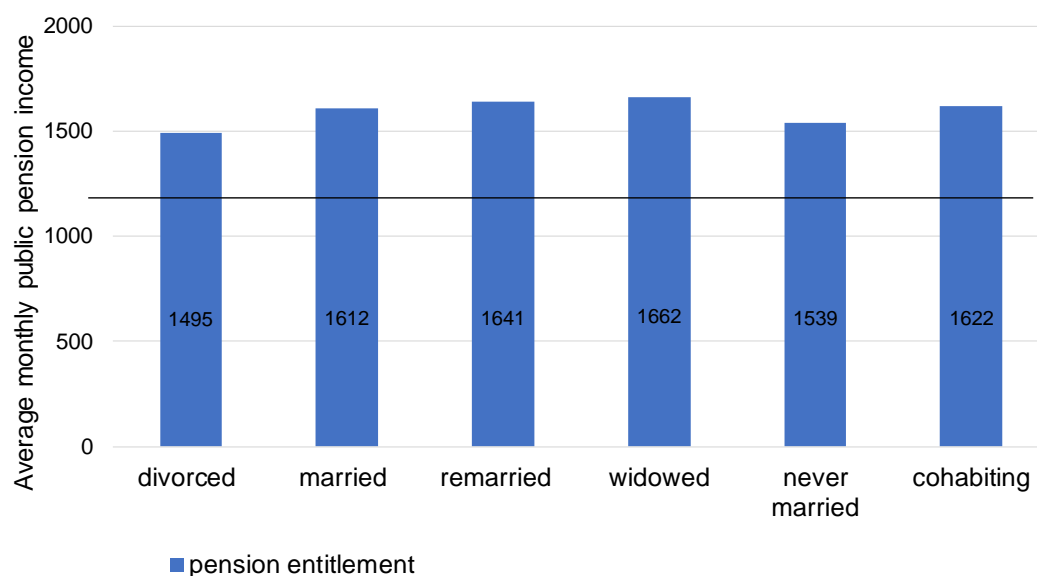
Table A4.5: Average monthly public pension income in euros, by family status for women and men in the year of retirement, Sweden and West Germany

	West Germany		Sweden	
	women	men	Women	Men
<b>Married</b>				
monthly pension entitlement	661	1 304	1612	2392
Std. dev.	447	682	871	1647
before child crediting	570	1 303		
Std. dev.	462	682		
N	1,058,443	1,109,253	114,844	101,162
<b>Divorced</b>				
monthly pension entitlement	1 052	1 117	1495	1699
Std. dev.	539	492	851	1192
before divorce splitting	819	1 269		
Std. dev.	467	585		
N	167,715	131,718	35,697	28,692
<b>Remarried</b>				
monthly pension entitlement	969	1 299	1641	2271
Std. dev.	435	541	925	1689
before divorce splitting	787	1 451		
Std. dev.	452	601		
N	104,576	138,726	21,710	19,774
<b>Widowed*</b>				
monthly pension entitlement	806	1 016	1662	2342
Std. dev.	539	629	1143	1588
before child crediting	741	1 015		
Std. dev.	561	629		
N	347,572	220,805	15,165	4,465
<b>Never married/single</b>				
monthly pension entitlement	-	-	1539	1553
Std. dev.			858	992
N	-	-	21,294	31,931
<b>Cohabiting</b>				
monthly pension entitlement	-	-	1622	2024
Std. dev.			863	1223
N	-	-	24,807	26,608

Note: \*'widowed' includes 'never married' for the German sample and should therefore not be interpreted.

Source: RTZN-VVL2013-2018 & Swedish registers; own calculations.

