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Late-career Risks in Changing Welfare States: Comparing Germany and the United States since the 1980s

Changing Welfare States

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Jan Paul Heisig

Late-career Risks in Changing Welfare States

Comparing Germany and the
United States since the 1980s

Amsterdam
University
Press

Late-career Risks in Changing Welfare States

Changing Welfare States

For quite some time, a key finding and theoretical puzzle in comparative welfare state research was welfare states' remarkable stability. In the last decade, however, it has become clear that advanced welfare states were (far) less immovable than they seemed at first. In fact, speaking of *changing welfare states* captures much better the actual reforms that were taking place. This series is about the trajectories of those changes. Have there been path-breaking welfare innovations or are the changes incremental instead? Are welfare states moving in a similar or even convergent direction, or are they embarking on divergent trajectories of change? What new policies have been added, by which kind of political actors, how, and with what consequences for competitiveness, employment, income equality and poverty, gender relations, human capital formation, or fiscal sustainability? What is the role of the European Union in shaping national welfare state reform?

This series answers these and related questions by studying the socioeconomic, institutional and political conditions for welfare state change, its governance, and its outcomes across a diverse set of policy areas. The policy areas can address traditional "old" social risks like old age, unemployment, sickness (including the health care system), disability and poverty and inequality in general, or "new" social risks that have arisen mainly due to post-industrialization, such as reconciling work and family life, non-standard employment, and low and inadequate skills. In addition to focusing on the welfare state more narrowly defined, the series also welcomes publication on related areas, such as the housing market. The overriding objective of the series is tracing and explaining the full trajectories of contemporary welfare state change and its outcomes.

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Comparing Germany and the United States since the 1980s

Jan Paul Heisig

Amsterdam University Press

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Berlin, December 2014
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Part I
Background

1 Introduction

Industrialized societies are undergoing dramatic demographic changes. As a result of growing life expectancy and low fertility rates, all countries are experiencing declines in the size of the working-age relative to the older population: The so-called 'elderly dependency ratio' is increasing. The consequences of these demographic changes extend far beyond the economic realm, but one of their most serious and best understood implications is that they threaten the solvency of public pay-as-you-go (PAYG) pension schemes. Potential labor shortages are another scenario troubling policymakers and employers alike.

Across industrialized countries, policymakers are therefore seeking to raise employment levels, and older workers in their 50s and 60s are one population group that is receiving considerable attention in this context. This is especially true in many Continental European countries which even until the 1990s actively promoted early retirement as a means of reducing labor supply and thereby unemployment (Kohli et al. 1991; Ebbinghaus 2006). While preventive policies such as health promotion and lifelong learning also have their place, at least in theory, cutbacks in (early) retirement benefits are a straightforward way of improving the sustainability of PAYG schemes. Lower retirement benefits not only directly reduce pension outlays; they should also induce individuals to postpone retirement and remain in the labor force, thereby increasing labor supply, tax revenue, and contributions to public insurance schemes.

Reforms intended to raise employment levels have not been confined to public pension schemes. Other key welfare state programs such as unemployment insurance and disability benefits also underwent major reforms in many advanced countries during recent decades, with the 'activation' of older workers and other groups such as single mothers and the long-term unemployed being a top priority. Generally speaking, this goal has been pursued through a combination of 'enabling' and 'demanding' policy changes (Eichhorst et al. 2008; Eichhorst and Konle-Seidel 2008): Enabling reforms include the expansion of active labor market policies such as training measures, policies facilitating the reconciliation of paid and care work, and instruments that seek to raise the net gain from working such as wage subsidies or negative income taxation. Examples of demanding reforms are the tightening of readiness-to-work requirements and suitability criteria or cuts in the level and duration of benefits.

One possible interpretation of these changes is that they reflect necessary and inevitable responses to demographic changes and other challenges

facing advanced economies. A second, less benign interpretation is that they form part of a more general trend toward a (re-)privatization of key life risks formerly covered by public provisions (Hacker 2006; Breen 1997; O'Rand 2011). In both the United States and Europe – and in academic circles as well as the general public – there is a widespread perception that workers and families are facing greater economic insecurity today than they did twenty or thirty years ago (Western et al. 2012; Lengfeld and Hirschle 2009) – and commentators on both sides of the Atlantic view changes in welfare state programs and their functional equivalents, in particular employer-based social protection, as one of the main causes of this increase in economic insecurity.

Especially in the United States, there is no shortage of bold and discomfiting claims about an alleged decline of social protection and its ramifications for income security. For example, in *The Great Risk Shift*, his widely read book on rising economic insecurity in the United States, Yale political scientist Jacob Hacker (2006: 6ff.) writes:

Insecurity today reaches across the income spectrum, across the racial divide, across lines of geography and gender [...] By the early 1970s, it [America's distinctive framework of economic protection, J.P.H.] worked tolerably well in insulating most middle-class Americans from the major financial risks of a capitalist economy. Today, however, it is falling apart under the weight of political attack and economic change [...] Through the cutback and restructuring of workplace benefits, employers are seeking to offload more and more of the risk once pooled under their auspices. Facing fiscal constraints and political opposition, public social programs have eroded even as the demands on them have risen.

Echoing that sentiment, Peter Gosselin (2009: 8) asserts:

[T]here is another more immediate cause for [...] insecurity [...]: an increase in the risk that Americans must bear as they provide for their families, pay for their houses, save for their retirement, and grab for the good life. The increased risk is the product of a shift of economic dangers from the broad shoulders of business and government [...] to the backs of working families. And the shift has not just affected the working poor and those in the great statistical middle, but has reached households long thought immune to dislocation [...].

Both passages contain at least three claims: First, economic insecurity has risen. Second, this rise in insecurity is not confined to lower strata or

low-income households but reaches well into the middle and perhaps even the upper classes. Third, the erosion of public and – particularly important in the American case – employer-provided income support and protection programs is a major cause of this trend towards heightened insecurity.

While there are no equally influential and widely read books describing such trends for Germany, similar claims are familiar from public as well as academic debates. Recently, Lengfeld and Hirschle (2009) noted a heightened sense of economic insecurity, especially among the middle classes, and a 2008 report by Grabka and Frick stirred considerable debate as to whether the German middle class was ‘shrinking’. In addition, there is a widespread perception that Germany’s system of social protection has become considerably less generous since the 1970s and 1980s, a perception that became even more prominent after the so-called ‘Hartz reforms’ of the early 2000s, but had been widely held already before that time. The following passage from Christoph Butterwegge’s (2006: 9) book on the German welfare state (translation J.P.H.) nicely illustrates this view:

A central thesis of this book is that the welfare state is being restructured and dismantled since the middle of the 1970s [...] the neoliberal turn brings with it the end of the welfare state known from the ‘old’ Federal Republic; however, a US-style society characterized by high performance and fierce competition is not a desirable alternative for the majority of the population.¹

Not only is this passage strikingly reminiscent of Hacker’s and Gosselin’s descriptions of welfare state change in the US, it also highlights the importance of the United States as a (dystopian) reference point in German and European social policy discourse. Thus, the term ‘Americanization’ is frequently invoked as a synonym for welfare state retrenchment or a ‘race to the bottom’ (Starke et al. 2008: 981; see also Alber 2010).

Against this background, this study seeks to contribute to a well-founded empirical assessment of these claims about the direction and implications of welfare state change. It does so by focusing on the situation of workers above age 50 in Germany and the United States during the 1980s, 1990s, and 2000s.

1 ‘Eine zentrale These des Buchs lautet, dass der Sozialstaat seit Mitte der 1970er-Jahre restrukturiert und demontiert wird [...] die neoliberale Wende [bringt] zwar das Ende des Wohlfahrtsstaates, wie ihn die “alte” Bundesrepublik kannte, mit sich; eine Hochleistungs-, Konkurrenz- und Ellbogengesellschaft nach US-amerikanischem Muster bietet aber für die Mehrheit der Bevölkerung keine erstrebenswerte Alternative.’

Older workers are a particularly interesting case because they are one of the groups who have arguably been most strongly affected by recent welfare state change: Besides changes in public PAYG pension schemes, reforms that have likely had a disproportionate effect on older workers include the retrenchment of long-term unemployment and disability benefits. In addition, the consequences of the shift from defined-benefit (DB) to defined-contribution (DC) plans as the predominant type of employer-provided pension plan in the US – a core element of the ‘Great Risk Shift’ according to Hacker and Gosselin – will be most directly felt by individuals near and beyond retirement age.

Recent decades have also seen rapid change in arenas other than social policy. Increasing mobility of capital and labor, rising internationalization of production, growing product market integration, and rapid technological progress are only some of the far-reaching changes that are sometimes subsumed under the umbrella term ‘globalization’ (Blossfeld et al. 2007a). In a comparative volume on *Globalization, Uncertainty and Late Careers in Society* Blossfeld et al. (2006) suggest that older workers are among the losers of accelerated structural change because employers may view ‘late-career employees as an increasingly expensive and inflexible burden’ (p. 3). This suggests a gloomy scenario where the labor market prospects of older workers deteriorate, while welfare state provisions that would formerly have alleviated their lot are being scaled back to promote longer working lives.

To explore the actual implications of these (alleged) trends for older workers, I will combine a detailed analysis of German-American differences and trends in key welfare state programs with an analysis of ‘how real lives are really lived’, as Goodin et al. (1999: 1) put it in their seminal book on the *Real Worlds of Welfare Capitalism*. In a first step, I will provide a thorough account of relevant welfare state provisions and employer-based social protection. Subsequent parts of the study will then use longitudinal data from the German Socio-Economic Panel (SOEP) and the American Panel Study of Income Dynamics (PSID) to investigate the financial consequences of two crucial ‘trigger events’ (DiPrete and McManus 2000): involuntary job loss and retirement in the sense of long-term exit from work.

In addition to current debates about economic insecurity and the direction of recent welfare state change, this study also speaks to broader questions about the relationship between (macro-level) institutions and individual life courses. Until the 1980s or even the 1990s, life course sociology was preoccupied with identifying secular and universal trends in overall life course patterns, as captured by the distinction among traditional, industrial, Fordist, and Post-Fordist life courses (Mayer 2005). Since then,

and due in part to the growing availability of longitudinal micro data, research has increasingly focused on the extent and institutional sources of variability beyond these highly stylized distinctions (e.g., Mayer 1997, 2005; DiPrete 2002; Leisering 2003; Diewald 2010). Much of this research, however, has analyzed midlife or early career trajectories such as the transition from school to work. Comparative research on the later life course has so far predominantly focused on the timing of retirement (e.g., Kohli et al. 1991; Maltby et al. 2004; Blossfeld et al. 2006; Schils 2008; Radl 2010). There is much less comparative research on the income trajectories of older workers and retirees, even though household income mobility undoubtedly is a crucial life course outcome (DiPrete 2002; Mayer 2005). This study directly addresses this research gap.

On a very general level, the primary research questions of this study can thus be summarized as follows:

1. How do the financial consequences of exit from work and late-career job loss differ between the United States and Germany?
2. Have the financial consequences of these events changed over time? In particular: Are they increasingly associated with declines in economic well-being?
3. To what extent can country and period differences be attributed to differences in welfare state provisions?

The remainder of this introduction is divided into three sections. In the next section, I further elaborate why I selected Germany and the United States as country cases. In Section 1.2, I sketch the rationale for studying the real-life consequences of (changing) welfare state arrangements by focusing on income mobility around potentially adverse life events. Section 1.3 concludes with a brief overview of the study.

1.1 Why compare Germany and the United States?

A primary reason for selecting Germany and the United States is that they are important and paradigmatic reference points in two of the most influential accounts of institutional variability across industrialized countries: the welfare regimes approach associated with the work of Gøsta Esping-Andersen (1990) and the varieties of capitalism (VOC) approach set out in an edited volume by Peter Hall and David Soskice (Hall and Soskice 2001b).

Welfare state scholars consider Germany the prime example of a conservative (or corporatist) welfare state. Conservative welfare states feature

high contribution-based and earnings-related public benefits that serve the goal of status maintenance (Esping-Andersen 1990). Labor markets tend to be regulated with relatively strong employment protection, which reduces labor market turnover and stabilizes careers, possibly resulting in a marked divide between 'labor market insiders' with secure jobs and 'outsiders' such as low-skilled workers or labor-market entrants and re-entrants (Blossfeld et al. 2007b; Gießelmann 2009).

The US, by contrast, epitomize the so-called liberal (or residual) welfare state that emphasizes individual responsibility. Public benefits tend to be meagre and of limited duration. They are often means-tested and/or restricted to certain ('deserving') population subgroups such as families with children or the disabled and the elderly. The flip side of limited public benefits is a greater salience of private and employer-provided benefits in pensions and health care. The labor market is relatively unregulated and turnover is high. Social services are even less developed than in the ideal typical conservative welfare state, but the private service sector is larger due to (downwardly) flexible wages and a large immigrant workforce.

While some authors have drawn on the VOC approach to explain country differences in systems of social protection (Estevez-Abe et al. 2001; Iversen 2005), it is primarily a typology of different production systems characterized by distinctive configurations of economic governance mechanisms, skill (and skill formation) regimes, and product market strategies. The basic distinction put forward by the VOC approach is between 'coordinated' and 'liberal' market economies – with Germany exemplifying the former and the US the latter type of economy. In fact, Germany and the United States are the two countries Hall and Soskice use to illustrate the coordinated-liberal distinction in their introduction to the 2001 volume (Hall and Soskice 2001a).

According to the VOC account, German firms pursue a strategy of incremental innovation or 'diversified quality production' (Sorge and Streeck 1988) that relies heavily on workers' industry/occupation as well as firm-specific skills. In this 'specific skills regime' both firms and workers have strong incentives to enter into long-term relationships: Because they are difficult and costly to replace, employers want to hold on to workers who are equipped with the necessary industry-, occupation-, and firm-specific skills. Well-matched workers, too, have high stakes in their jobs, as they allow them to reap the returns on their investment in non-portable skills. From this point of view, Germany's more generous early retirement or 'welfare-sustaining employment exit policies' (DiPrete et al. 1997: 328) are not simply the outcome of a stronger labor movement. They can also be seen as devices that 'allow firms that operate production regimes requiring

employee loyalty to release labor without violating implicit contracts' (Hall and Soskice 2001a: 50).

The typical American firm, by contrast, follows a strategy of 'radical innovation' (Hall and Soskice 2001a: 39) that relies more on general skills which are portable across firms and even industries. Labor market turnover is higher than in coordinated market economies. This may partly be due to lower levels of employment protection, but the VOC approach argues that there will also be less demand for such protection on the part of workers in liberal market economies, because greater emphasis on portable general skills makes job loss less costly.

The welfare regimes and VOC approaches have provided important cues for attempts to identify systematic cross-national variability in life course patterns (see, for example, Mayer 1997, 2005; DiPrete 2002; Diewald 2010) and according to Mayer (2005: 35) 'a plausible argument can be made that major institutions and a series of life course outcomes do in fact cluster to a considerable extent'. This study contributes to these ongoing debates about the identifiability of distinct life course regimes by focusing on one aspect of the life course that has so far received only limited attention – changes in economic well-being during the late career and at the transition to retirement – and by doing so in two countries that figure as important reference points in both the welfare regimes and VOC literatures.

Yet, while the findings of this study are certainly relevant to these debates, I opt for an in-depth comparison of two countries rather than a broader comparison of multiple countries from different regimes. This approach is in the spirit of Mayer (2005: 36) who opines that regime-style typologies are too coarse for 'establishing credible links' between institutions and individual life course outcomes and goes on to argue that there is 'no alternative than to resort to the level of particular countries and particular institutions' (*ibid.*). The implicit hope here is that intimate knowledge of institutional configurations – as opposed to abstract and stylized regime-style classifications – will shorten the 'inferential leap' involved in (causally) attributing country differences in life course outcomes to country differences in institutions. Equipped with such detailed institutional knowledge, a researcher may be able to rule out some explanations that are plausible from a welfare regimes perspective. In a related vein, Alber (2010) argues that at least some widely held beliefs about differences between the American and European welfare states turn out to be exaggerated when confronted with institutional realities.

It is also important to stress that in this study the country comparison is only one of two axes of comparison, the second being the within-country

comparison across time. As later parts of the study will show in more detail, Germany and the United States are interesting cases for such a within-country comparison because both countries have seen considerable, albeit quite different, changes in their systems of social protection over the last three decades. As Chapter 3 will explore in greater detail, public pension replacement rates in both countries have fallen modestly over the course of observation period. In Germany, a perhaps even more consequential development has been the retrenchment of generous early retirement options in the public pension pillar and their functional equivalents in other welfare state programs. As noted above, such programs are often seen as a key functional requirement of a labor market that emphasizes non-transferable skills and is characterized by marked occupational boundaries that constrain displaced older workers' opportunities for reemployment. This suggests the possibility of an 'institutional mismatch' where displaced older workers are faced with increasing pressures to return to work, while other institutional factors restrict their opportunities for actually doing so. In the United States, the most consequential changes have arguably occurred in the sphere of employer-provided pensions, where DB pension plans have increasingly been replaced by DC pension plans, which has shifted investment risks from employers to workers.

1.2 Why study income mobility around job loss and retirement?

There are many possible ways to study how the 'real lives' of citizens vary across countries and over time. The approach taken in this study is to examine how the income situation of workers and their families changes around two (potentially) adverse 'trigger events': late-career job loss and exit from work. This approach entails two general commitments: to focus on the *income situation* of individuals (as opposed to other outcomes such as subjective well-being) and to focus on *changes around major life events* (as opposed to, say, cross-sectional inequalities).

Disposable income is an interesting outcome because of its presumably close relationship to individual (economic) well-being, particularly if certain corrections are made for differences in household needs. As I will further discuss at the beginning of Chapter 2, there is a long-standing debate in social philosophy and welfare economics about the nature of individual welfare (or well-being). Even though many authors convincingly argue that well-being must ultimately be conceptualized in terms of ends that are

valuable in themselves (such as ‘utility’ or ‘capabilities’), few would dispute the claim that, at least in advanced economies, income is a crucial resource for achieving such ends.

For good reasons, income maintenance and prevention of income poverty are therefore typically seen as important objectives of welfare state policy (Goodin et al. 1999). Welfare states broadly construed do many things other than promoting income security (e.g., provide social services), yet programs whose primary function is to provide (partial) protection against the adverse economic consequences of ‘life course risks’ (DiPrete 2002) arguably form the core of the welfare state. Thus, many of the major welfare state programs operate on the ‘principle of causality’ (*Kausalprinzip*; Alber 1982: 27) whereby eligibility for a certain type of benefit is contingent on the occurrence of a specific life course risk. For example, unemployment benefits are intended to cover workers who have (involuntarily) lost their job. Other programs such as means-tested programs that provide basic income support are not clearly targeted at those who have experienced a specific event, but their contribution, too, may be most clearly visible after the occurrence of adverse events with the potential to trigger downward income mobility. In other words, welfare state programs are the prototypical set of ‘societal institutions’ that ‘mitigate the consequences of [...] events [with the potential to change a household’s life conditions]’ (DiPrete 2002: 267).

Job loss is a paradigmatic life course risk: It often strikes unexpectedly and is usually accompanied by an episode of unemployment without any labor income. In addition, research on so-called ‘scar effects’ suggests that earnings losses may persist long after reemployment (Arulampalam 2001; Gangl 2004a; Farber 2005). Retirement (in the sense of exit from work) is a more ambiguous event. It also entails economic risks, as it is associated with a decline in labor income. However, it is often a long-anticipated transition that households financially prepare for in various ways, some of them mandatory such as participation in public PAYG schemes, some of them voluntary such as most forms of individual or employer-subsidized saving. Given that retirement is often anticipated, it might be considered an abuse of terminology to call it a ‘risk’. Yet, as I will argue in more detail in later chapters, there are many reasons why public pension schemes and (the regulation of) second- and third-pillar pensions can be expected to influence how well-prepared different kinds of workers are for their retirement – and thus how their income situation changes in the course of that transition.

In addition, not all late careers unfold as planned. In particular, previous research suggests that retirement often occurs rather unexpectedly:

A non-negligible number of workers retire earlier than planned due to unforeseen adverse events, with job displacement and health problems being the primary triggers of such 'involuntary early retirement' (Szinovacz and Davey 2005; Lachance and Seligman 2010). The two events examined in this study – job loss and retirement in the sense of exit from work – are thus interrelated. I take this interrelationship into account by making a basic distinction between involuntary retirees who retire after suffering an involuntary job loss or a sudden decline in health and voluntary retirees whose retirement choices are not immediately constrained by these events. More concretely, my analysis of retirement will focus on income dynamics among voluntary retirees. The analysis of late-career job loss then complements this analysis by looking at employment/retirement and income trajectories around one crucial trigger of involuntary early retirement. Accounting for differences in control over retirement is crucial when it comes to assessing the consequences of recent welfare state change: Workers whose late careers are interrupted by job loss or health problems likely find it more difficult to comply with the new paradigm of late retirement than workers whose late careers run smoothly.

1.3 Overview of the study

The study consists of nine chapters, which are divided into four parts.

Part I places the study in the recent empirical literature on income mobility and develops a general analytical framework. It also provides a detailed account of relevant institutional differences between Germany and the United States and of recent changes in key welfare state programs. More specifically, Part I contains three chapters in addition to this introduction.

Chapter 2 begins with a discussion of the study's main outcome variable: household income mobility. I then situate my approach within the context of recent mobility research. Following DiPrete (2002) and others, I argue that the analysis of household income mobility around 'trigger events' is a promising approach for understanding how (changes in) welfare state provisions and institutional context more generally affect the lives of ordinary citizens. My review of the trigger events framework suggests three general questions to be addressed in the subsequent analysis: What are the key welfare state programs for cushioning the impact of retirement and late-career job loss and how have these programs changed over time? How do institutions shape the rates of counter-mobility conditional on the

occurrence of an event – for example, how do displaced older workers' reemployment chances differ between Germany and the US and over time? And: How does the scope for 'family buffering' through the incomes of other household members vary across countries and periods? The chapter concludes with a discussion of the relationship between late-career job loss and exit from work. As discussed above, I argue that it is sensible to adopt a basic distinction between voluntary retirees whose retirement choices are not constrained by job loss or the onset of health problems and between workers whose late careers are interrupted by these events, as the latter may find it more difficult to comply with the 'new paradigm' of late retirement.

Chapter 3 focuses on institutional factors that are relevant to the three questions identified in the previous chapter. I first discuss a set of interrelated factors (strength of labor market boundaries and employment protection legislation, continuing training participation, statistical age discrimination) that are often argued to influence the demand for older workers and the reemployment chances of displaced older workers in particular. My review suggests that the reemployment opportunities of displaced older workers are more limited in Germany. I then provide an in-depth analysis of German-American differences and recent trends in relevant welfare state programs. In addition to public and complementary pensions (i.e., employer-sponsored and individual private pensions), I examine earnings-related unemployment benefits and disability benefits, which often serve as temporary bridges for early retirees who are not yet eligible for standard retirement benefits. I also briefly discuss means-tested assistance/welfare benefits and progressive income taxation. I then explore country and period differences in household earnings arrangements that are likely to influence the extent of family buffering. The chapter concludes with a summary of key differences and trends in the two systems of social protection.

In **Chapter 4**, I describe my empirical approach for investigating the consequences of late-career job loss and voluntary retirement. I introduce the so-called counterfactual account of causality and discuss when and why the construction of an appropriate control or comparison group is essential for identifying the effect of an event. I argue that comparisons to a control group are not required for voluntary retirees because the relevant counterfactual is not well-defined, but that such comparisons are indispensable when investigating the impact of job loss. I also review difference-in-differences matching (DID matching) as a promising empirical strategy for identifying the effects of events and elaborate my own implementation of this approach. I conclude with a few essential technical details of empirical analysis.

Part II contains the empirical analysis of income mobility around retirement in the sense of exit from work.

Chapter 5 lays the ground for the empirical analysis of income dynamics around retirement. Drawing on research in psychology, behavioral economics, and sociology, I argue that – contrary to the predictions of neoclassical economics – even voluntary retirement may be associated with substantial declines in economic well-being. I then combine this account with the institutional information provided in Chapter 3 to formulate expectations for the empirical analysis. I conclude with a review of previous longitudinal research on income changes at retirement.

Chapter 6 confronts the hypotheses from Chapter 5 with an empirical analysis of income trajectories around exit from work. I examine average income changes relative to preretirement levels, the prevalence of poverty entries, and the proportion of workers with large declines in disposable income (i.e., declines of more than a third and more than half). I compare losses before and after taxes and transfer and changes in different income components to get a better sense of country and period differences in the importance of public and complementary pensions. The chapter concludes with an analysis of differences by level of education and retirement age.

Part III presents the empirical analysis of employment/retirement and income trajectories around late-career job loss.

Chapter 7 again prepares the empirical analysis. Based on standard theories of job search I provide a stylized account of how supply- and demand-side factors influence the likelihood that displaced older workers return to work. I then draw on the institutional information provided in Chapter 3 to formulate a set of hypotheses and research questions for the empirical analysis. The chapter concludes with a brief review of relevant previous research.

Chapter 8 provides an empirical analysis of employment patterns, income trajectories, and changes in spousal labor supply around late-career job loss. Throughout the chapter, I provide DID matching estimates of the impact of late-career job loss as well as simple non-differenced estimates of employment/income trajectories among displaced workers. I begin with an analysis of employment and income changes for displaced workers as a whole. I then analyze changes in spousal labor supply around late-career job loss and conclude with a disaggregated analysis that differentiates between ‘involuntary retirees’ who leave employment after late-career job loss and ‘returners’ who become reemployed.

Part IV consists of only one chapter, Chapter 9, which summarizes the main findings of the study and relates them to the research questions and broader debates highlighted above. I close with a short discussion of open questions and directions for future research.

2 Welfare state change and income mobility: a framework

The present study explores how two crucial life events – job loss and long-term exit from work or ‘retirement’ – affect the income situation of older workers ages 50 and above. One of my major goals is to understand how changing welfare state provisions in the US and Germany have cushioned (or failed to cushion) the financial consequences of these events. Like Goodin et al. (1999) in their seminal study on the *Real Worlds of Welfare Capitalism*, I seek to provide a clearer picture of ‘how real lives are really lived’ (p. 1) in the United States and Germany – and of how real lives have changed over time.

The objective of this chapter is to provide the general theoretical and conceptual background for the analysis. Based on this discussion, the next chapter will then take an in-depth look at the changing institutional contexts in Germany and the US. Chapters 5 and 7 will then draw on this information to formulate concrete hypotheses and research questions for the empirical analysis of income changes around retirement and job loss, respectively.

The present chapter is divided into three sections. Section 2.1 discusses and specifies the main outcome examined in this study: income mobility. I argue that needs-adjusted disposable income is a reasonable proxy for economic well-being, while also exploring a number of relevant limitations. Building on contributions by DiPrete (DiPrete and McManus 2000; DiPrete 2002) and others (e.g., Western et al. 2012), Section 2.2 then sketches a general framework for studying country and period differences in the economic consequences of life events. I argue that the study of income mobility around ‘trigger events’ is particularly well-suited for investigating the contribution of welfare state provisions to country and period differences in economic insecurity. This is because cushioning the impact of such events is the primary function of some of the most prominent welfare state programs and of their employer-based functional equivalents. However, the review also suggests two crucial additional factors that influence the (longer-term) consequences of trigger events: the opportunity structure for compensatory counter mobility and affected workers’ access to other private income sources including spousal earnings. Section 2.3 explores interrelationships between the two events examined in the study. I review research on involuntary early retirement and ‘pathways to retirement’ that has shown job loss and health problems to be important triggers of early retirement. I explain how these findings influence the design of the present study.

2.1 Income mobility: relevance, limitations, and empirical approaches

This section gives a brief discussion of the term ‘income mobility’. It establishes the overall relevance of this outcome, clarifies certain conceptual ambiguities and highlights a few crucial complications. The term ‘income’ refers to the amount of money received by a given unit (e.g., individual, household) over a fixed period of time (e.g., month, year). The term ‘income mobility’ simply refers to changes in the amount of money received by a given unit from one period t to another period $t + a$ (Fields and Ok 1999).¹

Individuals and households often receive income from multiple sources. For example, they may collect earnings from their own employment, income from assets (e.g., dividends), and public transfers such as old-age pensions or unemployment benefits. It is sometimes useful to disaggregate total income into its component parts, for example, in order to gauge the importance of welfare state transfers for individual income or to see how quickly the earnings of displaced workers recover. However, disposable (or post-government) income, that is, total income after taxes and transfers, occupies a special place in that it is arguably more closely related to individual economic welfare (or economic well-being²) than other income aggregates. In fact, a key assumption underlying this study is that a person’s level of needs-adjusted disposable income is a reasonable proxy for that person’s level of economic welfare.

This assumption entails, a), a restriction to *economic* (as opposed to overall) welfare and, b), the concession that income is only a *proxy* for, rather than a direct measure of, economic welfare. As for a), the question how overall well-being should be conceptualized is the subject of long-standing discussions in such diverse disciplines as philosophy, sociology, psychology, and economics, and it is beyond the scope of this study to review or enter this debate at length (see Nussbaum and Sen [1993] for a classic volume that offers a variety of perspectives). It is worth noting, however, that many influential positions in this debate assert that overall well-being cannot be defined solely in economic terms. For example, Allardt (1993) makes the famous claim that a satisfactory conceptualization of overall well-being must account for three fundamental and irreducible human needs that he

1 Throughout this study, I will focus on intragenerational income mobility where the receiving individual is the same in both t and $t + a$. I do not deal with intergenerational income mobility (see, e.g., Solon 2002), that is, changes in income from one (parental) generation to the next (filial) generation. For a recent comparison of intergenerational income mobility in Germany and the United States, see Schnitzlein (2012).

2 I will use the terms ‘welfare’ and ‘well-being’ interchangeably throughout this study.

refers to as ‘Having, Loving, and Being’. Only the first dimension, *Having*, refers to economic welfare or ‘material conditions’ (Allardt 1993: 89), while *Loving* stands for the need to relate to other people and to form social identities [... and ...] *Being* stands for the need for integration into society and to live in harmony with nature’ (Allardt 1993: 91; emphasis in original). Income may help buy food, shelter, and other goods, but may be of little use when it comes to forming true friendships or developing a sense of purpose in life.

However, even if we restrict our attention to the sphere of economic well-being, a person’s level of income can probably not be *equated* with that person’s level of economic well-being. This is the second issue identified above: Rather than being an end in itself, income is only a resource, though perhaps a crucial one, that helps people realize (economic) goals that are valuable in themselves. This is why a focus on income is sometimes referred to as a ‘resource approach’ to measuring economic well-being or poverty (Hauser 2008; Zaidi 2008).

Questions of income inequality and mobility receive considerable attention in both the academic and in the broader public sphere, suggesting that income is widely accepted as a crucial resource. At the same time, it is important to be aware of some issues that may complicate the link between disposable income and economic welfare, because this will be helpful in gauging potential limitations of the results reported in later chapters and in identifying questions to be addressed in complementary research. The following discussion therefore explores a few complications that are particularly relevant in the context of the present study.

It is useful to begin with the common view that the link between consumption and economic welfare is more direct than the link between income and economic welfare (while noting that consumption may still not be the same as economic welfare). Accepting this premise is sufficient for illustrating the issues that I have in mind, while allowing me to remain agnostic toward the question how economic well-being should ultimately be construed, a question that is no less contested than the definition of overall well-being. The idea that income is related to economic well-being via consumption is emphasized by Champernowne and Cowell (1999: 5) who conceptualize the relationship as follows:

income → consumption → economic welfare

In a related passage, Ringen (1991: 2) argues that to ‘measure welfare by income, we should measure the consumption people could have given

their income (potential consumption). The emphasis on potential rather than actual consumption can be rationalized as follows: If two people have identical opportunities for consumption, yet one of them freely chooses not to fully realize that potential, their level of economic welfare should nevertheless be considered equal.³

This perspective on the (indirect) relationship between income and economic welfare suggests that income is a better proxy for economic well-being when it is *tightly coupled* to (potential) consumption. Conversely, the relationship between income and economic welfare becomes more problematic when the income-consumption link is weak or when its strength varies across different types of individuals, across countries, or over time. I now address three specific issues that complicate the link between income and (potential) consumption: the unknown extent of income pooling within the household, differences in individual/household needs and non-discretionary expenses, and the possibility to finance consumption from savings.

The unknown extent of income pooling. A first issue has to do with the appropriate unit of analysis. In most cases, income mobility is analyzed on the level of the individual, because households are often not stable over time (Duncan and Hill 1985; Fachinger and Himmelreicher 2012). In addition, economic welfare is fundamentally an attribute of individuals. Yet complications arise because most individuals live in multi-person households and because the members of a given household can be expected to share their resources to some extent. The precise extent of sharing, however, is usually unknown. Empirical research almost uniformly makes the ‘full income pooling assumption’ according to which members of multi-person households fully pool their income or, equivalently, total household income is divided equally among all household members. Potential within-household differences in consumption chances are ignored.

Some empirical studies (e.g., Thomas 1990; Lundberg et al. 1997) have tested the pooling assumption empirically and found compelling evidence against it. For example, Lundberg et al. (1997) study changes in household demand after a reform of UK child allowances in the late 1970s which made ‘the mother [...] the sole direct recipient of the payment’ (p.467). Before the reform, fathers had usually received at least a portion of total child benefits. Changing the transfer recipient should have no effect on household demand

3 This emphasis on potential as opposed to actual outcomes is also prominent in the influential capability approach developed by Nussbaum and Sen (Nussbaum and Sen 1993; Sen 1999).

if the pooling assumption is correct, yet as Lundberg et al. (1997) show, household expenditure on women's and children's clothes rose relative to spending on men's clothes after the reform. While these and other studies convincingly refute full income pooling, they do, unfortunately, provide little guidance on how to improve on this assumption with the information available in typical survey data sets. This leaves applied researchers with little choice but to note the problem and continue to use the pooling assumption nonetheless. This study will be no exception in this regard. Fortunately, however, violations of the assumption are unlikely to introduce strong systematic biases into my analysis, because the majority of households can be expected to remain stable around my focal events. Violations of income pooling are a more pressing concern when events directly involve changes in household composition, as is the case with events such as separation/divorce (McManus and DiPrete 2001; Andreß et al. 2006; Radenacker 2011) or widowhood (Burkhauser et al. 2005).

Differences in needs and non-discretionary expenses. Another complication arises because individuals and households differ in their financial needs. Like most applied research, this study will use an 'equivalence scale' to adjust incomes for basic differences in household needs: By virtue of the income pooling assumption, members of the same household are treated as having the same effective level of income. The purpose of equivalence scales is to render comparisons more meaningful across households of different sizes and with different age structures. This is usually achieved by dividing total household income by a weight that depends on household size and frequently also on the age composition of household members. The first adult person in a household receives a weight of 1. For additional household members, the weight is increased (because feeding another mouth requires additional resources), but usually by a value smaller than 1 (to reflect household economies of scale, e.g., from sharing space or durables) (Ringen 1991, 1996). The 'equivalized' or 'needs-adjusted' household income of individuals living in multi-person households is therefore smaller than total household income, but greater than household income per capita, that is, per household member.

Typical equivalence scales are an effective step towards making comparisons of income more meaningful, but they ignore heterogeneity beyond household size and age composition. However, individual and household needs likely depend on numerous other characteristics. At least two factors with potentially important implications for household needs, health and employment status, are worth some discussion in the context of this study.

As for health status, health likely has an independent effect on well-being, but it also affects the level of income needed to achieve a given level of consumption or economic welfare (Zaidi 2008). Individuals suffering from medical conditions or disabilities will often incur disease-related expenses that leave them with less freely disposable income than healthier individuals (Zaidi and Burchardt 2005; Morciano et al. 2012). These individuals will therefore require a higher level of income to achieve the same level of economic welfare as an otherwise comparable non-disabled individual. The additional costs incurred by ill or disabled individuals likely not only depend on the severity of their condition (Morciano et al. 2012), but can also be expected to differ across countries and among population groups within one country, due to differences in the availability of compensatory cash or in-kind transfers. In particular, health care coverage is nearly universal in Germany and out-of-pocket expenditures are relatively low, whereas in the US coverage is incomplete and stratified by socioeconomic status, both in terms of coverage and quality of healthcare plans (Fronstin 2012). Americans with recognized disabilities and those aged 65 and older are eligible for the public health insurance program Medicare which certainly reduces German-American disparities compared to younger age groups; but Medicare deductibles and co-payments are comparatively high compared to German standards (Schulenburg and Greiner 2007).

Crystal et al. (2000) estimate that in 1995 the average Medicare beneficiary aged 65 or older spent 8.4% of total income on out-of-pocket expenditures (excluding expenses for external long-term care) and another 10.6% of total income on insurance premiums for (supplemental) health insurance. Importantly, they also find that these shares are substantially larger (at, respectively, 14.3 and 17.2%) for beneficiaries in the bottom quintile of the income distribution. For comparison, in Germany, maximum annual co-payments are capped at 2% of gross annual income (1% for persons with chronic conditions) for members of statutory health insurance (*Gesetzliche Krankenversicherung*) which covers between 80 and 90% of the population (Wörz 2011a). Expenditures exceeding this cap are fully covered by the insurer. The typical older worker or retiree in the US will thus spend a substantially larger portion of his/her income on health-related needs. Particularly for Americans with low incomes, health care costs may pose a substantial financial burden that is not captured by the income measures considered in this study.

Employment status is related to financial needs because employed individuals incur non-discretionary expenses that are more or less directly work-related. Important examples are expenses for travel, clothing, training,

restaurant meals, increased calorie intake because of physical activity, or domestic services such as daycare and cleaning (Hurst 2008; Battistin et al. 2009). Typically, retiring workers – as well as displaced workers reducing their labor supply – will therefore not only experience a decline in income, but also a concomitant drop of work-related expenses that partly offsets the former. Income losses around retirement (or job loss if the latter is followed by non-employment) may thus overstate its impact on economic welfare, as retirement goes hand in hand with a decline in work-related expenses. Unfortunately, few data sets contain enough information to obtain good estimates of the level of work-related expenses, and the ones used in this study are not among them. However, it seems unlikely that work-related expenses should differ strongly between the US and Germany.⁴

Many employees of course also enjoy work-related in-kind benefits such as a car or frequent flyer miles and, more importantly, classical fringe benefits such as health care or pension plan coverage. These fringe benefits are an important component of total compensation, especially in the United States. They are strongly positively correlated with monetary compensation so that inequality of total compensation is greater than inequality of earnings (Pierce 2001). This suggests that the loss of employer fringe benefits is an important element of the overall economic risks associated with job displacement in the American labor market, above and beyond direct earnings losses (see Gruber and Madrian [1997] for an empirical study of changes in health care coverage after job loss). In the case of retirement, loss of fringe benefits is less of an issue because individuals aged 65 (and permanently disabled persons below this age) are covered by the Medicare program and because retirees have reached the pay-out phase of their retirement plans. For Americans retiring before age 65, loss of fringe benefits may be an important economic factor, however.

Financing consumption from assets and savings. A third reason why the link between income and consumption chances may be imperfect is that individuals may draw on savings (or take-up debt) to finance their consumption. Thus, Milton Friedman's (1957) famous 'permanent income hypothesis' claims that consumption is only determined by long-term 'permanent' income and that the influence of short-term income fluctuations is essentially zero. In a Friedmanian world, individuals would save (or pay back debt) during periods with incomes above their long-term average and would

4 Childcare costs are higher in the United States due to lower levels of public involvement in pre-school daycare (Immervoll and Barber 2006), but they play a marginal role for older workers.

deplete their savings (or take-up debt) during periods of below-average income so as to smooth their level of consumption over the life cycle (see also Ando and Modigliani 1963).

While the idea of perfect consumption smoothing may seem suspect, savings from high-income episodes undoubtedly play an important role in maintaining consumption levels during low-income episodes. This is particularly obvious in the case of older workers, many of whom will possess considerable assets, which in turn will often have been accumulated, at least in part, with the explicit purpose of financing consumption in old age, that is, for planned retirement. Income changes around retirement may thus overstate the actual decline in economic well-being, as newly retired workers can often draw on savings to top up their retirement income.

Not taking household wealth into account may be more problematic in the United States, where private savings and housing wealth are more important for retirement preparation. A rare comparative study on household wealth after retirement age by Sierminska et al. (2007) confirms this intuition. Analyzing data from the Luxembourg Wealth Study, Sierminska et al. (2007) find that, compared to their German counterparts, American households with an elderly (65+) person as head or spouse are more likely to own their primary residence or to have liquid financial assets. However, the importance of liquid assets appears to be quite limited for the majority of households in both countries.⁵ Housing wealth is substantially greater than liquid assets in both countries, and as just noted it is greater in the United States where 83.3% of elderly households are homeowners, compared to only 53.6% in Germany. Conditional on owning their home, however, Germans are more likely to own it 'outright' (i.e., without associated debt) and the median worth of their homes is also higher.

A common empirical strategy for accounting for the shadow value of owning one's home, is to include 'imputed rent' – the rental value of owner-occupied housing minus ownership costs (including interest payments) – in the income measures (Frick and Grabka 2003). In theory, including imputed

5 According to Table 5 on p. 34 of their paper, 94.9% of American households with an elderly head/spouse have positive financial assets, compared to only 61.8% in Germany – a difference that is somewhat inflated because the German data do not record small wealth holdings. More importantly, Sierminska et al. (2007) estimate median financial wealth among those with positive assets (in \$ 2002) at a mere \$22,000 in both countries. Even though asset holdings just after retirement may be noticeably higher – because the sample of all elderly includes individuals who have been retired for many years and have already consumed a substantial portion of their savings – these figures suggest that liquid assets are of limited importance for the majority of households in both countries.

rent renders income comparisons between homeowners and non-owners more meaningful (Canberra Group 2001). In practice, much depends on the quality of the imputation. Unfortunately, exploratory analysis revealed that imputed rental values provided in the data sets used in this study show implausibly large year-to-year within-person variability.⁶ I therefore decided not to include them in the income measure.

To summarize, it is important to keep in mind that income-based estimates of changes in economic well-being may be exaggerated for workers with significant non-annuitized wealth, and that the omission of wealth may be somewhat more of a problem in the United States. At the same time, the results of Sierminska et al. (2007) suggest that liquid assets play a rather limited role in maintaining economic well-being for the majority of retirees in both countries (which is of course compatible with wealth playing a major role for a non-negligible minority).

The upshot of the above discussion may seem to be that focusing on consumption would, in principle, always be preferable to focusing on disposable income and that the latter approach is merely a second best that is dictated by the practical difficulty of ascertaining consumption levels.⁷ The rationale for analyzing consumption more directly may appear particularly compelling when dealing with the transition to retirement because of the potentially important role of non-annuitized retirement savings for maintaining consumption in old age. Recent research on the consequences of retirement in economics has indeed concentrated on changes in expenditure, which is usually considered to be a more immediate proxy for consumption than income (Hausman and Paquette 1987; Banks et al. 1998; Smith 2006; Battistin et al. 2009).

Yet, even ignoring practical issues of measurement, there are also reasons why changes in income around retirement may ultimately be as or even

6 For example, the standard deviation of two-year changes (i.e., between a given year t and another year $t + 2$) in log imputed rental value is 0.97 in the German and 0.70 in the American data. For comparison, the standard deviations of two-year changes in log individual labor income among workers aged 25-55 (which one would expect to be much larger) are 0.60 and 0.79, respectively. In both cases, I computed changes only for individuals with positive imputed rental value/labor earnings.

7 Take the example of food consumption. It certainly is a daunting task to elicit reliable information on the quality and quantity of food *consumed* during a given period. Researchers eager to capture levels of consumption more directly therefore usually have to rely on *expenditure* data (e.g., Banks et al. 1998; Smith 2006), which – while perhaps being a better proxy than disposable income – is clearly not the same as a direct measure of consumption (Aguiar and Hurst 2005).

more interesting than changes in consumption. As Burkhauser et al. (2009: 57) note with respect to the American context: 'The possibility of outliving one's assets is perhaps the most prominent risk affecting retirees'. A related concern is that many American retirees may be 'underannuitized', that is, too small a portion of their wealth is converted into annuities that provide annuitants (and often also potential survivors) with a reliable flow of income until their death, thereby providing insurance against the 'risk' of longevity (Diamond 2004; Diamond and Orszag 2005).

These considerations suggest two important points. First, they draw attention to the possibility that retirees may overconsume in the sense of depleting their assets faster than they can afford in the long run. Such overconsumption would seem to be most likely during the early years of retirement, because this is when anticipating one's future income needs is most difficult and perhaps also because of inertia in consumption patterns. Second, income changes around retirement can be expected to be a good proxy of how retirees' annuitized income, that is, those resources that are most secure in the longer run, compare to their preretirement income.

Of course, the most comprehensive approach to studying the short- and long-term consequences of retirement for economic well-being would be to jointly analyze changes in income and expenditure/consumption, while also accounting for housing wealth and other financial assets as well as differences in longevity. Unfortunately, such an approach is usually not feasible due to data restrictions and its sheer complexity. Changes in income, the subject of this study, may then ultimately be at least as relevant as changes in expenditure, despite the tendency of recent economic literature to focus on the latter outcome. At the same time, it is important to be aware of the above complications in order to identify potential biases and fruitful directions for complementary research.

So far, I have concentrated on the first component of the composite term 'income mobility', that is, I have discussed the rationale for, and potential pitfalls of, using income as a proxy for economic welfare. While I have sometimes used longitudinal examples for illustration, the aspect of mobility has not really been integral in the sense that most of the problems noted above are also relevant to cross-sectional analyses. For example, the question of health-related expenses is as relevant to cross-sectional comparisons between disabled and non-disabled persons as it is to studies that explore the consequences of *becoming* disabled. In the remainder of the section, I now focus more explicitly on the aspect of mobility and situate the present study within recent literature on intragenerational income mobility.

Different perspectives on income mobility

With the advent of large-scale household panel studies, research on income mobility has flourished. On a general level, one can distinguish between two major approaches to the analysis of income mobility (Western et al. 2012). The first seeks to quantify the overall level of income mobility (or ‘volatility’)⁸ in a population. This line of research is concerned with aggregate or ‘macro’ (Fields 2005) mobility. It addresses questions of the following kind: Does the overall extent of income mobility vary across countries or has it increased over time?

Just like cross-sectional inequality research uses Gini coefficients, decile ratios, or other indices to quantify inequality at a point in time, this literature uses transition matrices and derivative indices (Burkhauser and Poupore 1997), Shorrocks’ R (Shorrocks 1978), the Fields-Ok-index (Fields and Ok 1999), or yet other measures to quantify overall mobility levels. Fields (2005, 2010) provides insightful discussions of the macro mobility literature: He observes that different mobility measures operationalize different conceptions of income mobility, identifying a total of six alternative and irreducible mobility concepts. A systematic review of empirical research on aggregate income mobility is beyond the scope of this study. It is worth noting, however, that many studies conclude that the United States – albeit frequently characterized as the ‘land of opportunity’ – do not exhibit exceptional levels of (disposable) income mobility when compared with other developed countries, including Germany (Ayala and Sastre 2004; Gangl 2005). Other studies, however, seem to confirm the intuition that income mobility after taxes and transfers is greater in the US than in Germany (Fabig 1999; Rohde et al. 2010). Differences in underlying mobility concepts are one plausible explanation for these divergent results.

Research on aggregate mobility has undoubtedly produced important insights, but a thorough understanding of mobility patterns arguably requires that researchers more explicitly address the underlying micro-level processes. A second line of research therefore relates changes in income and economic well-being to ‘trigger events’ (DiPrete and McManus 2000;

8 These two commonly used terms – mobility and volatility – hint at a fundamental ambiguity characterizing the literature on (aggregate) income mobility. On the one hand, income mobility appears desirable because it reduces income inequality: Given similar levels of short-term income inequality, long-term income inequality will be lower when income mobility is higher (Shorrocks 1978). The term ‘volatility’, on the other hand, captures the negative perspective on income mobility: More mobility may also be experienced as greater economic insecurity. Gottschalk and Spolaore (2002) provide an illuminating formal discussion of this trade-off.

DiPrete 2002), supposedly influential changes in labor market position, household structure, or other life domains (Western et al. 2012). Studies commonly differentiate between positive life events such as taking up employment or being promoted and negative, adverse life events such as job loss or union dissolution. Motivated by a concern for social problems, many authors restrict their attention to the latter class of events. By analyzing income trajectories around retirement and late-career job loss, this study adopts this second event-focused approach to the study of income mobility.

The trigger events approach has been especially prominent in longitudinal poverty research (Western et al. 2012). Since Bane and Ellwood's (1986) landmark analysis of poverty dynamics in the US, numerous studies have investigated the events associated with poverty entries and exits, usually finding that employment-related events such as job loss and reemployment and family-related events such as separation and union formation are among the primary triggers of upward and downward mobility (see, for example, Stevens 1999; Oxley et al. 2000; Fouarge and Layte 2005; Valletta 2006; Vandecasteele 2010). Insofar as they are relevant to my research questions, I will review the substantive findings of these and similar studies in Chapters 5 and 7 where I summarize previous research on the financial consequences of late-career job loss and retirement. At this point, I simply want to contrast research on poverty dynamics which examines transitions with respect to a threshold value, the poverty line⁹, with another line of research that examines relative (and sometimes also absolute) changes with respect to the level of income before an event (DiPrete and McManus 2000; McManus and DiPrete 2001; Andreß et al. 2006). Many individuals experiencing an adverse life event such as job loss may incur substantial income losses yet remain above the poverty line, for example, because their pre-event income was relatively high and because earnings-related unemployment benefits are therefore sufficient to avoid poverty.

These two general approaches are evidently complementary in that they speak to different questions. I will take up both of them in the present study, that is, I will investigate both income changes relative to pre-event levels and risks of poverty entry. These two outcomes – relative income change and poverty risks – correspond to two different goals of social policy, namely, the goals of status maintenance and of poverty prevention. These outcomes would thus appear to be a particularly well-chosen pair for the

9 A few studies also define poverty in terms of receipt of means-tested assistance benefits which in some countries provide a (nearly) universal income floor (e.g., Leisering and Leibfried 2001).

present investigation: Comparative literature on welfare regimes views Germany as a paradigmatic example of the conservative-corporatist regime, which is often characterized as putting great emphasis on the goal of status maintenance (Esping-Andersen 1990: 75). In the words of Goodin et al. (1999: 55, emphasis in original): ‘The basic *goal* of corporatist welfare policy is security and stability.’ By contrast, the United States exemplify the liberal welfare regime which, having roots in pre-modern poor laws, concentrates on poverty alleviation: ‘[L]iberal social welfare policy aims merely to alleviate undeserved distress [...] The way that goal is operationalized in liberal welfare regimes is as the “alleviation of poverty”, at least for the “deserving poor”’ (Goodin et al. 1999: 45).

2.2 Income mobility around adverse life events – a framework

By focusing on the economic consequences of job loss and retirement this study adopts the ‘trigger events approach’ to studying income mobility. This decision is not accidental. It is based on the assumption that this approach carries great potential for illuminating how welfare state arrangements affect the economic well-being of citizens. This is because many, albeit not all, of the major welfare state programs operate on the ‘principle of causality’ (*Kausalprinzip*; Alber 1982: 27), whereby eligibility for a certain type of benefit is contingent on the occurrence of a specific ‘life course risk’ (Kohler et al. 2012a). For example, eligibility for (first-tier) unemployment benefits is generally restricted to workers who have (involuntarily) lost their job (and who meet further eligibility criteria; see Chapter 3). Other programs such as means-tested programs providing basic income support are less clearly targeted at those who have experienced a specific event, but their contribution, too, may be most clearly visible when adverse events trigger an unforeseen downward change in income trajectories.

Thomas DiPrete (2002) has perhaps made the most elaborate case that comparative stratification and life course research have much to gain from adopting the trigger events approach.¹⁰ DiPrete argues that comparative research on intragenerational mobility should analyze ‘cross-national variation in the extent to which societal institutions influence the rate of events with the potential to change a household’s life conditions [...], and

¹⁰ DiPrete’s arguments were partly already developed and applied in a joint paper with Patricia McManus (DiPrete and McManus 2000). For simplicity I will nevertheless refer to the framework as DiPrete’s throughout this study.

the extent to which they mitigate the consequences of these events through social insurance' (2002: 267).

On a general level, the question how 'the state', and institutions more broadly, shape individual life courses has certainly been a core theme of life course research for much longer (see Mayer and Schoepflin [1989] for a review of early research). However, much of the earlier literature focused on the role of the state in influencing the timing of events (e.g., by setting more or less binding age norms for transitions such as school entry or retirement) or, even more fundamentally, in defining social categories such as being a student, worker, or retiree (Mayer and Müller 1986; Mayer and Schoepflin 1989). Relatedly, Kohli (1985) emphasized the role of the state in shaping the modern tripartite life course with its characteristic sequence of full-time education (or 'preparation'), employment (or 'activity'), and retirement. The role of the welfare state in shaping household income mobility played practically no role in the research reviewed by Mayer and Schoepflin (1989), although they note towards the end of their article that 'the welfare state provides continuity over the life course by preventing sudden and steep income losses through health and unemployment' (Mayer and Schoepflin 1989: 203).¹¹

DiPrete is not the only scholar who has recently sought to direct attention towards this function of the welfare state: In a book chapter on 'Government and the Life Course', Leisering (2003: 211) identifies three 'core fields' of social policy: education, old-age pensions, and what he refers to as the 'system of risk management' by which he primarily means social insurance and assistance programs, but also in-kind transfers and publicly provided social and personal services. According to Leisering (2003: 213), '[t]he systems of risk management deserve close attention since this aspect of the welfare state has until recently been almost totally overlooked by students of the life course'. In his more recent writings on the possibility of identifying a small number of distinct life course regimes, Mayer (1997, 2001, 2005), too, assigns a central role to issues of income trajectories and income stability.

DiPrete's crucial contention is that it is possible to characterize national mobility regimes 'in terms of societal mechanisms that control the rate of potentially class-altering events [...] and those that mitigate their

11 Data availability likely was an important reason for the neglect of income dynamics, as longitudinal data available in the 1970s and 1980s were mostly based on retrospective interviews and due to recall problems contained no or only questionable information on income trajectories. Prospective panel data with high-quality income measures only became more widely available from the 1980s onwards.

socioeconomic consequences through some form of social insurance' (DiPrete 2002: 268). Employment protection legislation which affects overall levels of labor market turnover (OECD 1999) would be a paradigmatic example of a 'societal mechanism' or 'societal institution'¹² that primarily affects the incidence of events. Public transfer programs for the unemployed, disabled, or retired, on the other hand, epitomize the class of institutions whose primary function is to mitigate the consequences of trigger events. It is this hypothesized tight linkage between welfare state provisions and income mobility after (adverse) trigger events that motivates the design of the present study.

In practice, the distinction between rate-influencing and consequences-influencing institutions may be somewhat blurry, as the (expected) consequences of an event will influence the incentives for avoiding that event and for seeking compensatory countermobility conditional on its occurrence (cf. DiPrete 2002: 277f.). In particular, programs mitigating the consequences of adverse events might discourage individuals from avoiding them or from pursuing countermobility after their actual occurrence. It is this alleged 'incentive' or 'moral hazard' effect of social insurance programs (Barr 1992) that is at the root of long-standing criticisms of the welfare state as wasteful and inefficient (e.g., Feldstein 2005): Generous early retirement options may discourage older workers from participating in training to maintain their employability, provide incentives for leaving employment before the statutory retirement age (Gruber and Wise 1999), and can also be expected to influence job search and retirement decisions after late-career job loss (Maestas and Li 2006). The process of countermobility immediately suggests a differentiation between the short- and longer-term consequences of an event. The longer-term effects of an adverse event, while presumably still depending on social insurance and welfare state benefits, are also crucially influenced by 'a society's structure of *conditional* mobility, given a prior trigger event' (DiPrete and McManus 2000: 345; emphasis in original), that is, by the opportunities for countermobility, for example, through reemployment or remarriage.¹³ On average, subsequent (counter)mobility can be expected to reduce the immediate negative effects of an initial adverse life event, but

12 DiPrete uses the terms 'societal institutions' and 'societal mechanisms' interchangeably and so do I in this study.

13 DiPrete also conjectures that country differences in patterns of countermobility after the occurrence of an event might often be smaller than differences in the incidence of the original trigger event. For example, while rates of union dissolution are substantially lower in Germany than in the United States, rates of re-partnering conditional on having undergone a separation appear to be more similar (see DiPrete and McManus 2000: 365, Table 8).

it also seems possible that such an event sets in train a process of cumulative disadvantage (DiPrete and McManus 2000: 345; see also DiPrete and Eirich 2006). For example, one partner's job loss might create psychological stress that eventually results in union dissolution.

It is instructive to briefly review the critical assessment of traditional stratification research that motivates DiPrete's framework: '[S]tratifaction theory generally assumed that the family was the appropriate conceptual unit of stratification and that the class or status position of the family could be identified with the class position of the male breadwinner' (DiPrete 2002: 268f.). He identifies at least four problems with this approach: First, growing instability of households casts doubt on the practice of using the family or household as the unit of analysis. Individuals can no longer be expected to spend all or most of their lives with the same partner and changes in partnership status have become important trigger events in their own right. Researchers therefore should make the individual rather than the household their unit of analysis – although at any given point in time an individual's level of welfare will depend on his/her current family situation (cf. the discussion of income pooling in Section 2.1 above). Second, various developments such as economic globalization and technological change have weakened the link between occupational position and economic resources, thus undermining the argument that the former is a good proxy for long-term or 'permanent' income (for recent analyses of American trends in within- and between-occupation earnings inequality, see Kim and Sakamoto [2008] and Mouw and Kalleberg [2010]). Third, many households receive large parts of their income from public transfers, whose level, albeit sometimes related to former earnings, is less tightly coupled to occupational status than earnings. Fourth and last, increasing female labor force participation has resulted in a great diversity of earnings arrangements, ranging from traditional families with a single male breadwinner to dual career couples with two full-time earners. The presence of additional incomes in households with more than one earner has important consequences for the well-being of household members that cannot be captured by an approach that treats well-being as derivative of the main breadwinner's economic status.

The relationship between earnings arrangements and household income mobility warrants some further discussion. Hacker (2006) and others have suggested that the growing prevalence of multi-earner arrangements has ambiguous implications for overall levels of income volatility. On the one hand, households comprising a greater number of earners are more likely to experience any kind of income mobility due to an (adverse)

employment-related event such as job loss or a health-related reduction in work hours. It simply is more likely that at least one household member experiences job displacement when more household members work and are therefore 'at risk' of losing their job. This 'incidence effect' tends to raise income volatility. It is, however, counterbalanced by an 'insurance' or 'risk spreading effect': When the single breadwinner in a household with a traditional earnings arrangement becomes unemployed, total household earnings will temporarily drop to zero. In a dual-earner household where both partners have identical earnings, unemployment of one of the partners will result in a decrease of total household earnings by only 50 per cent. In direct analogy to the 'buffering' of income losses by welfare state transfers (DiPrete and McManus 2000), the presence of additional earners thus works as a type of 'family buffer' (Ehlert 2012). This is also recognized by Western et al. (2012: 352) who argue that 'the family itself should also be viewed as an informal risk-pooling organization that stabilizes welfare in the face of adverse events'.

The presence of additional household members also creates possibilities for a special form of countermobility that has been described as an 'added worker effect' (AWE) (Cullen and Gruber 2000; Stephens 2002; Coile 2004; McGinnity 2004). The simple idea of the AWE is that adverse events may be offset by *increases* in spousal labor supply. The AWE story emphasizes that besides spouses' actual earnings, further potential for family buffering stems from their not-yet-realized earnings capacities. Consider the wife of a man who suffers late-career job loss. A non-employed wife might take up employment, a part-time working wife might switch to full-time work, and a full-time working wife might take up a second job or delay retirement. All these scenarios are conceivable and should be considered instances of an AWE, even though empirically some may of course be more common than others.

The long-run risk of experiencing downward earnings mobility may also influence basic labor supply decisions in a more fundamental way. In a country with high risks of job displacement and/or low levels of income replacement for displaced workers the insurance function of multi-earner arrangements is more salient. Especially if opportunities for short-run AWE-type responses depend on the employment record of potential added workers – a long-term housewife may find it very difficult to find (well-paid) employment – couples would be well-advised not to opt for single-earner arrangements under such circumstances. By the same token, higher expected risks of divorce should also discourage specialization in unpaid domestic work (Mayer 1997).

As noted above, a substantial number of (comparative) empirical studies have applied the trigger events approach to the study of income mobility in recent years. This study contributes to this growing literature by taking a closer look at the special situation of older workers, who have so far received very little attention (for a similar assessment, see Buchholz et al. 2009: 4-5).¹⁴ Like most previous studies using the trigger events framework, I will primarily focus on the financial consequences of two key late-career events – job displacement and retirement in the sense of long-term labor force exit. I will not attempt to provide a systematic account of country and period differences in the incidence of these events. The focus on their consequences follows naturally from my interest in the changing influence of the welfare state on economic insecurity.

Compositional changes as a source of changes in the effects of events

While the overall or group-specific incidence of ‘trigger events’ is not a central concern of this study, this issue does warrant some further discussion. First, it is simply worth noting that, besides welfare state change, scholarly and public debates also mention the growing incidence of (adverse) life events as an important source of the purported trend toward greater economic insecurity: Alleged secular and pervasive increases in job and family instability are frequently seen as major causes of growing income volatility (Western et al. 2012). In many cases empirical research suggests that these trends are not as clear-cut and pervasive as many believe, often being confined to certain population subgroups (see, e.g., Martin [2011] for a study of family instability in the US and Giesecke and Heisig [2010] for an analysis of employment instability in Germany). Nevertheless, the contribution of changes in the incidence of trigger events to economic insecurity, while being beyond the scope of this analysis, is certainly worthy of further exploration.

A related issue that is directly relevant to the present study is that the typical consequences of a given trigger event may depend on who is exposed to it, that is, on the composition of affected individuals. Thus, Giesecke and Heisig (2010) find that, among (West) German prime-age workers, the risk of leaving employment has primarily risen for the low-skilled,

14 Many studies deliberately restrict their attention to mobility among prime age adults, that is, roughly to the age range 25 to 50 (DiPrete and McManus 2000; Ehlert 2012). Other studies do include older workers, but generally do not analyze older individuals separately (e.g., McManus and DiPrete 2001; Andreß et al. 2006; Dewilde and Uunk 2008; Vandecasteele 2010).

while American studies show no such polarization of job displacement (Boisjoly et al. 1998; Farber 2010).¹⁵ This suggests that in Germany rates of poverty entry after (late-career) job loss might have risen simply because job loss is increasingly concentrated among workers with low (near-poor) levels of income prior to job loss – and not because welfare state programs cushioning the effects of job loss have been dismantled. As another important example, secular increases in women’s labor force participation have likely resulted in recent female retirees having accumulated higher individual pension claims than earlier cohorts (Butrica et al. 2003; Isaacs 2010). For women, a (hypothetical) trend toward lower retirement income, for example, because of declining public replacement rates, might thus have been counteracted by increases in the continuity of women’s employment biographies.

As a robustness check on my findings and to better understand the processes behind actual trends, I will therefore generally compare actual trends in the consequences of my focal events with adjusted results that control for key compositional changes among affected workers. The technical details of my approach are explained in Chapter 4.

Returning to the primary focus of this study – how welfare state arrangements and institutional context more broadly shape the economic consequences of late-career job loss and retirement – the discussion in this section suggests three crucial questions that need to be addressed by the institutional synopsis in the next chapter – and by the subsequent analysis more generally. The first and most prominent question is:

What are the key welfare state programs cushioning the impact of retirement and late-career job loss on disposable income and how have these programs changed over time?

Given my interest in the implications of changing welfare state provisions for the lives of ordinary citizens, this question is clearly the most prominent. However, the above discussion also suggests that income mobility after

¹⁵ As education/skill differentials in the risk of job loss tend to be greater during recessions, the American trend might partly reflect more favorable macroeconomic conditions during the 1990s and, before the Great Recession, also the 2000s. In Germany, macroeconomic conditions might also partly account for the educational polarization of displacement risks, as they were, on average, less favorable in the 1990s and 2000s than in the 1980s. However, Giesecke and Heisig (2010) find that their trend estimates are robust for controlling for GDP growth and the overall unemployment rate.

an adverse event will not only depend on the availability of welfare state benefits, especially in the longer term. Particularly when dealing with an unexpected event such as involuntary job loss, the longer-term implications for economic well-being also depend on the opportunities for compensatory countermobility (while noting that welfare state benefits may also affect the incentives for actually pursuing such countermobility). As I discuss further in the next section, the importance of opportunities for countermobility is less clear when dealing with a foreseeable and often long-anticipated transition such as (voluntary) retirement. Ignoring these complications for the moment, another important question highlighted by the above discussion is:

How do institutions affect the opportunity structure for countermobility conditional on the occurrence of an event? For example, how do the reemployment prospects of displaced older workers differ between Germany and the US as well as over time?

In keeping with my main research questions, I will follow DiPrete (2002) as well as comparative life course research more broadly (e.g., Mayer 2005) and focus on the role of (relatively stable) institutional factors in shaping the 'structure of countermobility'. However, it should not be overlooked that at any given point in time the opportunities for countermobility likely depend crucially on macroeconomic and labor market conditions, which I will therefore briefly discuss at the beginning of the next chapter.

Finally, the above discussion also draws attention to the potential salience of other household members' incomes in alleviating the consequences of adverse late-career events. Again, this is more clearly relevant in the context of unexpected adverse events and – just like the responses of affected workers themselves – spousal labor supply responses are likely endogenous to institutional variables, including the availability of welfare state benefits. In any case, a final question to be addressed in the next and subsequent chapters is:

How do earnings arrangements (single vs. multiple earners) vary across countries and periods and what is the likely scope of added-worker-type processes conditional on the occurrence of a given life event?

Before addressing these questions, however, it is useful to say a few words about, and discuss possible interrelationships among, the two trigger events examined in this study.

2.3 The focal events: job loss and retirement

In Parts II and III, I will investigate period and country differences in the economic consequences of retirement and job loss among workers aged 50 and older. Details on operationalization are provided in later chapters, but a somewhat more precise definition of these events is useful at this point: By ‘job loss’ – or ‘(job) displacement’ – I generally mean separations that are due to factors beyond a worker’s immediate control. In particular, I will look at separations due to business closure, being fired, and the termination of a fixed-term contract if the latter is accompanied by at least one month of unemployment. I define retirement as long-term exit from employment after age 50. It is also worth noting that I will focus on medium-term changes from 1 or 2 years before the event until 4 or 5 years after the event.¹⁶ As indicated by my deliberate use of the term ‘worker’, I will generally restrict the analysis to people who work a substantial number of hours before the occurrence of the focal events. This is because I concentrate on one important channel through which these events affect the economic situation of workers and their family members: the decline of labor income which they (may) bring about. As discussed in Section 2.1 above, job loss and retirement may also affect workers’ economic well-being through other channels but unfortunately my data are not well-suited for investigating these additional pathways.

Previous research shows that job loss and retirement are interrelated. In particular, job displacement is an important trigger of involuntary early retirement (Szinovacz and Davey 2005; Lachance and Seligman 2010). In an analysis of data from the Health and Retirement Survey (HRS), Lachance and Seligman (2010: 40) report that 10.7% of self-classified involuntary retirees say that their last job ended because the business closed and 20.3% say that they were ‘laid off’ or ‘let go’. Health problems are the second major factor mentioned by involuntary retirees: 43.1% cite poor health or disability as a reason for leaving their last job.¹⁷ Sociological research within the

16 The main reason for not considering longer-term changes is that meaningful comparisons across different event periods would no longer be feasible because of sample attrition and the obvious fact that a given event must have occurred at least a year before the last year of data for a worker’s income a year after the event to be observed. See Hungerford (2003) for a German-American comparison of longer-term income trends after retirement.

17 Respondents could give multiple reasons so there may be some overlap among those categories. For comparison, ‘family care’, the next most important reason that captures a substantively interesting potential trigger of involuntary retirement, is mentioned by only 3.8% of involuntary retirees (26.3% say that they ‘retired’ and 7% that they ‘quit’).

'pathways to retirement' paradigm further underlines the importance of unemployment and health for early retirement (see, for example, Kohli and Rein 1991; Ebbinghaus 2006; Fasang 2008; Radl 2010).

Given my interest in the economic consequences of retirement, an important result reached by several studies is that the impact of retirement on economic well-being is more severe if it can be characterized as involuntary, either on the basis of self-perceptions (Szinovacz and Davey 2005; Lachance and Seligman 2010; Chiang 2012) or the occurrence of unemployment, job loss, or health shocks before retirement (Hausman and Paquette 1987; Smith 2006; Barrett and Brzozowski 2010). In fact, neoclassical life-cycle and permanent income models (Friedman 1957; Ando and Modigliani 1963) even yield the result that voluntary or anticipated retirement should have no effect at all on economic well-being. In a similar vein, Western et al. (2012: 345) suggest that when 'changes in income are produced voluntarily, such as through planned retirement, they cannot be characterized as unexpected or a source of insecurity. To assess the extent of involuntary income losses, additional information must be enlisted on, say, layoffs, disability, or other shocks'. While Chapter 5 will discuss several reasons why even voluntary retirement may be associated with declines in economic welfare, these considerations do suggest that it is crucial to account for differences in the level of individual control over retirement. When analyzing income trajectories around retirement in Part II, I will therefore differentiate between voluntary and involuntary retirement on the basis of whether it was preceded by involuntary job loss and/or a 'health shock', that is, an abrupt decline in health (see Barrett and Brzozowski [2010] for a similar approach).

Importantly, workers with high and low levels of control over retirement are likely affected differently by country or period differences in welfare state arrangements. As an example, assume that public policy seeks to promote later retirement by raising the financial penalties for retiring early (which, as further explored in Chapter 3, has actually been the case in the US and particularly in Germany during the last two decades). It seems reasonable to expect that these reforms have been more consequential for workers whose late careers are interrupted by job displacement or the onset of health problems (cf. Bäcker et al. 2009; Kingson and Morrissey 2012): Workers experiencing smooth and stable late careers can quite easily respond to changed financial incentives by delaying their retirement. By contrast, older workers who experience a job loss are faced with a decision between retiring earlier than planned and becoming reemployed, possibly at a much lower wage than they earned before displacement. Other things being equal, raising the costs of early retirement should have two

effects: First, fewer older workers should retire and more workers should seek reemployment. Second, conditional on each path (i.e., retirement vs. reemployment), displaced older workers should be worse off when early retirement is more costly – retirees because they receive lower benefits and reemployed workers because lower retirement benefits will induce them to accept lower wages. On average, however, displaced older workers may still be better off if reemployed workers fare better than retiring workers; and of course *ceteris paribus* conditions may fail to hold in practice. Workers' opportunities for countermobility might improve because of changes in labor market conditions or because employers begin to view older workers more favorably as early retirement becomes less common.

This brief discussion of the decision facing displaced older workers highlights a simple, yet important fact: Involuntary retirement will usually not be inevitable. It certainly is appropriate to characterize an older worker who does not return to work after losing her job as having retired involuntarily, because she would presumably have retired at a later point in time if the job loss had not occurred. At the same time, most workers experiencing late-career job loss and, unless impairments are severe, also those suffering from health problems retain some degree of control over whether to retire or seek reemployment. In other words, they are faced with a basic choice between a retirement/benefit path and a work path (Burkhauser and Daly 2002). By affecting the demand for older workers and the financial attractiveness of early retirement, contextual factors will influence the likelihood that a given worker ends up on one path or the other: In a country where demand for older workers is low and where early retirement policies are generous, workers will be more likely to retire after late-career job loss than in a country where their labor market prospects are better and where income support programs are limited. More generally, retirement patterns after late-career job loss depend on the opportunities and incentives for returning to work. Simply looking at those who retire (involuntarily) after late-career job loss would thus be 'unfair' toward a country that provides meagre early retirement benefits, but is good at reintegrating displaced older workers into the labor market.

Rather than simply compare voluntary and involuntary retirees, I will therefore proceed as follows: In my analysis of income trajectories around retirement in Part II, I will focus on those exits that can be credibly characterized as voluntary in the sense of not being preceded by job loss or declines in health (even though I will also provide key results for involuntary retirees). In Part III of this study, I will then examine employment and income trajectories around one primary trigger of involuntary early retirement:

late-career job loss. An obvious extension would be to explore the impact of health problems on the retirement and income trajectories of older workers, but because of space limitations I will leave this to future research.

This discussion of voluntary and involuntary retirement may also have clarified why issues of countermobility, family buffering, and spousal labor supply responses are more salient in the context of late-career job loss. Job loss is an unexpected adverse event that will usually entail what economists refer to as a negative shock to lifetime income. It is reasonable to expect that affected workers and their families will try to cope with such a shock as best they can. By contrast, it is slightly odd to ask how families cope with the economic consequences of voluntary retirement. It is of course conceivable that some voluntary retirees quickly learn that their retirement income is lower or that their financial needs are greater than expected. These and other factors may eventually induce them to 'unretire' or trigger changes in the labor supply of spouses. Importantly, however, using the HRS, Maestas (2010) finds that the majority of unretirement events in the US are anticipated prior to the initial retirement event, which she interprets as evidence that unanticipated financial problems cannot be the primary motivation for unretirement. In addition, findings by Maestas and Li (2007) indicate that 'burnout' due to high levels of work-related stress may be an important trigger of temporary retirement, that is, retirement followed by (planned) unretirement. Unretirement thus seems to be more likely to occur when the initial retirement is involuntary in the sense outlined above, which further supports the idea that the issue of countermobility need not be a primary concern when dealing with voluntary retirement.

3 Institutional context and social policy change

In the last chapter, I highlighted the potential of the trigger events perspective for understanding the real-life implications of welfare state provisions. My review of recent mobility research suggests that three factors are crucial in shaping income trajectories around adverse trigger events: institutions that cushion the financial consequences of adverse events such as welfare state programs; the opportunity structure for compensatory countermobility; and family insurance provided by the actual income and earnings potential of other household members. So far, I have only discussed these three factors in very general terms. This chapter provides a more concrete account of relevant differences between the US and Germany and of changes between the 1980s and early 2000s.

The chapter is structured as follows. Section 3.1 summarizes overall macroeconomic conditions during the observation period. Section 3.2 then sets the stage for the discussion of institutional factors by documenting marked and well-known German-American differences in the employment rates of people in their 50s and 60s: Previous research suggests that these divergent patterns cannot simply be attributed to overall labor market conditions. It convincingly argues that they are at least partly due to mutually reinforcing institutional differences that affect both the demand for and labor supply of older workers. Sections 3.3 and 3.4 take a closer look at these differences, Section 3.3 concentrates on differences that should primarily affect the demand for older workers such as differences in skill/production regimes and the strength of labor market boundaries, in continuing training participation, and in the prevalence of (statistical) age discrimination. The predominant supply-side factor stressed in the literature is the availability of early retirement benefits and other welfare state transfers that make early exit from work financially viable or even attractive. I discuss these arrangements and their employer-based functional equivalents in Section 3.4. As my primary goal in this study is to better understand the implications of changing welfare state arrangements for ordinary citizens, I will examine these regulations in particular detail. Section 3.5 explores differences in earnings arrangements which influence the extent to which the impact of adverse events is buffered by spousal income. Section 3.6 summarizes and concludes.

3.1 Macroeconomic context

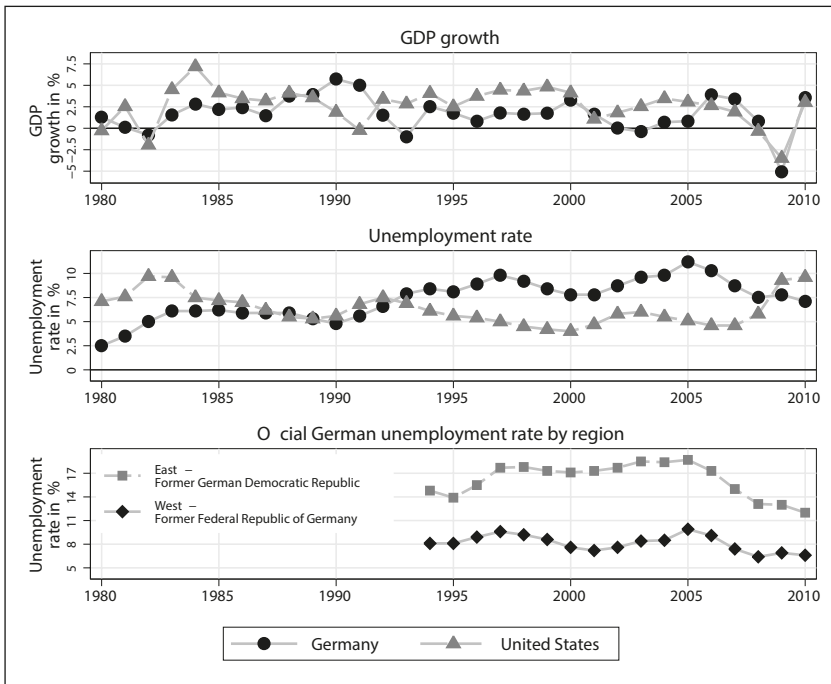
As I will discuss below, Germany and the US are characterized by marked institutional differences that likely affect the (re)employment prospects of older workers in systematic ways. However, these prospects can also depend on overall labor market conditions. Macroeconomic conditions may influence the consequences of retirement or job loss also through other channels, for example, by affecting the growth rate of private retirement savings (Burtless 2003; Wolff 2011). It will not be possible to unambiguously disentangle the role of macroeconomic context from that of other (institutional) variables in the empirical analysis. Some background information on macroeconomic conditions is nevertheless indispensable for an informed interpretation of the results presented in later chapters.

Figure 3.1 depicts annual GDP growth (upper graph) and harmonized unemployment rates (middle graph) for the US and Germany (West Germany/Federal Republic until 1990; all of Germany thereafter). The bottom graph shows official unemployment rates for East and West Germany, that is, the former German Democratic Republic and the former Federal Republic of Germany.

German-American differences are especially clear for the unemployment rate, which exhibits greater year-to-year stability (I will not discuss GDP growth explicitly, as this indicator leads to very similar conclusions). The (West) German unemployment rate was lower than the American through most of the 1980s. Toward the end of that decade, both countries had very similar unemployment rates in the neighborhood of 5%. In both countries, unemployment rose during the early 1990s. In the US the increase was the result of a 'normal' recession, and the unemployment declined steadily after 1992, remaining relatively low (and certainly far lower than in Germany) until the 'Great Recession' of the late 2000s. The German case looks very different. Here, 1990 marked the beginning of a more persistent increase in the unemployment rate that brought the latter up to a value of approximately 10% in 1997. After a noticeable decline around the year 2000, the unemployment rate climbed again, reaching a new high in 2005. Since then it has declined substantially and did not increase much during the economic crisis of the late 2000s, a fact that has received much attention recently (see, e.g., Burda and Hunt 2011). In fact, the years 2009 and 2010 were the first years since 1992 when the German unemployment rate was lower than the American.

The bottom graph shows that the increase in the German unemployment rate during the 1990s is closely related to German reunification.

Figure 3.1 Macroeconomic context: GDP growth and unemployment rate



Sources: GDP growth: International Monetary Fund, World Economic Outlook Database (<http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx>); unemployment rate: OECD Stat Extracts (<http://stats.oecd.org/>); official unemployment rate by region: Bundesagentur für Arbeit as provided by Statistisches Bundesamt (<http://www-genesis.destatis.de/genesis/online>).

Unemployment in East Germany rose massively in the course of the transition and has remained far above West German levels ever since.

Over the observation period of this study, macroeconomic conditions were thus more favorable in the US, especially since the most recent recession is not covered by the American data which are only available until 2004/05. Perhaps more importantly, trends over time differed between the two countries. In the US, the institutional changes discussed below occurred in a context of improving labor market conditions: The average American unemployment rate was 7.1% during the years 1981-1990 and only 5.6% during the years 1991-2000. By contrast, the average German unemployment rate during the 1980s was 5.2%, compared to an average rate of 8.1% in the 1990s. These differences in overall macroeconomic context are important to keep in mind when interpreting the results presented in later chapters.

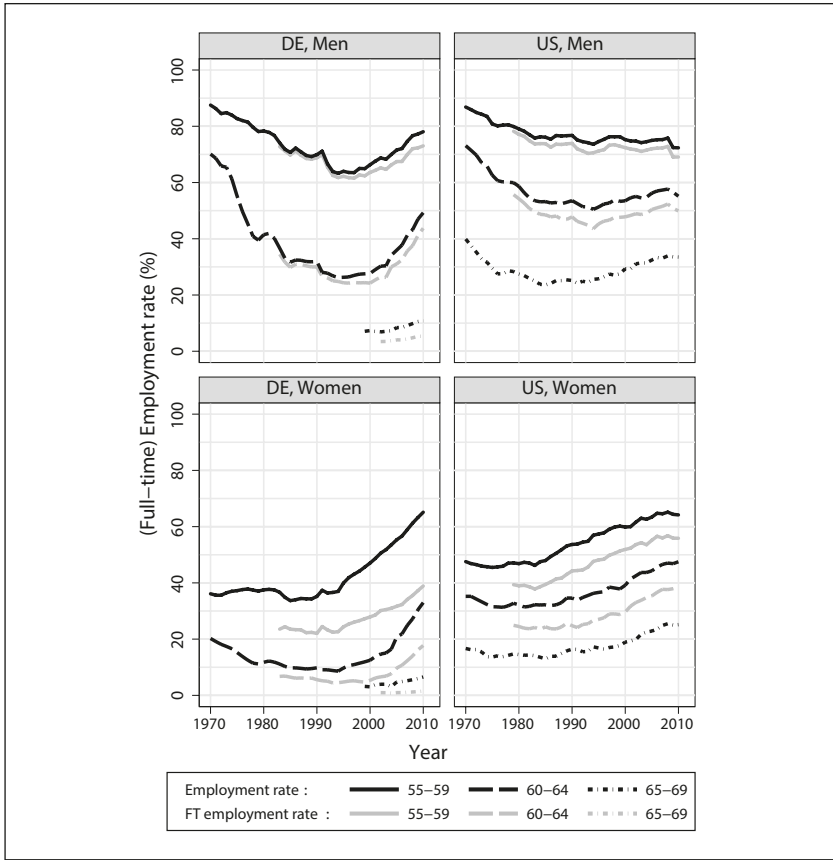
3.2 Differences and trends in the employment levels of older people

Figure 3.2 depicts overall and full-time employment rates of German and American men and women in their late 50s and 60s from 1970 to 2010. It illustrates three important 'stylized facts'. First, employment rates of older American and German men fell substantially during the 1970s and 1980s, as in most other industrialized countries (e.g., Blöndal and Scarpetta 1999; Ebbinghaus 2006). This trend was more dramatic in Germany than in the US. Due to secular increases in labor market attachment, the picture is more ambiguous for women. However, once cohort differences in overall labor force participation are taken into account, women too can be shown to have left employment at ever younger ages during the 1970s and 1980s (Ebbinghaus 2006: 7-8).

Second, and relatedly, older Germans were much less likely to work than their American counterparts throughout the 1980s and 1990s. Among men, differences were noticeable at ages 55-59, yet even more pronounced at ages 60 and above. During the 1990s, barely more than a fourth of German men aged 60-64 worked for pay, compared to over 50% of their American counterparts. Despite slight increases in recent years (data are available only from the late 1990s onward), work after age 65 remains a marginal phenomenon among German men. The employment rate of American men ages 65-69 was considerably higher throughout the period from 1970 to 2010, exceeding 20% in all years. It is worth noting that in 1970, before the trend toward earlier retirement took off, employment rates of German and American men had been quite similar. In that respect, the picture is different for women. As with older men, German women were less likely than American women to work during the 1980s and 1990s. A noticeable difference, however, existed already in 1970, attesting to long-standing German-American differences in female labor supply. It is beyond the scope of this study to explain these differences in female labor force participation (for further discussion, see Lewis [1992]; Jaumotte [2003]; Pettit and Hook [2005], among many others), but I will revisit them when discussing country differences in earnings arrangements in Section 3.5.

A third and last result apparent from Figure 3.2 is that the trend toward earlier retirement has recently been reversed in both countries and for women as well as for men. Among men, the reversal started in the mid-to late 1990s. The increase in employment rates has been much more pronounced in Germany, where prior declines had also been stronger. However, American men's employment rates have also increased noticeably, especially at ages 60

Figure 3.2 Employment rates by gender and age



FT = Full-time. German data for age group 65-69 only available from 1999 onwards. Data on full-time employment rates missing for early years in both countries and missing completely for 65-69 age group in the United States.

Source: OECD Labour Force Statistics (<http://stats.oecd.org/>)

and above. Given broader trends toward increased labor market attachment, older women’s employment rates have risen more strongly, and for American women ages 55-59 employment rates began to trend upward already in the 1980s. Finally, for German women, full-time employment rates (depicted by the lighter lines) have increased much less than overall employment rates.

How can these country and period differences in the labor supply of older people be explained? There is widespread agreement that they cannot simply be attributed to differences in overall labor market conditions. One tremendously influential perspective, articulated most forcefully in the

economic literature on early retirement, emphasizes financial incentives. According to this view, differences in the financial incentives provided by public pension programs go a long way toward explaining patterns in Figure 3.2 (Blöndal and Scarpetta 1999; Gruber and Wise 1999, 2004b; Duval 2003). This literature argues that public pension systems often impose an ‘implicit tax’ on the earnings of older workers: Most public pension programs grant workers some discretion concerning the age when they claim retirement benefits. Claiming benefits earlier will usually result in lower monthly benefits to account for the fact that benefits will be collected for a longer period of time. Often, however, benefit adjustments are quite small so that delaying benefit take-up reduces expected lifetime benefits or, more precisely, so-called ‘Social Security Wealth’ (ssw), that is, ‘the expected present discounted value of promised future social security benefits’ (Gruber and Wise 2004a: 6). It is this reduction in expected lifetime benefits due to delayed benefit take-up that can be considered an implicit tax. Benefit adjustments that are just large enough to preserve the value of expected benefits are referred to as ‘actuarially neutral’ or ‘actuarially fair’.

This literature has amassed considerable evidence that financial incentives for early retirement in public pension programs and other public transfer programs are an important source of country and period differences in older workers’ labor supply (Gruber and Wise 1999, 2004b). Indeed, there can be little doubt that Germany sustained more generous early retirement provisions than the United States throughout the observation period, as I will explore in greater detail in Section 3.4.

Sociological and gerontological research on early retirement generally appears to have accepted that financial incentives are important in shaping retirement timing. Yet, research in these disciplines has also been crucial in developing richer accounts of retirement behavior, both on the micro level of decision-making and on the macro level of institutional context. On the micro level, one of the most crucial contributions has been to direct attention to the role of ‘push factors’ such as health problems or job loss in the process of retirement (see, e.g., Guillemard and Rein 1993; Shultz et al. 1998; Szinovacz and Davey 2005; Radl 2007, 2012a), as already noted in the discussion voluntary vs. involuntary retirement at the end of Chapter 2.

As for the macro level of pension policy, a key insight is that early retirement policies can be seen as distinct, path-dependent responses to common challenges (to macro-level push factors in a sense): the economic (oil) crises of the 1970s, accelerated sectoral and technological change, and economic globalization (Ebbinghaus 2001, 2006; Buchholz et al. 2006; Hofäcker 2010; Buchholz et al. 2011). An important motive for implementing

early retirement policies was to reduce overall labor supply during times of mass unemployment, in the hope that this would open up job opportunities for younger workers without endangering social peace (e.g., Ebbinghaus 2001, 2006). The prevailing view now is that early retirement policies did not actually have this desired effect (Kalwij et al. 2009; Börsch-Supan and Schnabel 2010; Gruber and Wise 2010).

To a considerable extent, the economic and technological pressures noted above were and still are common to all industrialized countries. Why then did some countries (such as Germany) put much greater emphasis on early retirement in their responses to these challenges than others (such as the United States)? I will not attempt to provide a comprehensive answer to that question because my primary aim is not to explain country differences and changes in pension policy (see Ebbinghaus [2001, 2006] for a seminal effort that elucidates how complex interactions among public authorities, employers, and workers shape retirement policy). Given my overarching interest in the economic well-being of older workers, I will primarily focus on one general reason why there may be a greater need (and electoral demand) for early retirement policies in the German context: the relatively low demand for older workers.

3.3 Institutional context and the (re)employment prospects of older workers

This section discusses crucial institutional differences between the United States and Germany that are often argued to affect the demand for older workers. These differences are most obviously relevant to the present study because they affect the reemployment prospects of displaced older workers, that is, the prospects for compensatory countermobility after late-career job loss. This is not to say, however, that these factors are unrelated to the retirement and income trajectories of workers who enjoy smooth late careers. For example, low rates of continuing training participation (see below) may exacerbate the problem that the skills of older workers are (perceived as) obsolescent. This in turn may induce employers to promote (voluntary) early retirement of their employees by offering 'golden handshakes' in the form of severance pay (Eichhorst 2008) and to advocate public early retirement policies in an effort to externalize the costs of workforce restructuring (Ebbinghaus 2006).

Buchholz et al. (2006, 2011) argue that economic globalization and accelerated technological change have negatively affected the labor market

situation of older workers. Technological and sectoral change requires firms to update the skill profiles of their work forces and lead to overall increases in labor market turnover. This may substantially lower the attractiveness of older workers as their skills and qualifications are more likely to be outdated and because retraining efforts may be too costly given their imminent retirement (Ebbinghaus 2006: 30f.). This problem may be exacerbated by the fact that older workers often receive comparatively high wages due to deferred-compensation policies that tie wages to seniority (Lazear 1979). Finally, older workers tend to be over-represented in the shrinking sectors and occupations and where the need to 'shed' labor is most pressing (Blöndal and Scarpetta 1999).

These challenges are more or less common to all industrialized countries, but their precise impact on older workers is likely conditioned by 'institutional filters' (Buchholz et al. 2006; Hofäcker 2010; Buchholz et al. 2011). In other words, the precise implications of these macro level trends for the employment prospects of older workers depend on their interaction with a country's institutional makeup. In the following, I focus on four crucial aspects: Skill regimes and labor market boundaries, continuing training participation and lifelong learning, employment protection legislation, and age discrimination.

'Varieties of Capitalism', skill regimes, and labor market boundaries

The literature on 'Varieties of Capitalism' (VOC; Hall and Soskice 2001b) famously contrasts two ideal typical systems of production – coordinated market economies (CMEs) and liberal market economies (LMEs) – with Germany representing the former and the United States representing the latter type. This dichotomy seeks to capture the purported fact that industrialized countries exhibit distinctive *institutional configurations* across such diverse spheres as education and training systems, industrial relations, corporate governance, and social protection. In other words, institutions tend to cluster, presumably because of 'institutional complementarities' which arise when 'the presence [...] of one [institution] increases the returns from [...] the other' (Hall and Soskice 2001a: 7). Such complementarities in turn influence the preferences and optimal strategies of relevant actors such as firms or workers, inducing them to behave in ways that are consistent with, and reinforce, existing arrangements.

For my purposes, one of the most important insights of the VOC approach is that coordinated and liberal market economies tend to rely on different skill mixes or 'skill regimes', which in turn are supplied by distinctive

systems of skill formation. A prime example is Germany's characteristic system of vocational education and training (Mayer and Solga 2008; Ebner 2013).

The German skill regime emphasizes specific skills, whereas the American relies primarily on general skills. The distinction between general and (various kinds of) specific skills originates from human capital theory (Becker 1964). By definition, general skills are portable across – and will thus be rewarded in – all kinds of jobs, whereas portability of specific skills is limited. It is common to further differentiate specific skills into skills that are specific to certain industries, occupations, or firms: As the labels suggest, industry-specific skills can be put to use in different jobs as long as they are in the same industry, while the use of firm-specific (occupation-specific) skills is restricted to jobs in one and the same firm (occupation).

From the worker's standpoint, investing in specific skills is risky because the investment will only pay off if she finds the 'right' kind of job (Iversen 2005). Estevez-Abe et al. (2001) argue that an important function of status-maintaining social protection therefore is to promote workers' readiness to invest in occupation, industry, and firm-specific skills. Generous earnings-related benefits lessen workers' reluctance to invest in specific skills: They ensure that their investment will continue to be rewarded during periods of joblessness (because benefits are related to wages on the previous job) and that unemployed workers can afford longer job searches, which increases their chances of finding a job that matches their skill profile (Gangl 2004b, 2006). To the extent that employers rely on workers with specific skills, they should therefore be supportive of social protection (Mares 2001). According to this perspective, one reason why Germany sustains relatively generous, status-maintaining social policies is that the product market strategies of German firms require higher levels of specific skills (Sorge and Streeck 1988).¹

A potential drawback of the German emphasis on non-portable specific skills is that it impedes worker mobility: Workers are faced with marked 'labor market boundaries' that limit their opportunities for inter-occupational

¹ The literature is somewhat ambiguous as to what types of specific skills (industry, occupation, or firm-specific) are most salient in the German system. Some authors (e.g., Estevez-Abe et al. 2001) seem to suggest that all three kinds of specific skills are important in Germany. Others characterize Germany as an 'occupational' (and the United States as an 'internal') labor market, which suggests that Germany is distinguished by its reliance on occupation-specific skills (Marsden 1999; Gangl 2001). The general assumption that skills with limited portability play a larger role in the German than in the American context seems to be relatively uncontested, however.

or inter-industry mobility and, more important in the present context, their opportunities for reemployment after late-career job loss (DiPrete et al. 1997; Mayer 2005; Blossfeld et al. 2011). In the German case, labor market boundaries are further reinforced by a strong credentialism that ties access to skilled occupations to formal qualifications (DiPrete et al. 1997; Shavit and Müller 1998; Kerckhoff 2004). In the US, by contrast, general education is less standardized and occupational skills tend to be acquired via informal on-the-job training. Formal credentials are less important for gaining access to occupations or individual jobs (Allmendinger 1989). Mobility prospects for German workers may be better when it comes to transitions that do not involve occupational mobility. In this case, standardized credentials may facilitate moves across firms by reducing uncertainty about the skills a given worker has to offer (Gangl 2001). However, this may be of little help to older workers who are often displaced from declining industries and occupations (Blöndal and Scarpetta 1999) and whose certified skills may be perceived as obsolescent (Buchholz et al. 2011).