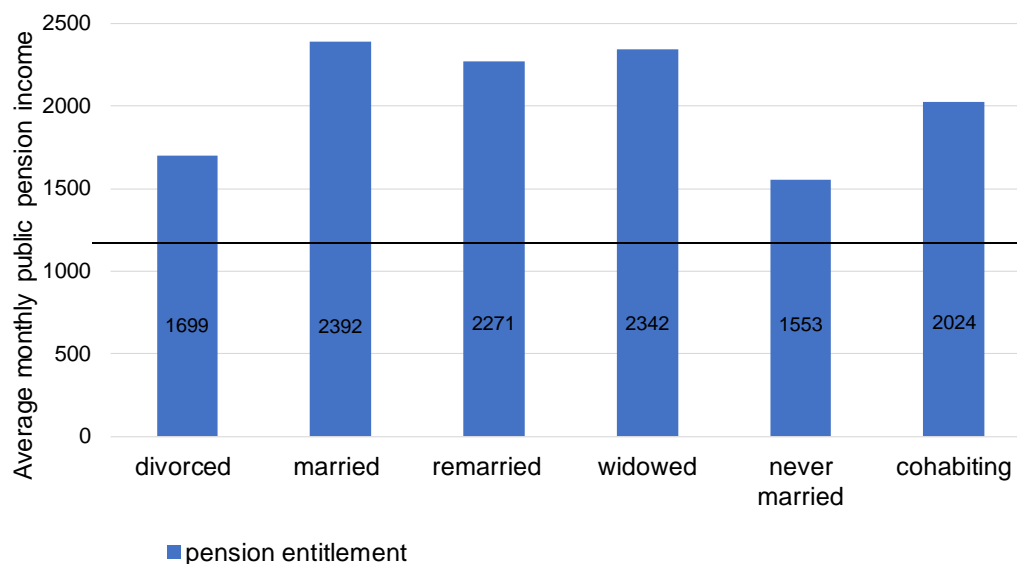
Figure A4.1: Average monthly public pension income in euros, by family status for women in the year of retirement, Sweden



Note: Poverty line Sweden (2017): 1200€.

Source: Swedish registers; own calculations.

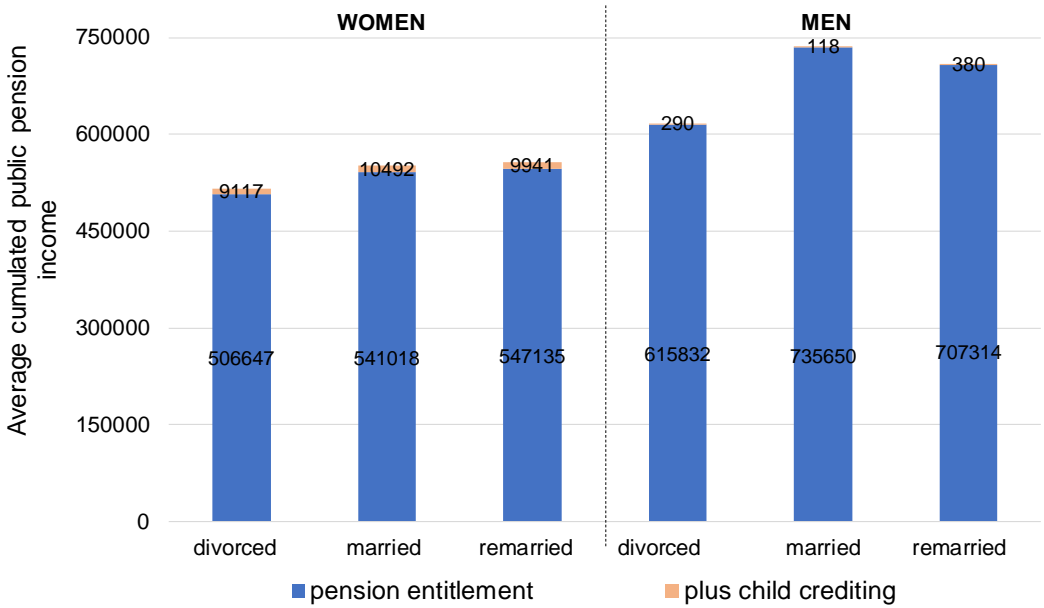
Figure A4.2: Average monthly public pension income in euros, by family status for men in the year of retirement, Sweden



Note: Poverty line Sweden (2017): 1200€.