Continuing training and lifelong learning

Participation in continuing training or 'lifelong learning' is often argued to be indispensable for keeping the skills of workers in tune with changing job requirements, especially in an environment characterized by rapid technological progress and sectoral restructuring (Buchholz et al. 2011; Eichhorst 2011). Hence, the (re)employment prospects of older workers can be expected to depend also on the prevalence of continuing education.

The predominant view is that participation in continuing training is relatively low in Germany (Eichhorst 2011) which likely further limits the (re)employment prospects of older workers. The relative neglect of lifelong learning may also be an important reason for why until recently German employers were rather supportive of early retirement policies: In the words of Buchholz et al. (2011: 16) it leads to a situation where 'adaptation to structural and technological change is mainly achieved via generational replacement in the labor market'. Yet, causality likely runs both ways in that prospective early retirement also undercuts incentives for investing in the continuing training. Initially, training requires investments in the form of time and money from the worker, employer, or both. Older workers planning to retire soon, and employers expecting their employees to do so, have little incentive to undertake these investments, as the expected pay-off period of their investments will be relatively short. I return to this issue in my discussion of statistical age discrimination below.

In the United States, rates of continuing training participation are higher. Especially for younger workers, on-the-job training is crucial for the acquisition of specific skills which play a relatively marginal role in formal educational institutions (Allmendinger 1989). With respect to older workers, Buchholz et al. (2011: 16) suggest that participation is higher in liberal than in conservative welfare states because low levels of social protection lead to a situation where '[o]lder workers have to undergo constant retraining in order to remain competitive on changing labor markets'. According to their reasoning, older workers in liberal welfare states can be expected to develop and maintain their skills simply because this is necessary to avoid downward job mobility, unemployment, or involuntary early retirement – scenarios that are rather unattractive due to limited levels of public income support. They contrast this pattern of 'market-induced employment maintenance' with the 'public-induced employment maintenance strategy' of Scandinavian countries where the state pursues a more active role in maintaining and adapting the skills of the workforce (Buchholz et al. 2011: 16-17).

The extent of participation in continuing education is difficult to measure because it is often short-term and less formalized than education in school, vocational training, or institutions of higher education. That said, Organisation for Economic Co-operation and Development (OECD) data on adult participation in continuing training confirm that Americans were more likely to participate in continuing training than their German counterparts in the early 2000s (OECD 2005: 310ff.). While not being available for the United States, Eurostat data on levels of training participation in European countries underline this finding by showing that participation levels of Germans aged 25-64 are below the EU-27 average (Eichhorst 2011: Figure 3 on p.5).

Employment protection legislation

Another important difference between Germany and the United States is the extent of labor market regulation. In particular, Germany has considerably stricter employment protection legislation (EPL) than the United States (OECD 1999: Ch. 2; Estevez-Abe et al. 2001). From the perspective of the VOC approach, EPL is yet another means of raising workers' readiness to invest in non-transferable skills, because it reduces the likelihood of being dismissed from a well-matched job where those skills are remunerated (Estevez-Abe et al. 2001). It is worth noting, however, that Germany extended the possibilities for fixed-term employment and other forms of 'non-standard' or 'atypical' employment such as temporary agency work over the course of the observation

period, whereas protection for workers with permanent contracts did not change much (DiPrete et al. 2006; Giesecke 2006; Gebel and Giesecke 2011).

The prevailing view is that stricter EPL has no clear effect on overall levels of employment or unemployment, but that it reduces labor market turnover and affects the composition of the unemployed (OECD 1999; Boeri et al. 2000; Esping-Andersen and Regini 2000; Gebel and Giesecke 2011). Under stricter EPL, employers may be more likely to hold on to workers during episodes of low demand, yet they may also be more reluctant to hire workers on a permanent basis when demand increases. By the same token, employers will be more likely to respond to demand changes via internal flexibility (e.g., changes in work hours) and by hiring workers on a fixed-term basis, if the latter is permissible (Bertola et al. 2000; Boeri et al. 2000). Previous studies indeed show that stricter EPL is associated with lower rates of outflow from unemployment and thus with longer unemployment spells (e.g., OECD 1999; 2004). As for the composition of employment and unemployment, past research provides evidence that stricter EPL promotes labor market segmentation or insider-outsider divides, with prime-age men enjoying greater job stability and marginal labor market groups such as young workers, low-skilled workers, or women facing greater risks of unemployment and atypical, unstable employment (Esping-Andersen and Regini 2000; OECD 2004; Gebel and Giesecke 2011).

As for older workers, Germany's stricter EPL likely reduces the risk of involuntary job loss for those who are employed on permanent contracts. In fact, German regulation of dismissal procedures explicitly requires that a worker's age be considered in dismissal decisions when jobs are terminated for business reasons (*betriebsbedingte Kündigung*) (Eichhorst 2006). While older workers with permanent contracts may thus benefit from Germany's stricter EPL, those who have lost their job may encounter greater difficulties in finding reemployment, as employers may be reluctant to hire older workers (who enjoy special protection) on a permanent basis. For similar reasons, Dorn and Sousa-Poza (2010) expect stricter EPL to increase the proportion of retirements that are involuntary, a prediction that is supported by their empirical analysis of 19 industrialized countries. To mitigate this potential problem, legislation restricting the use of temporary contracts 'without substantive cause' (*sachgrundlose Befristung*) has long included exemptions for workers above a certain age threshold – 58 until 2002 and 52 from 2003 onward (Eichhorst 2006).² Nevertheless, it does seem plausible that

2 In 2005, the European Court of Justice ruled that these exemption clauses constitute a form of age discrimination. To counter this objection, the exemption clause now requires that

Germany's stricter EPL diminishes the reemployment prospects of older German workers compared to their American counterparts, or at least their chances of securing (more attractive) jobs with permanent contracts.

Age discrimination and feedback effects of retirement patterns

Age discrimination or 'ageism' (Bytheway 2005; OECD 2011) is another possible factor influencing the employment chances of older workers. The term 'discrimination' refers to the differential treatment of individuals on the basis of ascriptive characteristics such as race, gender, class background, or age, rather than on the basis of differences that are inherently relevant in a given setting. Discrimination can occur in various settings (e.g., on labor, housing, or marriage markets) and the meaning of 'inherently relevant differences' will differ accordingly. In the context of labor markets, it is common to think of 'worker productivity' as the inherently relevant characteristic (see, for example, Aigner and Cain 1977).

Discrimination can take two basic forms: taste-based and statistical. Taste-based discrimination against older workers would occur if an employer favored younger workers simply because of their being younger and not because of characteristics that are related to the worker's productivity. In addition to employers' preferences, tastes of co-workers and customers are further potential sources of discrimination (Becker 1957). For example, if customers have a preference for being served by younger workers, a profit-maximizing employer would be inclined to prefer younger workers even if she entertained no age-related tastes herself.

Statistical discrimination (Phelps 1972; Arrow 1973; Aigner and Cain 1977) is a form of discrimination that may occur even in the absence of discriminatory tastes. It arises because employers cannot directly observe the productivity of prospective employees and therefore have to form beliefs about their expected productivity on the basis of observable characteristics. For example, higher age may signal lower average computer skills. Other things being equal, employers screening applicants for a job requiring computer use can then be expected to treat older workers less favorably and thus fail to reward the competencies of computer-proficient older workers. If employers' beliefs about average productivity levels – or, more generally, conditional productivity distributions – of different groups are correct and if more cost-efficient ways of assessing worker productivity do not

workers are above age 52 and have been non-employed for at least four months, thus explicitly targeting older people with labor market difficulties.

exist, then statistical discrimination is efficient in the sense of being profit-maximizing.³ This does not hold, however, for statistical discrimination based on erroneous beliefs about group-specific productivity distributions (Blau et al. 2006).⁴

Do older workers really face discrimination? Perhaps the most compelling empirical evidence on labor market discrimination comes from so-called audit studies which compare job search outcomes of fictitious applicants. The crucial advantage of audit designs over studies based on standard observational data is that they allow for controlled manipulation of worker characteristics, thus keeping omitted variable problems to a minimum (Lahey 2008). The audit approach is somewhat difficult to apply in the study of age discrimination, because resumes of workers of different ages cannot be rendered identical in terms of key productivity-related characteristics such as work experience or year of graduation (which may signal currentness of skills). Another potential limitation is that audit studies focus on entry-level jobs (where employers are unlikely to conduct extensive background checks on applicants): An older worker who is (still) applying for low-level jobs may be considered as having revealed low potential, whereas applications by younger workers may be regarded as typical of early career stages (Lahey 2008). Despite these complications, several studies have studied age discrimination using audit designs and practically all of them conclude that older workers face substantial discrimination in the hiring process (Bendick et al. 1997, 1999; Riach and Rich 2006, 2007a,b; Lahey 2008).

A potentially important source of statistical discrimination against older workers is their expected time until retirement. Employers may be reluctant to hire a worker whom they expect to leave sooner rather than later: Most jobs, and skilled ones in particular, require some 'investment period' during which workers acquire the job- and firm-specific skills needed for being maximally productive. Other things being equal, workers will therefore be more attractive when their expected tenure is longer, as this will leave more time for the initial 'investment period' pay off. A similar argument can of course be made with

3 Becker's (1957) famous argument that discrimination is inefficient and that discriminating employers could therefore not survive in competitive markets would thus not apply in this case where statistical discrimination is cost-efficient (Blau et al. 2006). In any case, this argument crucially rests on the assumption of perfectly competitive markets (Heckman 1998), an assumption whose empirical relevance is dubious (Ganßmann 2003).

4 Empirical evidence on age-productivity differentials suggests that overall the relationship between age and productivity is at most only slightly negative, at least up to age 65 (Börsch-Supan et al. 2005; Garibaldi et al. 2010). This literature also suggests that age-productivity profiles depend on job tasks and therefore vary across firms and industries (Garibaldi et al. 2010).

respect to further training of workers who are already with an employer. The direct costs of replacing a worker (search costs) are another reason why expected tenure may often be a crucial criterion in hiring decisions.⁵ The potentially important role of expected tenure for hiring and training decisions suggests that prevailing retirement patterns have far-reaching implications for older workers' labor market prospects via processes of statistical discrimination. If the majority of workers retire around age 60, workers in their late 50s will face great difficulties in finding jobs with ascending tenure-productivity profiles. By the same token, employers will be reluctant to invest in the skills of their older workers, suggesting that the prevalence of early retirement is a major reason for the rather steep negative age-training gradient in Germany (Eichhorst 2006). An 'early-exit culture' may thus be self-reinforcing, as those older workers who would prefer later retirement will have few job opportunities and will often be excluded from employer-supported training measures that would sustain and enhance their productivity.

I have elaborated four reasons why the employment prospects of older workers are likely to be less favorable in Germany than in the US: an emphasis on specific skills that results in marked labor market boundaries, lower levels of participation in continuing education, stricter employment protection legislation, and the possibility that an 'early exit culture' (Hult and Edlund 2008) exacerbates statistical discrimination on the basis of age. In the context of the present study, these factors are most immediately relevant because they affect the opportunities for compensatory countermobility after late-career job loss. Not only are displaced German workers prone to face greater difficulties in finding adequate reemployment than their American counterparts; it seems likely that differences in the demand for older workers also affect the scope for labor supply responses by potential spouses who will often be in their 50s or 60s as well.

From the perspective of displaced older workers, limited reemployment prospects create a greater need for 'welfare-sustaining employment exit policies' that limit the economic risks associated with late-career job loss (DiPrete et al. 1997: 328). Differences and recent trends in such policies are a central issue of the following section, where I provide an in-depth account of the main welfare state programs (and employer-based functional equivalents) that influence the financial consequences of late-career job loss and voluntary retirement.

5 Differences in expected tenure are also often cited as an important source of statistical discrimination against women (Bielby and Baron 1986).

3.4 Differences and changes in public and employment-based protection

This section provides a comprehensive account of German-American differences, and recent changes, in several key welfare state programs: (means-tested) basic assistance programs, unemployment insurance, public and complementary pensions, disability benefits, and progressive income taxation. As noted above, economic literature on early retirement has primarily studied the impact of welfare state programs on older workers' labor supply and (early) retirement. The trigger events perspective developed in Chapter 2 offers a different take on these programs: They can be seen as societal institutions that cushion the economic consequences of mobility-triggering life events. This is the primary perspective adopted in this study where I am interested in the contribution of welfare state arrangements to German-American differences and alleged recent increases in economic insecurity.

Before beginning with the in-depth review of individual programs, it is useful to provide some basic orientation. An obvious starting point for the country comparison is Esping-Andersen's (1990) threefold distinction of the social-democratic, conservative-corporatist, and liberal-residual welfare regimes. Germany is widely considered as a prime example of the conservative regime, while the United States epitomize the liberal cluster.

The regimes identified by Esping-Andersen are ideal types and different welfare states may conform to these ideal types to varying extents. This has sparked considerable debate concerning the classification of particular countries and the overall usefulness of the typology (Arts and Gelissen 2002). For example, several authors (e.g., Ferrera 1996) have argued that it is useful to distinguish a fourth 'southern' cluster exemplified by Mediterranean countries such as Spain and Italy. Germany and the United States generally belong to the countries whose classification is less contested, but even in their cases some authors note considerable discrepancies between ideal typical descriptions and empirical reality (cf. Alber [2010] for the American case).

The stereotypical conservative welfare state features comparatively high contribution-based and earnings-related public benefits that serve the goal of status preservation for those who have earned claims via covered employment (Esping-Andersen 1990). Labor markets tend to be regulated with relatively strong employment protection, which reduces labor market turnover and stabilizes careers, possibly at the cost of 'outsiders' (women, labor market entrants, or low-skilled workers) who do not succeed in securing

a well-protected 'insider' position (Blossfeld et al. 2007b). Conservative welfare states are heavily transfer-oriented and public provision of services such as childcare is limited, which goes hand in hand with a reliance on male breadwinning and women's unpaid care work (Lewis 1992; Esping-Andersen 1999).

The liberal welfare state, by contrast, relies on the market for the provision of welfare. The degree of 'de-commodification' which 'occurs when a service is rendered as a matter of right, and when a person can maintain a livelihood without reliance on the market' (Esping-Andersen 1990: 21-22) is lower than in the other welfare regimes. Earnings-related unemployment benefits are limited, both in terms of benefit duration and benefit levels. Long-term income support programs provide low benefit levels, are strictly means-tested and often restricted to certain 'deserving' population subgroups such as single mothers, the disabled, or the old. Employment is crucial for the financial well-being of non-disabled workers below retirement age. The flip side of limited public benefits is a greater salience of private and employer-provided benefits, especially in pensions and health care. The labor market is relatively unregulated and turnover is high. Public social services are even less developed than in the ideal typical conservative welfare state, but the private service sector is large due, among other things, to downwardly flexible wages.

A few introductory remarks concerning the direction of recent welfare state change are also warranted. As noted in Chapter 1, concerns about financial sustainability have been an important motive for recent welfare state reforms in many Western countries. This is perhaps nowhere clearer than in the case of public pension programs whose long-term solvency is threatened by population aging. A second and partly related motivation has been a concern about the incentive effects of many welfare state programs. According to this view, transfer programs reduce incentives for economic self-sufficiency and encourage socially costly behaviors. Again, public pension programs are a case in point: As discussed above, Germany and many other countries long offered generous early retirement options that had rather dramatic negative effects on the labor supply of able-bodied older workers in their 50s and early 60s (Blöndal and Scarpetta 1999; Gruber and Wise 1999). However, arguments about incentive effects have also been marshalled to justify reforms of many other welfare state programs, including unemployment insurance and basic assistance programs (which allegedly reduce job search and work effort) or health care (which allegedly promotes unhealthy behaviors by socializing their costs).

While this two-item list of motivations for welfare state reform is certainly not exhaustive⁶, it may be sufficient for understanding many of the most crucial elements of recent welfare state change in Germany and the United States. In terms of specific regulations, welfare state reforms have been multidimensional and staggeringly complex. An important common denominator of many changes, however, has been to strengthen work incentives for those who are considered capable. The diverse reforms undertaken toward this end are often referred to as 'activation policies' (e.g., Eichhorst and Konle-Seidel 2008).

In Germany and the US, as in many Western countries, one crucial element of the activation paradigm has been to reform tax and benefit systems in order to raise the net gain from working (compared to transfer receipt), especially for low-wage workers. In the United States an important instrument designed to 'make work pay' (Immervoll and Pearson 2009) has been the Earned Income Tax Credit (EITC), a tax credit awarded to households with positive labor earnings below a certain threshold, which has been expanded repeatedly over the course of the observation period. In Germany, possibilities for combining work and transfer income were expanded by the fourth so-called Hartz reform which became effective in 2005 (Eichhorst et al. 2010; Alber and Heisig 2011). Earlier reforms had already introduced (partial) exemptions from social security contributions for low-earning jobs (so-called Mini/Midi-Jobs), which grew rapidly afterwards, especially among women (BA 2007). Training and counseling measures as well as other types of active labor market policy have also been extended.

These 'enabling' policies were accompanied by 'demanding' measures that raised pressures on the unemployed to return to work (Eichhorst and Konle-Seidel 2008). These include reductions in benefit levels and duration, changes in suitability criteria, and the strengthening of workfare elements 'which require people to work in exchange for, or instead of, social assistance benefits' (Lodemel [2000], as quoted in Koch et al. [2005: 421]).

With these stylized summaries in mind, I now take a closer look at the most important programs affecting the consequences of late-career job loss and (voluntary) exit from work. I begin with a brief description of means-tested income support programs. I then describe earnings-related insurance

6 For example, German debates in the 1990s and early 2000s also emphasized possible negative effects of non-wage labor costs (primarily social insurance contributions) on labor demand. In addition, concerns about persistently low fertility rates as well as 'new social risks' (Taylor-Gooby 2004) arising from growing family instability have sparked various expansionary reforms in Germany (Bleses and Seeleib-Kaiser 2004).

benefits for the unemployed. Next, I chart the complex landscape of public and complementary pensions. I continue with a description of disability benefits and conclude with a brief discussion of progressive income taxation as another means of smoothing household income over time. I should note at the outset that the sections on means-tested benefits, unemployment insurance and old-age pensions draw heavily on excellent overview articles by Britta Grell (2011a,b) and Markus Wörz (2011b,c).

3.4.1 Means-tested income support programs

United States. In the US there is no universal cash-transfer assistance program for the population as a whole. Individuals aged 65 or older and younger workers qualifying as disabled are eligible for benefits from the federal Supplemental Security Income (SSI) program. SSI was introduced in 1974 as a federal replacement for various uncoordinated state-level programs that provided basic income support to disabled workers and older people (Grell 2011a). SSI claimants are subject to a relatively strict means test. In 2009, monthly benefits were \$674 for a single person and \$1,011 for married couples, with many states offering some additional cash benefits (SSA 2009: 15). In most states, SSI recipients are automatically eligible for means-tested in-kind benefits such as Medicaid, Food Stamps, and housing benefits (Daly and Burkhauser 2003). Federal SSI benefits on their own are insufficient for lifting recipients above the (absolute) federal poverty line. Like the poverty line, SSI benefits are adjusted annually to compensate for inflation and have therefore remained constant in real terms, while declining relative to median or average family income. When the program started, elderly people (65 or older) accounted for 60% of SSI recipients. Since then the role of SSI as a last safety net for the elderly in the US has declined (Elder and Powers 2006). In 2009, only 27% of all SSI beneficiaries were elderly (SSA 2009: 21). SSI receipt is increasingly concentrated among disabled people below retirement age.⁷

Older Americans below retirement age who do not meet the disability criterion for SSI eligibility have very limited access to long-term cash transfers. The most important alternative sources of basic income support, Aid to Families with Dependent Children (AFDC) and, since July 1997, its successor program Temporary Assistance for Needy Families (TANF), are largely restricted to families with minor children. Only 3.3% of TANF recipients were

7 Unlike benefit levels, thresholds used in means-testing have not been adjusted for increases in the cost of living, so the means test has effectively become more stringent, which likely is one important reason why fewer elderly people are claiming SSI (Nicholas and Wiseman 2009).

older than 49 in 2006.⁸ Some states sustain ‘General Assistance’ (or ‘General Relief’) programs for childless adults, but these are a heterogeneous array of more or less voluntary state or county level programs that provide very meagre benefits. In addition, these programs have been further scaled back from the 1990s onward. According to Grell (2011b: 21), ‘[a]s of 2007, only two states paid cash welfare benefits to childless adults deemed “able-bodied”’. Childless older workers below retirement age may be eligible for food stamps and other in-kind benefits such as Medicaid or housing assistance, yet some of these programs, too, are effectively restricted to adults with children.

Germany. In Germany, a universal basic income floor was long provided by the means-tested ‘social assistance’ program (*Sozialhilfe*, SH). Many older people with low incomes, however, did not claim SH, mainly for fears that their children would be required to support them. In 2003, this led to the creation of a separate benefit scheme for older people over 65 and permanently disabled adults over 18 years, the so-called *Grundsicherung im Alter und bei Erwerbsminderung* (GAE). Under the new scheme, no recourse is made to children or parents of claimants if their annual income is below €100,000. Until 2005, GAE benefit levels were slightly above social assistance rates. Since then, they have been equal to the standard rate of SH benefits and the new basic jobseeker’s allowance, ‘Unemployment Benefit II’ (*Arbeitslosengeld II*, ALGII) which was created by the fourth so-called Hartz Reform in 2005. In 2009, this rate was equal to €359 for a single person, plus allowances for housing and heating. Disabled people and individuals of retirement age are entitled to GAE if their monthly income is below this standard rate and if they meet an additional asset test. Non-disabled older people below retirement age are entitled to the new ALGII (or to SH which has been continued as a much smaller program for those not considered capable of work).⁹

3.4.2 Earnings-related unemployment benefits

I now summarize key country differences and trends in insurance-type, earnings-related unemployment benefits. This endeavor is complicated by the fragmentation of American unemployment insurance: State-level

8 <http://archive.acf.hhs.gov/programs/ofa/character/FY2006/tab18.htm>, access date November 22, 2012.

9 Technically, there is a third type of benefit, Sozialgeld, which is paid to persons not capable of work but living in a household with a recipient of ALGII. Persons not deemed capable of work may be entitled to SH rather than GAE because the concept of ‘restricted earnings capacity’ used in assessing eligibility for GAE requires health problems to be longer-term.

programs form the backbone of America’s system and despite a few federal guidelines interstate variability in funding mechanisms, eligibility rules, and benefit levels is enormous (Grell 2011b). Concise summaries of the American context are therefore utterly difficult. With this caveat in mind, I begin my review of earnings-related benefits with a discussion of maximum benefit duration, which is one of the few aspects that are relatively uniform across the 50 American states. I then turn to benefit levels and conclude with a discussion of eligibility criteria.

Benefit duration. In the US, practically all state-level programs provide unemployment benefits for a maximum of 26 weeks. However, during periods of high unemployment, two types of measures routinely provide extended benefits to workers who have exhausted their state-level benefits. The first measure is a permanent program that provides benefits for another 13 weeks (20 weeks in some states with voluntary additional programs). Benefits are funded half from state budgets and half from federal funds. This ‘Federal-State Extended Benefit Program’ is generally triggered when the (seasonally adjusted) state insured and/or total unemployment rates exceed certain threshold values (Lake 2002; Grell 2011b).¹⁰ In addition to this permanent and automated supplementary program, further ad hoc extensions are often enacted during severe recessions (Grell 2011b). Table 3.1 lists the four instances of such extensions during the observation period, along with the total maximum duration of unemployment benefits, that is, the combined duration of benefits from state-level programs, automated federal extension programs, and ad hoc extensions.

Table 3.1 Ad-hoc extensions of maximum unemployment benefit duration, 1980-2008

Program name	Dates	Maximum benefit duration
Federal Supplemental Compensation	9/1982 – 6/1985	40 weeks
Emergency Unemployment Compensation	11/1991 – 4/1994	59 weeks
Temporary Extended Unemployment Benefits	3/2002 – 12/2003	52 weeks
Emergency Unemployment Compensation of 2008	since 7/2008	99 weeks

Source: Kohler et al. (2012b)

In Germany, maximum duration of first-tier benefits was set at 52 weeks for younger workers throughout the observation period. Older workers have

¹⁰ See USDOL (2008b: 4/14-15) for further details.

been entitled to age-graded benefit extensions since 1985. The exact pattern of age-graded extensions changed several times during the observation period (Wörz 2011c). The initial reform in 1985 extended maximum duration to 18 months for workers ages 49 and over, but the next expansion followed already in 1986. The all-time high was a maximum duration of 32 months for workers aged 55 and older (57 and older from 1997 onwards) which was in effect from January 1987 to January 2006. A comparable system of age-graded benefit duration cannot be found in the US.

Second-tier benefits could in principle be claimed indefinitely, but they were abolished in 2005. Since then claimants who have exhausted their first-tier benefits (now labeled *Arbeitslosengeld I*) have to rely on ALGII, the flat-rate means-tested benefits described in Section 3.4.1. In addition, maximum duration of first-tier benefits was reduced considerably after a transitional period ending in January 2006. Initially, it was set to 12 months for workers below age 54 and to 18 months for workers ages 55 and above. For workers ages 57 and older maximum duration was thus cut by 14 months. However, maximum duration for workers ages 58 and older was reextended to 24 months in 2008. Additional detail on age-graded benefit durations is provided in Dietz et al. (2008) and Wörz (2011c).

Benefit levels. Subject to maximum benefit restrictions, German first-tier as well as former second-tier benefits replace a certain proportion of average net earnings in the year before unemployment. Workers with dependent children have been entitled to somewhat higher replacement rates since 1984. Unlike with benefit duration, age plays no role for benefit levels. As shown in Table 3.2, first-tier (and, until their abolition, also second-tier) replacement rates declined noticeably over the past 30 years, at least for workers without dependent children.

Table 3.2 Replacement rates of German unemployment benefits since 1980

	1980-1983	1984-1993	1994-2004	since 2005
<i>First tier (Arbeitslosengeld/Arbeitslosengeld I)</i>				
With dependent children	68	68	67	67
W/o dependent children	68	63	60	60
<i>Second tier (Arbeitslosenhilfe)</i>				
With dependent children	58	58	57	-
W/o dependent children	58	56	53	-

Source: Kohler et al. (2012b); Wörz (2011c)

In the US benefit levels differ enormously from state to state. For example, in January 2011, maximum weekly benefits excluding dependents' allowances, which are available in some states, were \$625 in Massachusetts, but only \$247 in Louisiana (Isaacs and Whittaker 2011: 7-8, Table 1). Partly due to this state-level heterogeneity, different sources reach different conclusions both with respect to benefits levels at a given point in time and with respect to changes over recent decades. For example, van Vliet and Caminada (2012) estimate that the replacement rate for a single, 40-year-old worker with average production worker earnings declined from 69% to 57% between 1980 and 2008. The corresponding estimates for the same type of worker with a non-working spouse and two children are 61% and 52%.¹¹ These figures are substantially higher and show a clearer downward trend than official US replacement rates published in the Green Book (USDOL 2008b), which declined from 38% to 35% between 1980 and 2008. However, these strikingly lower replacement rates likely understate actual replacement rates for workers entering unemployment: They are based on a (cross-sectional) comparison of the average benefits received by benefit claimants with the average wages of covered workers, thus ignoring the fact that (former) low-wage workers are overrepresented among the unemployed (Grell 2011b).

Eligibility criteria. Earnings-related insurance-type unemployment benefits are generally restricted to workers meeting certain eligibility criteria. A first set of work history or 'entitlement' (Venn 2012) criteria relates to a (newly unemployed) worker's recent employment history. As in most other countries with similar programs, German and American workers are required to have been covered by unemployment insurance for a certain amount of time during a certain reference period before the beginning of unemployment. Among other things, coverage requires that workers and/or their employer made contributions to unemployment insurance. In both countries, coverage is mandatory for the vast majority of wage and salary workers, while the self-employed as well as certain other groups of workers (e.g., German civil servants) are not covered by unemployment insurance.¹² In both countries, earnings during reference periods also have to exceed certain thresholds. For example, workers in 'Mini-Jobs' earning less than

11 For comparison, the corresponding estimates for a single worker in Germany are 68% (1980) and 60% (2009) and thus identical to the 'legislated' replacement rates in Table 3.2. Their estimates for the couple case are 70% and 71% which is slightly above legislated rates, presumably because van Vliet and Caminada (2012) also factor in child benefits (*Kindergeld*).

12 Under certain circumstances, self-employed workers can opt for coverage. In particular, they need to have been covered as wage and salary workers before becoming self-employed.

€400 per month are not covered by unemployment insurance in Germany: They are not subject to contributions and workers do not earn entitlements to earnings-related unemployment benefits. Again, a summary of American work history criteria is difficult due to considerable heterogeneity across the 50 states.

A second set of eligibility criteria can be characterized as 'behavioral'. Violations of these criteria are usually punished with benefit reductions or even a (temporary) complete loss of benefits. Some behavioral requirements refer to the time before the actual onset of unemployment: For example, German workers with a fixed-term contract are expected to notify the employment office up to three months before the actual termination of their job. In both countries, a common reason for benefit sanctions is that a job separation was initiated by the employee 'without good cause'. A second important set of behavioral criteria relates to search behavior and readiness-to-work during unemployment. Behavioral criteria are not restricted to recipients of earnings-related benefits, but are also applied to recipients of second-tier or means-tested benefits. In fact, behavioral criteria are usually stricter for these latter groups who tend to have been unemployed for longer periods of time. For example, German ALGII recipients are subject to much broader definitions of suitable job offers than recipients of earnings-related first-tier benefits (Clasen 2011).

Eligibility criteria are often defined using rather complex and idiosyncratic institutional categories, so it is difficult to compare their overall strictness across countries. That said, conventional wisdom suggests that eligibility criteria and especially behavioral requirements are stricter in the US. Recent attempts to quantify the overall strictness of eligibility criteria in OECD countries at least partly confirm this intuition (Hasselpflug 2005; Venn 2012). Disaggregated results suggest that strictness of work history criteria is similar in the US and Germany. In terms of behavioral criteria, both Hasselpflug (2005) and Venn (2012) classify German regulation as noticeably *more* stringent with respect to job search and availability criteria, yet this counterintuitive difference is more than made up for by much harsher sanctions for noncompliance in the United States (Venn 2012: 21, Figure 6). For example, American workers considered to have quit their former job or refused a suitable job offer 'without good cause' will typically be denied benefits completely, while German regulation generally only allows for limited disqualification periods (Venn 2012).

Tracking changes in eligibility criteria over time is somewhat easier because these changes tend to occur within one consistent categorical framework. As for work history requirements, changes in Germany during

recent decades are probably best described as a limited and incremental trend towards tighter eligibility criteria. However, one of the most significant changes, which doubled the required number of months in covered employment during the so-called 'reference period' (*Rahmenfrist*) from six to twelve, already occurred in the early 1980s (Wörz 2011c). A description of American trends is again complicated by state-level variation. Overall, however, the literature reviewed by Grell (2011b) seems to suggest no clear trends.

Consistent with the increased focus on activation and workfare principles noted above, behavioral criteria were tightened in both countries during the last 20 to 30 years. This trend affected both claimants of first-tier benefits as well as recipients of second-tier or basic income support programs, with changes generally being more pronounced for the latter group. In Germany, definitions of suitable jobs were gradually liberalized and workfare elements such as the requirement to participate in training measures or community work were expanded. The most far-reaching changes were enacted by the 'Hartz Reforms' in 2003-2005 (Eichhorst et al. 2010; Alber and Heisig 2011; Clasen 2011), but initial changes in this direction occurred already in the 1980s and 1990s (Clasen et al. 2001). However, despite this increasing emphasis on activation, regulation that freed some older claimants of unemployment benefits from any job search requirements remained active until the end of 2007 (Eichhorst and Sproß 2005). More specifically, unemployed workers aged 58 and older were not required to be available for work if they committed to claiming a deduction-free old-age pension at the earliest possible date (so-called *58er-Regelung*). For most workers, this was the 'old-age pension after long-term unemployment and old-age part-time work' which could long be claimed by workers who were at least 60 years old and had been unemployed for at least 52 weeks after age 58 and a half (for further details, see the discussion of early retirement options in Section 3.4.3 below). Introduced in 1986, this regulation played an important role in facilitating early retirement during the observation period (Jacobs et al. 1991; Knuth and Kalina 2002).

In the US, demands on claimants of means-tested benefits have risen considerably, in particular after the 1996/1997 welfare reform (Blank and Haskins 2001). Welfare reform increased pressures to take up work for recipients of TANF compared to former beneficiaries of the predecessor program AFDC (Blank 2009). For example, federal regulation requires that states limit the total lifetime duration of TANF receipt to 60 months¹³, but

13 States can, however, exempt a limited proportion of the caseload from this lifetime maximum (Blank 2009). Thus 'hardship cases' are often eligible for benefit extensions beyond the 60 month limit.

as noted above this program plays a marginal role for older workers. AFDC and TANF have received far more attention in the literature, but behavioral requirements have also become stricter for claimants of other types of welfare benefits such as 'General Assistance' (Ifcher 2007). Unfortunately, there seems to be no systematic account of trends in behavioral eligibility requirements for unemployment insurance benefits. However, given the overall trend toward activation it does seem likely that this group, too, has been facing increasingly stringent demands.

3.4.3 Public and complementary pensions

I now provide an overview of public and complementary pensions in Germany and the US. For the vast majority of households, these programs are by far the most important sources of income after exit from work. In both the US and Germany, large public pay-as-you-go (PAYG) pension programs financed by payroll taxes form the backbone of the system of old-age income provision. I first discuss key general features of these programs and characterize the overall level of public retirement benefits in terms of the benefits received by a person retiring at the statutory or full retirement age. I then provide an overview of employer-provided and individual private pensions. Finally, I turn to the options for, and costs of, early pension take up, with the focus being on the public pension pillar.

It is important to note a crucial fact about pension policy: Many reforms take effect with considerable delay. Thus, the Social Security Amendments scheduling the gradual increase in full retirement age from 65 to 67 for Americans born 1938 and later were passed in 1983, yet it was only in the year 2000 that the first birth cohorts affected by these changes reached the minimum retirement age of 62. Similarly, while diffusion of defined-contribution plans among American employer-sponsored pensions accelerated from the 1980s onwards, participation in these plans has grown more rapidly for younger cohorts that are still of working age.¹⁴ Another example are recent German reforms that seek to promote second and third-pillar pensions, most importantly the so-called *Riester-Reform*¹⁵ of 2001 which introduced subsidies and tax advantages for accredited private pension

14 In 2001, according to Munnell and Sundén's (2004: p.56, Table 3-1) estimates from the Survey of Consumer Finances, 44.2% of workers aged 40-49, but only 31.8% of workers aged 50-64 participated in a 401(k) pension plan, the dominant type of employer-sponsored DC pension plan.

15 The reform is named after Walter Riester, the German Minister of Labor and Social Affairs from 1998 to 2002, who was one of the main architects of the reform.

plans. As the primary aim of this chapter is to prepare and complement the empirical analysis of survey data in later chapters, I will largely concentrate on changes that affected recent retirement cohorts. Some of the changes that are currently most fervently debated (e.g., the increase of statutory retirement to 67 or the strengthening of private pensions in Germany) will play only a marginal role in my discussion, as they will primarily affect future retirement cohorts.

Public pension programs and overall benefit levels

For most of the observation period, the statutory retirement age was 65 in both countries. Americans born 1938 or later were affected by a gradual increase in the full retirement age, which is set to increase further, to 67 years, for Americans born after 1959. In Germany, the scheduled gradual increase of the standard retirement age from 65 to 67 does not affect Germans born before 1947 (with 67 being the full retirement age for birth cohorts 1964 and later).

Unlike unemployment compensation, 'Social Security' – as the American public pension scheme is often called – is a federal program with uniform rules determining coverage, eligibility, and benefit calculation. First introduced in 1935, Social Security has been repeatedly expanded to new groups of workers and today covers more than 90% of the workforce, including the majority of the self-employed. Germany's public pension program dates back to the late 19th century. It is somewhat less encompassing than Social Security, mainly because the self-employed (with some exceptions, e.g., for self-employed teachers or artists) and public employees with 'civil servant' status (*Beamte*) are not covered by the program.¹⁶ However, civil servants generally have lifetime employment contracts and receive retirement benefits that tend to be more generous than regular public benefits.

Benefit levels. In both countries, monthly retirement benefits are closely related to earnings histories. Under current regulations¹⁷, German workers are awarded so-called 'earnings points' (*Entgeltpunkte*) on the basis of their earnings during a given calendar year. To calculate the number of earnings points, a worker's earnings are divided by the average earnings of all

16 Self-employed workers not belonging to the groups that are automatically covered can make voluntary contributions, however.

17 See Borgmann and Heidler (2007) for technical details on the 'old pension formula' applied before 1992.

covered workers. A worker who earned only 50% of the average in a given calendar year would thus receive 0.5 earnings points and a worker earning 150% of the average would receive 1.5. Monthly benefits are then calculated by multiplying all earnings points accumulated during the career with a constant, the so-called 'current pension value' (*Aktueller Rentenwert*)¹⁸ and two further factors that depend on age at pension take-up (*Zugangsfaktor*, see discussion of actuarial reductions for early retirement below) and the type of pension (*Rentenartfaktor*).¹⁹ The current pension value is adjusted annually according to a factor that depends on wage growth among the insured population and a few other variables. It is clear from this short summary of benefit calculation that pension benefits are roughly proportional to lifetime contributions, because the number of earnings points is more or less a linear function of covered earnings.

American Social Security benefits are calculated on the basis of a worker's average indexed monthly earnings (AIME). A worker's AIME value essentially is the average of past annual earnings divided by twelve and adjusted for average wage growth.²⁰ Only the 35 years with the highest earnings are used in the calculation (years with zero earnings are included if a worker has fewer than 35 years with positive earnings). The worker's AIME then serves as the basis for calculating the so-called primary insurance amount (PIA). For a worker claiming Social Security benefits at the full retirement age, monthly benefits are equal to the PIA. Importantly, the formula for calculating the PIA is quite progressive, that is, workers with low AIME have a substantially larger proportion of their AIME replaced by Social Security benefits: In 2013, the PIA was calculated by summing 90% of the first \$791 of AIME, 32% of AIME over \$791 and through \$4,768, and 15% of AIME above \$4,768, up to an upper limit given by maximum taxable earnings (\$8,230 for a person retiring at age 65 in 2013).²¹ The threshold values or 'bend points' used in this formula are updated annually according to average wage growth.

Table 3.3 presents OECD (2007) estimates of net replacement rates – which are preferable to gross replacement rates because they account for

18 The 2012 values were €24.92 for East and €28.07 for West Germany (http://de.wikipedia.org/wiki/Aktueller_Rentenwert, accessed December 18, 2012).

19 The *Rentenartfaktor* ('type of pension factor') is 1 for old-age pensions and full disability benefits and smaller than 1 for partial disability benefits and survivors' pensions.

20 However, earnings are indexed to the year when the retiring worker turned 60 and not to the year of retirement.

21 For the calculation of the PIA, see <http://www.ssa.gov/oact/cola/piaformula.html>, accessed December 18, 2012. For information on maximum taxable earnings, see <http://www.ssa.gov/oact/cola/examplemax.html>, accessed December 18, 2012.

differences in benefit taxation – for a worker who enters the labor market at age 20 and works without interruption until standard retirement age. According to Table 3.3, the replacement rate for an American worker who earned 50% of average earnings throughout his career is 67.4%. Workers with higher earnings have lower replacement rates. Consistent with the progressivity of the benefit formula, a typical worker earning 150% of the average wage had a much lower estimated replacement rate of 47.9% and a worker earning twice the average wage had a replacement rate of only 43.2%.

Table 3.3 Net replacement rates for male workers at different earnings levels

	Earnings, in % of average				
	50%	75%	100%	150%	200%
Germany					
Approximate replacement rate for recent retirement cohorts (pre-reform scenario)	66.3	73.4	79.5	86.9	65.2
Impact of recent reforms on future replacement rates (1984 birth cohort)	53.4	56.6	58.0	59.2	44.4
United States					
	67.4	58.0	52.4	47.9	43.2

Pre-/post-reform comparison missing for us because no major changes took place (OECD 2007: 64ff). Source: OECD (2007)

For German workers, Table 3.3 presents two sets of estimates. Estimates in the upper row are based on the so-called pre-reform scenario that does not account for legislative changes during the 1990s and 2000s. These figures should provide reasonable approximations to the replacement rates received by recent retirement cohorts. According to these estimates, the net replacement rate for a German worker with 45 years at 50, 150, and 200% of average earnings were 66.3, 86.9, and 65.2%, respectively. Except at the lower end of the earnings distribution, public pension replacement rates were thus considerably higher in Germany.²²

I will discuss changes in pension generosity among recent retirement cohorts shortly. Before doing so, let me briefly highlight the dramatic impact

22 Higher benefit levels are one major reason why the payroll tax levied to finance public pensions is considerably higher in Germany than in the us. In 2012, the German payroll tax was equal to 19.6% of covered gross earnings. The American tax was only 10.4%, a temporary reduction (in response to the World Financial Crisis) from 12.4%. In both countries, contributions are paid half by employers and half by employees.

of recent reforms on future retirement cohorts. The second set of figures for Germany show the OECD's (2007) projected replacement rates for the 1984 birth cohort. For the US, no such projections are available, simply because no comparably far-reaching reforms have been passed (yet). The projections for Germany are striking, however. Depending on the earnings level, they imply declines from about 13 to over 20 percentage points compared to the replacement rates enjoyed by recent retirement cohorts. It is understandable that these changes have stirred considerable debate about the economic well-being of future retirement cohorts.

Even though the most dramatic changes are thus yet to come, there were also a number of small and incremental changes affecting overall (net) benefit levels for German workers who retired during the observation period of this study. For example, public pensions became subject to health insurance contributions in 1983 and the contribution rate was gradually increased to the full 'employee contribution rate' (*Arbeitnehmeranteil*)²³ until 1987 (Borgmann and Heidler 2007). Net pension levels were thus also affected by subsequent increases in health insurance contributions.²⁴ There were also repeated and rather technical changes in benefit indexation (for further details, see Borgmann and Heidler 2007; Bäcker et al. 2009; Wörz 2011b).

Borgmann and Heidler (2007) quantify the impact of changes in German pension legislation between 1970 and 2004 by calculating their impact on Social Security Wealth (see Section 3.2 above), a measure that is common in the economics literature and closely related to monthly benefit levels.²⁵ Unfortunately, their results are only presented in graphical form so it is not possible to reproduce their exact estimates here. For their prototypical pensioner, a single childless man retiring at the full retirement age of 65, Borgmann and Heidler (2007) calculate modest declines in ssw from the

23 Like contributions to the public pension schemes, contributions to statutory health insurance for wage and salary workers are paid partly by employees and partly by employers. For recipients of public old-age pensions, the public pension scheme pays the employer's part of the contribution.

24 Between 1990 and 2010, the (average) employee contribution rate increased from 6.3% to 7.9% (see http://www.sozialpolitik-aktuell.de/tl_files/sozialpolitik-aktuell/_Politikfelder/Finanzierung/Datensammlung/PDF-Dateien/tab116.pdf for full contribution rates, i.e., combined contributions of employee and employer; accessed March 17, 2014).

25 Social Security Wealth, introduced by Feldstein (1974), is equal to the discounted value of expected lifetime benefits, which means that, in addition to the level of monthly benefits, it also depends on remaining life expectancy at the time of pension take-up. ssw also depends on the chosen discount factor, but this is of minor importance if the goal is to compare levels of ssw across cohorts or point of time (rather than, for example, to other types of wealth).

mid-1980s to the mid-1990s and somewhat stronger declines over the following ten years. Consistent with legislative changes discussed below, they calculate much larger reductions in ssw for two other types of workers: an early retiree and an early retiree with seven years of education after age 16. The results of this simulation study – limited, but noticeable across-the-board decreases in benefit levels and stronger cuts for early retirees and for those with many years of education – are consistent with the results of more qualitative analyses (cf. Wörz 2011b).

Table 3.4 Changes in US social security net replacement rates (RR) by level of earnings

	Replacement rate in %				Change in rr	
	1980	1990	2000	2007	2007-1980	2007-1980
Low earnings	66.0	58.4	52.2	56.7	-9.3	-14.1
Average earnings	48.9	43.5	38.8	42.0	-6.9	-14.1
High earnings	47.9	39.8	33.2	35.0	-12.9	-26.9
Maximum earnings	40.6	35.7	28.6	28.8	-11.8	-29.1

Replacement rates for hypothetical workers retiring at the full retirement age (65 for years 1980, 1990, 2000; 65 years and ten months for 2007)

Source: USHOR (2008a: Table 1-49)

Like their German counterparts, American cohorts retiring during the observation period of this study experienced a gradual decline of Social Security benefit levels. Table 3.4 reproduces net replacement rates for retirement at age 65, as calculated by official US sources (USDOL 2008a) and compiled by Grell (2011a: 12, Table 1). The decreases in replacement rates between 1980 and 2007 are noticeable, ranging from 6.9 percentage points for a worker with average earnings to 12.9 percentage points for a worker with high earnings. This is equivalent to declines of, respectively, 14.1 and 29.1% of baseline replacement rates in 1980. Reductions were larger for higher-earning retirees, whose replacement rates had already been lower in the 1980s. Neither Grell (2011a) nor USDOL (2008a) provide explanations for these trends in replacement rates. As there were no changes in the benefit formula (other than through wage indexation), changes in benefit taxation are a likely reason for the decline in replacement rates, especially for workers with high earnings (Social Security benefits first became taxable in 1984 and taxation of high-income beneficiaries was increased further in 1993; cf. Burman and Saleem 2004; Scott 2013). Trends might differ by earnings level because of the growth of earnings inequality over recent decades (Katz and Autor 1999): Since indexation of past earnings (for the purpose

of calculating AIME) is based on average earnings growth, low-earning workers would see their early-career earnings indexed at rates that exceed the rates of growth that they actually experienced over the course of their careers (in other words, indexed early career-earnings will be high relative to earnings just before retirement). Furthermore, because low-earning workers' AIME have grown at below-average rates, a larger portion of their AIME will fall into the lower brackets where the replacement rate is higher (again, because the bend points of the benefit formula are tied to average wage growth; cf. Autor and Duggan 2003, who argue along these lines in the context of disability benefits).