Source: Swedish registers; own calculations.

Figure A4.3: Average cumulated public pension entitlement for divorced, married and remarried women and men in Sweden



Source: Swedish registers; own calculations.



Table A4.6: Regression models with monthly public pension entitlement in euros as dependent variable, for women and men, West Germany

		West Germany						
		women	95% CIs			men	95% CIs	
<b>Family status</b>								
	married	ref.				ref.		
	divorced	350	348	352	-186	-189	-182	
	remarried	231	229	234	-15	-18	-12	
	widowed/ never married	109	107	111	-247	-250	-245	
<b>Retirement Year</b>								
	2013	ref.				ref.		
	2014	59	56	61	36	33	39	
	2015	95	93	97	48	45	51	
	2016	90	87	92	30	27	33	
	2017	104	102	106	51	47	54	
	2018	119	117	122	73	69	76	
<b>Education</b>								
	no additional years	ref.				ref.		
	additional years	103	102	105	90	88	92	
<b>Age at retirement</b>								
	60	275	264	286	250	234	266	
	61	229	225	233	194	187	201	
	62	388	384	392	456	451	461	
	63	352	350	353	441	439	444	
	64	376	374	378	433	430	436	
	65	ref.				ref.		
	66	-123	-125	-121	-255	-257	-252	
	67	-261	-268	-254	-495	-504	-485	
<b>Number of children</b>								
	No children	86	84	88	-	-	-	
	One child	ref			-	-	-	
	Two children	-80	-82	-121	-	-	-	
	Three or more children	-132	-268	-254	-	-	-	
<b>Constant</b>		490	487	492	1069	1066	1071	
<b>N</b>		1,678,306			1,600,502			

Note: Results rounded.

Source: RTZN-VVL2013-2018; own calculations.

Table A4.7: Regression models with monthly public pension entitlement in euros as dependent variable, for women and men, Sweden

	Sweden						
	women	95% CIs			men	95% CIs	
<b>Family status</b>							
married	ref.				ref.		
divorced	-96	-106	-86		-606	-624	-587
remarried	51	39	63		-124	-145	-103
widowed	124	110	138		11	-31	52
never married/single	1	-12	14		-689	-707	-672
cohabiting	58	47	70		-280	-299	-261
<b>Retirement Year</b>							
2013	ref.				ref.		
2014	14	3	25		21	1	41
2015	66	55	77		71	50	91
2016	113	102	125		133	113	153
2017	145	133	156		180	160	201
2018	158	147	171		205	184	225
<b>Education</b>							
Phd studies, higher education	438	430	446		719	704	733..43
12 years of education	ref.				ref.		
9 years or less of education	-241	-250	-233		-265	-279	-250
<b>Age at retirement</b>							
60	-727	-770	-685		-576	-635	-517
61	-567	-592	-539		-380	-415	-346
62	35	16	57		82	52	112
63	166	150	185		292	266	319
64	278	264	294		394	371	418
65	ref.				ref.		
66	163	154	170		233	217	250
67	443	431	455		605	584	626
<b>Number of children</b>							
No children	-129	-142	-117		-	-	-
One child	ref.				-	-	-
Two children	69	60	79		-	-	-
Three or more children	-111	-122	-101		-	-	-
<b>Constant</b>							
	1312	1298	1326		1918	1897	1939
<b>N</b>	233,517				212,628		

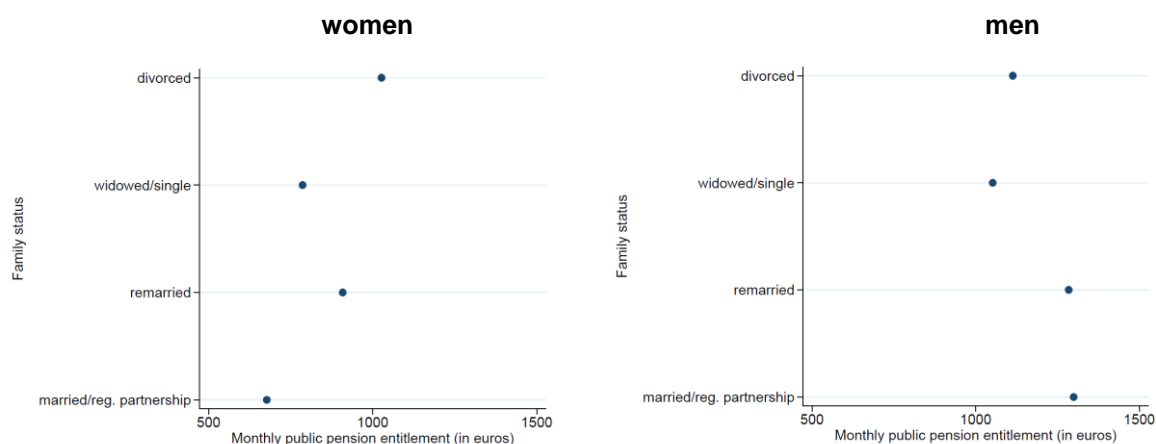
Source: Swedish registers; own calculations.

Table A4.8: Average Marginal effects of family status for women and men, West Germany and Sweden

	women			Diff. / %	men			Diff. / %
	Margin	95% CIs			Margin	95% CIs		
<b>West Germany</b>								
married	677	676	678	-	1299	1298	1301	-
divorced	1027	1025	1029	350 / 34	1114	1110	1117	185 / 14
remarried	909	906	911	232 / 25	1284	1281	1287	15 / 1
widowed/never married	786	785	788	109 / 14	1052	1050	1054	247 / 19
<b>Sweden</b>								
married	1590	1586	1595	-	2346	2337	2355	-
divorced	1494	1486	1503	96 / 6	1740	1724	1756	606 / 26
remarried	1641	1630	1652	51 / 3	2222	2203	2241	124 / 5
widowed	1715	1701	1728	124 / 7	2356	2316	2397	-
never married/single	1591	1579	1603	-	1656	1641	1672	690 / 29
cohabiting	1649	1638	1659	58 / 4	2066	2049	2083	280 / 12

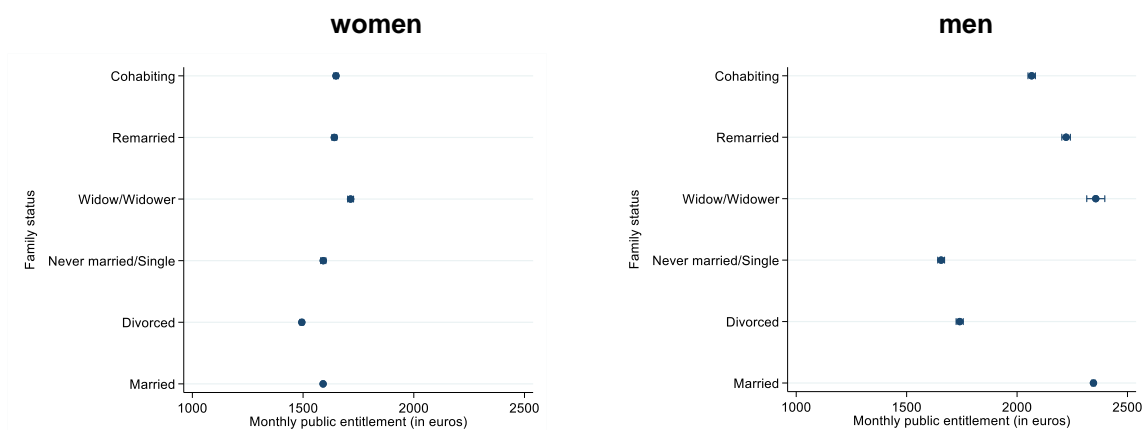
Source: RTZN-VVL2013-2018, Swedish registers; own calculations.

Figure A4.4: Average Marginal effects of family status, for women and men, West Germany



Source: RTZN-VVL2013-2018; own calculations.