Supplementary benefits. A major difference between American and German public pensions concerns the availability of supplemental benefits for spouses and dependent (i.e., minor or disabled) children of *living* beneficiaries.²⁶ Whereas Germany provides no auxiliary benefits for dependents, spouses of Social Security recipients, who are disabled or aged 62 or older and who do not claim Social Security benefits on their own, are entitled to a supplement of 50% of the primary recipient's benefits (Isaacs 2010). Supplements are also available for children below age 18 (19 if still in high school) and for older disabled children. However, total benefits are capped at 150 to 180% of the insured person's benefits. Even divorced spouses are eligible for spousal benefits if they have not remarried, if the marriage lasted at least ten years, and if they meet the usual age/disability requirements. Availability of spousal benefits implies that Social Security replacement rates for single (male) breadwinner families are substantially higher than those shown in Table 3.3. Ignoring the impact of benefit taxation, these rates would have to be multiplied by a factor of about 1.5, lifting them near or even above German (pre-reform) replacement rates, especially for families with low preretirement earnings. Availability of spousal benefits thus subsidizes single breadwinner families – and it is therefore somewhat surprising to find them in the US, but not in Germany, the country usually considered to have a stronger male breadwinner orientation (Lewis 1992).

Pension credits for non-work periods. Differences between the US and Germany also exist with regard to the crediting of certain non-work periods. In contrast to the US, where there are essentially no pension credits for non-work periods, the German system long awarded generous pension

26 In both countries, there are survivor pensions for orphans and widow(er)s of deceased workers and beneficiaries.

credits for times spent in full-time education. Years in education (including higher education) after age 16 were credited at 75% of average earnings up to a maximum of 13 years until the early 1990s. Starting in 1992, the number of creditable years was gradually reduced, first to seven (1992 reform) and then to three years (1997 reform). Finally, between 2005 and 2009, educational credits were phased out completely for most types of education (Wörz 2011b).²⁷ Retirement benefits for workers with long educational records, in particular university graduates, have thus fallen substantially since the 1980s. At current benefit levels, benefit reductions would be around €200 per month for a person with 13 formerly creditable years of education after age 16. In contrast to education credits, pension credits for child rearing have been substantially expanded, from one year at 75% to three years at 100% of average earnings per child. However, these extensions only apply to parents of children born after January 1, 1992, and hence are hardly relevant for recent retirement cohorts.²⁸

Complementary pensions

Given Social Security's modest replacement rates for workers with higher incomes, complementary pensions – that is, employer-provided (second-pillar) and individual private (third-pillar) pensions – have long played a greater role for older Americans than for older Germans: According to OECD estimates for the mid-2000s (OECD 2009: 60, Figure 2.3), the average German household headed by a person aged 65 or older received roughly 73% of their disposable income from public pensions and transfers and 15% from private pension and other capital income. The corresponding figures for the US are 36% and 30%, respectively. The remaining portion of disposable income, a mere 12% in Germany and a more significant 34% in the US, came from employment income, which was of course contributed by younger household members to some extent, but also reflects the greater propensity of Americans to work after statutory retirement age (see Figure 3.2 above).

I now give an overview of complementary pensions in the US and Germany. I begin with a discussion of the (changing) American situation, which

27 Up to a maximum of eight years in education are still credited towards 'qualification periods'. While they no longer affect benefit levels directly, they may thus still be relevant with regard to eligibility for early retirement options that require a certain length of the contribution period (see discussion of early retirement options below).

28 The one-year credit was introduced in 1986 and, in contrast to the 1992 expansion, was applied retrospectively, that is, it was also granted to mothers whose children were born before 1986 (Fasang 2008).

also serves to introduce some general differences among different types of complementary pension plans. In a second step, I then review the role of complementary pensions in Germany.

Complementary pensions in the United States. Occupational and private pension plans come in various flavors and their heterogeneity is particularly large in the United States. Second-pillar employer-provided pension plans account for approximately two thirds of retirement savings. Another quarter is allocated to 'Individual Retirement Accounts' (IRAs), the most important form of third-pillar individual private pension plans (Grell 2011a: 20). To encourage saving, contributions to IRAs and employer-sponsored plans below certain contribution ceilings are usually exempt from taxation or subject to reduced tax rates. To receive such preferential treatment, both employer-provided plans and IRAs have to meet certain requirements. Benefits from employer-provided plans and withdrawals (or 'distributions') from IRAs are subject to income taxation. Early withdrawal (before age 59 and a half) of savings from IRAs or other types of retirement savings accounts is possible but subject to an additional tax penalty of 10%.²⁹

A crucial distinction in regard to complementary pension plans is between defined-benefit (DB) and defined-contribution (DC) plans. These two broad classes of retirement plans are internally diverse and I cannot provide more than a stylized overview. DB plans resemble public PAYG schemes in that retirement benefits are some (complicated) function of a worker's contribution or earnings history. DC plans, by contrast, are similar to private savings accounts: The worker's contributions (and potential employer supplements) are invested in one way or another, with the worker usually having substantial discretion over portfolio decisions. From the worker's perspective, an oft-cited advantage of DC plans is their portability: Savings in DC accounts are readily transferred into accounts with new employers, whereas many DB plans punish changes of employer, for example, by tying benefits to length of service or final salary.

In the United States, DC plans have replaced DB plans as the dominant type of employer-sponsored pension over the last decades. Wolff (2003: 486, Table 4) estimates that the proportion of households aged 47-64 with positive DC pension wealth rose from 11.9% to 59.7% between 1983 and 1998. Over the same period, the share of households with positive DB pension wealth (i.e., with DB pension entitlements from previous and/or current jobs) declined from 87.0% to 52.7%.

29 This penalty can be waived in cases of financial hardship such as high medical expenses.

Importantly, DB and DC plans have different consequences for risk sharing between worker and employer. Under a DB plan, employers carry the lion's share of investment risk: For a given earnings or contribution record, the plan guarantees participants a certain level of benefits, and employers are the ones who have to ensure that they can meet their payment obligations.³⁰ Under a DC plan, workers are the primary carriers of risk: If their investment choices turn out poor, they may end up with limited resources for retirement. This potential problem can be exacerbated by the fact that the 'administrative fees' charged by providers of DC plans (or the providers of the mutual funds that DC wealth is often invested in) tend to be considerably higher than (implicit) fees for DB plans or public pension schemes (Blackburn 2008).

It is because of this difference in the primary carrier of risks that Jacob Hacker (2006) considers the growing importance of DC plans as a core element of *The Great Risk Shift*. Of course, DC plans may also prove advantageous, at least for some workers. If workers make good choices and stock market trends are favorable DC plans can yield much higher returns on savings than would be enjoyed under a DB alternative. I will further explore these issues in Chapter 5. One thing that is worth noting at this point is that the overall economic climate and stock market trends in particular were rather favorable during the 1990s (Wolff 2011). The latest American retirement cohort included in my data are workers who left employment in 2002, long before the Financial Crisis of the late 2000s, which has caused much concern about retirement income security (see, for example, VanDerhei 2009; Maurer et al. 2011, Wolff 2011). In this study, the consequences of the shift toward DC pensions will thus be examined under 'best-case' conditions.

Another difference between DB and DC plans is that they tend to differ in terms of (default) payment options. As noted in Chapter 2, many commentators argue that a considerable fraction of American retirees is 'underannuitized' in the sense of consuming too little of their retirement savings in the form of annuities that guarantee monthly payments until the death of the primary recipient (or of the primary recipient's survivors) (Brown et al. 2001; Diamond 2004; Diamond and Orszag 2005; Brown et al. 2008). Annuitization is crucial because it provides protection against the risk of outliving one's assets. Under DB plans, the default payment option

30 DB plans are not completely risk-free for workers because plans may be only partially insured against bankruptcy of the provider. In the US, employer-sponsored DB plans are insured by the *Pension Benefit Guaranty Corporation*.

usually does involve some form of annuity payments³¹, although so-called cash-balance plans that allow workers to choose a lump-sum payment instead of an annuity are increasingly common (Blostin 2003). This trend notwithstanding and even though many DC plans do offer alternative options³², lump-sum payments are more common with DC plans. Even if a DC plan does not offer an annuity option, beneficiaries may of course use their lump-sum distribution to purchase an annuity on the general market, but many observers suggest that this is (too) rarely done and that annuity markets are not functioning well, perhaps due to adverse selection problems (Diamond 2004; Munnell and Sunden 2004). This suggests that the growing prevalence of DC plans may increase the number of retirees whose long-term financial well-being is precarious.

The difference in default payment options also suggests that the growing prevalence of DC plans has raised the importance of non-annuitized wealth – which is not captured by the income measures used in the empirical chapters of this study – for financing consumption in retirement. This issue must be kept in mind when interpreting changes over time in the US, but it should not be exaggerated. In a recent study based on the Health and Retirement Study (HRS), Poterba et al. (2011: 25) estimate that '[h]alf of all households headed by someone between the ages of 65 and 69 in 2008 had total financial assets, including assets in IRAs and 401(k)s, of less than \$52,000' (401(k)s, named after the relevant section in the US tax code, are the most common form of employer-sponsored DC account). Even though 401(k) balances may be somewhat underreported in the HRS (Venti 2011), this estimate suggests that the majority of US households headed by a just-retired or soon-to- retire person did not hold massive amounts of non-annuitized (non-housing) wealth even in the mid-2000s.

Coverage by, and actual participation in, employer-sponsored pension plans are highly stratified. In general, coverage is higher for male, white, full-time, higher-educated and higher-earning workers as well as for workers in the public sector and in large private sector firms (Copeland 2011). These differences are of course interrelated. For example, in 2010, women were

31 Often several annuity options are available which differ, for example, with respect to the provision of survivor benefits. An important variant that facilitates early retirement is the level income option, which pays higher benefits until recipients become eligible for Social Security benefits (Blostin 2003).

32 According to the figures reported in Blostin (2003: Table 2 on p.4), about one third of DC plans in private industry feature an annuity option and roughly half a so-called 'installment option' that provides monthly payments for a specified number of years – but not necessarily until the beneficiary's death.

more likely to participate than men when annual earnings were controlled (Copeland 2011: 15, Figure 5). Participation rates tend to rise during macro-economic expansions. In part because of this relationship, participation rates rose during the late 1990s and declined somewhat thereafter.

Extant research also documents two important secular trends in group-specific coverage rates. The first is a convergence of coverage rates by gender. According to estimates by Copeland (2011: 30, Figure 22) the participation rate of female wage and salary workers ages 21-64 increased from 40.7% in 1987 to 44.4% in 2010, while the participation rate of their male counterparts fell from 51.0% to 45.3%. The second trend can be described as a trend towards increased inequalities in pension coverage, particularly among male workers. Wolff (2011: Ch.4) shows that, among current workers below age 65, differentials in coverage rates by race, income, and education grew considerably between 1980 and 2007. More importantly, he also shows that differentials in household complementary pension wealth by educational attainment grew considerably over the same period in practically all age groups (cf. Wolff 2011: Ch. 6). This trend also holds for households with heads aged 56-64 and 65+, which are the most relevant age groups in the context of the present study. He also finds that the shift from DC to DB pensions was a crucial factor behind these trends, as DC pensions are much more unequally distributed, both in terms of coverage and pension wealth.

Complementary pensions in Germany. According to Börsch-Supan et al. (2001: 173-174), '[a]lthough company pensions exist in Germany, their role is subsidiary' and 'the average [company] pension is [...] low'. In comparison to the US, the same can be said about private savings and individual retirement plans. Given this widespread perception, it is surprising to find that recent data on complementary pension coverage suggest that the proportion of the working-age population who are covered by an occupational and/or individual private pension plan is similar in the US and Germany (Antolin and Whitehouse 2009; OECD 2011: 173), although there may of course still be substantial differences with respect to expected benefits from these plans. As noted above, OECD (2009: 60-61) data for the mid-2000s do confirm the conventional wisdom that American retirees draw a considerably larger portion of their income from 'capital', which includes complementary pension (as well as asset) income. In addition, German reform measures in the early 2000s, most importantly the *Riester-Reform* of 2001, sought to expand complementary pension coverage and recent figures partly reflect

their impact. For the cohorts examined in this study, German-American differences in coverage rates have therefore likely been greater.

As in the US, complementary pension coverage in Germany is stratified by earnings (OECD 2012: Ch.4) and other (related) characteristics such as gender or occupation (TNSIT 2008). For example, according to recent OECD (2012: 111-113) estimates, the average coverage rate (in % of the total labor force) was 39% for the lower half and 66% for the upper half of the income distribution. The corresponding figures for the US are 37% and 81%, respectively, suggesting that inequalities in complementary pension coverage may be somewhat smaller in Germany.³³ However, this may again reflect the impact of recent reforms, as participation in Riester-type plans (which are eligible for quite progressive public subsidies) is distributed more equally across the income distribution than participation in other complementary pension plans (OECD 2012: 119-121).

It is also important to note that, in comparison to the US, second- and third-pillar pensions in Germany are predominantly low-risk. Pure defined-contribution company pension plans where workers carry the full investment risk are not recognized as occupational pensions under German law and are therefore not eligible for exemptions from taxes and social security contributions: Employers or their contractors are required to guarantee a minimum pension to their employees (Beckstette and Zwiesler 2004; OECD 2012: Ch.5). Similarly, third-pillar pension plans also need to guarantee a minimum pension to be eligible for Riester-type subsidization. Typically, German complementary pension plans will thus be either pure DB plans or hybrid plans with a strong risk-hedging DB component.

Presumably due to their limited importance for retirement income, empirical research on complementary pensions in Germany is relatively scant, making it difficult to draw definitive conclusions about changes over time. To assess changes in the relative importance of different income sources for recent retirees, I therefore used data from the American Panel Study of Income Dynamics (PSID) and the German Socio-Economic Panel (SOEP) to estimate trends in the relative importance of public pension income, private (i.e., complementary) pension income, and asset income for people aged 66 to 70. More specifically, I computed the average proportion of total pre-tax post-transfer income (household pre-tax income from all public and private sources) coming from each of these income sources (pre-tax post-transfer

33 The original OECD publication presents decile-specific coverage rates. I obtained estimates for the lower (upper) half by averaging coverage rates across the bottom (top) five deciles. Data are available from <http://dx.doi.org/10.1787/888932598550> (accessed December 13, 2012).

income additionally includes labor earnings, private transfers, and public non-pension transfers, see Chapter 4).

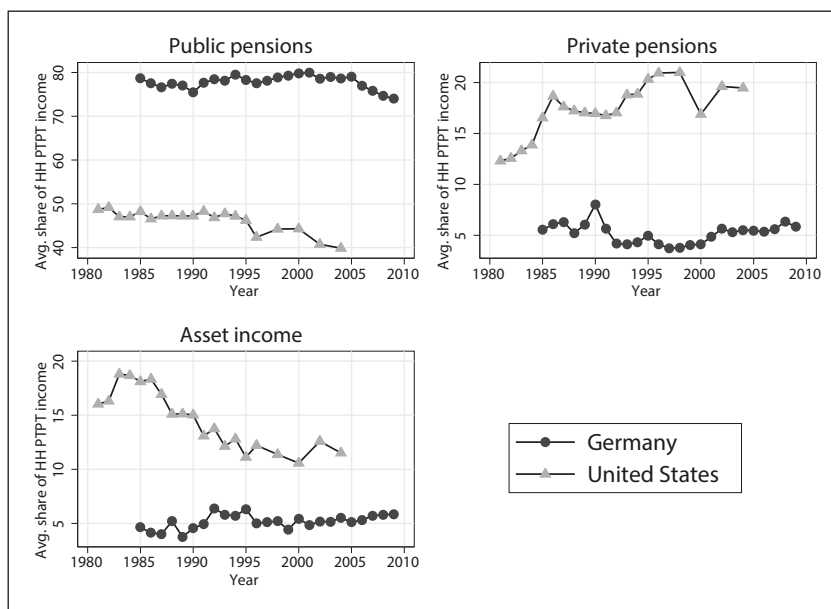
Figure 3.3 confirms that public retirement income is much more important for Germans than for Americans and vice versa for private income sources. During the observation period, Germans aged 66-70 derived between 70 and 80% of their income from the public pension system, while this proportion was between 40 and 50% for Americans in this age group. As for trends over time, American results show a modest decline in the importance of public pensions as well as a more substantial decline in the importance of asset income. At the same time, the proportion of income coming from private pensions has risen considerably, suggesting a crowding-out relationship between private pension and asset income: As DC plans and IRAs have become more widespread, workers may have shifted general savings (i.e., savings not earmarked as retirement savings) into these explicit retirement savings devices.³⁴

As for German trends over time, results suggest at most a very slight increase in the importance of private retirement income towards the end of the observation period. Between the late 1990s and late 2000s, the average share of income coming from private pensions rose from approximately 4 to approximately 6%. Compared to the 1990s, the relative importance of private retirement income had already been somewhat greater in the 1980s, so the share has actually followed a rather flat U-shape over the course of the observation period. The dip is clearly attributable to East Germans joining the population in the early 1990s: For obvious reasons, this group had accumulated very limited occupational pension entitlements. In this context, it is somewhat surprising that I cannot find a similar pattern for the asset income share, which shows no clear trend over time (and in fact takes its highest values in the early 1990s, that is, immediately after reunification). Overall, the pattern of changes in Germany is thus rather complex, but it is clear that the relative importance of private sources for retirement income has risen very modestly at most and remained far below American levels throughout the observation period.

Early retirement options. I conclude my overview of public and complementary pensions with a discussion of early retirement options. I will concentrate on early retirement options in the public pension programs. Given the great

34 However, Wolff (2011: 57) concludes that 'previous studies that consider whether accumulations in DC pension plans add to net household wealth or merely substitute for other forms of household savings have been inconclusive'.

Figure 3.3 Trends in the relative importance of different income components, ages 66-70



Graphs depict the average proportion of household pre-tax post-transfer (HH PTPT) income from the income source given in the title. Additional income components (not shown): labor earnings, private transfers, public (non-pension) transfers. See Chapter 4 for details.

Sources: CNEF, PSID, SOEP, own calculations

diversity of complementary pension plans, a review of early retirement arrangements in second- and third pillar pension plans is not feasible. As a general rule, however, it can be stated that employer-based DB plans often feature rather generous early retirement provisions once individuals have reached plan-specific early retirement ages (Stock and Wise 1990). Monthly benefits tend to be only mildly reduced as a consequence of early benefit take-up and the reduction is generally less than would be required by actuarial neutrality. As noted above, actuarial neutrality holds when the present value of expected retirement benefits is independent of retirement age, that is, when the (monthly) benefit reduction for early retirement is just large enough to offset the fact that benefits will be collected for a longer period of time (see Clemens [2004] for a thorough discussion). Because they are essentially savings accounts, DC plans are actuarially neutral by construction: Retiring earlier means that accumulated savings will have to sustain the retiree for a longer period of time. Similarly, an early-retiring worker seeking to annuitize her DC savings will have fewer resources available than a later-retiring worker

and will pay a higher price for a given level of (monthly) annuity income because of her longer remaining life expectancy. Early retirement thus tends to be more costly for DC than for DB participants and the growing prevalence of DC plans presumably is an important driver of recent increases of the recent trend towards later retirement in the US (Munnell et al. 2003). By the same token, DC (rather than DB) coverage can also be expected to raise the costs of (involuntary) early retirement after late-career job loss or declines in health, thereby creating incentives for returning to (or remaining in) employment after the occurrence of these events.

Turning to public retirement benefits, early take-up before the full retirement age can result in lower benefits for two main reasons (Clemens 2004; Hoffmann 2007; Himmelreicher and Stuchlik 2008). The first is that early retirees forego future earnings and pension contributions that would have resulted in higher benefits. This factor tends to weigh more heavily in Germany where each additional earnings point raises pension claims by the same amount, that is, regardless of the number of earnings points a worker has already accumulated. A worker with average earnings who retires at age 60 rather than 65 will thus forego five additional earnings points, the equivalent of approximately €140 in monthly benefits in West Germany in 2012. In the US, losses due to foregone earnings are limited by the fact that AIME are calculated on the basis of the 35 years with the highest earnings (see above).³⁵ Actuarial reductions are the second major reason why early benefit take-up usually entails lower benefits. Actuarial reductions ensure that an early-retiring worker will receive lower benefits than a late-retiring worker with the same contribution history (or, more precisely, the same number of earnings points or AIME). Actuarial reductions thus (partly) compensate for the fact that early-retiring workers will on average collect their benefits for a longer period of time.

At what ages can (non-disabled) American and German workers start to collect public retirement benefits and what actuarial reductions do they incur? American regulations are simple to summarize and remained largely unchanged during the observation period: Early pension take-up is possible from 62 onwards, but it involves (relatively high) benefit reductions of 5/9% per month of early retirement. Assuming a statutory retirement age

35 To see this, consider a worker who ponders whether to claim pensions or work for another year: Because AIME are calculated on the basis of the 35 highest-earning years, earnings during the next year must be higher than for at least one of what currently are her 35 highest-earning years to affect her AIME. Even if this is the case, the net gain in Social Security benefits would be small unless earnings during the additional year are much higher than earnings during the lowest-earning of what previously were the 35 highest-earning years.

of 65 years, this adds up to a total reduction of 20% for a person retiring at age 62. Non-disabled retirees under 65 are also ineligible for Medicare, the public health care program for the elderly, until reaching full retirement age. Despite these substantial disincentives, the proportion of American workers claiming Social Security benefits at age 62 has remained above 50% since the mid-1980s (USDOL 2008a: 61, Table 1-27). The latest birth cohorts examined in this study were affected by the gradual increase of the full retirement age to 67. More specifically, the statutory retirement is set at 66 for birth cohorts 1943-1954 and was gradually increased in steps of two months per (birth) year for those born between 1938 and 1942. Retirement at age 62 remains possible for these cohorts, but triggers additional benefit reductions. For those retiring more than three years before their full retirement age, a smaller reduction factor of $5/12$ (as opposed to $5/9$) % is applied for every month beyond the first 36 months. For example, pension take-up at age 62 entailed benefit reductions of 24.17% for workers born in 1942 and of 25% for birth cohorts 1943-1954.

German early retirement options are more difficult to summarize, as they have long been based on an intricate system of group-specific pensions. Throughout the observation period, workers who did not meet the eligibility requirements of any of these group-specific pensions could not claim public old-age pensions before the full retirement age. The vast majority of workers, however, were eligible for at least one of several early retirement options. Before the changes introduced by the 1992 pension reform³⁶ (see below), these workers could generally claim benefits before the full retirement age *without incurring benefit adjustments*.

Four early retirement options were by far the most important³⁷: The old-age pension (OAP) for women allowed women with 15 or more years of contributions, at least ten of which were acquired after age 40, to claim old-age pensions at age 60. The OAP for the long-term insured offered retirement at age 63 to workers with a contribution record of at least 35 years. Given the relatively favorable labor market conditions of the post-war decades and generous pension credits for times spent in military service and education, this requirement was met by most men³⁸ from the cohorts studied here.

36 The reform bill was actually passed in 1989, but is named after the year when its first regulations became effective.

37 There are a few more group-specific pensions of limited numerical importance which I do not cover here (e.g., the old-age pension for miners).

38 I deliberately refer to men here because this option has always played a marginal role for women. The simple reason is that women meeting the eligibility requirements for the OAP for the long-term insured were usually eligible for the OAP for women (Bäcker et al. 2009: 63).

The OAP for the severely disabled entitled people who were recognized as severely disabled to a regular old-age pension at age 60. Finally, the OAP after long-term unemployment and old-age part-time work (hereafter: OAP after long-term unemployment) provided early retirement benefits at age 60 if a worker was currently unemployed and had been unemployed for a total of at least 52 weeks after age 58 and a half (or had been in old-age part-time work for at least 24 months). In combination with the provision lifting job search requirements on older unemployed people who committed to claiming a deduction-free OAP at the earliest possible date (*58er-Regelung*, see Section 3.4.2 above), this early retirement option was crucial in making the ‘unemployment pathway’ one of the major routes for (very) early exit from the labor force in Germany (Jacobs et al. 1991; Knuth and Kalina 2002; Ebbinghaus 2006).

The 1992 pension reform introduced major changes to these early retirement options. In the original bill, increases in the retirement ages for group-specific pensions were scheduled to start in 2001, but due to financial considerations and growing concerns about the prevalence of early retirement the reform was later preponed (Bäcker et al. 2009: 60; see Table 3 for details). For all four group-specific pensions, ages for reduction-free pension take-up were gradually raised, usually in steps of one month per month of birth.³⁹ Early retirement at the former age thresholds remained possible, but became subject to benefit reductions of 0.3% per month (which is still considerably lower than the American adjustment factor of 5/9% per month). Table 3.5 summarizes and provides further details on these changes. Straightforward calculation reveals that the first cohorts affected became eligible for early benefit take-up in the late 1990s and early 2000s. For completeness, Table 3.5 also shows that, ignoring certain protective clauses (*Vertrauensschutz*), old-age pensions for the long-term unemployed and for women have been abolished completely for birth cohorts 1952 and later, while the other two types of pensions have been continued in modified form. However, this is not relevant for the birth cohorts retiring during the observation period of this study.

Taken together, these changes have raised the costs of early retirement considerably (Borgmann and Heidler 2007; Himmelreicher and Stuchlik 2008; Bäcker et al. 2009), even though American provisions still seem to

39 For example, the reduction-free retirement age for the OAP after long-term unemployment was gradually increased for birth cohorts 1937 and later, with the retirement being raised to 60 years and 1 month for workers born in January 1937, to 60 years and two months for workers born in February 1937, and so on.

Table 3.5 Early retirement options in Germany

Type of old-age pension (OAP)	Main eligibility requirements	Birth cohorts	Age for deduction-free take-up	Minimum age for take-up	Benefit reduction for take-up at min. age
OAP after long-term unemployment (and old-age part-time work)	Currently unemployed & total unemployment after age 58 ½ ≥ 52 weeks (or old-age part-time work for 24+ months)	Before 1937	60	60	None
		1937-1941	Gradual increase to 65	60	0.3%-18%
		1942-1951	65	60	18%
OAP for women	Women with at least 15 years of contributions or equivalent periods (at least 10 of which at ages 40 and older)	1952 and later	Abolished (subject to protective clauses)		
		Before 1940	60	60	None
		1940-1944	Gradual increase to 65	60	0.3%-18%
OAP for the long-term insured	35 years of contributions or equivalent periods	1945-1951	60	60	18%
		1952 and later	Abolished (subject to protective clauses)		
		Before 1937	63	63	None
OAP for severely disabled people	Officially recognized as severely disabled (degree of disability ≥ 50%)	1937-1938	Gradual increase to 65	63	0.3%-7.2%
		1939-1947	65	63	7.2%
		1948 and later	Further changes, see Bäckler et al. (2009)		
OAP for severely disabled people	Officially recognized as severely disabled (degree of disability ≥ 50%)	Before 1941	60	60	None
		1941-1943	Gradual increase to 63	60	0.3%-10.8%
		1944-1951	63	60	10.8%
		1952 and later	Further changes, see Bäckler et al. (2009)		

Changes subject to protective clauses (cf. Bäckler et al. 2009: ch. 2 & pp. 402-411). OAP after long-term unemployment and OAP for severely disabled people require minimum contribution/contribution-equivalent periods of 15 and 35 years, respectively. Periods considered as contribution-equivalent differ across pension types (cf. http://de.wikipedia.org/wiki/Wartzeit:_%28Sozialversicherungsrecht%29, accessed December 18, 2012). Examples are years in education after age 16 or times spent caring for children below age 10. Years of disability pension receipt (up to age 60) are counted towards contribution requirements for the OAP for severely disabled people. Sources: Bäckler et al. (2009: ch. 2 & pp. 402-411); Wörz (2011b)

impose somewhat harsher penalties. Toward the very end of the observation period these changes in early retirement options proper became reinforced by reductions in the maximum duration of first-tier unemployment benefits and the abolition of the second earnings-related tier (see Section 3.4.2 above), which lowered the attractiveness of using unemployment benefits as a bridge transfer on the path to early retirement. However, as noted above, the possibility to claim unemployment benefits without being available for work was maintained until the end of 2007, although the declining generosity of unemployment benefits had arguably rendered this option less appealing by then. In any case, the process of scaling back early retirement options and their functional equivalents is still ongoing and in particular was not completed before the end of this study's observation period, even though considerable changes had clearly occurred by then.

3.4.4 Disability benefits

I now turn to one last type of transfer program: earnings-related disability benefits. Disability benefits are most immediately relevant for workers who experience a decline in health. This is because eligibility for disability benefits generally requires that a worker suffers from physical and/or mental conditions that limit her earnings capacity. At the same time, there is convincing evidence that disability rolls are sensitive to changes in labor market conditions and that receipt of disability benefits may sometimes be a hidden form of long-term unemployment, especially in countries with few alternative options for long-term income support (Autor and Duggan 2003; Beatty et al. 2007; Koning and Van Vuuren 2007).⁴⁰ In fact, regulations often explicitly require that award decisions take labor market conditions into account (Blöndal and Pearson 1995) – and Germany is a leading example where this is the case. Similarly, disability benefits may become more attractive when other options for early retirement are restricted (Ebbinghaus 2006: 213ff; Duggan et al. 2007). Older workers may thus use disability benefits as early retirement benefits or as a means of long-term income support after late-career job loss. Yet, while the stringency of screening criteria might of course vary considerably across space and time, it can be expected that demonstrable health problems are indispensable for, or at least greatly

40 Autor and Duggan (2003) argue convincingly that the relationship between local labor market conditions and disability rolls is driven by 'conditional applicants' who apply for disability benefits after (i.e., conditional on having experienced) job loss.

improve an applicant's chances of, gaining access to disability benefits (Bound and Waidmann 2000).

In both Germany and the US, the system of earnings-related disability benefits has a bipartite institutional structure: Disabilities that are related to injuries at work are covered by a different, employer-financed scheme (German *Unfallversicherung* and American *Workers' Compensation*) than disabilities which are not – or at least not directly – work-related. Public coverage of this general (as opposed to work-related) disability risk is provided by special benefits within the two countries' public pension programs. Here, I will mainly focus on the latter programs for workers whose conditions are not work-related. This can be justified by their considerably greater size: In the US, wage replacement benefits paid by workers' compensation totaled \$29.5 billion in 2008, whereas 2009 public disability benefit payments summed to \$118.3 billion (SSA 2011a: pp. 1 and 6). In Germany, there were over 1.63 million recipients of public disability benefits in 2011 (DRV 2012: 3, Table 1.00 G), compared with approximately 750,000 recipients of work-related disability pensions (DGUV 2011: 74; this figure includes pensions paid because of school-related injuries/disabilities which are administered by the same body). That said, benefits provided by the programs for work-related disabilities are broadly similar in Germany and the US and replace approximately two thirds of predisability earnings for fully disabled workers (Aarts et al. 1998). In both countries, partial benefits are available for workers with some remaining earnings capacity (which, as I discuss below, is not the case with public disability benefits in the US).

I now turn to the review of public disability benefits. I first discuss eligibility criteria and availability of partial pensions and then provide an overview of benefit levels. I conclude with a few remarks on complementary disability insurance.

Eligibility criteria and availability of partial benefits. In both Germany and the US, disability benefits are insurance-type benefits intended as (partial) earnings replacements. In addition to medical criteria, workers therefore have to fulfill certain work history requirements to be eligible.⁴¹ As discussed in Section 3.4.1, disabled workers who do not qualify for earnings-related

41 Currently, American workers must have at least one quarter of coverage for each year since age 21. They must also have at least 20 quarters of coverage in the ten-year period before the disability began (this reference period is shorter for very young workers) (ssa 2011b). German workers must have at least five years of coverage and at least 36 months of coverage in the last five years (ssa 2012).

benefits (or whose earnings-related benefits are very low) may be eligible for long-term means-tested income support.

The distinguishing feature of disability benefits is that eligibility requires a worker to be considered as 'disabled'. In most countries, including the US and Germany, disability is ultimately not defined in terms of medical conditions, but in terms of a 'performance criterion' (Haveman and Wolfe 2000: 998), that is, in terms of the capacity to earn a certain amount of money or to perform (certain types of) paid work.⁴² It is also generally required that reductions in earnings capacity can be expected to persist for a certain period of time (for a comparative review of short-term earnings replacements, often referred to as sickness benefits, see Blöndal and Pearson 1995). Of course, the application of general performance criteria to concrete cases can be very difficult and occasional misclassification will be inevitable. However, a detailed discussion of the medical screening process is beyond the scope of this study.

In the US, disability is defined in monetary terms: A person is considered disabled if she is 'unable to engage in substantial gainful activity (SGA)', where 'substantiveness' is defined by a monthly earnings threshold. The 2013 threshold was \$1,040.⁴³ Benefits are awarded on an all-or-nothing basis, that is, applicants are either considered to meet the SGA requirement or not. Partial benefits are not available.

Apart from annual adjustments of earnings thresholds for average wage growth, this definition of SGA has not been modified during the observation period and there were few other important changes. However, 'there have been significant changes in the interpretation of SSA [Social Security Administration, J.P.H.] medical and vocational eligibility criteria' (Burkhauser and Daly 2002: 216). Even when the nominal definition of SGA does not change, there is considerable scope for discretion in how strictly to interpret this standard. In particular, eligibility procedures became more restrictive in the late 1970s and early 1980s, resulting in a strong decline in the number of pensions awarded and in many beneficiaries losing their claim after reevaluation (Burkhauser 2012). However, in response to court rulings and widespread dissatisfaction with the new practice, 'eligibility was relaxed

42 In practice, certain medical conditions may of course be codified as sufficient for assuming disability.

43 <http://www.ssa.gov/oact/cola/sga.html>, accessed December 20, 2012. There is a higher threshold of \$1,740 for blind applicants. These thresholds may appear relatively high. This is underscored by the following calculations by Dean (2005): In 2004, the SGA threshold of \$810 was only slightly below the earnings of a person working full-time at the federal minimum wage (\$824).

again in 1984, and the rolls have been increasing ever since' (Burkhauser and Daly 2002: 216). Most of this increase in the number of recipients occurred in the 1990s and went hand in hand with declining employment rates among working-age adults with self-reported work limitations (Burkhauser and Daly 2002; Burkhauser and Schröder 2004).⁴⁴

Under current German legislation, performance standards are defined in terms of hours of work rather than earnings (Köhler-Rama 2003: 26-27): Workers are entitled to a 'pension because of partially limited earnings capacity' (*Rente wegen teilweiser Erwebsminderung*), if they are deemed capable of working between three and six hours per day. Workers whose earnings capacity is judged to be below three hours per day are entitled to a 'pension because of fully limited earnings capacity' (*Rente wegen voller Erwerbsminderung*). Workers capable of working six or more hours per day are not eligible for disability benefits. Partial pensions amount to 50% of full pensions (details of benefit calculation are discussed below) and are intended to be supplemented with earnings from part-time work. In this regard, an important feature of German award practice is the principle of 'concrete assessment' (*konkrete Betrachtungsweise*; cf. Schubert et al. 2006). This principle requires that partial (rather than full) pensions can be paid only if a worker can realistically be expected to find a part-time job. If part-time jobs are unavailable, even partially disabled workers are entitled to a full pension.⁴⁵ The practice of concrete assessment is widely regarded as the main reason why partial benefits accounted for less than a fifth of men's and less than a tenth of women's newly awarded pensions after the 1970s (Viebrok 2003: Figure 1 on p.205).

Current legislation was introduced by a major reform of disability pensions that was passed in December 2000 and became effective on January 1, 2001 (hence the year used for labeling the reform differs across sources). Before the reform, there were two types of pensions as well, but the key distinction was between 'occupational disability' (*Berufsunfähigkeit*) and

44 Autor and Duggan (2003) argue that this can largely be attributed to two factors: the growing implicit value of Medicare coverage due to rising medical costs and growing earnings inequality which resulted in rising effective replacement rates for low-skilled workers (due to the interaction of below-average wage growth for this group with indexing of benefits to average wages, see Section 3.4.3 above). As summarized in Burkhauser and Daly (2002), other proposed explanations include growing severity of impairments (Kaye 2003) and unintended effects of antidiscrimination legislation (in particular, the *Americans with Disabilities Act* of 1992) which may have deterred employers from hiring workers with disabilities (Acemoglu and Angrist 2001).

45 In practice, the unavailability criterion is routinely considered met if the federal employment agency cannot offer a suitable part-time job within one year (Bäcker et al. 2011).

'incapacity to work' (*Erwerbsunfähigkeit*). Full incapacity to work pensions were granted if a worker's remaining earnings capacity was less than one seventh of the average insured person's income (€325 in 2002; see Viebrok 2003: 201). Like the current pension because of partially limited earnings capacity, occupational disability benefits were intended as partial pensions to be topped up with earnings from own employment. They were, however, set at two thirds (rather than half) of full disability benefits. Importantly, only 'suitable' jobs were to be considered in assessing a worker's eligibility for occupational disability benefits, with suitability being defined on the basis of qualifications and the previous main job.⁴⁶ For younger cohorts, this element of status protection was abolished by the 2001 reform, that is, all types of jobs are now to be considered in assessing eligibility for disability benefits. For workers born before 1961, protective clauses ensure that they can still claim partial benefits on the basis of occupational disability (i.e., taking suitability of jobs into account). However, the rule that partial pensions are now equal to half rather than two thirds of full pensions does apply to these older cohorts as well.

Occupational disability benefits were granted if a worker's 'ability to work had decreased to less than *half* of that of a physically, intellectually and mentally healthy person with similar training and equivalent knowledge and abilities' (Viebrok 2003: 203, emphasis in original). Assuming a 5-day work week with a total of 40 work hours, this definition implies a threshold of 4 hours per day, which is stricter than the 6-hour threshold introduced by the 2001 reform (see Köhler-Rama 2003: 36, note 85). Crucially, however, the principle of concrete assessment was also applied in the context of occupational disability benefits. In particular, workers whose ability to work was greater than half that of a comparable worker could become eligible for occupational disability and in fact even for full disability benefits if suitable, that is, qualification-adequate, part-time jobs were not available (Köhler-Rama 2003: 27ff.; Schnapp and Schmitt 1992: 102). This included workers with relatively minor health problems as the law did not specify a minimum level of impairment for this principle to apply. In this respect, the new regulations are considerably more restrictive: The principle of concrete assessment is only applied if a worker's remaining earnings capacity is below six hours per day. Workers who do not meet the six-hours requirement do not have access to disability pensions and are therefore treated like unimpaired workers even if they cannot find an appropriate part-time job (Köhler-Rama 2003; Bäcker et al. 2011).

46 See Viebrok (2006: 256) for further information on suitability standards.

Benefit levels. In both Germany and the US, disability benefits are calculated on the basis of the formulas for old-age pensions described in Section 3.4.3. However, certain adjustments are made for the fact that disabled workers have shorter earnings histories than workers applying for old-age pensions. In the US, this means that AIME are not calculated on the basis of the 35 highest-earning years, but on the basis of all years after the year when the worker turned 21. As in the calculation of old-age pensions, a certain number of years (those with the lowest earnings) are excluded from the calculation of AIME. The number of these so-called 'dropout years' rises with age.⁴⁷

Benefit calculation in Germany is slightly more complicated, because pension benefits are calculated on the basis of total (rather than average) covered earnings. For purposes of benefit calculation, workers are therefore treated as if they had continued to work (and accumulate 'earnings points') until a certain age. The number of earnings points awarded per month of this 'virtual' (Viebrok 2003: 217) period of insurance (*Zurechnungszeit*) is closely related to the average number of earnings points acquired per month of work before the onset of disability (further details are given below and in Viebrok [2006] and Köhler-Rama et al. [2010]).

How have disability benefit levels changed over time? In Section 3.4.3, I documented a trend toward lower replacement rates for regular old-age pensions. Because of the close linkages between old-age and disability pensions, most of the underlying changes apply to disability benefits as well (Bäcker et al. 2011).

In the US, there seem to have been no important legislative changes that have affected the level of disability pensions beyond this overall trend in pension levels (but recall the possible implications of growing earnings inequality for group-specific replacement rates emphasized by Autor and Duggan 2003, cf. Section 3.4.3).

In Germany, the 2000/2001 reform did introduce further changes that reduced the level of disability benefits in addition to trends in overall pension generosity: First, as noted above, new partial benefits were set at 50% of the full pension – rather than the two thirds provided by the old occupational disability pension. Second, disability pensions claimed before the new full (i.e., reduction-free) retirement age for the OAP for the severely disabled were now treated as cases of early pension take-up. More specifically, benefits became subject to actuarial adjustments of 0.3% for every month until

47 One additional dropout year is granted for every five years since turning 21, up to a maximum of five years. Thus, persons claiming disability benefits before age 27 are not granted any dropout years, while persons ages 47 and over are granted the maximum of five.

the full retirement age (63 for birth cohorts 1944 and later, between 60 and 63 for birth cohorts 1941-1943; see Table 3.5 above). Workers claiming disability benefits before age 60 are treated as having retired at age 60 for the purposes of calculating actuarial adjustments which are therefore capped at 10.8% (given a full retirement age of 63). This considerable decrease in generosity for workers claiming disability benefits before age 60 was partly offset by changes in the calculation of virtual insurance periods. Before the 2001 reform, workers received additional pension credits for all months remaining until age 55 and for a third of the months between ages 55 and 60.⁴⁸ Since the reform, months between ages 55 and 60 are fully counted (rather than only to a third). Köhler-Rama (2003: 37-38) cites estimates by Göhde (2000) according to which the combined effect of these changes was to reduce full disability benefits by 3-4%. Calculations by Viebrok (2003: 219, Figure 3) suggest that losses were greatest for those claiming disability benefits in their late 50s, because these workers feel the full force of the newly introduced actuarial adjustments, while not or only partly benefitting from the more generous calculation of virtual insurance periods. Because of the reduction from two thirds to only half of full benefits, losses are greater for recipients of partial pensions.

Complementary disability insurance. A final issue that deserves brief discussion is the role of complementary insurance against disability-related earnings losses. In both the US and Germany, a worker who starts to claim public disability benefits in his 50s can typically collect benefits that are not much lower than the regular old-age pension that she would have received a few years later (i.e., if she had not become disabled). Thus, if public benefits are largely sufficient for maintaining one's standard of living, there is little need for complementary disability insurance. However, if public pension replacement rates are rather low – as is the case in the US and increasingly also in Germany – disability benefits will have to be supplemented with additional income. One option for older (as opposed to younger) workers may be early take-up of complementary old-age pensions. In this regard, it is important to recall that early retirement tends to be more costly under DC than under DB plans (see 3.4.3), suggesting that, other things being equal, the diffusion of DC plans in the US has reduced

48 For example, a worker becoming disabled at age 50 would have received 80 months of additional credits (60 for the five years until age 55 and another twenty for the five years from ages 55 to 60). A person becoming disabled at age 58 would have received 8 months of additional credits (one third of the 24 months remaining until age 60).

older workers' capabilities for coping with disability via early retirement. A second option is to rely on complementary disability benefits. As with complementary old-age pensions, such complementary coverage can be employer-provided or individualized and technically it can be 'built into' old-age pension plans via special disability provisions or provided by separate insurance plans.

Unfortunately, consistent time series on the prevalence of employer-based and individual disability insurance do not seem to exist for either Germany or US. However, in the American case, experts suggest that the decline of DB pensions has gone hand in hand with a decline of employer-provided disability benefits, which were often provided via disability provisions in DB retirement plans or as separate elements of traditional 'benefit packages' (Rappaport 2011; Shea 2012). As for Germany, the ongoing trend toward lower public replacement rates creates a need for complementary disability coverage that according to most observers has so far been only insufficiently met by employer-provided and/or individual disability insurance (Gunkel 2008; Köhler-Rama et al. 2010; Bäcker et al. 2011).

The growing need for complementary disability insurance likely poses particular problems for low-income households: A first reason is that, like access to other fringe benefits, access to employer-provided disability insurance is highly stratified (for recent American figures, see USDOL 2012: Table 16). Second, low-skilled and low-paid workers tend to face higher risks of becoming disabled, for example, because they work in more physically demanding or psychologically stressful jobs (Köhler-Rama et al. 2010; Bäcker et al. 2011). This drives up the price of individualized disability insurance for these workers, because premia are closely tied to individual disability risks (often ascertained through extensive background checks). The result is a situation where those most in need of complementary insurance are often unable to afford it. Köhler-Rama et al. (2010: 67; translation J.P.H.) therefore conclude that 'the "three-pillar paradigm" is not a realistic model for the risk of invalidity'.⁴⁹

3.4.5 Income taxation

In addition to transfer programs, progressive income taxation is another important means of cushioning the economic impact of trigger events.

49 '[D]as "Drei-Säulen-Paradigma" [stellt] in Bezug auf das Invaliditätsrisiko kein realistisches Modell dar.'

The more progressive a tax system, the more income changes in pre-government (or taxable) income will be attenuated through taxation (Fabig 1999; McManus and DiPrete 2000; Chen 2009).⁵⁰ Overall, the German system of income taxation appears to be more progressive than the American⁵¹ (Mendoza et al. 1993) – while noting that the precise degree of progressivity, defined as the change in the average tax rate associated with a change in taxable income, may be very different at different levels of income.

As for changes in progressivity over recent decades, there appear to be no strong trends in Germany, but the American tax system has become dramatically less progressive at the very top of the income distribution (i.e., for the 0.5% and especially the 0.1% of households with the highest incomes, see Piketty and Saez 2007). Changes were much less pronounced, however, for the middle of the income distribution (Piketty and Saez 2007), which is more relevant to this study. In the lower part, the US tax system appears to have become more progressive due to repeated extensions of the Earned Income Tax Credit (EITC, see Blank [2009]). The EITC is a key element of American ‘activation’ or ‘make work pay’ policies. It is a tax credit awarded to low-income families on the basis of their earned income. The award initially rises with earned income (‘phase-in range’) and thus is effectively a negative income tax. It then reaches a plateau where the credit is at its maximum and does not change with further increases in earned income as long as it remains below a threshold value that marks the beginning of the ‘phase-out range’. In the phase out-range, the credit is gradually reduced, that is, the marginal tax rate is positive, until the credit finally reaches zero. The thresholds for the various stages, the maximum credit, and the (negative) marginal tax rates in the phase-in and phase-out ranges all depend on family composition.

In general, the credit is much more generous for households with children. In 2010 the maximum credit for a childless single person was

50 This can be illustrated by a simple example. Consider a worker whose earnings fall from \$4,000 to \$2,000 after late-career job loss and who does not receive any other income. In a country with a flat (proportional) income tax of 25%, that worker's post-government income would fall from \$3,000 to \$1,500. Relative to predisplacement income, the worker would have experienced a decline of 50% before as well as after taxes (so there is no cushioning of losses through the tax system). By contrast, in a country with a strongly progressive tax system where a monthly income of \$4,000 is taxed at 25% and an income of \$2,000 is taxed at only 10%, the in post-government would fall from \$3,000 to \$1,800, a loss of only 40%.