Figure A4.5: Average Marginal effects of family status, for women and men, Sweden



Source: Swedish registers; own calculations.

Table A4.9: Average Marginal effects from the two-way interaction of family status and year of retirement, for women and men, West Germany

	women			men		
	Margin	[95% Conf. Interval]	Margin	[95% Conf. Interval]	Margin	[95% Conf. Interval]
<b>married</b>						
2013	587	585	589	1259	1257	1263
2014	650	648	651	1298	1296	1301
2015	690	688	692	1310	1308	1313
2016	690	689	692	1290	1288	1293
2017	703	702	705	1306	1303	1309
2018	720	718	722	1324	1323	1328
<b>divorced</b>						
2013	974	968	979	1080	1073	1090
2014	1022	1017	1027	1095	1089	1104
2015	1044	1040	1049	1099	1093	1108
2016	1017	1012	1022	1088	1082	1098
2017	1039	1035	1044	1136	1130	1146
2018	1053	1048	1057	1171	1165	1181
<b>remarried</b>						
2013	862	854	869	1241	1234	1251
2014	919	913	926	1268	1262	1277
2015	928	922	934	1277	1272	1286
2016	911	905	916	1279	1274	1289
2017	912	906	917	1304	1299	1313
2018	926	920	931	1320	1316	1330
<b>widowed/never married</b>						
2013	710	707	714	982	998	1010
2014	762	759	765	1021	1037	1049
2015	800	797	803	1040	1058	1069
2016	791	788	794	1011	1033	1045
2017	810	807	814	1032	1058	1070
2018	824	820	827	1056	1087	1099

*Note:* Results rounded.

*Source:* RTZN-VVL2013-2018; own calculations.

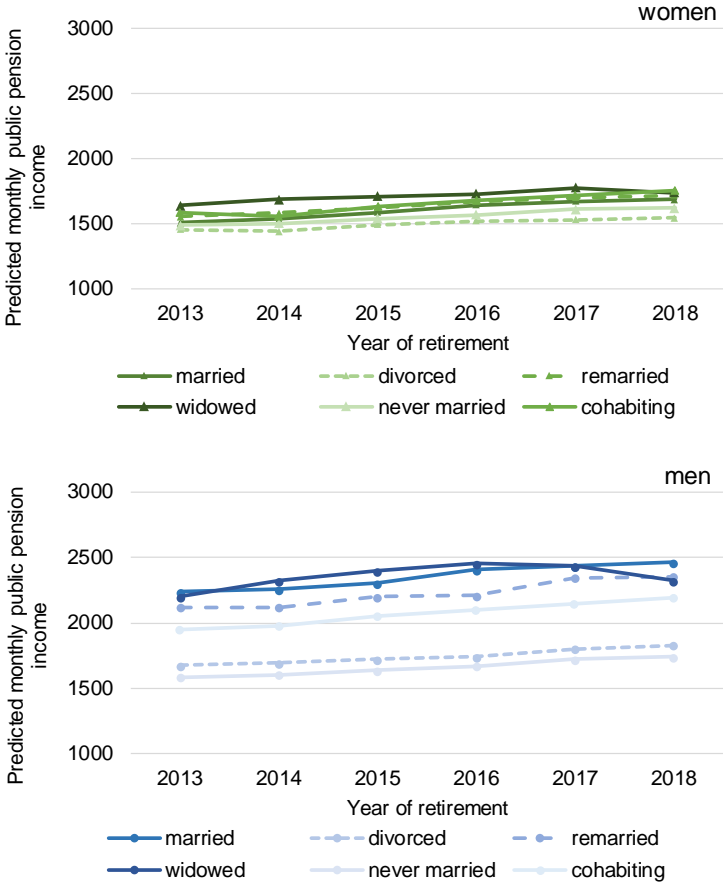
Table A4.10: Average Marginal effects from the two-way interaction of family status and year of retirement, for women and men, Sweden