51 However, consumption taxes, which tend to be regressive because lower-income households consume a larger portion of their income are higher in Germany (Mendoza et al. 1993).

only \$457, compared to a maximum credit of \$5,036 for a single person with two children.⁵² Households must not have investment income (e.g., dividends, interest, or rental income) above a threshold value to be eligible.⁵³ The EITC is intended to reward paid work and therefore only earned income is counted in determining its size. However, disability benefits are considered earned income before the minimum retirement age and may be supplemented by the tax credit. Non-disability pensions are not considered earned income, but neither are they treated as investment income, so it is possible to supplement early retirement pensions with limited earned income and an EITC. However, as the credit to childless household is restricted to persons between ages 25 to 64 (or couples where at least one spouse falls into this age range), it is generally not possible to draw on the credit for income support after reaching the full retirement age. For older workers below age 65 it must also be kept in mind that the credit awarded to childless household has always been very modest.

3.5 Female labor force participation and earnings arrangements

A central tenet of life course sociology is that individual life courses are shaped by their multiple interdependencies with other individuals' lives. This very general idea of 'linked lives' – that '[l]ives are lived interdependently and social-historical influences are expressed through this network of shared relations[h]ips' (Elder 1999: 10) – has been applied to a broad range of questions. Several studies have analyzed the extent of retirement coordination among spouses, with most studies finding that a retired spouse – or the spouse's financial incentives for retirement⁵⁴ – indeed raises the likelihood of retirement (e.g., Allmendinger 1990; Gustman and Steinmeier 2002; Coile 2003; Radl 2010). More recently, studies have begun to explore the impact of family biographies (widowhood, divorce, fertility) for retirement timing (Fasang 2008) and retirement income (Fasang et al. 2013).

52 http://en.wikipedia.org/wiki/Earned_income_tax_credit (access date: November 22, 2012).

53 \$3,150 for tax year 2011 (http://en.wikipedia.org/wiki/Earned_income_tax_credit, access-date November 22, 2012).

54 The economic literature prefers this measure because of the potential endogeneity of spousal retirement status (Gustman and Steinmeier 2002; Coile 2003).

In this study, my main focus is on the role of spousal income as a potential buffer against the financial impact of adverse late-career events. As discussed in Chapter 2, labor income of an employed spouse (or pension income of a formerly working, retired spouse) reduces the relative decline in disposable household income after an adverse trigger event ('insurance effect'). In addition, the presence of a partner opens up the possibility of an added worker effect where the earnings losses of the affected individual are (partly) offset by an increase in spousal labor supply. The actual scope for labor supply responses, however, may depend on the initial employment status of the spouse. A spouse working long hours already may have limited leeway for further increases in labor supply, but among older workers another important option may be to delay retirement (Coile 2004). For long-time non-employed spouses such as homemakers, on the other hand, a substantial added worker effect may be possible in theory, but their actual labor market opportunities may be very limited due to a (perceived) lack of skills (Allmendinger 2010).

These considerations suggest that country differences in prevailing earnings arrangements may lead to differences in the economic consequences of late-career events. Table 3.6 reports employment to population ratios and the share of full-time workers (as a percentage of all workers) for men and women aged 50 to 54, that is, largely before the occurrence of retirement. I report estimates for 1985, 1995, and 2005 to highlight changes over time. Men's employment rates are similar across the two countries, ranging between 81 and 88%, and very few men work part-time. Period differences are also rather small, although there are hints of a downward trend in men's employment rates, especially in Germany. Clear country differences, however, emerge for women. In 1985, 58% of American women ages 50-54 worked for pay, compared to only 46% of their German counterparts. Over time, women's employment rates have grown in both countries, but more rapidly in Germany. Thus, while there was still a substantial difference of roughly nine percentage points in the mid-1990s, the difference had declined to a mere two percentage points in 2005. However, this convergence in women's overall employment rates conceals very different trends in the prevalence of part-time employment: 40% of *working* German women worked less than 30 hours per week in 2005, up from 33% in 1985. In the US, this share fell from 17% to 11% over the same period. In terms of the number of hours worked, German-American differences in women's labor supply thus remained substantial even in the mid-2000s.

Table 3.6 Employment to population ratio (EPR) and prevalence of part-time work at ages 50-54

	Germany			United States		
	1985	1995	2005	1985	1995	2005
Men						
EPR	88	85	81	85	83	83
% working < 30 hrs/week	1	2	5	2	2	2
Women						
EPR	46	60	70	58	69	72
% working < 30 hrs/week	33	35	40	17	13	11

Part-time share is the proportion of working men/women with less than 30 hours per week rather than the population share.

Source: OECD Labour Force Statistics (<http://stats.oecd.org/>)

Table 3.7 more directly looks at earnings arrangements of individuals aged 50-54. It confirms that, among the cohorts studied here, earnings arrangements were more traditional in Germany than in the US. In 2004, 25% of Germans aged 50-54 lived in couples with two full-time earners, compared with almost 40% in the US. Traditional male breadwinner households were more common in Germany, where 46% lived in households with a man working full-time and a woman working between 10 and 30 hours (25%) or less than 10 hours (21%). In the United States, only 28% lived in households where the man worked substantially longer hours (in 13% of cases the woman worked part-time and in 15% she worked fewer than 10 hours). Less than 10% lived in female breadwinner households where the woman was the main earner (in terms of work hours). Over time, there has been a clear trend toward less traditional earnings arrangements and more dual-earner couples in both countries, suggesting that the buffering capacity of families has grown. In both countries, most of the change occurred between the mid-1980s and mid-1990s with 'detraditionalization' slowing down afterwards.

The German trends partly reflect the impact of reunification. As is well known, earnings arrangements had been much less traditional in the German Democratic Republic and to some extent this difference persisted after reunification. The German changes between 1985 and 1995 are therefore partly attributable to the inclusion of less traditional East German households into the population. The changes between 1995 and 2005 conceal different trends in West and East Germany. In the West, there was a continuing trend towards more dual-earner and modified male

breadwinner couples where the woman works part-time rather than not at all or only very short hours. In East Germany, the share of dual-earner couples declined substantially, presumably because of persistently difficult labor market conditions.

Table 3.7 Earnings arrangements at ages 50-54 (column percentages)

	Germany			United States		
	1985	1995	2005	1985	1995	2005
Dual FT earner	16	28	25	28	39	39
Man FT, Woman PT	19	22	25	20	16	13
Man FT, Woman NM	42	29	21	26	18	15
Woman FT, Men PT	1	2	2	4	3	4
Woman FT, Men NM	2	5	7	4	5	5
Single, FT	12	9	10	12	14	15
Single, PT	2	2	3	2	3	3
Single, NM	5	3	6	4	3	5

FT = Full-Time (30+ hours per week), PT = Part-Time (10-30 hours), NM = Not/Marginally employed (< 10 hours).

Source: PSID, SOEP, CNEF, own calculations

These pronounced differences in female labor force participation, particularly during the 1980s, are consistent with greater institutional support for traditional earnings arrangements in Germany (Lewis 1992; Sainsbury 1999). With respect to the questions of this study, these country and period differences in earnings arrangements in Table 3.7 suggest that there will be systematic variation in the extent of family buffering through the presence of additional earners and strength of added worker processes. Given the greater share of non-employed older women in Germany, particularly in the 1980s, married men suffering late-career job loss or health shocks will more often have been their household's sole earner. Over time, the buffering potential of the family seems to have increased in both countries. Whether this also holds for the average worker experiencing late-career displacement or some other adverse event, however, depends on how the profile of these workers compares to that of older workers as a whole. For example, late-career job loss might be increasingly concentrated among low-skilled men who are more likely to be single.

3.6 Summary

This chapter has mapped the changing institutional context of late-career job loss and exit from work in Germany and the US. In keeping with the overarching research questions of this study, my main focus has been on welfare state programs that play a crucial role in maintaining income after these events. However, I have also sought to broaden the picture beyond the welfare state narrowly construed. In particular, I have discussed how various contextual factors might affect the (re)employment prospects of older workers and how differences in family earnings arrangements might influence the potential for private income buffering.

What are the main insights to take away from the above discussion? In terms of older workers' (re)employment prospects, there are several plausible explanations why Germany long used to be 'No Country for Old Workers' (Dietz and Walwei 2011). In particular, Section 3.3 emphasized the following factors: the existence of marked labor market boundaries; low levels of participation in continuing training and lifelong learning; high levels of employment protection that may shelter workers with permanent contracts, yet diminish the reemployment prospects of displaced older workers; and the possibility that the predominance of early retirement exacerbates statistical age discrimination. Some of these factors may be amenable to short-term change: Presumably, levels of continuing training participation could be boosted in the short or medium run, perhaps by emulating the model of 'public-induced employment maintenance' (Buchholz et al. 2011: 16) found in the Scandinavian countries. In addition, the very idea that an 'early exit culture' undermines incentives for skill development and reinforces (statistical) age discrimination suggests that the situation of older workers may improve as the recent trend toward later retirement (see Section 3.2) continues and stabilizes. Other factors depressing the demand for older workers, and the reemployment prospects of displaced older workers in particular, seem to be more deeply entrenched in Germany's institutional structure. The most obvious one is an emphasis on specific skills that, in combination with a strong 'credentialism', results in marked labor market boundaries.

Compared to Germany, the (re)employment prospects of older workers appear to be much better in the US. The trend toward early retirement during the 1970s and 1980s was not nearly as strong as it was in Germany and impediments to worker mobility are widely considered to be lower in the American context where portable 'general' skills play a greater role. Participation in continuing training is also higher than in Germany, particularly

among older workers. At least in part, these differences are probably due to the stick of less generous (early) retirement benefits and lower overall levels of 'decommodification' rather than to the carrot of more attractive job opportunities. They may nevertheless greatly improve the reemployment prospects of displaced workers, compared with their German counterparts.

Against this background, I then examined the main welfare state programs and employment-based functional equivalents that provide insurance against the economic consequences of job loss and contribute to income maintenance after exit from work. Here, the main differences between Germany and the US can be summarized as follows:

- Public pensions replace a greater portion of former earnings for German workers, except at the very bottom of the earnings distribution.
- Complementary pensions, that is, employer-sponsored and individual private pensions, play a much larger role for retirement income in the US. In addition, the typical complementary plan in the US is more risky in the sense that returns on savings are more uncertain. This difference appears to have grown in recent years as DC plans have diffused in the US.
- Access to and actual participation in complementary pensions are stratified in both countries: Higher-earning, more educated, male, and non-minority workers are more likely to have complementary pension wealth (which includes claims to annuity-type benefits).
- Early retirement options in the public pension program were much more generous in Germany than in the US, especially until the mid to late 1990s.
- Other public transfer programs that cushion the impact of late-career job loss and that may be used as bridge benefits on the way to early retirement were also more generous in Germany. For example, maximum duration of earnings-related unemployment benefits was considerably longer in Germany throughout the observation period, even though differences have somewhat narrowed over time. Public disability benefits also tend to be higher in Germany, especially for workers with higher earnings, as their level is closely related to that of public old-age pensions. In addition, labor market considerations explicitly enter into award decisions for disability benefits in Germany. It is difficult to tell whether and to what extent complementary disability insurance in the US made up for this gap.

In qualitative terms, these differences seem to have persisted throughout the observation period. At the same time, many of these programs have undergone major changes. The following trends are the most noteworthy ones:

- In both countries, net replacement rates provided by the public pension pillar have declined over recent decades. At least in Germany, this trend is set to continue over the next decades.
- From the late 1990s onwards, the costs of early retirement – in terms of benefit adjustments for early take-up of public pensions – have risen markedly in Germany. By contrast, adjustments for early take-up of public benefits changed very little in the US.
- In Germany, reforms of early retirement options in the public pension pillar were accompanied by declines in the generosity of unemployment and disability benefits. The most far-reaching changes of unemployment benefits (cuts in maximum benefit durations for older workers and abolition of the earnings-related second tier) did not occur until the mid-2000s. However, a limited and incremental trend toward lower replacement rates and tightening of eligibility criteria occurred already during the late 1980s and 1990s. Disability benefits were reduced modestly by the 2000/01 reform.
- In the US, changes in the sphere of employer-provided pensions have arguably been far more consequential than changes in the public pension pillar. In particular, low-risk defined-benefit pension plans have increasingly been replaced by higher-risk defined-contribution plans. DC plans not only also tend to raise the costs of early retirement compared to DB plans. There is also considerable evidence that this ‘Transformation of the American Pension System’ has gone hand in hand with increased social inequalities in complementary retirement wealth, especially by level of educational attainment (Wolff 2011).

Overall, German-American differences in welfare state arrangements thus accord with conventional wisdom, even though the American public pension pillar is perhaps larger and more redistributive than suggested by the stereotypical characterization of the American welfare state as ‘residual’ (cf. Alber 2010). In addition, the detailed analysis of recent trends in key welfare state programs also seems to confirm widespread views that collective insurance mechanisms have diminished over recent decades. In Germany, more of the dynamic has occurred in welfare state programs proper, that is, in the public pension scheme and in other public programs that cover the majority of the workforce. In the US, at least with respect to late-career risks, the most striking and consequential changes have arguably occurred in the realm of employer-provided pensions.

But do these German-American differences add up to distinctive social models that result in distinctive life course trajectories? And do recent

trends really justify the pessimistic conclusions of authors such as Hacker (2006) and Butterwegge (2006)? Even though the answers to these questions may always contain some element of arbitrariness, taking a closer look at 'how real lives are really lived' (Goodin et al. 1999: 1) seems indispensable for providing well-grounded answers to these questions. Section 3.2 showed that the employment rates of older workers have risen noticeably in recent years. Perhaps then older workers have been able to compensate for lower public replacement rates by delaying their retirement? Perhaps the investment choices of American workers have been good enough so that they are faring as well under the new DC regime as they did in the old DB world, perhaps they are even faring better? Perhaps the impact of declining public transfers for displaced older workers in Germany has been limited by improved opportunities for reemployment, or by increased 'family buffering'?

In order to address these and related questions, the following chapters provide an analysis of income trajectories around exit from work and late-career job loss. More concretely, the next chapter discusses the general empirical strategy and essential technical aspects of the analysis. It is followed by the two main empirical parts that deal with the consequences of exit from work and job loss, respectively. For each of these events, I will first provide a shorter chapter that combines the institutional information in this chapter with microsociological considerations to formulate a set of concrete hypotheses and research questions for the empirical analysis. A longer empirical chapter then confronts these hypotheses and questions with empirical data.

4 Data and methods

The remaining parts of this study will investigate how two late-career trigger events – exit from work and job loss – affect the financial situation of older workers and their families. My broader aim is to better understand how observed income trajectories are brought about by the interplay of welfare state provisions with ‘family buffering’ and labor market trajectories.

This chapter outlines the empirical approach for identifying the impact of the focal trigger events. I first provide a general description of my conceptual framework and analytical strategy (Section 4.1). Building on the counterfactual account of causality, I argue that simple before-after comparisons may provide a satisfactory picture of the impact of voluntary retirement, but that identifying the impact of late-career job loss requires comparison to an adequate control group. I identify difference-in-differences (DID) matching as a promising and increasingly popular empirical approach for constructing such a comparison group. Section 4.2 then discusses technical aspects of my implementation of DID matching. It also describes a method to account for compositional changes in the treatment group. In Section 4.3, I then summarize essential details of the data sets used in the subsequent analysis and describe the main outcome and event variables. More specific aspects of the analysis are covered in the individual chapters.

4.1 Conceptual framework and analytic strategy

To explore the economic effects of retirement and job loss, I will use longitudinal data that enable me to compare the situation of affected workers before and after the occurrence of an event. As just noted, I will describe technical aspects of the databases and key measures in Section 4.3 below. This section elaborates my general conceptual framework and analytical strategy.

Let y represent an income-based measure of a worker’s economic situation, for example, an indicator for having low income below the poverty line or the level of income, perhaps expressed in percent of pre-event income (to focus on relative changes). Let $e_i = 1$ indicate that an individual i experienced a given event e such as late-career job loss between two time points $t = 0$ and $t = 1$ and let $e_i = 0$ indicate that an individual was not exposed to the event. Further, let y_{i1} and y_{i0} stand for i ’s value of y at $t = 1$ and $t = 0$, respectively. A natural starting point for investigating the impact

of e on y then is to focus on changes in y between $t = 0$ and $t = 1$ among those who experienced e . For individual i this difference is equal to $y_{i1} - y_{i0}$ and its expected value can be written as:

$$E(y_{i1} - y_{i0} | e_i = 1) \quad (4.1)$$

This quantity is readily estimated by computing the corresponding sample average. However, the change in y among those who experienced e may not be a satisfactory conceptualization of the effect of e . More specifically, the so-called counterfactual account of causality (Morgan and Winship 2007) – sometimes also referred to as the ‘Neyman-Rubin causal model’ or the ‘potential outcomes approach’ – suggests that the treatment effect¹ of e on y for individual i , say TE_i , should be conceptualized as the difference between changes in y under exposure and non-exposure (see, for example, Gangl 2010a: 23). To express this difference formally, it is necessary to define another variable e_i^* that is used to represent the two potential states of the world where i experienced e ($e_i^* = 1$) and where i did not experience e ($e_i^* = 0$). Then TE_i can be defined as follows:

$$TE_i \equiv (y_{i1} - y_{i0} | e_i^* = 1) - (y_{i1} - y_{i0} | e_i^* = 0) \equiv \Delta y_{i1} - \Delta y_{i0} \quad (4.2)$$

where $\Delta y_{i1} \equiv (y_{i1} - y_{i0} | e_i^* = 1)$ and $\Delta y_{i0} \equiv (y_{i1} - y_{i0} | e_i^* = 0)$. Equation 4.2 conceptualizes the effect of e as the difference between two outcomes (each of which is itself a difference): The change in y conditional on exposure to e minus the change in y conditional on non-exposure to e . The ‘fundamental problem of casual inference’ (Holland 1986) is that only one of these outcomes is observed because individuals either experience e or not: For those exposed to e , we only observe Δy_{i1} , but not Δy_{i0} , and vice versa for those not exposed to e . If we are interested in the effect of e on the ‘treated’, that is, on those who actually experienced it, inferences about their counterfactual trajectories under non-exposure will have to be based on the actual trajectories of individuals who were not exposed to e . The crucial task is to exploit information on the actual trajectories of non-exposed workers in such a way as to obtain good approximations of the counterfactual trajectories exposed workers would have experienced

1 The label ‘treatment effect’ alludes to experimental studies where subjects are randomly allocated to a group receiving a treatment (such as a newly developed medicine) and a control group receiving no or only a placebo treatment.

under non-exposure.² In analogy to experimental designs, this can be thought of as the task of finding an adequate control (or comparison) group for the treated.

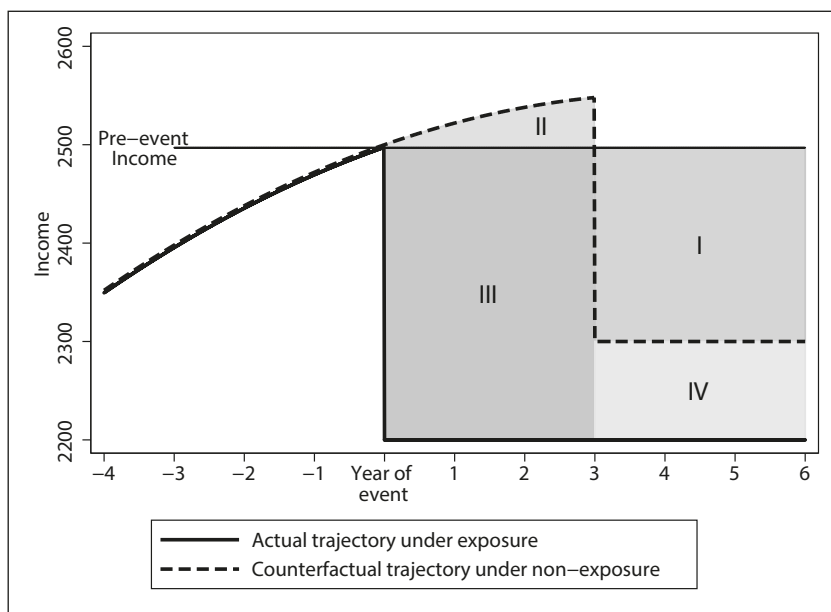
For most events, the (unobservable) difference defined in Equation 4.2 will be a more convincing conceptualization of their effect than the simple (observable) within-person difference defined in Equation 4.1. The case seems to be different, however, for voluntary retirement. One way to see this is to consider the analogy to the experimental situation and to ask oneself whether it is possible to conceive a suitable experiment for identifying the effect of an event. Even though such an experiment would be unethical, the idea of designing an experiment where we randomly assign workers to a treatment group who lose their job and a control group who do not is perfectly sensible. However, the idea of assigning workers to a treatment group who retire voluntarily appears inherently contradictory because assignment by a third person contradicts the very idea of voluntary retirement. For this reason, I will focus on the simple within-person difference from Equation 4.1 in my analysis of voluntary retirement and on the difference defined in Equation 4.2 in my analysis of late-career job loss. The following discussion of how to conceptualize and estimate the effect defined in Equation 4.2 is therefore primarily relevant to my analysis of income changes around job loss.³

Figure 4.1 illustrates the counterfactual conception of causality using a hypothetical example. The solid line represents the actual income trajectory of a hypothetical person, say Mallory, who was exposed to an event, say late-career job loss, in year 0. Let us assume that Mallory's reemployment prospects were not too bright and that she therefore retired immediately after job loss. The dashed line represents the counterfactual income trajectory that Mallory would have experienced if she had not lost her job. Under that scenario, she would have enjoyed further earnings/income growth for another three years. She would then have retired (voluntarily) and her income would have declined, though to a lesser extent than it actually did when retiring after late-career job loss (perhaps because she incurred actuarial deductions for early retirement in the latter case). What are

2 The same, of course, holds *vice versa* if one is interested in estimating the counterfactual trajectories non-exposed workers would have experienced under exposure.

3 This approach accords with extant research: Previous studies on the consequences of labor force exit have generally eschewed comparisons with non- or later-retiring workers (see, for example, Grad 1990; Bardasi and Jenkins 2002; Motel-Klingebiel and Engstler 2008), whereas studies on the consequences of job loss routinely make use of comparisons with non-displaced workers (e.g., Brand 2006; Schwerdt et al. 2010; Dieckhoff 2011; Ehlert 2013).

Figure 4.1 Conceptualizing the effect of an event



Mallory's total income losses six years after job loss? According to the simple within-person comparison (see equation 4.1), total losses are equal to the sum of rectangles I, III, and IV. According to the counterfactual account (see equation 4.2), losses are instead given by the sum of rectangles II, III, IV. During the first three years after job loss, losses are greater than suggested by the within-person comparison (because of foregone earnings/income growth). During years four to six, they are smaller (because voluntary retirement would have led to a decline in income anyway). The counterfactual conception thus isolates the additional income loss attributable to job loss.

Figure 4.1 makes clear that country or period differences in the impact of events can stem from differences in trajectories after exposure and/or differences in trajectories after non-exposure. For example, a decline in income replacement rates should affect the costs of late-career job loss primarily by exacerbating the losses incurred by workers actually exposed to the event, that is, by changing the path of the solid line in Figure 4.1. A general trend toward later retirement, by contrast, can be expected to also and perhaps even primarily affect income trajectories under non-exposure (although it may also affect the trajectories of those exposed to late-career job loss, for example, because they become more likely to reenter

employment). This suggests that it may often be illuminating to investigate treatment and control group trajectories separately rather than only their difference. In my empirical analysis of income mobility around job loss in Chapter 8, I will therefore often examine the actual ‘non-differenced’ trajectories of displaced workers in addition to DID estimates (i.e., differences between displaced workers and a comparison group of non-displaced workers).

It is common to differentiate individuals with respect to their actual exposure to the treatment and to define conditional average treatment effects on that basis (Imbens 2004; Gangl 2010a,b). More specifically, the Average Treatment on the Treated (ATT) and the Average Treatment Effect on the Non-treated (ATN) can be defined as follows:

$$ATT \equiv E(\Delta y_{it} - \Delta y_{oit} | e_i = 1) \quad (4.3)$$

$$ATN \equiv E(\Delta y_{it} - \Delta y_{oit} | e_i = 0) \quad (4.4)$$

Finally, the (unconditional) Average Treatment Effect (ATE) can be expressed as a weighted average of ATT and ATN. With $p(e = 1)$ denoting the (population) share of treated units, the ATE is given by:

$$ATE \equiv p(e = 1) \cdot E(\Delta y_{it} - \Delta y_{oit} | e_i = 1) + (1 - p(e = 1)) \cdot E(\Delta y_{it} - \Delta y_{oit} | e_i = 0) \quad (4.5)$$

It is common to differentiate between the population and sample versions of these quantities, that is, between PATT, PATN, and PATE (with ‘P’ standing for ‘Population’) on the one and SATT, SATN, and SATE (with ‘S’ for ‘sample’) on the other hand (Imbens 2004). Equations 4.3, 4.4, 4.5 define the population versions (because they define average effects in terms of expectations rather than sample averages). The distinction between population and sample variants emphasizes the classical problem of drawing inferences about population parameters from a limited sample. However, there is an important difference here to the problem of estimating, say, population means on the basis of sample means: While no uncertainty is involved in calculating the sample mean of a given variable (at least if we ignore issues of measurement error), identification of sample (average) treatment effects does involve an important element of estimation as it requires identification of the unobserved potential outcomes. This second inferential problem – the

identification of counterfactual outcomes – is in fact the more vexing challenge in drawing inferences about the effect of e .⁴

Like most applied research, my focus in this study will be on estimating the effect of job loss on those who were actually exposed to it, that is, the ATT or, more precisely, a feasible variant of this effect that is characterized in more detail below. What is required, therefore, is an estimation of the changes in y that displaced workers would have experienced if they had not lost their job.⁵ As noted above, there is usually no other empirical basis for estimating these trajectories than the actual trajectories of individuals who were not exposed to job loss. However, there are two general reasons why in non-experimental settings the typical trajectory of a non-exposed individual (i.e., $E(\Delta y_0 | e_i = 0)$), may be very different from the typical counterfactual trajectory of exposed workers (i.e., from $E(\Delta y_0 | e_i = 1)$) (cf. Gangl 2010a: 25): Outcomes of exposed and non-exposed workers might have differed even in the absence of exposure (Gangl refers to this as ‘heterogeneity’) and the probability of exposure might be related to the size of TE_i (Gangl refers to this as ‘endogeneity’).

There are different approaches to estimating treatment effects using non-experimental data (for recent overviews, see Morgan and Winship [2007] or Gangl [2010a]). A fundamental question is whether one can hope to fully account for heterogeneity and endogeneity by conditioning on observed characteristics (Morgan and Winship 2007). To ‘fully account for heterogeneity and endogeneity’ here means that the distribution of potential outcomes is independent of treatment status conditional on observed covariates. The assumption that this is the case is often referred to as the conditional independence, ignorability, or unconfoundedness assumption.⁶ While more or less convincing indirect tests may sometimes be available (cf. Imbens 2004: 21-22), direct tests of the unconfoundedness assumption are impossible because they would require knowledge of the counterfactual outcomes.

4 Because this is the key challenge, it is also generally the case that ‘a good estimator for one ATE [i.e., PATE or SATE, J.P.H.] is automatically a good estimator for the other’ (Imbens 2004: 6).

5 Estimation of ATN or ATE would also require estimation of the trajectories non-exposed individuals would have experienced under exposure.

6 The classical and strongest form of this assumption is that $(y_0, y_1) \perp e | X$ (Imbens 2004: 7), with ‘ \perp ’ denoting statistical independence. A weaker form that is sufficient for estimating the effect of treatment on the treated is $y_0 \perp e | X$, that is, conditional on X , the distribution of outcomes under non-exposure should be the same for treated on control cases (Imbens 2004: 8). Finally, if the focus is only on estimating average treatment effects the y_0 ’s and y_1 ’s in these equations can be replaced by the corresponding expected values, i.e., $E(y_0)$ and $E(y_1)$ (Heckman et al. 1997; Imbens 2004).

If unconfoundedness holds, causal effects can in principle be recovered through classical regression analysis (Imbens 2004; Imbens and Wooldridge 2009). However, researchers embracing the counterfactual conception of causality often prefer non- or semi-parametric matching approaches. The most common matching procedure, propensity score matching (PSM; Rosenbaum and Rubin 1983), proceeds by estimating a probability model of treatment assignment (or exposure to an event) and then matches treatment and control cases on the basis of their propensity scores, that is, the predicted probabilities from the assignment model. Matching approaches have some key advantages over classical regression analysis. First, they require researchers to more explicitly address the process of selection into treatment (Gangl and DiPrete 2004). Second, by ‘pairing observationally close, if not identical, observations’ (Gangl 2010a: 31) matching procedures highlight common support problems, that is, situations where reasonably similar comparison cases are missing for some units. Finally, and relatedly, classical parametric regression analysis makes strong assumptions about the functional form of relationships. This may render results highly ‘model dependent’ in the sense of being sensitive to specification choices, especially when extrapolation is involved, that is, when treatment and control cases are very dissimilar and the region of common support is limited (King and Zeng 2006). Ho et al. (2007: 201) therefore describe matching as a form of ‘preprocessing’ that ‘makes estimates based on the subsequent parametric analyses far less dependent on modeling choices and specifications’.

If unconfoundedness does not hold, neither regression analysis nor matching can go all the way towards providing unbiased effect estimates, although they may substantially reduce bias compared to naive (unadjusted) comparisons of treated and non-treated cases. Common methods for identifying causal effects in the absence of unconfoundedness which I will not discuss here are instrumental variables estimation or regression-discontinuity designs (see the overviews mentioned above for further details). In the context of the present study it is more important to highlight an important strength of panel data: Panel data, which provide repeated measurements on individuals (or other units of analysis such as firms or countries) enable researchers to estimate the impact of a variable solely on the basis of within-person (or, more generally, within-unit) variability. As is well known (see, for example, Halaby 2004), this eliminates any bias arising from time-invariant unobserved characteristics that would lead to violations of the unconfoundedness assumption in cross-sectional settings. To see this, consider the following outcome equation for individual i , which is a slight modification of equation 20 in Gangl (2010a: 34):

$$y_{it} = \alpha_i + x_{it}\beta + w_i\gamma + e_{it}\tau + \lambda_t + \epsilon_{it} \quad (4.6)$$

Here, y_{it} represents the level of the outcome variable for individual i at time t and x_{it} is a (row) vector of time varying control variables with associated coefficient (column) vector β . w_i is a vector of observed time-invariant covariates with associated coefficient vector γ . e_{it} is the variable of interest (e.g., an indicator for having recently experienced late-career job loss) with associated (treatment) effect τ . α_i is a time-invariant individual specific error term that captures the effects of all unobserved time-invariant variables. λ_t captures unobserved period effects that can be modeled by including appropriate dummy variables. Finally, ϵ_{it} is a random individual- and period-specific error term. Importantly, if α_i is correlated with e_{it} , cross-sectional estimates of τ obtained by regressing y_{it} on x_{it} , w_i , and e_{it} will be biased. For example, cross-sectional estimates of the consequences of late-career job loss based on comparisons between employed and unemployed individuals could be biased because the unemployed are negatively selected with respect to unobserved attributes such as health status, field of study, or cognitive skills. The so-called first-difference (FD) estimator addresses this potential source of bias by analyzing within-person differences:

$$y_{it} - y_{it-1} = (x_{it} - x_{it-1})\beta + (e_{it} - e_{it-1})\tau + (\lambda_t - \lambda_{t-1}) + (\epsilon_{it} - \epsilon_{it-1}) \quad (4.7)$$

In this equation α_i , the person-specific error term capturing the combined impact of all unobserved time-invariant variables, drops out of the equation (and so does the combined impact of observed time-invariant variables whose effects can therefore not be estimated in the FD framework).⁷ This is the crucial advantage of within estimation over cross-sectional designs.

As noted above, the analysis of late-career job loss in Chapter 8 will use a special case of FD estimation that is often referred to as difference-in-differences (DID) estimation. The label ‘difference in differences’ comes from the fact that in applications with a binary treatment variable such as exposure to late-career job loss, the quantity of interest is a difference between two differences in the outcome variable y , namely the difference between the (average) change in y among the treated and the average change in y among the non-treated. The analogy to the counterfactual effect of an event e defined in equation 4.2 is obvious.

7 Fixed-effects (FE) estimation, a common alternative to FD estimation, achieves the same thing through so-called demeaning, that is, by subtracting the unit-specific means of all variables from their unit- and period-specific values (cf. Halaby 2004; Gangl 2010a).

DID estimation is a powerful tool for identifying causal effects, but it still rests on non-trivial assumptions. The crucial assumption required for DID estimation to yield unbiased estimates of the ATT is often referred to as the ‘common trends assumption’ (e.g., Lechner 2011). This assumption requires that, conditional on covariates X , the expected change in the outcome variable for the control group is equal to the expected (counterfactual) change that the treatment group would have experienced in the absence of treatment. Using the potential outcomes framework, this assumption can be expressed as follows (cf. Lechner 2011: 12):⁸

$$\begin{aligned} & E(y_{it}|e_i = 1, e_i^* = 0, X = x) - E(y_{io}|e_i = 1, e_i^* = 0, X = x) \\ &= E(y_{it}|e_i = 0, e_i^* = 0, X = x) - E(y_{io}|e_i = 0, e_i^* = 0, X = x) \end{aligned} \quad (4.8)$$

This assumption is untestable because $(y_{it}|e_i = 1, e_i^* = 0, X = x)$ and $(y_{io}|e_i = 1, e_i^* = 0, X = x)$ are unobservable. If e does not affect the level of y before its occurrence, $(y_{io}|e_i = 1, e_i^* = 0, X = x)$ will be equal to $(y_{io}|e_i = 1, e_i^* = 1, X = x)$ (i.e., the pre-treatment level of y for individuals who were exposed to e), which is observable. In general, the existence of pre-treatment effects of e on y constitutes a problem for DID estimation (Lechner 2011).⁹ If longer panels are available, a simple strategy for minimizing the impact of potential pre-treatment effects is to ensure that pre-treatment measures are not taken too shortly before the occurrence of the treatment. Thus, I will generally use income measures from one or two years before the occurrence of job loss as reference measures in my analysis of late-career job loss.

In my application, a simple comparison of displaced and non-displaced workers would probably not meet the common trends assumption: For example, displacement tends to be concentrated among less-educated workers whom previous research has shown to retire earlier than higher-educated workers even in the absence of displacement. This in turn suggests that displaced and non-displaced workers differ in their overall retirement propensity and hence in their earnings trends under non-exposure. An

8 Relatedly, Gangl (2010a: 34) notes that FD estimation requires exogeneity of the differenced error terms, that is, the differenced error term $\epsilon_{it} - \epsilon_{it-1}$ needs to be uncorrelated with the differenced causal variable $e_{it} - e_{it-1}$.

9 Such pre-treatment effects may occur because individuals anticipate the occurrence of and e or because assignment to (or selection into) the treatment depends on the level of y . A prominent example is the assignment to training programs on the basis of earnings, which will result in program participants having exceptionally low earnings prior to the treatment: This phenomenon is known as ‘Ashenfelter’s dip’ (Ashenfelter 1978), and will lead to upward bias in estimated program effects (because of ‘regression to the mean’).

obvious strategy for rendering the common trends assumption more plausible is to control for differences between treated and comparison cases that are thought to be related to trends under non-exposure, that is, to condition on a rich set of variables X . Hence, DID designs are often combined with parametric regression methods or other approaches that adjust for (pre-treatment) differences between treated and comparison units. In the present study, I combine DID estimation with a semiparametric matching technique, that is, I compare (within-person) changes among affected workers to changes among a ‘matched’ control group of observationally similar workers (Gangl 2010b). The goal of matching is to render trends among comparison workers a better approximation to the counterfactual trends that workers exposed to e would have experienced under non-exposure. DID matching is no panacea: Estimated treatment effects will still be biased if there is systematic variation in income trends after accounting for the variables included in the matching procedure. In general, however, matching can be expected to reduce bias compared to naive unadjusted DID estimates, while being sensitive to common support problems and avoiding restrictive functional form assumptions.

DID matching is an increasingly popular approach for addressing problems of causal inference in non-experimental settings. Extensive discussions and comparisons with cross-sectional matching estimators are provided by Heckman et al. (1997), Heckman et al. (1998), and Smith and Todd (2005). Recent studies that use DID matching to investigate the impact of job loss or unemployment on a variety of outcomes include Gangl (2006), Strauß and Hillmert (2011), and Dieckhoff (2011).

4.2 Implementation of DID matching and compositional adjustments

Matching procedure

The crucial task in the application of DID matching is the construction of an adequate control (or comparison) group. Most previous applications of DID matching (and cross-sectional matching) use some variant of propensity score matching (Rosenbaum and Rubin 1983). As discussed above, PSM begins by estimating a probability model (usually a logit or probit model) of being treated. A unit’s propensity score is the predicted probability from this model. In the second step, a control group is constructed by matching treated units to non-treated units with similar propensity scores. Different

algorithms such as (k -)nearest-neighbor matching or kernel matching are used in practice. Caliendo and Kopeinig (2008) provide a thorough discussion of the most common algorithms and other crucial steps in the application of PSM.

As with other matching methods, the ultimate goal of PSM is to eliminate or at least greatly reduce differences between treatment and control cases with respect to the matching variables, that is, the variables used in the probability model (Ho et al. 2007). Rosenbaum and Rubin (1983) therefore refer to the propensity score as one member of a more general class of ‘balancing scores’ that ‘balance’ treated and control units with respect to a given set of covariates (ideally, these will be the variables necessary to achieve unconfoundedness). In practice, it has to be checked post hoc whether a particular PSM solution effectively balances the data. If comparisons of treated and control cases reveal substantial differences with respect to one or more of the covariates, researchers will usually begin anew, running a different specification of the probability model and/or changing the matching algorithm (Caliendo and Kopeinig 2008: 47-49).

A classical alternative to PSM is exact matching (EM) which matches treated units with control units that are exactly identical with respect to the matching variables, that is, treated and control units are matched only if they fall into the same cell of the multidimensional table spanned by the matching variables X . Exact matching has some attractive properties: Treatment and control groups will be perfectly balanced by construction. Exact matching also guarantees similarity of the higher-order moments of X across treatment and control groups whereas balance checks performed in the context of PSM are often restricted to differences in means (Iacus et al. 2011, 2012). In practice, however, EM is rarely feasible because most data sets will lack exact matches for a large number of treated units. Difficulties to find exact matches rise rapidly (exponentially) with the number of matching variables¹⁰, a problem that is sometimes referred to as the ‘curse of dimensionality’.

In this study, I use Coarsened Exact Matching (CEM), a new matching method introduced by Iacus et al. (2011, 2012).¹¹ Like classical exact matching, CEM exactly matches on observable variables in the sense that treated and control units are matched if and only if they belong to the

¹⁰ For example, if matching is done on 4 dichotomous variables, there are a total of $16 = 2^4$ possible combinations. With 8 dichotomous variables, there are $256 = 2^8$ combinations.

¹¹ The Stata implementation used to obtain the results in this study is described in Blackwell et al. (2009).

same cell – or ‘stratum’ – of the multidimensional table spanned by X . This multidimensional table, however, is not based on the original metric of the variables in X , but rather uses ‘coarsened’ versions of at least some of these variables. Thus, the analyst will typically ‘coarsen’ continuous measures like employer tenure into categorical variables, ideally in ways that are consistent with substantive knowledge about the variable in question. Categorical variables can also be further collapsed. For example, an eleven-point happiness scale could be reduced to a four-category measure (very unhappy, unhappy, happy, very happy). While this procedure leads to somewhat greater dissimilarities between treated and control units than EM, it greatly reduces curse-of-dimensionality-type problems. Within the imbalances permitted by the chosen coarsenings, CEM by construction also balances treatment and control group with respect to ‘all multivariate nonlinearities, interactions, moments, quantiles, comoments, and other distributional differences’ (Iacus et al. 2012: 8).

CEM inherits from EM the property that some treated cases may not be successfully matched because the data include no control units sharing their combination of coarsened variables. There is a clear trade-off here in that wider coarsenings will reduce the number of treated units without matches, yet also permit greater covariate imbalance between treatment and control groups. However, it is worth stressing that problems to find matches for treated units may be more prominent with CEM, but that analysts using PSM also often discard cases without close matches (in terms of the propensity score) by enforcing so-called caliper or common support restrictions (Bryson et al. 2002; Crump et al. 2009).

To the extent that treated units cannot be matched, one will be estimating a restricted or feasible version of the population (or sample) average treatment effect on the treated, that is, one will be estimating FPATT (or FSATT) (Iacus and King 2012). However, this restriction to a feasible subset of treated cases will often be rewarded with substantial bias reduction.

To limit the number of unmatched treated units one may often have to use somewhat wider coarsenings than would be desirable under ideal circumstances. Fortunately, it is possible to mitigate this problem by combining matching with conventional regression analysis to adjust for remaining differences between treated and control cases (Blackwell et al. 2009; Iacus et al. 2012). As noted above, the ultimate goal of matching methods is to achieve covariate balance between treated and control units, and in practice this is achieved by applying a set of matching weights (see below). CEM, PSM and other matching methods are thus simply different approaches for obtaining a set of weights that improves covariate balance between treated

and control units.¹² Additional adjustments for remaining differences can be carried out by applying conventional regression methods to the reweighted data, an approach that is sometimes also taken in applications of PSM (e.g., Dehejia and Wahba 1999). Given that the matched and reweighted sample will be much better balanced than the unmatched sample, estimated treatment effects should be relatively robust to the inclusion of additional controls and to different specification choices – that is, they should exhibit substantially less ‘model dependence’ (Ho et al. 2007; Iacus et al. 2012). In my own analysis of the impact of job loss in Chapter 8, I will adopt this ‘matching-plus-regression’ or ‘augmented matching’ approach.

As just noted, CEM and other matching techniques can be viewed as reweighting approaches which seek to ensure that treatment and control groups are ‘balanced’ in the sense of being (reasonably) similar with respect to the matching variables. More specifically, standard CEM assigns the following weight w_i to matched unit i in stratum $s \in S$ – where S denotes the (sub)set of matched strata that include both treated and control units, and T^s and C^s denote the sets of matched treated and control units, respectively (cf. Iacus et al. 2012: equation 6 on p. 8):

$$w_i = \begin{cases} 1, & i \in T^s \\ \frac{m_C m_T^s}{m_T m_C^s}, & i \in C^s \end{cases} \quad (4.9)$$

Here, m_T^s and m_C^s denote, respectively, the number of treated and control cases in stratum s . m_T and m_C denote the total number of matched treated and control units, that is, $m_T = \sum_{s \in S} m_T^s$ and $m_C = \sum_{s \in S} m_C^s$. In this formula, the crucial expression for achieving comparability of treated and control units with respect to the coarsened matching variables is $\frac{m_T^s}{m_C^s}$. This factor ensures that the weight received by a given control unit equals $\frac{m_T^s}{m_C^s}$ the number of treated units it ‘represents’. $\frac{m_C}{m_T}$ is a scaling factor that ensures that the CEM-weighted ratio of matched treated and control units equals their unweighted ratio. Unmatched treated and control units are pruned from the analysis.

12 A straightforward way of assessing the relative effectiveness of different matching methods therefore is to see how successful they actually are in reducing differences between treated and control units (King et al. 2011).

Incorporation of survey weights

Like many observational data sets, the ones used in this study provide survey weights to correct for design effects (variable selection probabilities) and selective non-response. For example (see Section 4.3 below), low-income households were overrepresented in the original PSID sample, as were recent immigrants in the original SOEP sample. In longitudinal applications it may also be necessary to account for differential attrition rates. This raises the question whether to account for sampling weights when applying CEM. Generally speaking, if treatment effects are heterogeneous in such a way that size of treatment effect and size of sampling weight are correlated (e.g., because persons experiencing severe income losses have lower selection probabilities by design or are more likely to leave the panel), then unbiased estimation of (feasible) population average treatment effects seems to require that analysts take sampling weights into account.

For example, assume that we are interested in estimating the impact of job loss on the risk of entering poverty. If displaced workers have lower incomes than non-displaced workers they would presumably have a higher risk of entering poverty than the average non-displaced worker *even in the absence of displacement* (e.g., because of other events such as spousal job loss). Matching on predisplacement income addresses this problem by ensuring that displaced workers and comparison cases have similar incomes. However, low-income workers presumably face greater risks of becoming poor *because of displacement* than higher-income workers (e.g., because their earnings-related unemployment benefits are less likely to lift them above the poverty line). If, like the PSID, the data set used to study the impact of displacement oversamples low-income households, they will be overrepresented among displaced workers in the sample, compared to their share in the 'population' of displaced workers. Ignoring survey weights (and thus failing to account for this oversampling), will result in exaggerated estimates of the poverty-triggering effect of displacement.

Despite the increasing popularity of matching approaches, and of PSM in particular, for identifying treatment effects using survey data, there has been little systematic discussion of how to account for sampling weights. In the case of PSM, there are two questions: whether to use weights when estimating the assignment model and whether to account for them in the subsequent estimation of treatment effects (Bryson et al. 2002). In CEM, primarily the latter question arises. Here, researchers using PSM with sampling weights seem to have mostly applied weights to treated cases only (cf. Bryson et al. 2002: 29-30; Dolton et al. 2006: 46). This is also what is

tentatively suggested by Leuven and Sianesi (2012) in the help file for their widely used Stata implementation of PSM. The rationale for weighting only the treatment group presumably is as follows: As noted above, matching techniques themselves can be interpreted as reweighting approaches that aim to balance the composition of treated and non-treated units with respect to the matching variables. More specifically, if the quantity of interest is a (feasible) $PATT^{13}$, the goal of matching is to reweight non-treated units in such a way that (certain moments of) the reweighted multivariate distribution of the matching variables in the control group approximate the distribution in the treatment group. In this sense, the weights applied to control cases in the final estimation of treatment effects are derivative of the covariate distribution in the treatment group. Sampling weights have to be applied to the treated to ensure that their composition corresponds to the composition of the ‘population’ of the treated. The balance-achieving weights for control units are then determined by applying the matching procedure and need not take sampling weights into account.

However, as Zanutto (2006: 73) notes, it may be the case ‘the weights [...] contain information that is not available in the covariates’. For example, in longitudinal settings, longitudinal weights may capture systematic differences in attrition rates beyond those accounted for by the matching variables. In principle, it may be more compelling to use a richer matching specification that explains these differences (for an analogous argument in the context of traditional regression analysis, see Winship and Radbill 1994). In practice, however, such respecification may be difficult due to missing information or curse-of-dimensionality problems. In this study, I will therefore take the longitudinal survey weights of both treated *and* control units into account. More specifically, I construct the CEM weights using a modification of Equation 4.09 that replaces the terms from that equation with their survey-weighted equivalents. Let l_i denote the longitudinal survey weight for unit i and let T^m and C^m denote the sets of all matched treated and control units, respectively. I then construct CEM weights as follows:

$$w_i^* = \begin{cases} l_i, & i \in T^s \\ l_i \frac{\sum_{i \in C^m} l_i \sum_{i \in T^m} l_i}{\sum_{i \in T^m} l_i \sum_{i \in C^m} l_i}, & i \in C^s \end{cases} \quad (4.10)$$

13 If the goal is to estimate the PATE, sampling weights must also be applied to control cases to ensure that they are representative of the population of interest.

The weight of matched treated units is simply their longitudinal survey weight. As before, unmatched treated and control units are removed from the analysis. The weight assigned to matched control unit i in stratum s is the product of that unit's longitudinal survey weight with two additional factors. The first of these factors is the weighted equivalent of the scaling factor in Equation 4.09, and the second is the ratio of the weighted number of treated units in s to the weighted number of controls in s .

Adjusting for compositional changes in the treatment group

A major goal of my analysis is to better understand the implications of recent welfare state change for citizens' well-being by comparing the financial consequences of retirement and late-career job loss across historical time. But can the period differences emerging from such an analysis be attributed to country-period differences in welfare state arrangements? In Chapter 2, I noted one important alternative possibility, namely that such differences might also reflect the changing composition of those who experience an event: As a simple example, assume that rates of poverty entry after late-career displacement can be shown to have risen over time. Such a result could, for example, be due to displacement being increasingly concentrated among low-income workers near the poverty line – rather than to changes in welfare state provisions that raise the risk of entering poverty conditional on being a low- or high-income worker.

One straightforward way to address the possibility that period differences reflect such compositional changes is to adjust the composition of treated units from different periods so as to match a common reference distribution. Such an adjustment provides an answer to the question: What would period differences in the economic consequences retirement or displacement have looked like, if the composition of displaced workers had not changed? The difference between the unadjusted effects and the composition-adjusted effects is a measure of how important compositional trends have been in shaping observed trends in the effects of events. If a given trend in effects is reinforced after adjusting for compositional changes, one would conclude that compositional trends have attenuated the trend. Conversely, if a trend is attenuated by applying compositional adjustments, one would conclude that compositional trends (rather than welfare state change) have been an important source of observed changes in effects. Other examples of studies that use reweighting methods to adjust for compositional changes are DiNardo's (1996) pioneering analysis of changes in the American wage

distribution and Giesecke et al.'s (2015) study of inequality trends among low-skilled workers in Germany.

To implement the compositional adjustments, I employ the entropy balancing (EB) method introduced by Hainmueller (2012). While using a different approach for obtaining the weights, EB serves the same aim as the matching methods discussed above, namely to construct a set of weights that balances two or more groups with respect to a set of covariates. EB is a powerful tool, but can run into convergence problems, particularly with small sample sizes, which is a practical reason why I prefer CEM for matching treated to control units within periods. In addition and as noted above, CEM automatically balances all possible interactions and higher-order moments within the constraints set by coarsening choices. EB does not have this desirable property (although it is of course possible to explicitly include appropriate terms in the EB procedure).

I will generally carry out compositional adjustments for all variables included in the CEM procedure. As for the 'reference distribution', that is, the distribution to be approximated by the reweighted distribution of the period-specific treatment groups, I will use the average country-specific composition of treated units over the whole observation period. This differs from the approach taken by DiNardo et al. (1996) and Giesecke et al. (2015), who adjust the composition of workers from later subperiods to match the composition of workers during the earliest subperiod of their observation period. My reason for choosing the average composition instead is that the number of treated cases per period is sometimes quite small. Occasionally, sampling variability might therefore result in rather untypical period-specific samples and I want to avoid using such samples as a benchmark for the compositional adjustments.

Let E be the set of weights, obtained via entropy balancing, that balances the period-specific matched treatment groups with respect to a reference distribution. Technical details of the algorithm are described in Hainmueller (2012). Let $e_i \in E$ denote the weight for treated unit i . By straightforward modification of equation 4.10, the CEM weights for the composition-adjusted analysis are then defined as:

$$w_i^e = \begin{cases} e_i, & i \in T^s \\ \frac{\sum_{i \in C^s} 1 \sum_{i \in T^s} e_i}{1 \sum_{i \in T^s} e_i \sum_{i \in C^s} 1}, & i \in C^s \end{cases} \quad (4.11)$$

As the goal of the EB procedure is to balance the composition of the treatment group, weights for control units are still based on their longitudinal

survey weight 1_i , as are the sums of weights calculated over control units.¹⁴ As discussed above, the (augmented) matching approach ensures compositional similarity of the composition-adjusted treatment group and the control group. I obtained weights for the treatment group using the Stata implementation of EB developed by Hainmueller and Xu (2012), employing the *basewt* option to preserve information contained in the original longitudinal survey weights of the treated units (see Hainmueller [2012] and Hainmueller and Xu [2012] for further details).

4.3 Data and key measures

4.3.1 Data and general sample restrictions

My empirical analysis is based on data from the Panel Study of Income Dynamics (PSID, Hill 1992; Brown et al. 1996) and the German Socio-Economic Panel (SOEP, Wagner et al. 2007), two of the longest-running household panel studies in the world. The original PSID sample was drawn in 1968 and the original SOEP sample in 1984. Several key variables, including the income measures used in this study, come from the Cross-National Equivalent File (CNEF, Frick et al. 2007), which provides consistent and internationally comparable variables based on the original surveys. I use PSID data from survey years 1980 to 2005 and SOEP data from survey years 1984 to 2010. As I further describe below, all income measures refer to the previous calendar year, so the most recent years for which I have income data are 2004 in the American and 2009 in the German case. PSID/CNEF data from the 2007 wave (providing income data for 2006) were available at the time of writing. Unfortunately, exploratory analysis revealed severe problems with a crucial income component – household private pension income – in the 2007 PSID/CNEF data set. Because I was not able to construct a consistent time series from the original PSID variables, I had to exclude the latest wave of PSID/CNEF data from the analysis.

A major difference between the two studies is that the SOEP conducts personal interviews with all adult household members, whereas the PSID

14 The sums of weights calculated over treated units are based on the EB weights. However, the sum over all treated units is normalized to equal the sum of the original survey weights (i.e., $\sum_{i \in T^*} e_i = \sum_{i \in T^*} 1_i$). This does not, of course, hold within individual strata: In general, for most or all $T^* e_i \neq 1_i$ which is necessary for EB to fulfil its function of holding the composition of (matched) treated units constant.

obtains all information from a single interview with the so-called 'head' of the household. In opposite-sex couple households, it is usually the man who is assigned the status of head – except in a very small number of situations such as when the man is cognitively impaired. Information on adult household members other than the household head or his partner is very limited. To ensure comparability, I therefore excluded persons other than the 'head of household' (*Haushaltsvorstand*) or his/her partner from the German sample. However, income received by other household members is included in the household income measures from both surveys.

Both PSID and SOEP are based on probability samples of the residential population with oversampling of certain groups (e.g., immigrants in the SOEP, low-income households in the PSID), making the use of sampling weights imperative. New respondents can enter the studies in two principal ways: by moving into households with existing sample members or by being selected for inclusion in refreshment or enhancement samples. As for the first possibility, both SOEP and PSID collect information on persons entering the panel by moving into an existing SOEP / PSID household. However, the two surveys differ in their following rules, that is, in the extent to which persons who are not original sample members are followed when they no longer coreside with an original sample member, where an original sample member is a person that entered the sample through selection into the initial sample or an enhancement/refreshment sample (for details, see Schonlau et al. 2010).

As for the addition of new samples, the SOEP has been refreshed and enhanced repeatedly since the beginning of the study (Wagner et al. 2007). Despite panel attrition, the number of SOEP households roughly doubled from approximately 6,000 to approximately 12,000 households between 1984 and the early 2000s. The PSID did not draw new samples before 1990. As was widely recognized by then, this lack of enhancement samples compromised the representativeness of the PSID, as post-1968 immigration was not reflected in the panel. To alleviate this problem, a so-called 'Latino sample' of 2,000 Mexican, Cuban, and Puerto Rican households was drawn in 1990. However, the Latino sample was discontinued completely after 1995, rendering available panels too short for the present study. A smaller 'immigrant sample' that included other immigrant groups in addition to Latinos was added to the study in 1997.¹⁵ Again, this sample is largely excluded because of short panel lengths. 1997 was also the year when funding constraints forced

15 The 1997 sample included 441 households, another 70 households were added in 1999.

the PSID to switch to two-year interview intervals. From 1997 onwards, data were thus only collected in odd-numbered years. As explained below, this causes a number of complications.

Like any non-mandatory household panel study, SOEP and PSID are subject to attrition of households and individual respondents from the panel. Attrition not only diminishes sample sizes. To the extent that it is selective it may also result in biased estimates of population parameters. However, two studies of the impact of attrition in the PSID until the late 1980s found no evidence that it had caused major distortions (Fitzgerald et al. 1998; Lillard and Panis 1998). In addition, longitudinal weights can be an effective means of correcting for selective attrition. In the present study, I use a generic set of 'comparability optimized' longitudinal weights whose construction is described in Kohler (2011). These weights are optimized for comparability in two respects. First, individual attrition probabilities used in the construction of longitudinal weights are estimated on the basis of comparable specifications. Second, in the case of the PSID, positive weights are assigned to individuals entering the panel by moving into core sample households, and these weights are constructed on the basis of the corresponding SOEP procedures. The PSID does not provide sample weights for this group.

I generally restrict my analysis to individuals who were 50 or older at the time of the event in question. I also generally require that individuals have worked a non-negligible number of hours (10 or more per week) prior to the occurrence of the event. I focus on changes from one or two years before an event (the preretirement or predisplacement reference year) until four years later ('four-year changes') and six years later ('six-year changes'). The reasons for taking the pre-event measurement one year before the event in some and two years before the event in other cases are related to the PSID's switch to biennial interviewing (see Section 4.3.2 below). My unit of analysis can be thought of as an episode. An individual i contributes a treatment episode if she experienced e during the observation period and if sufficient income measures from adjacent years are available, so that the income change of interest can be calculated. I define retirement as a singular, non-reversible transition, so a given individual can contribute at most one treatment episode. By contrast, my definition of job loss allows for multiple job losses, so one and the same person can contribute multiple treatment episodes. Further details on the event variables are provided in Section 4.3.2 below.

I include a given (treatment) episode in the sample if it contains sufficient information for computing at least one of the two changes of interest, that

is, a four-year change or a six-year change.¹⁶ The survey weight assigned to an episode (i.e., the term l_i in equations 4.10 and 4.11 above) equals the longitudinal weight for the final year of that episode. Individuals with missing values on at least one of the variables used in the CEM or EB procedures are excluded from the analysis. These variables are listed and further described in the empirical chapters.

In the analysis of job loss, treatment episodes are matched with control episodes to obtain DID matching estimates of the impact of job loss. Potential control episodes must meet the following requirement: The contributing worker must have been ‘at risk’ of experiencing job loss at the relevant age (see below), but must not have actually experienced job loss in any of the years included in the potential control episode.

A concrete example may be helpful (for simplicity I focus on the case of four-year changes): I generally perform exact matching on age, because it plays a crucial role both for a displaced worker’s reemployment prospects and her (early) retirement options. Now, assume that individual i experienced job loss at age 58, that sufficient income measures are available to compute four-year income changes (from age 56 to 60), and that no matching variables are missing. A second individual j provides a potential comparison episode for i ’s four-year episode if the following conditions are met: j was observed from 56 to 60, was ‘at risk’ of experiencing job loss at age 58, (i.e., worked more than ten hours per week at age 56), but did not actually lose a job between ages 56 and 60, and no relevant data are missing. j is not required to have remained ‘at risk’ of job loss after age 58 in order to provide a potential comparison episode. For example, j may have retired (voluntarily) at age 60, but she must have been ‘at risk’ at age 58. In reality, my dataset of course contains many i ’s, that is, many episodes of workers who were displaced at age 58 and were observed long enough for four-year changes to be computed, and many j ’s, that is, many episodes of workers who were at risk of experiencing job loss at age 58, but did not actually experience it during the relevant observation window. These episodes are then matched according to the CEM algorithm outlined above. Details on the matching variables and coarsenings are provided in Chapter 8.

Finally, j may also contribute potential control episodes for workers displaced at ages other than 58. Assume that j was observed from age 52

¹⁶ To ensure that I am comparing well-matched samples of treated and control units for both types of changes, I created separate sets of CEM weights for four-year and six-year changes. Weights generated by simply matching units in the year of the event would become inaccurate as treated and control units drop out of the sample.

until age 62. In that case, j may also contribute a potential control episode for workers displaced at, say, age 54. Again, all that is required is that no relevant data are missing, that j was at risk of experiencing job loss at age 54, and that she did not actually experience it between ages 52 and 56. Under such circumstances, j 's level income at age 56 will be used multiple times. For example, it will be used in computing j 's four-year change from 52 to 56 (a potential comparison change for estimating the impact of job loss at age 54) and it will also be used in computing the four-year change from age 56 to 60 (a potential comparison change for estimating the impact of job loss at age 54). To account for the non-independence of observations arising from this setup, I generally compute cluster-robust standard errors with clustering at the person level. I also obtain such standard errors in the analysis of income changes around retirement where I pool four-year and six-year changes, as they tend to be very similar.

4.3.2 Key measures

4.3.2.1 *Income measures*

The primary outcome variables examined in this study are different components and aggregates of individual and household income. Both PSID and SOEP collect detailed retrospective information on various types of income for the calendar year before the interview. On this basis, the CNEF provides several cross-nationally comparable income measures. Table 4.1 lists the individual income components and provides definitions of key income aggregates (preceded by an equality sign) such as household pre-government income. Obviously, the income components are not elementary in any fundamental sense, as they could in principle be further disaggregated (e.g., into different types of asset income or public transfers). Total household taxes are not elicited directly from respondents, but estimated using tax simulation programs that are based on relevant regulations and empirical information (e.g., average tax rates for different income brackets). Further details on the simulation of household taxes are provided in the CNEF codebooks (Goebel et al. 2012; Lillard et al. 2012).¹⁷

17 For recent survey years, some of the income variables can take negative values in the US. To ensure consistency, I recoded negative values on these income components and aggregates to zero. The variable total household taxes can take negative values in both countries and at all time points and does so for a considerable and increasing number of households in the US, which attests to the (growing) importance of the EITC. I did not recode negative household taxes to zero in order to capture the income-smoothing effects of negative income taxation (cf. Chapter 3).

Table 4.1 Income components and income aggregates

Individual labor earnings	
+	Earnings by other household members
+	Household asset income
+	Household private transfers
+	Household private retirement income
<hr/>	
=	Pre-government household income
+	Household public transfers
+	Household public retirement income
<hr/>	
=	Pre-tax post-transfer household income
+	Household (direct) taxes
<hr/>	
=	Post-government household income

To account for differences in household needs (see Chapter 2), I adjust pre- and post-government household income according to the modified OECD scale (Hagenaaers et al. 1994). More specifically, I divide these income variables by an equivalence weight that is constructed as follows:

$$1 + 0.5 \cdot (\text{HHM}_{15+} - 1) + 0.3 \cdot (\text{HHM}_{0-14})$$

where HHM_{15+} refers to the number of household members ages 15 and above and HHM_{0-14} refers to the number of household members ages 0 to 14. Adults living on their own thus receive a weight of one, that is, incomes are expressed in terms of the needs of a single-person household.

As discussed in Chapter 2, needs-adjusted post-government (or disposable) income occupies a central place in my analysis because of its presumably close relationship with economic well-being. I also noted that I will focus on two aspects of changes in needs-adjusted disposable income: relative changes with respect to pre-event levels and changes with respect to the poverty line.

My approach for estimating relative changes in the various income measures is straightforward. Consider the case of a worker who experienced event e in year τ . One could now consider many different kinds of income changes. For example, one might be interested in the change from two years before until two years after the event, that is, from $\tau - 2$ to $\tau + 2$, or in the change from one year before until five years after event, that is, from $\tau - 1$

to $\tau + 5$. More generally, given annual income data, the set of potentially interesting changes can be characterized in terms of the distance between the two income measurements α and the timing of the two measurements relative to τ . More formally, let y_t represent income in year t . The set of possible α -year changes given exposure to e in τ is then given by:

$$\Delta_{[-a,b]} = y_{\tau+b} - y_{\tau-a}, \text{ with } a, b \geq 0 \wedge a+b = \alpha > 0 \quad (4.12)$$

To analyze *relative* changes between $\tau - a$ and $\tau + b$, I simply express $y_{\tau+b}$ as a proportion of $y_{\tau-a}$ and then calculate:

$$\Delta_{[-a,b]}^{\text{rel}} = \left(\frac{y_{\tau+b}}{y_{\tau-a}} - 1 \right) \cdot 100 = \left(\frac{y_{\tau+b}}{y_{\tau-a}} - \frac{y_{\tau-a}}{y_{\tau-a}} \right) \cdot 100 \quad (4.13)$$

The second equality shows that this is a ‘proper’ difference in that it is taken with respect to one and the same measure, namely income expressed as a multiple of income at $\tau - a$. This difference ranges between -100 and $+\infty$. I cap this measure at $+100$ to limit the impact of positive outliers.

I examine several statistics that are based on Δ^{rel} . In addition to averages, I will examine its standard deviation to gauge the variability of income changes after an event. I will also estimate the proportion of workers whose income declines by more than a third (‘large loss’) or more than half (‘very large loss’) of pre-event income (see Gosselin and Zimmerman [2008] for a similar approach).

I define poverty as relative income poverty using a threshold of 60% of median needs-adjusted post-government income. As is common in analyses of group-specific poverty risks, this threshold is calculated on the basis of the whole adult population (rather than only on the basis of older workers) and calculated separately by country and year. The 60% threshold is commonly used in European research (e.g., Vandecasteele 2010) and is part of the so-called ‘Laeken indicators’ for social monitoring in the European Union (Atkinson et al. 2002; Krause and Ritz 2006). In the American literature, it is more common to use the federal poverty line (e.g., Johnson et al. 2010) which is an absolute poverty line based on a ‘basket of goods’ approach (Fisher 1992) Even if one believes that the term ‘poverty’ should be reserved for the latter type of measure, the measure used here can still be considered a useful indicator of having low income relative to the population at large. My analyses of poverty risks after the focal events are restricted to persons with pre-event incomes above the poverty line, that is, I examine the effect of the focal events on the likelihood of *entering* poverty.

In addition to changes in needs-adjusted post-government income, that is, relative changes and poverty entries after taxes and transfers, I will often provide similar results for needs-adjusted pre-government income (i.e., income before public pensions, other public transfers, and direct taxes; see Table 4.1).¹⁸ The comparison of income trajectories before and after taxes and transfers can provide useful information concerning the extent of ‘welfare state buffering’ (e.g., Goodin et al. 1999; DiPrete and McManus 2000; Ehlert 2012). This comparison will often be illuminating, but it is important to acknowledge that it is one piece of a complex puzzle rather than a clear and definitive answer to the question how effectively the welfare state cushions the effects of adverse life events. This is because pre-government trajectories are not independent of the system of taxes and transfers. For example, high public pension replacement rates can be expected to crowd out private retirement savings. Besides, a smaller difference between pre- and post-government income need not signal a ‘weaker’ welfare state, but may also reflect exogenous variation in problem pressures: There will be less need for welfare state buffering when displaced older workers are facing a strong labor market and can easily find well-paying reemployment.

Throughout the analysis I will focus on four- and six-year changes. That is, I will choose a and b such that $a + b = \alpha \in \{4, 6\}$. While longer-term changes would be interesting, panel attrition and the fact that income b years after an event is only observed if that event occurred at least b years before the end of the observation period severely restrict the possibilities for such an analysis. The focus on even-numbered intervals (i.e., four- and six-year rather than three- or five-year changes) is not motivated by substantive considerations, nor by a whimsical preference of mine, but rather dictated by the PSID’s biennial interview intervals after 1997.

Unfortunately, this is not the only complication arising from the change in the survey interval. This change also affects how accurately the timing of two of my focal events, exit from work and declines in health, can be ascertained (while I do not examine the impact of declines in health in this study, I do use an indicator of negative health shocks to distinguish between voluntary and involuntary retirement, see below). This is because information on the occurrence of these events is not elicited directly from respondents, but instead inferred from changes in ‘state’ variables (annual work hours in the year before the interview and health status at the time

¹⁸ I apply the poverty threshold based on median post-government income when examining poverty entries for pre-government income, as this simplifies the interpretation of differences in entry rates before and after transfers.

of interview). For example, I treat a respondent as having retired in t if she reported no or only marginal work hours for a given year t and reported a substantial number of work hours for $t - 2$ (I also require work hours to have been low in $t + 2$, but this is not relevant to the present discussion). My measure of job displacement is not subject to these inaccuracies because it is based on direct questions about the occurrence and timing of certain work-related events (however, as I elaborate below, the change to biennial interviewing leads to another set of problems in constructing the displacement indicator).

Let s_e be the state variable whose change signals the occurrence of event e , for example, an indicator of low work hours in the case of retirement¹⁹ or a measure of health problems in the case of health shocks. If interviews are conducted annually, I can ascertain whether s_e changed between the interviews in $t - 1$ and t , an interval that is usually about one year long. When interviews are conducted only every other year, I can only be sure that a change occurred between the interviews in $t - 2$ and t , an interval that is usually about two years long. For simplicity, let me adopt the convention of saying that e occurred in t , or that $\tau = t$, if s_e changed between $t - 1$ and t , noting that the change in s_e may well have occurred after the interview in $t - 1$ but before January 1 in t .²⁰ As just noted, in the case of biennial interviewing, we only know that the change in s_e occurred between the interviews in $t - 2$ and t . Assuming that e occurs with constant probability, we know that $\tau = t - 1$ for approximately half of respondents and $\tau = t$ for the other half, but we cannot tell which of the two groups a given respondent belongs to.

Recall that Equation 4.12 defined a specific type of α -year change in terms of a and b . Importantly, different types of α -year changes will be very different if income trajectories follow systematic pre- and/or post-event trends, for example, because some workers reduce their hours before retirement or because 'health-shocked' workers recover and increase theirs. As long as we have annual data on both s_e and income, nothing prevents us from calculating all possible α -year changes for every individual. With biennial data, however, not only becomes the analysis confined to even-numbered intervals: The timing of e now also inevitably affects the types of changes

19 The retirement indicator is based on retrospective information about work hours in the previous calendar year (rather than work hours at the time of interview), but this does not substantively affect the problem described here.

20 Both PSID and SOEP conduct the majority of interviews (approximately 90%) between January and July.

that can be calculated. To see this, recall that $\tau = t - 1$ for some (perhaps about half) of the workers with a change in s_e from $t - 2$ to t and that $\tau = t$ for the remaining workers. If we now calculate (four-year) income changes from $t - 2$ to $t + 2$ for these respondents, we will be calculating $\Delta_{[-1,3]}$ for the first and $\Delta_{[-2,2]}$ for the second group. Again, without further information, there is no way of deciding which group an individual belongs to. When averaging these four year changes across all exposed (or treated) workers, we will be estimating the following (weighted) average:

$$\frac{p(\tau = t - 1) \cdot \Delta_{[-1,3]} + p(\tau = t) \cdot \Delta_{[-2,2]}}{p(\tau = t - 1) + p(\tau = t)} \quad (4.14)$$

where $p(\tau = t - 1)$ and $p(\tau = t)$ denotes the proportions of workers for whom $\tau = t - 1$ and $\tau = t$, respectively. In the special case where the probability of e is constant $p(\tau = t - 1) = p(\tau = t)$.

In terms of practical implications, this discussion suggests that it is crucial to ensure that the same quantities are estimated when comparing income changes across countries and/or periods with different survey intervals. There are different strategies for achieving this goal. One of the simplest and the one that I will be using in this study is to estimate averages such as the one given in Equation 4.14 also during those periods where annually spaced interviews are available. I provide further details on my approach when describing the construction of the event variables below and in the individual empirical chapters.

4.3.2.2 *Event variables*

Part II of this study explores the economic consequences of retirement in the sense of exit from work and Part III the consequences of involuntary job loss. As noted in Chapter 2, these events are interrelated: Job loss has been shown to be an important trigger of involuntary early retirement. Moreover, there are reasons to suspect that country differences and recent changes in welfare state arrangements have different implications for workers who enjoy smooth late careers and for workers whose careers are interrupted by involuntary job loss or other unexpected events that limit their control over retirement. In my analysis of income trajectories around retirement, I will therefore make a basic distinction between involuntary and voluntary retirees and focus on the latter group of retirees. Consistent with previous research showing job loss and health problems to be the primary triggers of involuntary early retirement, I classify retirement as involuntary if it was preceded by job loss or the onset of health problems (see Barrett and Brzozowski [2010] for a similar approach). Even though I will not examine

the consequences of late-career health shocks explicitly, this event thus plays a crucial role in distinguishing voluntary from involuntary retirees. I now describe the construction of the three event indicators.

Retirement/Exit from work

Previous research has operationalized retirement in various ways, the three most prominent being self-reports (Drobnic 2002), pension take-up (Fasang 2008), and exit from work or the labor force (Radl 2010). In this study, I define retirement as exit from work because I am interested in the economic risks associated with retirement and because the decline in earnings associated with leaving employment is the primary relevant process in that regard. I focus on exit from work (in the sense of actual employment or work hours) rather than exit from the labor force, which includes the unemployed, that is, older people who are not working, but looking for work. This is because unemployment benefits often serve as de facto early retirement benefits (see Chapter 3) and because distinguishing between 'genuine' unemployment and unemployment that really is early retirement is exceedingly difficult.

I define retirement as the first prolonged spell without substantial employment after age 50. The analysis is restricted to persons who worked a substantial number of hours around and/or after age 50; a person who has never worked a substantial number of hours for a longer period of time in her later years is hence not 'at risk' of retirement. More specifically, to be 'at risk' of retirement, a person must have worked at least 15 hours per week on average between ages 48 and 50 or during her first three years in the PSID/SOEP if she entered the study at a higher age. The measure of weekly work hours is obtained by dividing annual work hours by 52. Annual work hours are based on retrospective questions about the previous calendar year and provided in the CNEF (for further details, see Goebel et al. 2012; Lillard et al. 2012).

For persons meeting this criterion, retirement is then defined as occurring in the first year of the first prolonged spell without substantial employment after age 50. More specifically, a person is treated as having retired in a given year τ if she worked less than ten hours per week in τ and worked less than ten hours per week two years later (i.e., in $\tau + 2$).²¹ Retirement is classified as involuntary if the worker experienced involuntary job

21 This definition does not rule out that a retiree 'unretires' (Maestas 2010) in the sense of working a substantial number of hours in years $t + 4$ and later, but such unretirements are rare in my data. In both countries, barely more than 5% of workers work ten hours or more in $t + 4$.

loss or a negative health shock at any time between two years before and one year after retirement.²²

As noted above, certain complications arise because the PSID switched to biennial interviewing in 1997. Thus, work hours are available for the years 1996, 1998, 2000, and so on, but not for the odd-numbered years in between. The same holds for the income measures which are also collected retrospectively for the previous calendar year. Now consider all persons who belong to the sample at risk and reported ten or more work hours for 1996, but fewer than 10 for 1998 and 2000. As discussed above, these persons may have worked fewer than ten hours already in 1997. Let τ denote the (unknown) actual year of retirement (i.e., 1997 or 1998). If the probability of retiring did not change from 1997 to 1998²³, then the four-year income change from 1996 to 2000 will be the change from $\tau - 1$ to $\tau + 3$ for one half and the change from $\tau - 2$ to $\tau + 2$ for the other half of retirees. In order to ensure comparability across countries and periods, I therefore mimic this situation for the country/periods where annual information is in fact available. That is, I compute four-year changes from $\tau - 1$ to $\tau + 3$ for workers retiring in odd-numbered years and from $\tau - 2$ to $\tau + 2$ for those retiring in even-numbered years. A completely analogous argument applies to six-year changes.

Job loss

The analysis of late-career job loss is restricted to individuals who worked at least ten hours per week before losing their job and who were between ages 51 and 65 at the time of job loss. Involuntary job loss is defined as an involuntary separation for one of the following reasons: closure of a business or establishment, being fired, or the end of a fixed-term contract if the latter was accompanied by at least one month of unemployment, either in the year when the contract ended or in the following year. Information on the occurrence of job loss events is based on a set of broadly comparable questions concerning respondents' recent job history that has been administered by both PSID and SOEP in all of the years included in this study. Self-employed workers are excluded from the analysis because the event is not well-defined for them.

22 The possibility that one of these events occurred after the year of retirement is primarily relevant in the context of health shocks, because retirees are mostly no longer at risk of losing a job.

23 For a given pair of adjacent years this assumption may sometimes be violated, but in the long-run retirement probabilities should not differ systematically between odd and even-numbered years.

The PSID's switch to two-year interview intervals in 1997 again creates difficulties because some job events were no longer recorded after the change. The complications arise because the reference period of PSID's job history questions was not changed after 1997: As before, respondents interviewed in t were asked to report job events that had occurred in the year before the interview (i.e., in $t - 1$) or before the interview in t (i.e., between January 1 and the day of the interview). Before the switch to biennial interviewing, information on job events occurring after the day of the interview in t , but before January 1 of the following year ($t + 1$) were thus recorded at the $t + 1$ interview. After the switch, however, no interviews were conducted in $t + 1$. Information on job events that occurred after the day of the interview in a given interview year is therefore missing. Hence I partially imputed the job loss indicator for interview years from 1997 onwards (i.e., $t_{\text{int}97+} \in \{1997, 1999, 2001, 2003, 2005\}$).

Because I do not distinguish between workers with only one and workers with multiple displacements in a given year, imputation was not necessary for those who reported having lost their job between January 1 and the day of the interview in $t_{\text{int}97+}$. To impute the displacement indicator for those who did not report having been displaced in the current year, I obtained a single imputation using the *mi impute logit* routine in *Stata 12*. The relevant outcome can be thought of as the likelihood of experiencing displacement in $t_{\text{int}97+}$ conditional on not having experienced it before the interview in that year. I therefore estimated the imputation model over all observations (i.e., including those from years before 1997) who did not report having been displaced in t at the interview in t . The outcome variable in this model is whether respondents reported having been displaced in t at the following interview in $t + 1$. This information is of course completely missing for observations from interview years 1997 and later. In addition to a large set of income- and employment-related variables, the imputation model includes dummies for the month of interview to account for the obvious relationship between interview timing and the likelihood of being displaced during the remainder of the year. To capture cyclical fluctuations as well as secular trends in displacement risks, I also included measures of overall displacement rates for adjacent years, that is, for $t - 1$ and $t + 1$. Job events during these years were still completely recorded after the switch to biennial interviewing.

Unlike with the retirement indicator, it thus remains possible to identify the exact year when a job loss occurred even after the PSID's switch to biennial interviewing (subject, of course, to the uncertainty of the imputation), but there is no real gain from this greater precision in event timing

because the income measures are available only for even-numbered years. Letting τ denote the year of job loss, I can therefore only compute four-year changes from $\tau - 1$ to $\tau + 3$ for workers displaced in odd-numbered years and from $\tau - 2$ to $\tau + 2$ for workers displaced in even-numbered years. The difference to the retirement case is that it is possible to tell, for each individual worker, which one of the two changes is calculated. For ease of presentation, however, I will proceed just as in the case of retirement and generally present averages of these two types of four-year changes. Again, as in the case of retirement, I will also do so for those country/periods where annual data are available in order to ensure comparability.

Health shocks

The indicator of negative health shocks captures relatively abrupt declines in health that show some persistence. I do not examine income or employment trajectories around health shocks in this study. However, as noted above, I do use information on health shocks to distinguish voluntary from involuntary retirees. Generally speaking, I define a health shock as having occurred in τ if a respondent reported 'bad health' in τ and $\tau + 2$, but did not report bad health in $\tau - 2$ and $\tau - 4$. The requirement that changes in health be persistent can be thought of as a proxy for severity (Schimmel and Stapleton 2012).

Unfortunately, it is not possible to construct the underlying measure of 'bad health' in a fully comparable fashion. In the American case, I use the disability variable provided by the CNEF which classifies individuals as disabled if they report a physical or nervous condition that limits the amount of work they can do. The CNEF treats German respondents as disabled if they report a legally recognized disability of at least 30%. However, in comparison to the US, this variable alone yields implausibly low shares of disabled persons. I therefore also classify German respondents as having bad health if they meet at least one of the following conditions (see Burkhauser and Daly [1998] for a similar approach and for empirical evidence suggesting that the resulting measure is broadly comparable to the American): They report very low health satisfaction (0-3) on an eleven-point scale or they report that their overall health strongly limits their ability to perform everyday tasks.²⁴ At the same time, I raise the threshold for the attested disability measure from 30 to 50%, which is the official German threshold for being considered as 'severely disabled'.

24 Although not specifically referring to (paid) work, this question is the one that is most similar to the PSD's. Unfortunately, it is missing for several waves.

Part II
Economic consequences of retirement

5 Literature review and research questions

'Retirement' is a multifaceted term that has been conceptualized in different ways in previous research. In this study, I will operationalize retirement as exit from employment or 'long-term labor force exit' (Burkhauser et al. 2001) because I am interested in the implications of the associated decline in earnings for retiring workers and their families. Exit from employment is one common way of defining retirement (see, for example, Burkhauser et al. 2001; Radl 2010), but many authors use other definitions. The most frequent alternatives are individuals' self-perceptions and self-reports (Bardasi and Jenkins 2002; Drobnic 2002) and definitions based on pension entrance (Fasang 2008). A possible criticism of equating retirement with exit from work is that this approach excludes a substantial number of (predominantly female) individuals (e.g., homemakers) who are not employed in their later years (Fasang 2008). To alleviate such concerns, I will briefly examine the economic situation of individuals without substantial late-life employment at the beginning of the next chapter.

As discussed above, an important tradition in sociological research stresses the heterogeneity of different pathways to retirement (Kohli et al. 1991; Ebbinghaus 2006; Fasang 2008; Radl 2010). This line of research is complemented by studies suggesting that differences in the level of individual control over retirement timing – as captured by the distinction between voluntary and involuntary retirement – are crucial for understanding differences in the impact of retirement on economic (Smith 2006; Lachance and Seligman 2010) and psychological well-being (Bonsang and Klein 2011). Both of these literatures support the view that health problems and job displacement are the primary triggers of involuntary early retirement. This is why these two events occupy a central place in this study: Part III will explore the employment and income trajectories of workers experiencing late-career job loss and it is only for reasons of space that I relegate a similar analysis of the consequences of late-career health shocks to future research.

In this part, I examine income dynamics around exit from employment, focusing primarily on workers whose exit is not preceded by job loss or the onset of health problems. I refer to these workers as 'voluntary retirees', while recognizing that this label is a simplification. On a conceptual level, it may be more convincing to think of workers as located on a continuum of control over retirement (Radl 2010). Moreover, some of the workers whom

I classify as voluntary retirees might presumably be better characterized as retiring involuntarily for reasons other than job loss or health problems (e.g., rising care demands). However, extant research suggests that the number of such cases is small compared to those whose retirement choices are relatively unconstrained (see, for example, Lachance and Seligman 2010).

The goal of this chapter is to prepare the empirical analysis of income trajectories around (voluntary) retirement in the next chapter. It is structured as follows. The next section discusses general reasons for expecting changes in economic well-being even when retirement is voluntary. In Section 5.2, I explore how the salience of these factors is conditioned by institutional context and formulate hypotheses concerning country and period differences in individual/household-level income trajectories around voluntary retirement. Section 5.3 concludes with a brief review of previous empirical research.

5.1 Why should economic well-being change at retirement?

Why should we expect economic well-being to change around retirement? After all, retirement appears to be a foreseeable transition which individuals prepare for by contributing to public and complementary pension plans as well as through other forms of saving. Influential work in neoclassical economics on the life cycle theory of savings (Ando and Modigliani 1963) and the permanent income hypothesis (Friedman 1957) indeed posits that individuals' consumption is a function of long-term 'permanent' rather than current income. This is usually taken to imply an economic neutrality prediction according to which economic well-being should not drop at retirement. The common empirical finding that levels of consumption – usually proxied by expenditure on food and other commodities – do fall at retirement has therefore been labeled the 'retirement-consumption puzzle' in the economics literature (see, e.g., Banks et al. 1998; Smith 2006; Hurst 2008; Battistin et al. 2009).

One proposed solution to this puzzle is that drops in expenditure at retirement do not really signal a decline in economic well-being because they may reflect declines in work-related expenditure and/or be offset by the increased time available for home production. For example, retirees could maintain preretirement levels of food consumption despite lower expenditure by growing vegetables or spending more time shopping in order to purchase food at lower prices (Aguiar and Hurst 2005; Hurst 2008).

However, extant literature highlights at least two general reasons why the economic neutrality prediction may not hold in practice. First, as I have

discussed extensively above, retirement may sometimes be involuntary and occur earlier than planned due to unanticipated events such as job displacement (Hausman and Paquette 1987; Smith 2006). The second reason is that people are ‘Humans’, not ‘Econs’ (Thaler and Sunstein 2008), that is, they differ from the sober calculators of neoclassical economics in numerous ways: by displaying inertia and procrastination, making idiosyncratic investment choices, and using biased heuristics when comparing alternatives. These deviations from the models of economic textbooks suggest several reasons why planned retirement, too, may trigger declines in economic well-being and the remainder of this section explores them in greater detail. The discussion owes a lot to the excellent literature reviews of Knoll (2010, 2011), who suggests that two broad issues can be distinguished: the question of retirement preparation, that is, whether workers save enough for their retirement and whether they allocate their resources efficiently (Knoll 2010); and the question of retirement timing, that is, whether older workers choose their retirement age wisely within the constraints set by their earlier savings decisions, family context, health status, employment prospects, and other factors relevant to the retirement decision (Knoll 2011).

Saving too little. There seems to be widespread agreement that many Americans save too little for their retirement (VanDerhei 2012). Research in psychology and behavioral economics identifies several reasons why this is the case (see Thaler and Sunstein [2008] and Knoll [2010] for literature reviews). Important and related reasons for inadequate savings behavior include limited self-control (Laibson et al. 1998), procrastination (O’Donoghue and Rabin 1999) and status quo bias which raises the salience of default options. Thus, Madrian and Shea (2001) find that automatic enrollment in a company pension plan results in substantially higher participation rates than an opt-in design where workers have to explicitly declare participation. In addition, default options for contribution rates and fund allocations also have rather dramatic impacts on investment choices of participating workers (Thaler and Sunstein 2008). This status quo bias is related to the issues of self-control and procrastination: Individuals may be aware that they should start saving (or save more) for their retirement, yet repeatedly defer making the necessary changes to the future (‘If I start next week, it will be soon enough’). In the case of saving for retirement these problems are exacerbated by the complexity of the task: Choosing the right level and allocation of retirement savings is a much more daunting task than choosing a loaf of bread. Indeed, studies of financial literacy show that many people are incapable of performing the basic calculations involved

in making retirement savings choices (Lusardi and Mitchell 2007; O'Rand 2011) and that workers with lower financial literacy are less likely to save (Lusardi and Mitchell 2007).

Making bad investment choices. Research also suggests that the investment decisions of saving workers are frequently suboptimal. For example, it is usually recommended that workers increasingly shift their assets towards low-risk investments (e.g., government bonds rather than equity) as they approach retirement. This is intended to reduce the vulnerability of their portfolio to short-term declines in stock prices because given their imminent retirement there may not be enough time left for recovery (Knoll 2010). Yet, a recent study of American workers' portfolio profiles at the time of the 2008 World Financial Crisis concludes that 'workers between 56 and 65 [...] have equity concentrations far beyond what are often thought to be appropriate at that age' (VanDerhei 2009: 4). Workers also tend to overinvest in stocks of their own employer and of domestic companies, a phenomenon referred to as 'home' or 'familiarity' bias (Börsch-Supan 2005; Thaler and Sunstein 2008). A related finding is that portfolios tend to be under-diversified and, again, under-diversification has been shown to be inversely related to financial literacy (Guiso and Jappell 2008). As with the decision whether and how much to save, motivational problems such as self-control, procrastination, and status quo bias also appear to be important sources of suboptimal portfolio profiles, in particular the failure to adapt portfolio composition over the course of the life cycle (Knoll 2010).

These findings have important implications for social inequalities in retirement outcomes, as financial literacy and motivational efficacy differ by level of education and other dimensions of stratification. Lusardi and Mitchell (2007) show that more educated individuals have higher levels of financial literacy. Likewise, levels of self-control are higher among those with higher education. In fact, self-control during early childhood has been shown to be an important predictor of educational success later in life (Moffitt et al. 2011). In addition to socially stratified access to employer-sponsored plans (cf. Chapter 3), another reason why greater emphasis on private (and occupational) pensions may raise inequalities in old age therefore is that individuals who are better off anyway are also more adept at undertaking financial preparations for their retirement.

Retiring too early. A further question concerning all workers who approach retirement, including those with only public pensions, is when to exit employment and start drawing benefits. In general, drawing public

retirement benefits early will result in lower monthly benefits (cf. Chapter 3 for a detailed discussion of rules for benefit adjustment). Complementary pension plans, too, usually offer possibilities for early benefit take-up which involve actuarial reductions. At this point, my focus is not on the specifics of benefit adjustment, but rather on the reasons why even ‘voluntary’ retirees who face no strong employment restrictions may choose to retire too early – at the cost of foregoing additional labor earnings and drawing lower retirement benefits until the ends of their lives. Again, Knoll (2011) provides a useful discussion of relevant research in behavioral economics and psychology.

One important explanation for premature pension take-up is that older workers overestimate the attractiveness of retirement because of systematic biases in ‘affective forecasting’ (Gilbert and Wilson 2007), that is, in anticipating the emotional qualities of different options – such as whether to work for another few years or leave employment. Workers facing this decision will try to forecast their level of well-being under these different scenarios using mental simulations. However, these simulations are necessarily abbreviated or ‘essentialized’ and research suggests that they will differ from the real experiential quality of the situations in systematic ways: Exceptional events with strong emotional content will be overemphasized at the cost of less vividly remembered everyday aspects, and major negative events are likely to be emphasized at the cost of major positive events due to ‘negativity bias’ (Knoll 2011: 21). A worker pondering whether to retire or work is therefore likely to construct unrepresentatively negative representations of what it is like to (continue to) work. Retirement, by contrast, is a situation that workers do not (yet) know from their own experience. Therefore, they cannot draw on their own memories (among which major negative aspects would presumably be overrepresented) in constructing their mental simulation of retirement.

In addition to problems of affective forecasting, further likely reasons for retiring too early are, again, issues of self-control and the related phenomenon of ‘hyperbolic discounting’ (Laibson 1997) whereby people assign exaggerated weight to immediate compared to distant rewards (more leisure now vs. more income over the whole retirement period).

Following age norms. Sociological arguments about the influence of ‘age norms’ suggest another reason why many workers may retire too early, particularly in the context of institutional change. Kohli (2000) and Leisering (2003: 214) argue that legal retirement ages affect retirement timing not only via financial incentives, but also by shaping citizens’ beliefs about

appropriate ages for labor force withdrawal, that is, by establishing age norms. Taking up these ideas, Radl (2010, 2012b) analyzes answers to a set of questions concerning ideal, minimum, and maximum retirement ages for men and women from the European Social Survey. He finds that most respondents answered these questions with finite positive numbers, suggesting that the notion of age norms has empirical content. He also shows that prevailing age norms are positively correlated with country-level differences in legal and actual retirement ages.

One possible interpretation of age norms is that people have a preference for retiring at certain, socially acceptable ages. According to a second interpretation individuals are overwhelmed by the complex task of making informed retirement choices and therefore resort to simple behavioral templates or 'default behavior' (Aaron 1999; Fasang 2008). As noted above, empirical studies of financial literacy in fact indicate that many people are incapable of performing the calculations required for informed retirement planning. Age norms could then be interpreted as behavioral templates that reduce complexity and help individuals make reasonable retirement decisions without incurring the information costs required for individually optimal decision-making. This interpretation becomes more convincing if we allow for the possibility of 'local' norms (Bicchieri 2005; Radl 2010) that are specific to population subgroups such as men and women, blue-collar versus white-collar workers, or even occupations.

In the context of institutional change, a key question then becomes how quickly age norms adapt to changes in financial incentives. If changes in age norms lag behind changes in financial incentives, this could be a potential source of changes in the economic consequences of retirement. For a potentially extended transitional period, age norms could prescribe what has become – due to institutional changes – suboptimal retirement behavior. As evidence accumulates that, say, early retirement is increasingly associated with economic hardship, age norms should eventually change. This pattern of 'lagged adaptation' is supported by Axtell and Epstein's (1999) simulations of retirement behavior. In their 'agent-based model' of a simple artificial society, only a small fraction of the population responds rationally to retirement incentives in the sense of always retiring at the optimal age. The majority of the population, the 'imitator agents', are purely norm-following in that they do not respond to economic incentives at all, but retire once a certain fraction τ of their network has retired.¹

1 A third and small group of actors, the 'random actors', retire with constant probability p in each period after reaching the minimum retirement age.

The optimal retirement age is the same for all actors. One of Axtell and Epstein's simulations analyzes a policy change scenario: How quickly does the retirement behavior of imitators respond to a change in the optimal retirement age? Their findings suggest that considerable time may elapse until all imitators retire at the new optimal retirement age. During the transitional period, many imitators display suboptimal retirement behavior.

5.2 Institutional context and income changes at retirement: research questions and hypotheses

The above considerations suggest several channels through which welfare state provisions might affect income mobility around voluntary retirement. Drawing on the institutional overview provided in Chapter 3, I now formulate a set of hypotheses and research questions to be addressed in the subsequent analysis. All of these hypotheses are meant to apply to voluntary retirees, even though I will also provide the main results for involuntary retirees who retire after a job loss or a decline in health. As noted above, I defer the systematic analysis of workers who are exposed to late-career job loss until Part III.

Average income changes

A first obvious set of expectations concerns the composition of retirees' 'income packages'. More specifically, lower public replacement rates and greater importance of private retirement savings in the US as well as the decline of public replacement rates in both countries suggest the following hypotheses (the label HVR signals that these hypotheses refer to income changes around voluntary retirement):

HVR 1: American retirees have a larger portion of their preretirement earnings replaced by private (pension and asset) income than German retirees.

HVR 2: German retirees have a larger portion of their preretirement earnings replaced by income from public sources (public pensions and other transfers) than American retirees.

HVR 3: In both countries, the portion of preretirement earnings replaced by income from public sources (public pensions and other transfers) has declined over time.