	women			men		
	Margin	[95% Conf. Interval]	Margin	[95% Conf. Interval]	Margin	[95% Conf. Interval]
<b>married</b>						
<b>2013</b>	1508	1496	1519	2239	2219	2259
<b>2014</b>	1532	1520	1543	2258	2238	2278
<b>2015</b>	1584	1572	1596	2304	2283	2325
<b>2016</b>	1643	1631	1655	2405	2384	2426
<b>2017</b>	1673	1661	1685	2433	2411	2455
<b>2018</b>	1687	1675	1699	2461	2439	2483
<b>divorced</b>						
<b>2013</b>	1454	1434	1474	1673	1635	1712
<b>2014</b>	1441	1420	1461	1695	1656	1734
<b>2015</b>	1491	1470	1512	1721	1682	1760
<b>2016</b>	1520	1499	1541	1739	1699	1778
<b>2017</b>	1530	1508	1552	1800	1759	1841
<b>2018</b>	1541	1519	1563	1828	1787	1868
<b>remarried</b>						
<b>2013</b>	1553	1528	1578	2122	2077	2167
<b>2014</b>	1580	1554	1606	2121	2075	2168
<b>2015</b>	1625	1598	1652	2202	2154	2250
<b>2016</b>	1671	1643	1699	2212	2164	2260
<b>2017</b>	1698	1670	1726	2345	2297	2394
<b>2018</b>	1717	1688	1746	2354	2305	2404
<b>widowed</b>						
<b>2013</b>	1639	1609	1669	2198	2104	2292
<b>2014</b>	1685	1654	1716	2322	2228	2415
<b>2015</b>	1710	1678	1742	2398	2303	2493
<b>2016</b>	1729	1695	1762	2453	2350	2555
<b>2017</b>	1774	1740	1808	2434	2326	2542
<b>2018</b>	1737	1702	1772	2323	2211	2435
<b>never married / single</b>						
<b>2013</b>	1487	1459	1514	1587	1548	1625
<b>2014</b>	1502	1475	1530	1607	1569	1644
<b>2015</b>	1540	1512	1567	1640	1602	1678
<b>2016</b>	1569	1541	1596	1668	1631	1705
<b>2017</b>	1610	1583	1637	1720	1683	1757
<b>2018</b>	1618	1591	1645	1739	1702	1776
<b>cohabiting</b>						
<b>2013</b>	1585	1560	1610	1949	1909	1989
<b>2014</b>	1550	1525	1575	1978	1938	2018
<b>2015</b>	1629	1603	1655	2054	2012	2096
<b>2016</b>	1674	1649	1700	2099	2059	2140
<b>2017</b>	1717	1692	1743	2146	2105	2187
<b>2018</b>	1749	1724	1775	2193	2152	2235

*Note:* Results rounded.

*Source:* Swedish registers; own calculations.

Figure A4.6: Predicted monthly public pension entitlement, by gender and family status over the years 2013-2018, Sweden



Source: Swedish registers; own calculations.

## Appendix List of individual papers and pre-publications

This cumulative dissertation includes a general introduction (Chapter 1) and three research papers (Chapters 2, 3, and 4).

Chapter 2 is co-authored with Anna-Karin Nylin.

- The paper is published as a pre-print in the Stockholm Research Reports in Demography and currently under review (revise & resubmit) in a scientific journal.
- Schmauk, S. & Nylin, A-K (2022): Mothers' earnings trajectories after separation in Sweden and western Germany. Stockholm Research Reports in Demography. Preprint.  
<https://doi.org/10.17045/sthlmuni.20066540.v1>

Chapter 3 is single-authored.

- It is currently under review (revise & resubmit) in a scientific journal.
- Schmauk, S. (2023): Retirement trajectories in West Germany: Does divorce matter? (under review)

Chapter 4 is co-authored with Linda Kridahl.

- It is currently under review (revise & resubmit) in a scientific journal.
- Schmauk, S. & Kridahl, L. (2023): Who receives most? Gendered consequences of divorce on public pension income in West Germany and Sweden. (under review)