Predictions concerning trends in the proportion of earnings replaced by private income are more difficult to make. Despite changes for future retirees, there seem to have been no strong trends in the salience of private pensions among recent German retirement cohorts (cf. Chapter 3). As for the US, it is difficult to predict the impact of the shift from DB to DC pensions on average replacement rates. Wolff (2011) finds that the share of workers without private pension wealth grew as DB plans were dismantled and DC plans diffused, yet average DC pension wealth grew substantially during the bull market of the 1990s. I therefore leave trends in the private income replacement rate as an open question.

In any case, with respect to retirees' economic well-being, the crucial question is not which sources they draw their income from, but how their disposable income changes around retirement. The discussion of the previous section suggests that mandatory retirement preparation, whether in the form of a public PAYG program or mandatory funded plans, reduces the likelihood that individuals save too little for retirement.² By the same token, greater reliance on voluntary complementary pensions raises the risk that some workers will not save enough. One intuitive interpretation of having saved 'too little' is having a low income below the poverty line. A second interpretation is that of experiencing large drops in income around retirement, which is likely to lead to declines in one's standard of living. I will address the latter possibility when formulating hypotheses about the variability of income changes below. As for changes in poverty status around retirement, one would expect the following:

HVR 4: Americans are more likely than Germans to enter poverty upon retirement.

In addition, declining public replacement rates can be expected to have led to greater poverty risks for recent retirement cohorts. In the US, this trend may have been reinforced by the shift towards DC benefits: First, as noted in Chapter 3, this shift has gone hand in hand with an erosion of complementary pension coverage among low-skilled workers (and particularly low-skilled men), that is, among those workers who are most likely to need complementary benefits to avoid poverty (Munnell and Sunden 2004; Wolff 2011). In addition, even those who have saved a considerable amount

2 Of course, people are not saving in the literal sense under PAYG, but they acquire claims to retirement benefits that can be considered as retirement savings with mandatory annuitization (cf. also the concept of Social Security Wealth introduced in Chapter 3).

of money may end up with small additional benefits if their portfolios evolve unfavorably. Based on these considerations, I posit the following hypothesis:

HVR 5: Over time, both German and American workers have become more likely to enter poverty upon retirement.

It is more difficult to predict average changes in disposable income relative to preretirement levels (rather than with respect to the poverty line). However, the decline in public replacement rates in combination with no clear upward trend in complementary pension coverage suggests that average losses of German workers have increased during recent decades. Trends in American Social Security replacement rates as well as Hacker's influential thesis of a 'Great Risk Shift' suggest a similar trend for the us, but the favorable economic climate and financial market trends of the 1990s may have limited changes in this direction. As noted in Chapter 3, the consequences of the shift toward DC accounts for American workers are thus examined under best-case conditions in this study. Nevertheless I formulate the following hypothesis for both countries:

HVR 6: In both countries, average declines in disposable income – relative to preretirement levels – have risen over time.

Variability of income changes at retirement

I now turn to the variability of income changes at retirement. In the empirical analysis, I will examine two aspects of variability: overall variability as captured by the standard deviation of relative income changes and the proportion of workers whose income drops by more than a third ('large drop') or more than half ('very large drop'). I am primarily concerned with variability within a retirement cohort, that is, among workers retiring within a given year or a narrow band of adjacent years. However, I will also formulate one hypothesis concerning the variability of income changes across different retirement cohorts (i.e., between-cohort variability).

In addition to addressing the problem of saving too little, public pension programs can also be expected to increase the homogeneity of savings rates across workers by defining a mandatory minimum and uniform level of savings. By applying uniform benefit formulae, public pensions will

typically also increase homogeneity of (implicit)³ returns on savings within a cohort. Progressive elements in benefit calculation lead to inter-individual differences in rates of return, but in ways that are often desirable from a social policy standpoint.

Greater emphasis on complementary pensions presumably raises variability of retirement outcomes within a retirement cohort. In addition, within-cohort variability can be expected to grow with the prevalence of DC (as opposed to DB) plans because the former leave more room for individual discretion concerning savings rates and investment choices. As noted repeatedly, research indeed suggests that the growing prevalence of DC plans has increased inequalities in the distribution of pension wealth in the US (Wolff 2011: 54 and Ch. 5). These considerations suggest the following hypotheses:

HVR 7: Variability of retirement-related income changes within a retirement cohort is greater in the US than in Germany.

HVR 8: Variability of retirement-related income changes within a retirement cohort has risen over time, particularly in the US.

HVR 9: Americans are more likely than Germans to experience large (post-government) income losses at retirement.

HVR 10: Over time, German and American workers have become more likely to experience large (post-government) income losses at retirement.

The relative importance of public vis-à-vis private pensions can also be expected to influence the variability of income changes across retirement cohorts. Again, emphasis on public insurance likely has a homogenizing effect. Cohort differences in the internal rate of return provided by a public PAYG system can be substantial and depend on political choices and demographic changes, but for mature PAYG systems they appear to have been limited during recent decades (see Leimer 2007 for the American case).⁴

3 In a pure PAYG system, there are no savings (or returns on these savings) in any strict sense. These concepts are, however, readily extended to the PAYG case by relating lifetime benefits to lifetime contributions. To distinguish it from real returns under a funded plan, the PAYG rate of return is usually referred to as the implicit (or internal) rate of return (see, for example, Leimer 2007).

4 Early retiree cohorts typically enjoy exceptionally high rates of return, as they receive high benefits for little or even no lifetime contributions. Historically, this has often been an attractive feature when initial generations of retirees were left with few resources for retirement because of war or economic crisis.

By tying returns on retirement savings to capital market performance, DC pensions in particular can be expected to raise cohort-to-cohort differences, particularly if many savers fail to follow the advice of shifting towards less volatile assets in their preretirement years (see Burtless [2003] for an instructive calculation of how identical portfolio choices can produce widely differing rates of return depending on a worker's year of birth). Another hypothesis to be tested in the empirical analysis therefore is:

HVR 11: Variability of income changes across retirement cohorts is greater in the US than in Germany.⁵

Group differences in income changes

Whereas hypotheses HVR 7 to HVR 11 refer to overall levels of variability, I now formulate a final set of hypotheses that refer to systematic differences across socio-economic groups. I focus on two aspects: education and retirement age. I will also conduct all analyses separately by gender. A major reason for differentiating by gender is that key institutional trends differ by gender. In particular, trends in employer pension coverage have been very different for American men and women: While both groups were affected by the shift toward DC pensions, during recent decades women caught up substantially in terms of overall pension coverage rates even though a noticeable gap remained in the late 2000s (Copeland 2011). Compositional trends likely also differ between men and women. For example, women's educational attainment has risen faster than men's (Buchmann and DiPrete 2006; Helbig 2012), although trends in retiree composition may differ somewhat from trends for women as a whole because women who work in their later years are a selective subgroup. In addition, women's labor force participation has risen and their employment biographies have become more continuous (see Isaacs [2010, Ch. 1] for a discussion of American trends in the context of retirement income security). Because of the close linkages between pension income and lifetime earnings, these compositional changes may have counteracted broader trends toward lower pension generosity, suggesting that income trajectories around retirement have developed more favorably for women.

5 One would also expect between-cohort variability to have risen as a consequence of the shift toward DC plans. However, ascertaining trends in cross-cohort variability would require a substantially longer observation window because between-cohort variability is itself an attribute of extended periods of time.

Differences by level of education. As for differences by retirees' level of education, I posit the following expectations:

HVR 12: Less-educated workers are more likely to enter poverty at retirement.

HVR 13: Educational inequalities in the risk of entering poverty are greater in the US than in Germany.

HVR 14: Educational inequalities in the risk of entering poverty at retirement have grown over time, particularly in the US.

How can hypotheses HVR 12 to HVR 14 be justified? To some extent, education plays the role of a proxy for lifetime earnings in these hypotheses.⁶ On average, low-educated workers will have had lower earnings over their working lives and their public retirement benefits will therefore typically be lower as well. Provided that they have not been poor already before retirement, low-educated workers can thus be expected to face greater risks of entering poverty after leaving work. Expectations are less clear for relative income changes which may be limited for less-educated workers due to progressive elements in public retirement benefits and because of minimum income floors provided by means-tested benefits. I therefore do not formulate hypotheses concerning educational differentials in relative income changes or the prevalence of large losses.

Turning to German-American differences (HVR 13), the progressivity of the American public pension scheme should reduce educational inequalities compared to Germany. The much greater salience of complementary pensions, however, likely more than neutralizes this equalizing effect of public benefits (O'Rand and Henretta 1999). As for changes over time, there are several reasons why the shift from DB to DC pensions has presumably led to growing educational inequalities in the US (e.g., greater salience of individual retirement planning under a DC regime). Available empirical evidence on the distribution of retirement wealth supports this expectation, particularly for men (e.g., Wolff 2011).

Another important factor influencing inequalities in retirement income is the overall wage structure during retirees' working lives: Because of the close linkages between lifetime earnings and pension income, working life

6 More fine-grained differentiations on the basis of class/occupation or other measures are precluded by the relatively small sample sizes.

inequalities can be expected to persist beyond retirement. In particular, if more recent retirement cohorts encountered greater educational earnings differentials during their working lives, we should expect them to exhibit greater educational differentials in poverty risks after retirement. In most Western economies, earnings inequality has indeed risen considerably during recent decades and this development has usually gone hand in hand with growing wage/earnings gaps among educational groups (OECD 2008). However, the timing and magnitude of changes varies considerably across countries.

The United States are among the countries with the most marked and earliest increases in earnings inequality: Earnings inequality began to rise in the 1970s, sky-rocketed during the 1980s, and continued to increase, albeit at a slower pace, during the 1990s (see, for example, Juhn et al. 1993; Katz and Autor 1999; Morris and Western 1999; Autor et al. 2008). In the 1970s and 1980s inequality increased across the whole wage distribution, with low-earning workers even seeing their real earnings decline, while in the 1990s inequality grew mostly in the upper part of the distribution (Juhn et al. 1993; Autor et al. 2008). By contrast, in Germany earnings/wage inequality rose markedly from the mid-1990s onward (Giesecke and Verwiebe 2008). Studies differ with respect to inequality trends during the 1980s and early 1990s, with some (e.g., Dustmann et al. 2009) finding a modest increase, at least for men, and others suggesting little change (e.g., Prasad 2004). However, the unemployment rate of low-skilled men clearly began to surge already in the early 1980s (Solga 2005: 20). The deterioration of less-educated workers' (lifetime) earnings and employment prospects is thus another reason for expecting their risk of entering poverty to have risen over time. The impact of this factor should be larger in the US, where the increase in inequality occurred relatively early and where it has been particularly steep.

Differences by retirement age. As discussed above, research on judgment and decision making in behavioral economics and psychology as well as sociological arguments about the salience of age norms suggest that retirement behavior may adapt rather sluggishly to changes in the financial incentives for (early) retirement (e.g., through the increase of full retirement age in the US and through the closing of group-specific early exit options in Germany). Many people may continue to follow established patterns of early retirement even when these have become considerably more costly due to changed regulations. The decision to retire (too) early may be most consequential in the long run when individuals have consumed potential

further resources such as savings and assets (Knoll 2011). Yet, it should also result in heightened immediate income losses around retirement for early retirees. Overall, changes in early retirement options appear to have been more substantial in Germany (cf. Chapter 3), suggesting the following final hypothesis:

HVR 15: Particularly in Germany, early voluntary retirement has been associated with greater financial losses for more recent retirement cohorts, both in terms of losses relative to preretirement income and in terms of poverty risks.

5.3 Previous research on income change at retirement

I conclude this chapter with a review of previous empirical studies that have investigated the impact of retirement on (disposable) income in Germany and/or the United States. I will mostly concentrate on the relatively few studies that use longitudinal data to compare income before and after retirement, as they are most closely related to the approach I will take in this study.

Burkhauser et al. (2001) provide what seems to be the only study of income changes around retirement that directly compares Germany and the United States (as well as two further countries, Canada and Great Britain). Consistent with the approach taken in this study, Burkhauser et al. (2001) consider changes around 'long-term labor force exit'. Their analysis is based on workers retiring in the early to mid-1990s and restricted to men whom they differentiate according to their age at the time of exit. Their findings confirm that public pensions are more important for postretirement income in Germany, while private pensions play a bigger role in the US.⁷ Estimated median changes in post-government income are -38% for American men exiting at ages 50 to 61, and -48% for those exiting at ages 62 and above. The corresponding estimates for German men are -23% for both age-at-exit groups.

7 The median public pension replacement rate (postretirement public pension benefits as a percentage of preretirement labor earnings) is 29% for German men retiring at ages 50 to 61 and 56% for those retiring at ages 62 and above. The corresponding American values are 0% and 35%. Conversely, the proportion of preretirement earnings replaced by private pension income is greater in the US. Reflecting low coverage rates, estimated private pension replacement rates are actually zero for the median German retiree in both age groups in Germany. By contrast, the median American worker sees 29% (ages 50 to 61) and 25% (ages 52+) of preretirement earnings replaced by private pension income.

The estimated income losses for American men appear large. However, due to a lack of comparable studies on the US, their plausibility is difficult to assess. In a rather dated study, Grad (1990) uses the Survey of Income and Program Participation (SIPP) to study income dynamics around retirement among Americans aged 55 or older. Her results, however, are difficult to compare with those of Burkhauser et al. (2001), as she partly uses different retirement definitions, does not differentiate between men and women, and, exploiting the SIPP's shorter interview intervals, examines changes in income from one three-month period to the next (rather than annual changes). Many respondents in her sample undergo a gradual transition to retirement that may be 'aggregated away' in annual surveys such as the PSID. However, even in her sample, roughly one fourth of transitions follow the stereotypical pattern of a transition from full-time employment without pension receipt to non-employment with receipt of retirement benefits. Grad (1990) estimates that the median decline in family income is 26% for workers collecting two types of retirement benefits (i.e., usually public as well as complementary benefits) and 38% for those collecting only one benefit. These results underscore the importance of complementary benefits for retirement income in the US. They also suggest somewhat smaller income losses than the study by Burkhauser and his colleagues.

A longitudinal analysis of income changes around retirement in Germany is provided by Motel-Klingebiel and Engstler (2008). Using the panel component of the 1996 and 2002 waves of the German Ageing Survey, they examine the relationship between six-year changes in needs-adjusted disposable income and different 'pathways to retirement'. Consistent with American research on the detrimental effects of involuntary early retirement, one of their main results is that workers who move from employment in 1996 to unemployment or other forms of early benefit receipt before age 60 (e.g., disability benefits) experienced greater income losses than workers transitioning from employment into regular public pension receipt. In fact, they find that average income of those transitioning directly remained almost stable between 1996 and 2002, but it seems that their income measure is not adjusted for inflation. A second measure that accounts for real income growth in the population by expressing income as multiples of the (year-specific) population average declines by 34% for the former and by 20% for the latter group.

Changes over time. Motivated by similar concerns as this study, a few studies have examined recent trends in income changes at retirement. Gosselin and Zimmerman (2008) use the PSID to examine period differences in the risk

of experiencing an income drop of 50% or more after various life events, among them a 'reduction in head's hours due to retirement or disability' (Gosselin and Zimmerman 2008: 34, Table 3). Their analysis is based on all households with heads between ages 25 and 65 and is thus not restricted to older workers (in particular, they include younger workers who leave employment because of a disability). However, older workers presumably account for the majority of retirement/disability events. Consistent with the notion of growing economic insecurity, they find that the proportion of households whose needs-adjusted disposable income drops by 50% or more at the time of retirement or disability-related reductions in labor supply rose from 25% in the 1974-83 period, to 31% for the 1984-93 period, to a maximum of 35% in the 1994-2003 period (cf. Table 3 in Gosselin and Zimmerman 2008).

Further evidence on recent trends in Germany and the United States comes from the chapters by Rinklake and Buchholz (2011) and O'Rand and Hamil-Luker (2011) in a recent comparative volume on 'Aging Populations, Globalization and the Labor Market' (Blossfeld et al. 2011). Rinklake and Buchholz (2011) use SOEP waves 1984-2007 and find that the negative relationship between having been unemployed at age 58 and absolute (inflation-adjusted) pension income is substantially stronger for birth cohorts 1946-51 than for birth cohorts 1934-1945. Overall, however, retirees from younger birth cohorts enjoyed higher absolute levels of pension income. The authors caution against over-interpreting these results because they are not able to control for cohort differences in employment biographies and pension contributions. One should add that rising (real) absolute pension levels are logically compatible with declining generosity in terms of replacement rates and with growing relative income losses at retirement. Unfortunately, the authors do not compare pension benefits to preretirement earnings or income.

O'Rand and Hamil-Luker's chapter (2011) on the US shows that younger American cohorts were more likely to experience unemployment after age 50, and that this increase is particularly strong for men without a high school degree. Differences and trends in public and private pension income are examined via growth curve models with random intercepts and a random quadratic growth rate. Unfortunately, results are somewhat difficult to interpret because of the complexity of the model, which is only presented in tabular form. Results for public pension income seem to suggest that the youngest cohort (1937-41) received substantially lower public benefits initially, yet estimates also suggest that this cohort enjoyed more rapid benefit growth afterward. At least at the individual (as opposed to household)

level, it is somewhat unclear, however, why public benefits should change after retirement (except through indexation). O'Rand and Hamil-Luker also find that average levels of private pension income were higher for younger cohorts. Cohort-specific (postretirement) trends in private pension income are not presented.

These previous studies have generated important insights. Yet, not only are some of them rather dated, they also leave open many of the questions raised above. Only the study by Burkhauser et al. (2001) is genuinely comparative in applying the same design and maximally comparable definitions across countries. In general, there is little attention to the variability of income changes (as opposed to their central tendency) and the relative importance of different types of income is rarely explored. Finally, evidence on changes over time remains very limited. Gosselin and Zimmerman's (2008) analysis provides some first evidence that retirement entails increasing economic risks in the US, yet their focus is on a much broader set of life events and on a much wider age range. The studies by Rinklake and Buchholz (2011) and O'Rand and Hamil-Luker (2011) likewise contain several interesting results (e.g., the finding that unemployment at age 58 is associated with lower pension income for younger German cohorts), yet they do not provide definitive answers to the hypotheses and research questions raised above. While using panel data, they do not analyze income trajectories around retirement in a before-after fashion, but instead focus on the absolute level of different types of postretirement (pension) income. To provide more conclusive evidence on the income trajectories experienced by German and American retirees, and on how these trajectories have changed over time, I therefore now turn to my own empirical analysis.

6 The changing economic consequences of retirement

In this chapter, I begin with the empirical analysis of the income trajectories experienced by older Germans and Americans. My main focus is on income changes among voluntary retirees whose exit from employment is not preceded by job loss or a decline in health. Part III will complement the present analysis by exploring the consequences of late-career job loss.

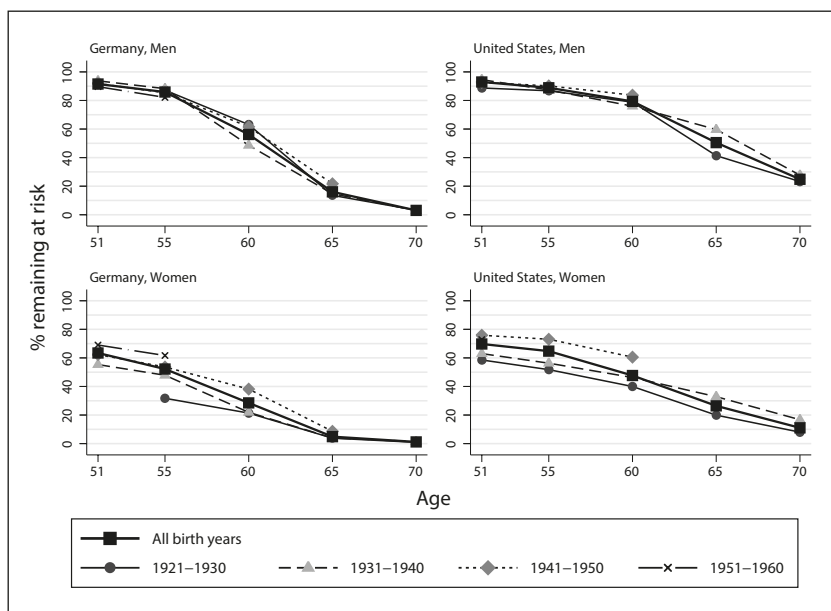
As discussed in Chapter 4, I define retirement in terms of exit from work (rather than from the labor force which includes the unemployed). In the interest of readability, I will nevertheless occasionally use the term ‘labor force exit’ as a synonym for ‘retirement’ and ‘exit from work’.

The chapter is structured as follows. The next section presents some straightforward results on gender and cohort-specific retirement patterns and briefly examines the economic situation of people without substantial employment after age 50. Section 6.2 describes the sample for the main analysis and discusses a few methodological details that were not covered in Chapter 4. Section 6.3 contains the analysis of income dynamics around exit from work. It is divided into three parts: The first focuses on average changes relative to preretirement income and on the risk of entering poverty, the second on overall variability of income changes, and the final part explores differences by level of education and retirement age. The chapter ends with a summary and conclusions in Section 6.4.

6.1 Retirement patterns and economic situation of non-working individuals

In Chapter 2, I highlighted key country differences and trends in gender-specific employment and retirement patterns and Figure 6.1 shows that these can also be found in the data used here. Separately by country and gender, it depicts the proportion of workers who are (still) at risk of leaving employment at different points after age 50. To remain at risk at a given age, a worker must have been employed relatively continuously since age 50 or since entry into the panel if the latter occurred after age 50 (see Chapter 4 for further details). I include cohort-specific estimates to illuminate changes over time. The curves in Figure 6.1 differ from standard survivor curves in that they are not conditioned on employment at age 50.

Figure 6.1 Age- and cohort-specific proportions of workers remaining at risk of exit from work



Sources: SOEP, PSID, CNEF, own calculations

Differences at age 51 capture initial differences in employment rates at the beginning of the late career. These differences arise from differences in the prevalence of long-term unemployment and inactivity states such as long-term sickness or being a homemaker. Differences at higher ages reflect a combination of these differences in initial conditions and differences in retirement patterns among those who meet the criterion of substantial late-life employment.

The upper part of Figure 6.1 shows that employment rates of German and American men are similar at age 51, but that German men leave employment much more quickly thereafter. Based on all birth cohorts, 79% of American men, but only 56% of their German counterparts remain at risk of labor force exit at age 60. Differences are even more pronounced at age 65 when about 50% of American, but only 16% of German men remain at risk. At age 70, only 3% of German men have not yet left employment, compared to 25% of their American counterparts. Comparisons across birth cohorts confirm previous findings that retirement ages have recently increased in both countries, with differences being strongest at age 60 in Germany and at age 65 in the United States (cf. Chapter 3).

Results for women are displayed in the lower pair of graphs and yield three main findings. First, at any given age women in both countries are less likely than men to still be at risk of labor force exit. This is due to gender differences in initial employment levels and women's earlier retirement. Second, at any given age, American women are more likely than German women to still be working and, again, this can be attributed to differences in initial employment levels as well as differences in retirement timing conditional on being at risk. Third, the trend toward increased late-life labor force participation and later exit is substantially stronger than for men in both the US and Germany. Financial incentives for later retirement and other changes affecting both sexes have apparently been reinforced by well-known and interrelated secular trends that are specific to women such as changing gender roles and women's faster growth in educational attainment.

As expected, these results show that, by focusing on income trajectories around labor force exit, I exclude a sizable female-dominated group of individuals with weak labor force attachment who have never worked or who are no longer working at age 50. Fasang (2012) therefore cautions against equating retirement with labor force exit and suggests that researchers use more flexible definitions to accommodate workers with limited labor force attachment. I do not fully take up this suggestion because the loss of earnings associated with exit from work is so central to the present analysis. However, to alleviate concerns that I may be missing an important part of the picture when confining my attention to workers with substantial late-life employment, Table 6.1 provides some basic information on the financial situation of individuals who do not work a substantial number of hours at age 50 (more precisely: who do not meet the criterion for being at risk which requires that a person worked at least 15 hours per week on average at ages 48 to 50). For simplicity, I will from now on refer to these workers as 'not employed at age 50'.

The first column in Table 6.1 reports the proportion of men/women in the given gender/partnership category who are not employed at age 50. It confirms that this proportion is considerably higher for women than for men. Among women, it is higher for those living with a partner reflecting the persistence of traditional earnings arrangements with a single male breadwinner. German women are more likely than American women not to be employed around age 50, irrespective of their partnership status. Among men, non-employment is more common among singles, which is consistent with research showing that partnered men are more successful on the labor market (Chun and Lee 2001).

Table 6.1 Financial situation of individuals with no or marginal employment at age 50

	% with no/ marginal work at age 50 (given gender/ partner status)	Avg. annual post-gov. Income at age 50 in '000s (2007 \$ PPP)	Median post-gov. income change (%) between 50 & 60	Poverty post- gov. rate age 50	Change in post-gov. poverty rate between 50 & 60	N (age 50)
Germany, men						
No partner	15	15.6	(12)	52	(-27)	58
Has partner	7	18.7	2	35	5	198
Germany, women						
No partner	24	16.1	10	49	15	128
Has partner	39	26.2	-3	12	9	1049
United States, men						
No partner	16	13.7	(4)	85	(-2)	48
Has partner						
United States, women						
No partner	18	11.7	-2	78	10	171
Has partner	30	35.4	-7	21	11	500

N (final column) refers to the number of men/women who are not or marginally employed at age 50. Estimated changes in household income/poverty rate based on fewer cases. Estimates in parentheses are based on fewer than 30 cases. Poverty rate is defined as relative income poverty with the poverty threshold set to 60% of median needs-adjusted post-government income for the whole adult population. Poverty thresholds are calculated separately by country and year. post-gov. = post-government.

Sources: SOEP, PSID, CNEF, OWN calculations

In both countries, women living with a partner are not only the group that is most likely not to work at age 50: They are also by far the largest group (cf. the unweighted case numbers in the final column) and the one that is best-off in economic terms. At age 50, their average disposable income is higher and their poverty rate¹ is lower than for any of the other three (gender/partnership) groups. This primarily reflects the fact that most of these women (86% in the US, 83% in Germany; results not shown) live with a working partner. Over the course of the next ten years, the typical partnered woman sees her disposable income fall slightly while the proportion with incomes below the poverty line rises noticeably, by 9 percentage points in

1 Poverty is defined as relative income poverty using a threshold of 60% of median disposable income for the adult population. See notes to Table 6.1 and Chapter 4 for further details.

Germany and by 11 percentage points in the US. Spousal (early) retirement likely is a primary driver of these changes, although other processes such as partner loss through widowhood or separation may also play a role. These results suggest that, even though I will not explicitly analyze the income trajectories experienced by these women in greater detail, the ensuing analysis of the consequences of men's labor force exit is directly relevant to their economic situation: The majority of non-employed women live together with a partner who is at risk of experiencing retirement as defined in this study.

I briefly summarize key findings for the other three gender-partnership groups: The economic situation of non-working partnered men is noticeably worse than that of partnered women. This is because their spouses are less likely to work and even conditional on working have much lower earnings than non-working women's spouses (results not shown). Interestingly, the well-being of partnered German men seems to change little between ages 50 and 60, while their American counterparts see their situation deteriorate as they live through the next decade of their lives. Single men and women who do not work at age 50 live in very precarious economic circumstances in both countries. At age 50, the estimated poverty rates for German and American men in this group are 52% and 85%, respectively. Perhaps due to survivor benefits, estimated poverty rates for women are somewhat lower at 49% and 78%. Given the small number of cases, changes between ages 50 and 60 must be viewed with caution, but except perhaps for German men there is little evidence that singles see their dire situation change for the better. If anything, estimated changes in poverty rates suggest that many experience further declines in economic well-being. These findings confirm previous findings that the economic situation of single older women is precarious, particularly in the US (e.g., Gornick et al. 2009). Single older men with weak labor market attachment, though fewer in number, also seem to be a vulnerable group, again especially in the US.

6.2 Sample characteristics and details of estimation approach

I now turn to the main subject of this chapter: The income trajectories experienced by older workers and their families as they leave work and retire. As described in more detail in Chapter 4, I define labor force exit as having occurred in year t when the following conditions hold: A person worked a substantial number of hours (on average 15 or more per week) at ages 48-50 or during her first three years in the panel if she entered it at a

higher age, worked less than 10 hours per week in t and worked less than ten hours per week two years later, that is, in $t+2$. I ignore information at $t+1$ to ensure consistency of the indicator across periods with annual and biannual survey intervals. I exclude a small number of (predominantly American) workers who retire after age 75. Finally, I differentiate between voluntary and involuntary retirees based on whether retirement was preceded by involuntary job loss or a decline in health. In this chapter, I will concentrate on income changes among voluntary retirees, yet I will provide core results for involuntary retirees as well.

As discussed in Chapter 4, I focus on four- and six-year income changes around retirement. Let t represent a given worker's year of retirement. For workers retiring in odd-numbered (e.g., 1995) years, four-year changes are calculated from $t-1$ to $t+3$ and six-year changes are calculated from $t-1$ to $t+5$. For workers retiring in even-numbered years (e.g., 1996), four-year changes are calculated from $t-2$ to $t+2$ and six-year changes from $t-2$ to $t+4$. This somewhat unusual approach alleviates comparability problems arising from the PSID's switch to biennial interviewing in 1997 (see. Chapter 4). I do not consider income in t because many retirees still worked on their preretirement jobs during the first months of the year (and because from 1997 onwards I do not observe income in t for American workers retiring in odd-numbered years). Estimated four- and six-year changes tend to be very similar. In other words, there is little evidence of systematic postretirement income trends at least until $t + 4/t + 5$. This is consistent with the results of Hungerford (2003), who studies income dynamics after retirement in Germany and the US and finds no clear trends until about four years after retirement.² To simplify the presentation, I therefore generally present the average of four- and six-year income changes rather than separate results. Throughout, standard errors are clustered on the person-level to account for intertemporal correlation.

A potential concern is that income just before retirement may be unrepresentatively low: Workers might have already reduced their work hours or work in (lower-paying) 'bridge jobs' (Ruhm 1990) that are not representative

2 However, Hungerford (2003), who analyzes changes relative to income in the first year after retirement rather than relative to preretirement income, also finds that American retirees of both sexes experience a steady decline of real income after their fourth or fifth year in retirement, while German retirees, and especially German men, even see their real income increase. He argues that these divergent trends are attributable to the greater relative importance of public benefits in Germany: While public retirement benefits are typically indexed to inflation or real wage growth, the complementary pensions are often not adjusted for changes in the cost of living and their real value therefore erodes over time. I return to these issues at the end of this chapter.

of their earnings during most of their working lives. Fachinger and Künemund (2009) use German administrative data to explore the sensitivity of empirical pension replacement rate estimates to various choices including the reference period used to determine preretirement income. Their calculations do suggest that using income just before retirement as the baseline may result in inflated estimates of replacement rates. As a robustness check, I examined the sensitivity of key results to calculating income changes with respect to average income at $t-4/t-3$ rather than income at $t-2/t-1$. Estimated replacement rates indeed were slightly lower when postretirement income was compared to income in $t-4/t-3$ rather than income in $t-2/t-1$, but differences were much smaller than those found by Fachinger and Künemund (2009).³ More importantly, there was no indication that qualitative conclusions concerning country and period differences in relative income changes would be affected. To maximize sample sizes, I therefore use income at $t-2/t-1$ as the reference.

Table 6.2 characterizes voluntary and involuntary retirees with respect to key variables. For voluntary retirees, Tables 6.A.1 and 6.A.2 in the appendix to this chapter provide additional information on compositional changes over time. All time-varying retiree characteristics were measured before retirement, in the same year as the preretirement income measure. The bottom rows of Table 6.2 report the number of cases with valid information on four- and six-year changes. In the US, the numbers are quite modest, especially when taking into account that observations for four- and six-year changes are not independent because of the panel character of the data.

A clear result emerging from Table 6.2 is that involuntary retirees not only retire earlier than voluntary retirees, but that they are also disadvantaged in several respects: In particular, they have lower levels of education and preretirement earnings and are more likely to be poor

3 There are several likely reasons why my estimates are less responsive to the choice of the reference period. First, two years before retirement, which is the reference year for approximately 50% of my cases, may already be 'early enough': Fachinger and Künemund (2009) indeed find that upward bias of replacement rate estimates is most extreme when estimates are based on income in the year of retirement and the year prior to retirement (cf. Table 6 in their article). Further helpful features of my analysis are the trimming of the change measure at +100% (which limits the influence of outliers with low preretirement incomes) and the fact that my definition of retirement is based on exit from work, whereas Fachinger and Künemund's is based on pension entrance. Thus, some retirees in their sample have presumably already left employment (and thus experienced a decline in income) in the years before their retirement event. Finally, I focus on changes in pre- and post-government household income, whereas Fachinger and Künemund examine the fraction of preretirement earnings that is replaced by individual public pension income.

or near poor (defined as having an income between 100 and 150% of the poverty line) before retirement. Workers with minority status (migration background in Germany, black in US) are also overrepresented among involuntary retirees. These results confirm previous findings that involuntary retirement is concentrated among more vulnerable groups (e.g., Szinovacz and Davey 2005; Lachance and Seligman 2010; Radl 2010, 2012a). They also caution against direct, unadjusted comparisons of the income trajectories experienced by the two groups and underline the need to employ a matching approach or some other technique to identify appropriate comparison cases for involuntary retirees, for example, via DID matching.

The lower part of Table 6.2 provides information on partner characteristics and changes in the partner's employment status for workers who were living with a partner prior to their retirement. It highlights an important fact about retirement processes at the household level: Workers' retirement is often accompanied by the retirement of their partner or spouse. For example, 11.8% of German men who retire voluntarily and were living with a partner at $t-2/t-1$ have a partner who worked part-time (i.e., between 10 and 30 hours) at $t-2/t-1$ and did no longer work a substantial number of hours (i.e., less than 10) in the year when the postretirement income measure was taken. Retirees in the other groups likewise often had partners who left employment at roughly the same time as they did. Regardless of what is driving this phenomenon of 'coretirement', it does complicate the task of identifying the economic impact of *individual* retirement on household income. This is also stressed by Bardasi et al. (2002: 145), who study income dynamics around men's and women's retirement in Britain:

Since we summarise each individual's economic wellbeing in terms of the total income of the household to which he or she belongs, individual wellbeing is affected not only by direct changes in each person's own status, but also by what happens to other individuals inside the household. In particular, there are reasons to believe that the retirement decisions of marital partners are linked.

There is no easy solution to this problem. One approach would be to focus only on types of income that accrue directly to the individual (e.g., by comparing individual public and private retirement income with preretirement earnings). However, this would clearly result in a very incomplete picture of changes in economic well-being. Not only would

this approach neglect the often important role of income components that flow to (or from) the household as a whole rather than to individual members such as most means-tested public transfers or direct taxes. It would also disregard the crucial importance of income pooling for individual well-being (cf. Chapter 2). Another possibility would be to differentiate between single and couple households and to further subdivide the latter with respect to their joint employment/retirement trajectories. However, such an approach is hardly feasible in the present context, where I want to compare the effect of retirement across countries and time periods, as it would likely run into sample size problems and lead to overwhelmingly complex and fragmented results. In addition, such an analysis would be complicated by the fact that households are often not stable over time.

While the phenomenon of coretirement thus complicates the interpretation of results, this issue should not be exaggerated. All of the (unadjusted) findings presented in this chapter have perfectly straightforward and interesting interpretations: The (hypothetical) finding that newly retired women's needs-adjusted household income is, on average, 20% lower than shortly before retirement would mean just that, even though some of the decline may be attributable to the retirement of partnered women's spouses rather than to the retirement of women themselves.

In addition, period differences in coretirement patterns (whether they reflect secular trends or sampling variability) can also be accounted for by the compositional adjustment procedure outlined in Chapter 4. As elaborated there, I use Hainmueller's (2012) entropy balancing method to purge my estimates of the impact of changes in retiree composition. By including appropriate variables in this procedure, I am able to assess the possibility that observed trends are driven by period differences in couples' joint retirement trajectories.

Table 6.3 lists and provides some detail on the retiree and partner characteristics included in the adjustment procedure. Most of the included variables are straightforward. I do not adjust retiree composition for retirement age because the latter is likely endogenous to institutional changes that affect the overall level of retirement benefits or the costs of early retirement. Adjusting for retirement age would therefore arguably introduce 'posttreatment bias', that is, bias arising from controlling for the consequences of a causal variable (Ho et al. [2007]; see also Wooldridge [2005]). For similar reasons, I also include only a crude measure of work experience (35+ vs. fewer than 35 years) because work experience is correlated rather strongly with age, especially for men.

Table 6.2 Retiree and partner characteristics

	Men				Women			
	Germany		United States		Germany		United States	
	Voluntary	Invol.	Voluntary	Invol.	Voluntary	Invol.	Voluntary	Invol.
Retiree characteristics								
Age at exit (mean)	61.6	59.0	63.4	62.3	60.1	57.3	62.2	60.5
% East Germany	14.7	29.6			21.7	33.0		
% civil servant ($t-2/t-1$)	13.2	3.9			4.4	0.3		
% migration background/ black	14.4	21.5	8.1	12.0	8.8	19.0	11.4	15.0
% intermediate education	65.5	65.8	47.6	49.4	58.3	56.7	60.9	64.1
% high education	20.1	11.5	27.5	17.1	15.0	9.5	22.6	11.9
% living with partner ($t-2/t-1$)	88.8	90.2	89.5	91.6	71.0	76.7	68.5	62.3
% with work exp. ≥ 35 yrs ($t-2/t-1$)	76.3	60.6	79.6	74.3	45.2	30.4	28.8	20.2
% working full-time ($t-2/t-1$)	72.3	71.9	63.2	59.4	50.9	49.2	46.6	41.8
% poor ($t-2/t-1$)	3.3	6.3	6.3	14.5	4.6	5.3	6.2	13.8
% near poor ($t-2/t-1$)	17.1	24.4	10.2	21.1	16.5	15.9	15.6	22.6
% middle earnings tercile ($t-2/t-1$)	33.6	39.5	26.3	27.1	31.2	31.7	28.7	31.5
% top earnings tercile ($t-2/t-1$)	44.1	30.8	50.9	35.0	15.6	7.5	18.8	5.2

	Men		Women	
	Germany	United States	Germany	United States
	Voluntary	Invol.	Voluntary	Invol.
Partner characteristics (if partner present at $t - 2/t - 1$)				
Age (mean)	56.5	53.7	60.4	62.1
% intermediate education	53.0	54.1	68.9	31.8
% high education	9.2	9.2	18.1	44.8
% works part-time	18.6	21.1	9.4	14.5
% works full-time	18.5	29.3	42.1	47.7
Change in presence/employment of partner (if partner present at $t - 2/t - 1$)				
% whose partner leaves PT work	11.5	9.2	7.3	9.7
% whose partner leaves FT work	8.2	10.3	25.4	22.1
% losing partner	3.8	3.9	4.8	9.9
N four-year change	944	495	587	310
N six-year change	721	407	424	298
				186
				156

Invol. = Involuntary. See Chapter 4 and Table 6.3 for details on variable definitions.
 Sources: SOEP, PSID, CNEF, own calculations

It is worth noting that I do not include a dummy for East German retirees in the compositional adjustments. Doing so would run into technical problems because the first subperiod ends in (retirement) year 1991 and includes practically no East German retirees. Alternatives would be to analyze East Germans separately or to exclude East German retirees from the analysis. The first approach, however, would further raise the complexity of results and run into sample size problems. The latter approach is unappealing because a substantial fraction of the population would be excluded from the analysis. I will therefore analyze East and West German retirees together and occasionally provide further detail on differences between the two groups. The EB procedure also helps to account for compositional trends that are related to the entry of East German retirees into the sample. Perhaps the most important trend is that the inclusion of East German women noticeably raised the proportion of women with long careers (as captured by the dummy for having 35 or more years of work experience). However, a somewhat weaker trend toward longer careers can also be found for West German women (i.e., women who lived in the Federal Republic of Germany before November 9, 1989).

As noted above, identification of individual retirement effects is complicated by the phenomenon of coretirement. Controlling for period differences in partner's labor supply and retirement behavior may help to rule out the possibility that observed period differences reflect differences in coretirement patterns rather than institutional change. At the same time, spousal retirement patterns may be subject to the same type of endogeneity issues that lead me to not control for period differences in retirement ages. I therefore present two sets of composition-adjusted estimates. The first set is adjusted with respect to covariate sets I and II in Table 6.3, that is, with respect to a rich set of retiree characteristics and a few basic partner/couple characteristics, including the age difference between the retiree and his/her partner, the partner's work experience and level of education, and an indicator for losing a partner due to separation or death. I will refer to this adjustment as 'Adjustment 1'. The second set of adjusted estimates ('Adjustment 2') is additionally adjusted for covariate set III, which includes measures of the partner's employment status at $t-2/t-1$ and dummy variables indicating whether the partner left full-time or part-time work between the preretirement and the postretirement observation.

Table 6.3 Characteristics included in compositional adjustment (entropy balancing)

Characteristic	Details
I. Retiree characteristics	
Civil servant status	DE only
Migration background/race	DE: migration background vs. no migration background US: black vs. non-black
Education	DE: No degree/general schooling only (low) vs. vocational degree (intermediate) vs. tertiary degree (high) US: Less than high school (low) vs. high school/some college (intermediate) vs. college degree (high)
Presence of partner in $t - 2/t - 1$	Yes vs. no
Total work experience (years), $t - 2/t - 1$	35 or more vs. less than 35 years
Work hours in $t - 2/t - 1$	10-30 vs. 30+ (full-time)
Household income in $t - 2$	Below poverty line (excluded from analysis of poverty entries) vs. 100-150% of poverty line (near poor) vs. more than 150% of poverty line
Labor earnings in $t - 2/t - 1$	Earnings terciles
II. Basic set of partner/couple characteristics (if partner present in $t - 2/t - 1$)	
Age difference	Age difference in years
Partner's education	See above (retiree characteristics)
Partner's work experience	See above (retiree characteristics)
Loss of partner due to separation or death	Dummy variable indicating loss of partner since $t - 2/t - 1$, time-varying (i.e., may take different values for first and second postretirement observation)
III. Additional characteristics included in full set of partner/couple characteristics	
Partner's work hours in $t - 2/t - 1$	Less than 10 vs. 10-30 (part-time) vs. 30+ (full-time)
Partner leaves employment	No exit vs. leaves part-time work vs. leaves full-time work; time-varying (i.e., may take different values for first and second postretirement observation)

6.3 Income changes around exit from work

I now address the main questions of this chapter: How do income trajectories around voluntary labor force exit differ between the US and Germany? How have they changed over time? And to what extent can welfare state arrangements account for observed country and period differences? I begin with relative income changes and the risk of entering poverty upon retirement. I then explore the variability of income changes around labor force

exit by looking at the proportion of workers who experience large drops of income and at the standard deviation of income changes. I conclude with an analysis of differences by level of education and retirement age. The focus is on voluntary retirees, but for the sake of completeness and comparison, I also present the main results for involuntary retirees. Throughout the chapter, the discussion refers to voluntary retirees unless explicitly stated otherwise.

Average changes

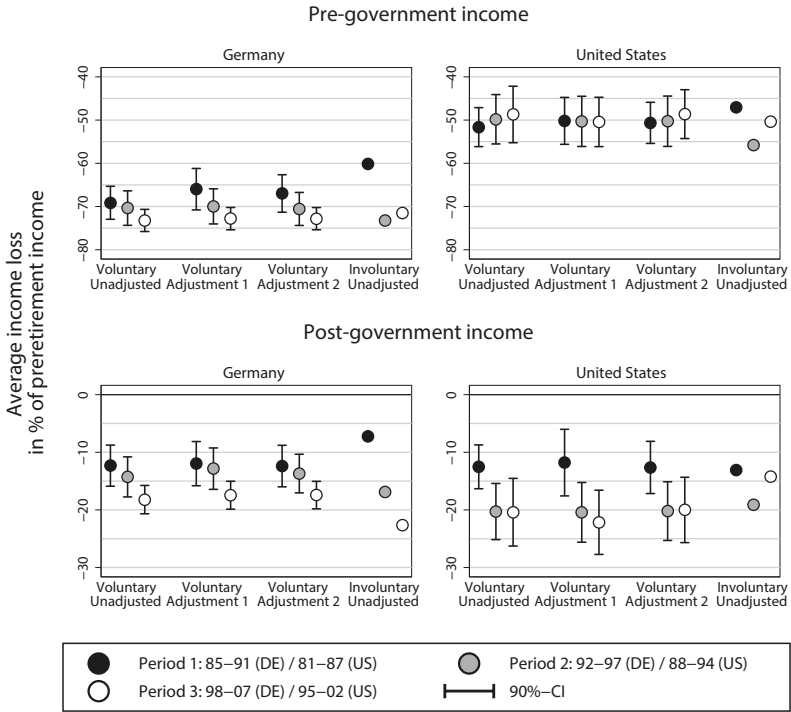
Figure 6.2 depicts average relative income changes around men's retirement. Changes before taxes and transfers are displayed in the upper row and changes after taxes and transfers in the lower pair of graphs. I show three sets of estimates for voluntary retirees: The leftmost triplet depicts unadjusted period-specific estimates. The second triplet is adjusted for period differences in retiree composition and for basic differences in partner/couple characteristics (Adjustment 1). The third triplet depicts estimated income changes under Adjustment 2, which additionally accounts for period differences in spousal labor supply and retirement behavior. Finally, the rightmost triplet shows unadjusted results for involuntary retirees. Results for voluntary retirees are accompanied by two-sided 90% confidence intervals.

The lower pair of graphs summarize changes in needs-adjusted income after government taxes and transfers, that is, in disposable income. Again focusing on results for voluntary retirees, the most striking finding is that average losses appear to have risen in both countries. Based on unadjusted estimates, the average decline experienced by German men rose from -12% in the first, to -14% in the second, and to -18% in the latest period: Formal tests show that the difference between the first and the last period is statistically significant ($p < 0.05$).⁴ Results are very similar when compositional differences are controlled. Separate analysis of East and West German retirees (based on their country of residence in 1989) does not lead to qualitatively different conclusions concerning the overall trend. However, results suggest that for West German men most of the increase in relative losses occurred from the first to the second period (with little additional change from the second to the third period).⁵

4 Throughout the study, I mainly convey statistical uncertainty using two-sided 90% confidence intervals that are based on cluster-robust standard errors (with clustering at the person level). However, I occasionally report the statistical significance of period or country contrasts. The p -values underlying these statements were generally obtained using the `suest` routine in Stata 12 (using the `vce(cluster)` option).

5 The fact that average estimates for West and East German men in Figure 6.2 suggest a more gradual decline is due to the relatively small losses of East German men in the second period (i.e.,

Figure 6.2 Men – income changes around retirement



Sources: SOEP, PSID, CNEF, own calculations

For American men, estimated losses increased from -12% in the first to -20% in the second and third periods. Composition-adjusted estimates lead to similar conclusions. Due to smaller sample sizes (see Table 6.2), these estimates are considerably more uncertain than for German men, yet unadjusted as well as adjusted differences between the first and the two subsequent periods generally reach or approach statistical significance at the 5% level.⁶ These results support hypothesis HVR 6 according to which average income losses have increased over time in both countries.

retirement years 1992-97). This is likely attributable to particularly generous (early) retirement opportunities for East German workers in the first years after German reunification (Jochem 2009: 224).

6 More precisely $p < 0.05$ for the difference between the first and the second period and $p < 0.13$ for the difference between the first and the third period.

Results for involuntary retirees, depicted by the rightmost triplets of dots, do not suggest that they suffer greater losses than their voluntary counterparts. Two things have to be kept in mind, however. First, the estimates in Figure 6.2 do not account for the fact that the decline in income associated with labor force exit occurs earlier for involuntary retirees which implies greater losses in terms of lifetime income. Second, as shown in Table 6.2, involuntary retirees have a rather different socioeconomic profile than voluntary retirees, so unadjusted comparisons must be viewed with caution. That said, Figure 6.2 shows a marked increase in pre- and especially post-government losses for German men. This provides some initial support for the idea that recent welfare state reforms have disproportionately affected older workers with unstable late careers, a possibility that I will explore in more detail in Part III.

Before examining income changes around women's retirement, I probe a little deeper into possible explanations for the observed pattern of men's income changes. Table 6.4 explores the role of private non-labor income and public taxes and transfers in buffering the decline in labor income associated with exit from work. Composition-adjusted estimates are provided in Tables 6.A.3 and 6.A.4 in the appendix to this chapter. Separately by country, gender, and period, Table 6.4 first reports the proportion of voluntary retirees experiencing a decline of individual and total household labor earnings around labor force exit. Not surprisingly, these proportions are generally close to 100%.⁷ For those who did experience a decline in household earnings, I then investigate whether and to what extent losses were offset by simultaneous increases in private non-labor income (PNLI; income from assets, private pensions, and private transfers), public pension and transfer income (PPTI; income from public pensions and all other public transfers such as unemployment benefits), or a decline in household direct taxes (HHT). For each of these income components, I report both the proportion of workers with increased income of the given type and the average and median 'replacement rate' for workers with an increase. Individual replacement rates are simply the gain in PNL, PPTI, or HHT expressed in percent of the household earnings loss.⁸ To reduce the impact of measurement error and random fluctuations, I ignore earnings losses and income

7 They may be less than 100% because the retirement indicator is compatible with fewer than ten hours of work per week in $t + 2/t + 3$ and any number of work hours in $t + 4/t + 5$. In addition, whether total household earnings decline also depends on the labor supply of other household members.

8 I calculate replacement rates on the basis of household rather than individual earnings because the other income components are also household-level aggregates.

gains of less than 5% (relative to income of the given type at $t-2/t-1$). I again average estimates for four- and six-year changes because there is little evidence of systematic differences.

Table 6.4 Changes in income components around retirement – voluntary retirees only

	(a) Men					
	Germany			United States		
	85- 91	92- 97	98- 07	81- 87	88- 94	95- 02
% with individual earnings loss (IEL)	99	99	98	96	97	96
% with household earnings loss (HEL)	95	95	98	96	95	95
Change in private non-labor income (PNLI)						
% with increased PNLi given HEL	64	54	52	81	61	70
Average replacement rate	18	12	16	37	46	47
Median replacement rate	7	5	7	32	29	33
Change in public pension and transfer income (PPTI)						
% with increased PPTI given HEL	94	91	91	82	79	63
Average replacement rate	60	56	51	37	35	34
Median replacement rate	51	47	44	27	27	22
Change in household taxes (HHT)						
% with decreased HHT given HEL	92	96	93	98	93	95
Average replacement rate	26	26	30	27	29	28
Median replacement rate	27	27	29	26	26	26
	(b) Women					
	Germany			United States		
	85- 91	92- 97	98- 07	81- 87	88- 94	95- 02
% with individual earnings loss (IEL)	97	98	95	98	94	99
% with household earnings loss (HEL)	96	95	94	93	93	92
Change in private non-labor income (PNLI)						
% with increased PNLi given HEL	59	38	58	58	58	67
Average replacement rate	24	18	19	37	46	52
Median replacement rate	12	6	8	28	29	33

	(b) Women					
	Germany			United States		
Change in public pension and transfer income (PPTI)						
% with increased PPTI given HEL	89	87	90	72	70	63
Average replacement rate	54	63	52	31	36	54
Median replacement rate	45	49	44	25	25	32
Change in household taxes (HHT)						
% with decreased HHT given HEL	92	92	93	96	92	89
Average replacement rate	28	26	31	31	26	31
Median replacement rate	28	25	32	27	23	26

Replacement rates are expressed in percentage terms and calculated as the increase in PNLI/PPTI or decrease in HHT divided by the absolute value of the decline in household labor earnings. Replacement rates capped at +200 per cent. Average and median replacement rates calculated over observations with nonzero replacement rates (i.e., over observations with an increase in the given income component).

Sources: SOEP, PSID, CNEF, OWN calculations

Results for male voluntary retirees are presented in panel (a) of Table 6.4. To what extent are earnings losses around men's retirement counterbalanced by increasing income from other private and public sources, or by a declining tax burden? Considering country differences first, estimates clearly show that public pension and transfer income is more important for German than for American retirees and that the opposite holds for income from private sources. These results provide strong support for hypotheses HVR 1 and HVR 2. Lower income taxes also play a crucial role in cushioning the loss of earnings associated with retirement and their importance appears to be broadly similar across the two countries.

Turning to changes over time, results for Germany suggest declines in the cushioning effect of private and public income sources. For private non-labor income, this trend is visible in the proportion of workers with increasing PNLI (rather than in replacement rates conditional on an increase). Further analysis shows that this is partly, but not completely, attributable to the presence of East German retirees in the second and third periods who tend to have low levels of private retirement income. As for public transfers, all three indicators declined from the first to the third period, with changes in average and median replacement rates being quite substantial: According to my estimates the former declined from 60% to 51% and the latter from 51% to 44% from the first to the final period. Again, the entry of East German retirees into the sample plays a role, but in this case it has slightly dampened rather than reinforced the negative trend (further calculations show that public replacement rates were somewhat higher for East German retirees,

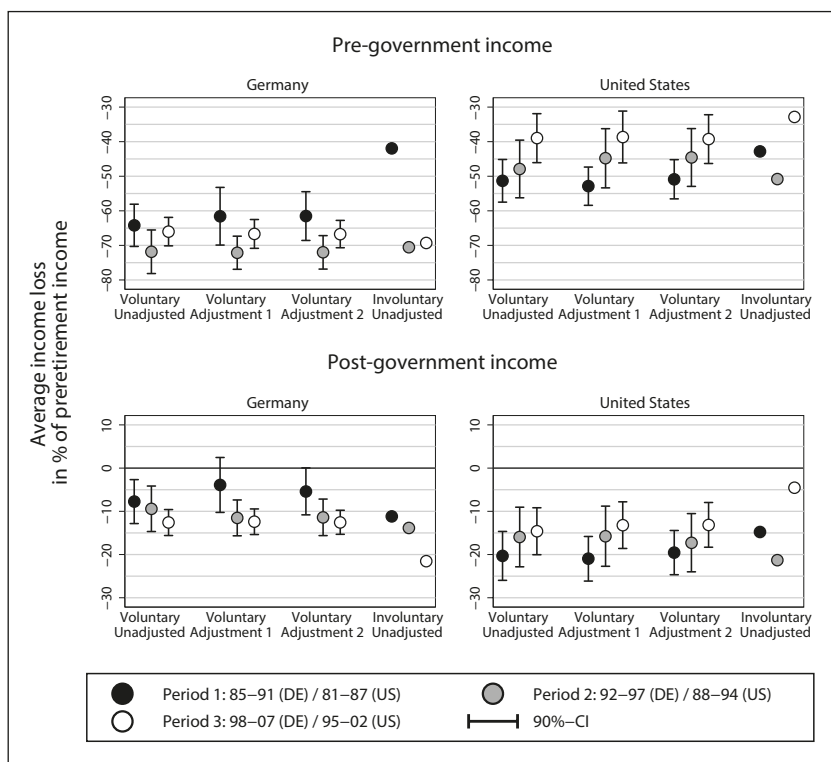
especially in the middle period). On the whole, these results support HVR 3, which predicts that the buffering effect of public transfers has declined. Finally, the extent of cushioning through direct taxes appears more or less stable over time, with perhaps a slight hint of a growing buffering effect.

Turning to American men, results suggest that the share of workers whose earnings losses are buffered by increasing private non-labor income fell noticeably between the 1980s and the early 2000s. The trend, however, is not monotone: The share of workers who saw at least part of the earnings loss offset by higher PNLI starts out at 81% in the first period, dips to 61% in the second period and recovers to 70% during the final period. For those who did see their PNLI rise, median replacement rates seem to have remained largely unchanged, whereas average replacement rates have increased, pointing to a growing influence of positive outliers who enjoy high replacement rates. These results provide initial support for the idea that the shift from DB to DC pensions has spawned greater inequalities in private pension income. As in the German case, results for public transfers again support HVR 3 which states that buffering through public transfers has declined. The striking drop in the share of retirees with increasing transfers must be interpreted with caution, as it is driven by trends among very late retirees who have begun drawing public pension benefits before leaving employment and therefore experience no marked increases in public transfer income when they finally exit from work. However, both average and especially median public replacement rates declined noticeably for those who did see their public transfer income rise. As in Germany, cushioning through changes in household taxes private taxes shows no strong trend.

Figure 6.3 depicts changes in needs-adjusted household income around women's retirement. Comparing results across countries, two findings are especially noteworthy: First, as with men, pre-government losses are substantially greater in the German case. Second, post-government losses are substantially greater for American women, except in the last period. This partly reflects differences in household composition: A somewhat larger share of American women lives without a partner and these women tend to experience larger income losses (results not shown). However, American women's retirement is also associated with greater income losses conditional on living with a partner.

As for changes over time, pre-government losses for German women who retire voluntarily follow no clear pattern. Unadjusted results for post-government income are suggestive of a slight downward trend, but the period differences are far from statistical significance. The trend is amplified, however, when retiree composition is held constant, mainly because

Figure 6.3 Women – income changes around retirement



Sources: SOEP, PSID, CNEF, own calculations

adjusted losses are much smaller in the first period. This suggests that compositional changes among female retirees have dampened the trend towards increased income losses found for German men. Period differences in coretirement patterns do not seem to be a major compositional factor, as the two sets of adjusted estimates are quite similar. As can be seen in Appendix Table 6.A.2, the most noteworthy compositional trends among female retirees are a clear educational upgrading, a (related) increase in preretirement earnings, and the growing share of women with 35 or more years of work experience. Further analysis suggests that women's gains in experience are the single most important factor.⁹ Given the close relationship between lifetime earnings and public pension benefits in Germany,

9 Estimated average income losses after taxes and transfers for the first period are reduced from 7.7% to 3.9% under Adjustment 1 (cf. the bottom left graph in Figure 6.3.). The impact of the compositional adjustment is substantially smaller, the reduction now being from 7.7% to 6.1%,

this is not surprising. As noted above, this compositional trend is partly attributable to the entry of East German women into the sample.

These results are underscored by estimated replacement rates for female voluntary retirees. In contrast to German men, public replacement rates in panel (b) of Table 6.4 do not appear to have declined over time, while there is some trend toward lower private income replacement rates. By contrast, adjusted estimates in Appendix Tables 6.A.3 and 6.A.4 do show declines in public replacement rates that are similar in magnitude to those for German men. This further supports the conclusion that compositional changes among female retirees – and in particular their longer work careers (in terms of actual experience) – have cushioned the impact of declining public pension generosity on women’s retirement incomes.¹⁰

Among American women retiring voluntarily, there is a clear trend toward smaller pre-government losses: According to my estimates, whereas the average recently retired woman’s pre-government income was 51% lower than before retirement in the early to mid-1980s, this difference was only 39% for women who retired between 1995 and 2002. This period difference is almost statistically significant ($p < 0.07$). It seems likely that this trend is at least partly attributable to the narrowing of the gender gap in private pension coverage (Copeland 2011). Consistent with this interpretation, panel (b) of Table 6.4 shows that the proportion of women whose (household) earnings losses are partly offset by rising PNLI has grown over time. As with men, there is also evidence of growing inequalities in private pension income, as indicated by the divergence of the average and median replacement rates for women with rising PNLI. Results in the bottom right graph in Figure 6.3 suggest that these favorable trends in pre-government income changes before taxes and transfers have translated into smaller losses after taxes and transfers, although the unadjusted difference between the first and the last period does not even begin to approach conventional significance levels. Unadjusted and adjusted estimates are broadly similar for both pre- and post-government losses. Unlike with German women, compositional changes (with respect to variables included in the EB procedure) thus seem to have played a minor role, despite broadly similar, albeit

when the measure of having 35 or more years of work experience is excluded from the adjustment procedure. Omitting the education and/or earnings measures has no comparably large effect.

¹⁰ Another potential, though apparently less important source of observed gender differences is that, especially for women, cutbacks in overall pension generosity have been partly offset by other legislative changes. Possible factors are the introduction of default pension sharing after divorce in 1976 (Fasang 2008) or the introduction of child care credits in the 1990s, although relatively few women in my sample will have benefitted from the latter.

somewhat weaker, trends in educational attainment and work experience (cf. Appendix Table 6.A.2).

So far, I have analyzed relative income changes for the average retiree. For men, I found rather clear evidence that income losses relative to pre-retirement income have risen over time in both Germany and the United States. Detailed analysis of changes in income components suggests that declining public replacement rates are the main force behind these trends. Results for women's retirement were more complex, with some indication of growing losses in Germany, especially when compositional changes are controlled. For American women, by contrast, losses seem to have declined, with rising private retirement income apparently accounting for the lion's share of the change.

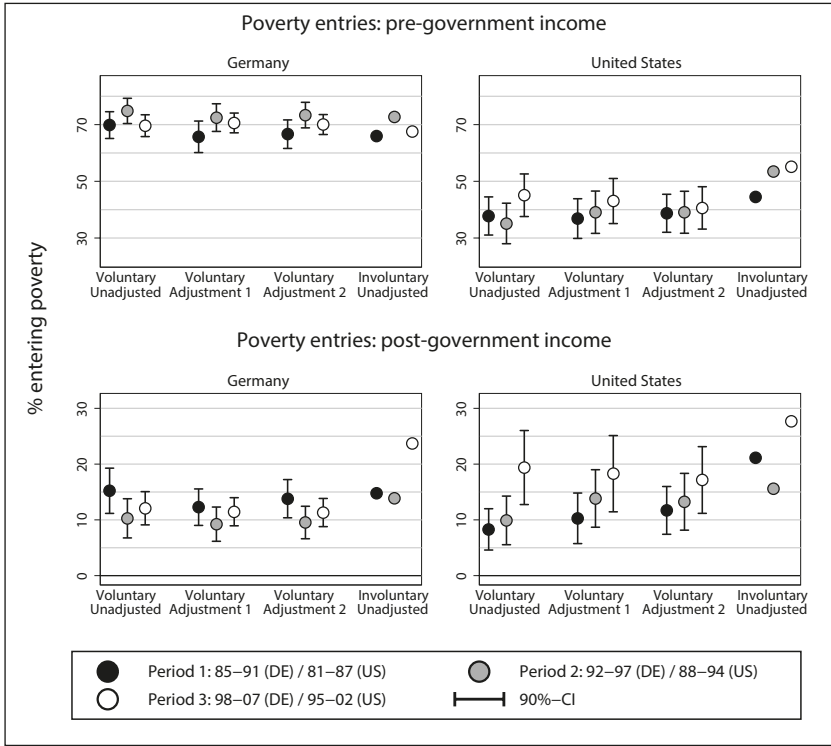
While illuminating, average changes relative to preretirement income cannot capture all interesting features of the trajectories experienced by retirees. I therefore now begin to address a few other crucial aspects of income changes at retirement. I start with poverty entries after retirement and then turn to the variability of relative income changes.

Figures 6.4 and 6.5 depict country and period differences in the risk of entering poverty around men's and women's retirement. As noted in Chapter 4, these analyses are restricted to workers with preretirement (post-government) incomes above the poverty line. As can be seen in Table 6.2, preretirement poverty rates are quite low for voluntary retirees, ranging between 3.3% for German men and 6.4% for American men. Higher preretirement poverty rates of Americans are consistent with well-known country differences in the prevalence of in-work poverty (see, for example, Brady et al. 2010). It is also worth noting that preretirement poverty rates are considerably higher for involuntary retirees, particularly in the US.

Turning to Figure 6.4, results again confirm that private retirement income is much more important for Americans. While approximately 70% of voluntarily retired German men would be poor if they had to live on private income alone, the corresponding estimates for American men are in the neighborhood of 40%. Unadjusted estimates suggest that the proportion of Americans with low pre-government income was higher in the final than in the first two periods, which might be taken as another piece of evidence for growing inequalities in private retirement income. However, not only do period differences in unadjusted estimates miss statistical significance by a substantial margin, the trend also turns out not to be robust in the compositional adjustments.

With regard to retirees' economic well-being, the crucial question of course is whether their post-government income is sufficient to avoid

Figure 6.4 Men – poverty entry around retirement



Sources: SOEP, PSID, CNEF, own calculations

poverty. Clearly, public pensions and transfers lift many of those with insufficient private income above the poverty line, especially in Germany. Nevertheless a substantial proportion of men who were not poor before exiting employment become poor after retirement. At least during the first two periods, German and American men who retired voluntarily faced broadly similar risks of entering poverty upon retirement, with entry rates oscillating between 8% and 15%. If anything, estimates are slightly lower for American men. However, the share of American men falling into poverty surged to almost 20% in the final period, with the difference to the first period barely missing conventional standards of statistical significance ($p < 0.06$). The increase in the proportion of men entering poverty is mitigated, but still quite substantial when compositional changes are controlled.

Trends for German men are strikingly different. While the trend toward greater relative income losses was similar in magnitude to that found for American men (cf. Figure 6.2), there is not the slightest indication in

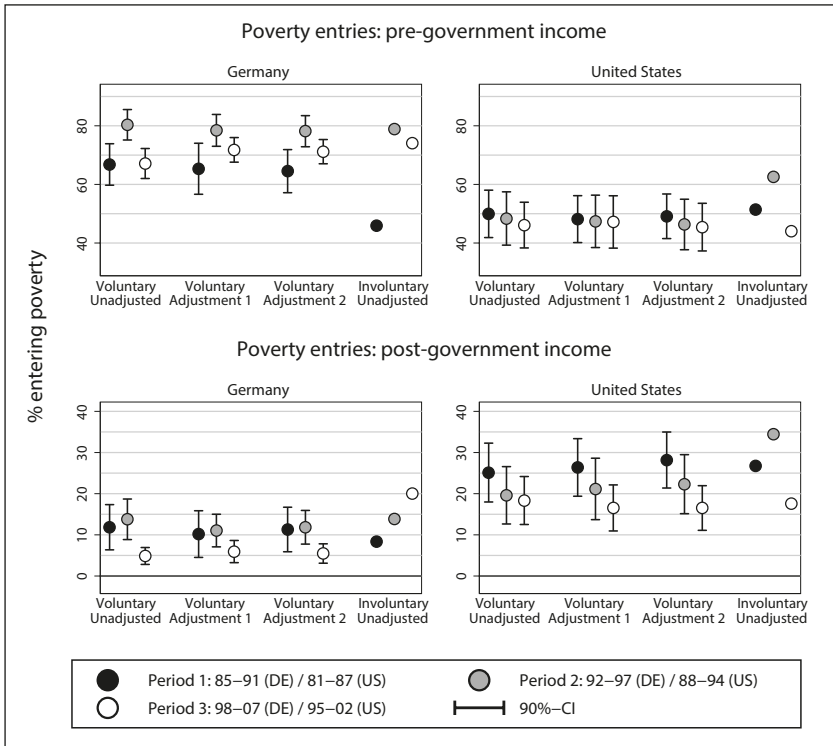
Figure 6.4 that German men retiring voluntarily have become more likely to fall into poverty after retirement. Growing relative income losses have thus not (yet) resulted in more men entering poverty, suggesting that increases in relative losses are concentrated among higher-income workers. This could be the case because public pension replacement rates have declined disproportionately for workers with higher incomes (recall the phasing out of pension credits for full-time education). A second (and compatible) explanation might be that higher-earning workers are more likely to retire early despite the growing financial penalties for doing so – simply because they are the ones who can afford to. This second possibility would not be at odds with research showing that the prevalence of early pension take-up is highest among workers who are unemployed prior to retirement (Brussig 2010), as such ‘involuntary retirees’ are treated as a separate group in the present analysis. In this context, it is also important to note that German men who retired involuntarily do seem to have faced substantially greater risks of entering poverty in the final period (cf. Figure 6.4).

Overall, results in Figure 6.4 provide only modest support for hypothesis HVR 4, which predicts that Americans are more likely to enter poverty because greater emphasis on complementary pensions results in more workers being inadequately prepared for retirement. A noticeable difference in the expected direction emerges only in the final period. Importantly, however, this is when the US had arguably become more American (in terms of corresponding more closely to the ideal type of a liberal/residual) welfare state, primarily because of the increasing individualization of employer-provided pension coverage. The hypothesis that rates of poverty entry have risen over time (HVR 5) is only supported for the US.

Figure 6.5 displays estimated rates of poverty entry after women’s retirement. Country differences show the by now familiar result that Americans have higher pre-government incomes after retirement and are therefore less likely to fall below the poverty threshold before public transfers are factored in. After taxes and transfers, however, American women are more likely to enter poverty, with their entry rates being in the neighborhood of 20% and German women’s being closer to 10%.

As for trends over time, results for American women largely mirror those for relative income changes. Just as American women’s relative income losses have declined, so has their risk of entering poverty upon retirement. Changes in pre-government poverty are small, but this need not imply that this trend is solely attributable to changes in public taxes and transfers, as there is plenty of room for improvements in private retirement income below (and/or above) the poverty line. The decline in the post-government

Figure 6.5 Women – poverty entry around retirement



Sources: SOEP, PSID, CNEF, own calculations

entry rate is also noticeably stronger when compositional changes are controlled. Trends in the poverty entry rate of German women are less readily reconciled with results for relative income changes. According to my estimates, the proportion of women entering (post-government) poverty was between 10 and 15% during the first two periods and dropped to approximately 5% in the final period, despite the slight trend toward greater relative income losses visible in Figure 6.3. Apparently, just as for German men, increases in relative income losses must have been concentrated among workers who either were poor already before retirement or among relatively well-off workers who could afford greater losses without falling below the poverty line. While their impact is much smaller than in the case of relative income losses, compositional adjustments somewhat attenuate the trend towards lower poverty risks. Finally, results for German women retiring involuntarily once more suggest that their situation has deteriorated compared to voluntary retirees. Overall, results for women,

thus support HVR 4 which predicts higher rates of poverty entry among American retirees, while the increase in poverty risks stipulated by HVR 5 is not borne out by these findings.

Variability of income changes

I now examine country and period differences in the variability of income changes. The variability of income changes, and in particular the proportion of retirees experiencing large income losses, provides important additional information for assessing the consequences of retirement for economic well-being. For example, Figure 6.2 showed that, consistent with hypothesis HVR 6, average income losses around men's retirement have risen in both countries. This trend would be especially discomfoting if it were due to an increasing number of retirees suffering very large income losses. It would give less cause for concern if it primarily reflected changes in the upper part of the distribution of income changes such as a decline in the fraction of retirees with very small income losses or even gains.

Table 6.5 focuses on country differences in the variability of income changes around retirement (see Appendix Tables 6.A.5 and 6.A.6 for composition-adjusted estimates). The first two columns show that the proportion of retiring men and women who experience large reductions in post-government income is substantially greater in the United States. 28% of retiring German men see their post-government income drop by more than a third ('large drop') and 10% even experience losses of more than a half ('very large drop'). For American men, these figures are higher, at 35% and 16%, respectively. The country difference for women is in the same direction and even larger in size. These results provide clear support for hypothesis HVR 9 according to which American retirees are more likely to experience large losses.

The remaining columns of Table 6.5 provide further evidence on the variability of income changes. The measures presented capture two distinct aspects of variability: within-cohort and cross-cohort differences. To measure within-cohort variability, I first calculated the standard deviation of income changes for all workers retiring in a given year¹¹ – a 'retirement cohort' – and then computed the average of these cohort-specific standard deviations. To measure cross-cohort variability, I first estimated median income changes for each of these cohorts and then computed the standard deviation of these medians across retirement cohorts. This measure thus

11 Or, more precisely, in the same two-year period because I pool observations from odd- and even-numbered years to ensure comparability of results across space and time.

indicates how much income changes for the typical worker differ across retirement cohorts. In contrast to the share of workers with large losses, the standard deviation is also sensitive to differences in the upper tail of the distribution of income changes. I provide results for both pre- and post-government income.

Table 6.5 Variability of income changes – voluntary retirees only

			Change in pre-gov. income			Change in post-gov. income		
			Average within-year SD of changes	Time trend of within-year SD	Cross-Year SD of median change	Average within-year SD of changes	Time trend of within-year SD	Cross-Year SD of median change
% of retiring workers with post-gov. loss								
> 33%	> 50%							
Germany								
Men	28	10	36.1	-0.34*	3.1 (2.6)	30.8	-0.13	5.2 (3.8)
Women	20	7	39.0	-0.18	6.6 (6.6)	30.6	-0.45 ⁺	6.5 (5.7)
United States								
Men	35	16	39.8	0.75**	6.4 (5.9)	35.2	0.87**	8.0 (7.6)
Women	36	15	45.0	0.39	12.0 (11.2)	37.6	0.08	10.1 (10.1)

Estimates in parentheses based on detrended estimates (i.e., residuals from a regression with a linear time trend). SD = Standard deviation. ⁺: p < .1; * : p < .05; ** : p < .01.

Sources: SOEP, PSID, CNEF, own calculations

In Chapter 5, I conjectured that greater reliance on private income sources in the US boosts intra- (HVR 7) and inter-cohort (HVR 11) variability of income changes. Results in Table 6.5 largely confirm these expectations. As shown in the third to last column, the average within-cohort standard deviation of relative changes in post-government income is estimated at 30.8 percentage points for German men and 30.6 percentage points for German women. The corresponding figures for American retirees are 35.2 and 37.6 percentage points, respectively. Results for pre-government income are qualitatively similar. Cohort-to-cohort variability of post-government changes is also greater in the US. According to the final column of Table 6.5, the standard deviation of the median change in post-government income is 5.2 percentage points for German men and 6.5 percentage points for German women. The corresponding estimates for American retirees are 8.0 and 7.6 percentage points, respectively. The figures in parentheses show that the country difference is amplified further when estimated

cohort-specific changes are purged of secular trends via a simple linear regression.¹²

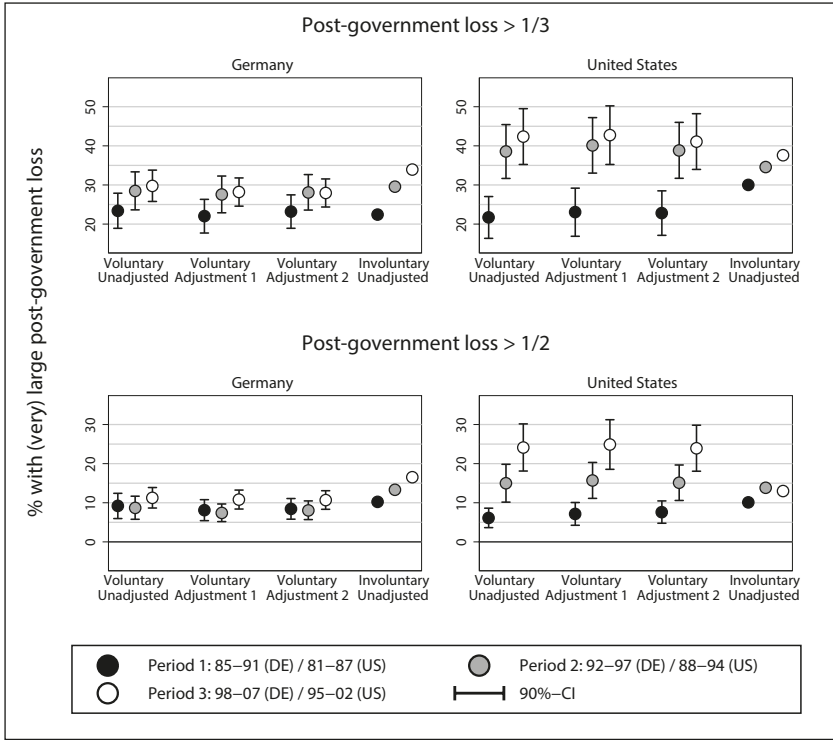
I also predicted (HVR 8) that variability of income changes has grown over time, particularly in the United States, where more heterogeneous and volatile DC plans have increasingly replaced DB plans as the predominant form of complementary retirement saving. As a straightforward check of this possibility, I regressed the estimated within-year standard deviations on a linear time trend. For German men and women, the trend estimates in Table 6.5 are uniformly negative, suggesting declining heterogeneity of income changes around retirement. By contrast, hypothesis HVR 8 is clearly supported for American men, the group where the strongest trend was expected. According to my estimates, the standard deviation of income changes among American workers retiring in the same year grew by 0.75 percentage points per year before taxes and transfers and by 0.87 percentage points per year after taxes and transfers, with both trend estimates being statistically significant.¹³ Estimates also suggest that variability increased for American women, especially before taxes and transfers, but the trends are weaker and not statistically significant.

Table 6.5 shows that American retirees are more likely to experience large income losses at retirement, but how has their incidence changed over time? The top pair of graphs in Figure 6.6 show that for retiring men 'large' income losses of more than a third have become more common in both countries.

12 Given the smaller number of observations for the US, one might be worried that the country difference is partly attributable to greater sampling variability of American estimates. As a simple robustness check, I randomly deleted observations from the German (male and female) samples so that the average number of observations per retirement cohort matched that of the corresponding American samples. I took the panel character of the data into account by applying this procedure separately to persons with only one postretirement observation (the vast majority of which are from $t+2/t+3$) and to persons with two postretirement observations. I repeated this procedure 250 times for each gender. On average, cross-cohort standard deviations of median income changes for the trimmed German samples were higher than the corresponding estimates in Table 6.5, yet remained substantially below the corresponding American estimates: For German men, the average standard deviation across the 250 trimmed samples is 5.7 percentage points for post-government and 5.6 percentage points for pre-government income, compared to untrimmed estimates of 5.2 and 3.1 percentage points, respectively (see Table 6.5). For German women, the trimmed samples yield average standard deviations of 6.6 (post-government) and 8.9 (pre-government) percentage points. The corresponding estimates for the untrimmed sample are 6.5 and 6.6 percentage points. One can therefore safely conclude that the finding of higher cross-cohort variability in the US is not merely a statistical artifact.

13 Following recommendations by Lewis and Linzer (2005), I obtained HC₃ heteroscedasticity-robust standard errors to account for the fact that the dependent variable in these regressions is estimated and therefore subject to sampling variability.

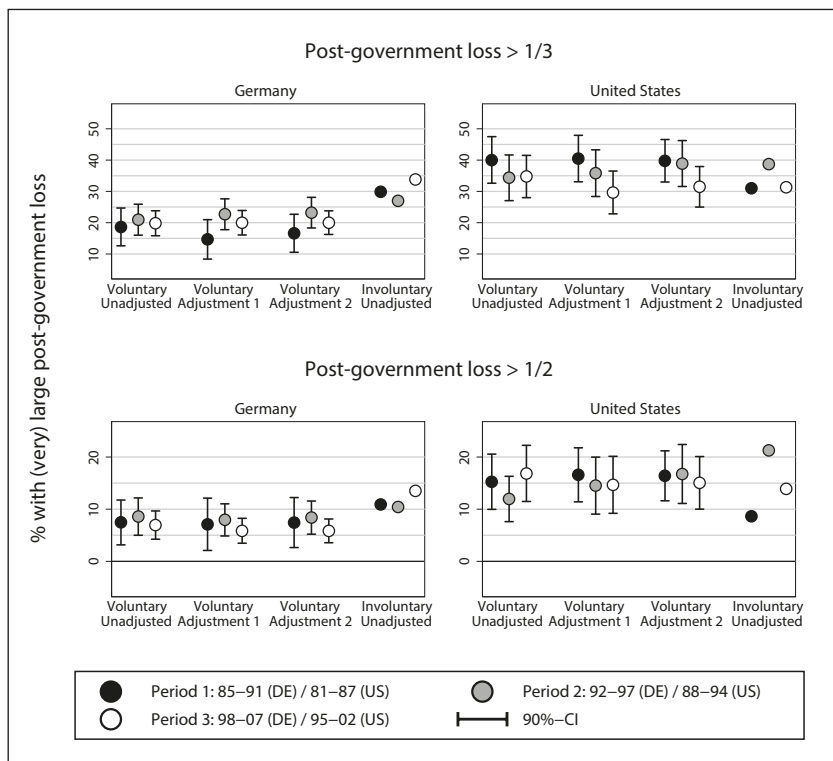
Figure 6.6 Men – proportion of retirees with large income losses



Sources: SOEP, PSID, CNEF, own calculations

The increase, however, is much stronger in the US, where the fraction of men whose disposable income drops by more than a third rose from 23% in the first to 43% in the last period, an increase that is statistically significant at the 1% level. The corresponding increase for German men, from 23% to 30%, appears almost negligible in comparison, although it, too, almost reaches conventional significance levels ($p < 0.11$) and is substantively meaningful. Country differences are even more pronounced for the share of men whose disposable income drops by more than half. For German men retiring voluntarily, such very large drops seem to have occurred at most slightly more frequently toward the end of the period, implying that the increasing number of workers with large drops is driven by workers losing between a third and half of their income. By contrast, for American men, the trend in the proportion of workers losing more than half of their preretirement income is no less dramatic than for large losses of more than a third. In fact, the increase from 7% in the first to 25% in the last period

Figure 6.7 Women – proportion of retirees with large income losses



Sources: SOEP, PSID, CNEF, OWN calculations

($p < 0.01$) is almost as large (in terms of percentage points) as the increase in the share of workers losing more than a third. None of these findings for men are changed substantively by the compositional adjustments.

Figure 6.7 displays period differences in the prevalence of large and very large income drops around women’s retirement. Consistent with the more favorable trends found so far, there is no clear evidence that women’s retirement is increasingly associated with substantial income losses. For American women, there is even some hint that large (though not very large) income losses occurred less frequently toward the end of the observation period, especially when retiree composition is held constant. Results for German women likewise echo earlier findings: While unadjusted estimates do not exhibit a clear tendency, there is some evidence for a growing prevalence of large (but not of very large) losses in the composition-adjusted scenarios. Again, this is an indication that compositional changes,

in particular women's longer/more continuous work careers, curbed an otherwise stronger trend towards increased downward income mobility at retirement.

Differences by level of education and retirement age

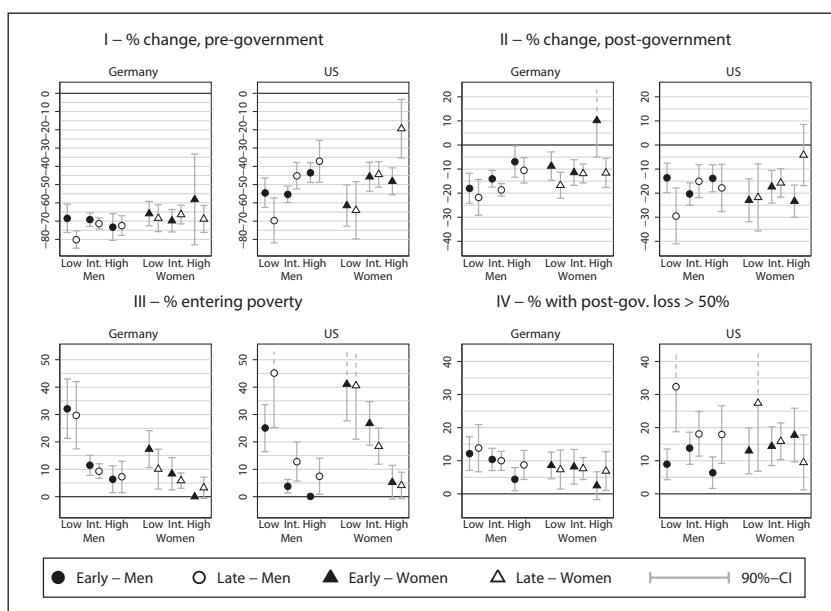
In a final step, I now explore systematic differences in income trajectories by level of education and retirement age. Hypothesis HVR 12 predicts that low-educated workers are more likely to enter poverty upon retirement, hypothesis HVR 13 expects that educational differences in the risk of poverty entry are greater in the US, and HVR 14 posits that educational differentials have grown over time, particularly in the US.

Figure 6.8 addresses these hypotheses by grouping voluntary retirees according to their level of education (for details on the educational categories, see Table 6.3 above). As before, retirees are also differentiated with respect to country, gender, and year/period of retirement. Due to small sample sizes, I now only differentiate between two periods, an early period comprising all workers who retired until 1992 in the US and until 1996 in Germany, and a late period comprising all workers who retired later. I do not present composition-adjusted estimates because the entropy balancing procedure often runs into convergence problems with small samples.

Figure 6.8 contains a large number of findings. To keep the discussion compact, I will focus on the results for poverty entries, which are displayed in Subgraph III at the bottom left of the figure, and only briefly highlight the most noteworthy results for the other outcomes. Estimates for men are represented by dots and estimates for women by triangles, with black markers representing estimates for the early and white markers those for the late period.

Focusing first on results for men, Figure 6.8 demonstrates that male retirees with a low education face much higher risks of entering poverty than their better-educated counterparts. Differences between workers with an intermediate level of education (DE: vocational degree; US: high school degree and no more than two years of post-secondary education) and those with a tertiary degree are rather small compared to the gap between low- and better-educated workers. These findings are consistent with hypothesis HVR 12. Support for HVR 13, which predicts greater educational inequalities in the US, is not unambiguous. In the early period, poverty risks were somewhat higher for all educational groups in Germany, with absolute educational differentials (i.e., in percentage point terms) being broadly similar across the two countries and relative differentials (i.e., in terms of relative risks or odds ratios) being smaller in Germany. In the late period,

Figure 6.8 Educational differences in income changes around retirement – voluntary retirees only



Periods defined in terms of the year of retirement. Early period: 1981-92 (us)/1985-96 (de). Late period: 1993-2002 (us)/1997-2007 (de). 'Low', 'Int.', and High refer to low, intermediate, and high level of education, respectively (for details on the educational categories, see Table 6.3 above). Dashed branches of confidence intervals were cut to avoid unnecessary extensions of the scale. All confidence intervals are symmetric intervals about the corresponding point estimate. Sources: SOEP, PSID, CNEF, OWN calculations

educational differentials appear to have been somewhat larger in the US, especially in absolute terms, though it must be noted that the uncertainty of American estimates is considerable.

This complex pattern of country differences is directly related to differences in changes over time. While for German men education-specific rates of poverty are virtually identical across the two periods, American men of all educational levels faced greater risks of poverty entry in the late period. In absolute terms, the estimated increase was largest for low-skilled men, with the rate of poverty entry almost doubling, from 25% to 45%. The confidence bands, however, indicate that the late-period estimate in particular is very imprecise. Poverty risks also rose for American men with higher levels of education: from 4 to 13% for those with an intermediate and from 0 to 7% for those with a high level of education. Taken at face value, these estimates imply an increase in absolute educational differentials

and a decline in relative educational differentials, thus providing partial support for hypothesis HVR 14.

Turning briefly to findings for the other outcome variables, conclusions from the analysis of poverty risks are generally confirmed. For example, the increase in average relative income losses after taxes and transfers for German men seems to have occurred in all educational groups (cf. Subgraph II). In the US, by contrast, relative post-government losses have risen clearly only for those with a low level of education. The increase in the proportion of retirees with very large income losses has also been strongest for this group (cf. Subgraph IV). Finally, low-educated American men also experienced greater reductions in pre-government income in the late period, while losses appear to have declined for the other educational groups (cf. Subgraph III). This is consistent with the view that, in addition to growing inequalities in (lifetime) earnings, growing inequalities in complementary pension wealth are threatening the economic well-being of less-educated American retirees.

Table 6.6 Income changes at retirement by education and private non-labor income
– American men retiring voluntarily

	Low education		Intermediate education		High education	
	Early	Late	Early	Late	Early	Late
% of retirees with no/low private non-labor income (PNLI)	33	47	5	22	4	6
Avg. % change in post-gov. income						
Substantial PNLI	-10	(-16)	-20	-15	-13	-16
No/low PNLI	-22	(-43)	(-26)	-16	(-32)	(-57)
% entering poverty						
Substantial PNLI	11	(22)	2	5	0	6
No/low PNLI	69	(83)	(27)	(52)	(0)	(24)
% with post-gov. loss > 50%						
Substantial PNLI	4	(19)	13	19	5	16
No/low PNLI	21	(45)	(24)	14	(17)	(74)

Substantial private pension income defined as private pension income accounting for at least 10% of household pre-tax post-transfer income. Estimates in parentheses are based on fewer than 30 observations.

Sources: SOEP, PSID, CNEF, OWN calculations

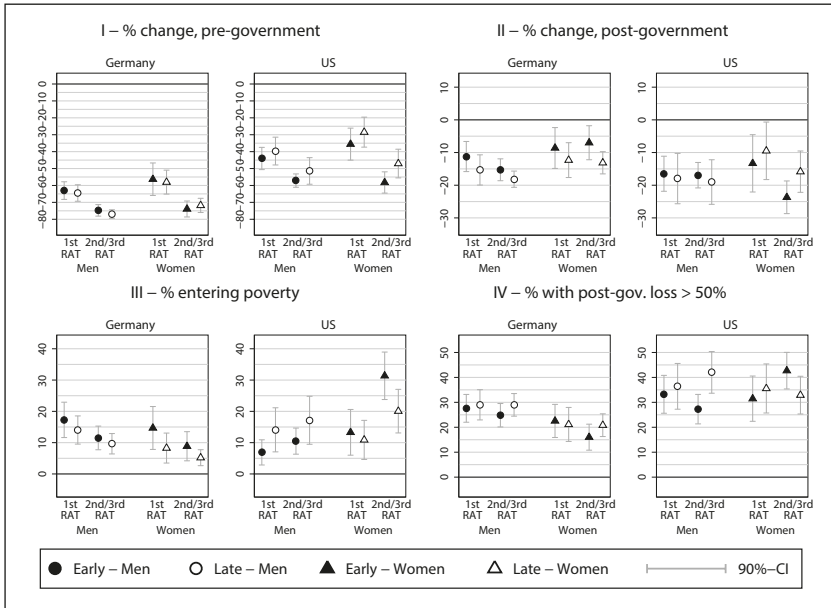
Table 6.6 further explores the role of private retirement income for growing educational inequalities among American men. The first row of the Table reports the period-specific proportion of workers within each educational category who have no or only low private non-labor income (PNLI) after retirement. More specifically, a retiree is classified as having no/low PNLI if it accounts for less than 10% of total household pre-tax post-transfer income.¹⁴ Subsequent rows then compare the income trajectories of retirees with and without substantial private pension income, again differentiating by level of education and retirement period (in the interest of brevity, I omit results for pre-government income).

Table 6.6 confirms that there is a steep educational gradient in access to PNLI among American men and that educational differentials have grown over time (cf. Wolff 2011). From the first to the second period, the proportion of newly retired men who had no or very low private non-labor income rose from 33% to 47% among those with low education and from 5% to 22% for those in the intermediate category, while remaining near 5% for those with a tertiary degree. Subsequent rows in Table 6.6 show that access to private non-labor income is crucial for the economic well-being of American retirees. The majority of men with low education cannot avoid poverty if they do not have access to complementary pensions or other types of PNLI. Workers with intermediate or high levels of education appear to be practically immune to poverty if they have substantial PNLI. Given the small number of observations findings must be viewed as tentative, but several of the results in Table 6.6 suggest that the link between access to PNLI and economic well-being has become stronger over time, at least if gaps between workers with and without substantial PNLI are considered in absolute (i.e., percentage point) rather than relative terms. This is what one would expect given a gradual decline of public benefit levels and the trend toward less favorable earnings histories for workers with lower levels of education.

After this excursus on the role of PNLI for American men, I briefly return to the results displayed in Figure 6.8, now focusing on educational differentials among retiring women. Findings for German women are readily summarized: Just as for German men, there is no evidence for growing educational differentials in income trajectories around retirement. If anything, differences across educational groups have slightly narrowed, as high-educated women faced somewhat greater income losses and poverty

14 Results are qualitatively similar when I consider only private pension income. I use all PNLI because private pensions and asset income may be partial substitutes (cf. also Figure 3.3 in Chapter 3).

Figure 6.9 Differences in income changes by retirement age – voluntary retirees only



Periods defined in terms of the year of retirement. Early period: 1981-92 (us)/1985-96 (de). Late period: 1993-2002 (us)/1997-2007 (de). Dashed branches of confidence intervals were cut to avoid unnecessary extensions of the scale. All confidence intervals are symmetric about the corresponding point estimate. RAT = Retirement Age Tertile.
 Sources: SOEP, PSID, CNEF, own calculations

risks in the second period. For American women, there is again evidence of growing educational differentials, although – as consistently found in this chapter – this has occurred in the context of more favorable overall trends than for men. While noting that estimates are often very uncertain, improvements from the first to the second period seem to have been confined to better-educated women and especially to women with a tertiary degree.

In Chapter 5, based on insights from behavioral economics, psychology, and sociological literature on age norms, I suggested that many workers retire too early even if their choices are not constrained by career interruptions or declining health. I also speculated that the prevalence of premature retirement might rise when early retirement becomes more costly because retirement behavior adapts only sluggishly to changing financial incentives. In view of growing financial penalties for early retirement, Hypothesis HVR 15 therefore predicts that early retirement was associated with greater income losses toward the end of the observation period. Figure 6.9 provides a

straightforward test of this hypothesis by differentiating voluntary retirees with respect to their retirement age. More specifically, separately by gender country and period, retirees are grouped into terciles of the retirement age distribution. I compare the income trajectories of workers in the first retirement age tercile (RAT), that is, the third of workers with the lowest retirement ages, to those of workers in the second and third RATs.¹⁵

Inspection of Figure 6.9 reveals no clear support for HVR 15. Period differences for workers in the different RATs are mostly quite similar and when they do differ in the expected direction (e.g., for very large income drops among German men) differences are generally quite small compared to the level of statistical uncertainty. I also investigated whether using different quantiles or allowing for non-monotonic relationships between retirement age and trends in income changes leads to different findings, but this was not the case. I therefore draw the preliminary conclusion that recent institutional changes have not led to a noticeable divergence of the income trajectories of early- and late-retiring voluntary retirees, although further research should devise more sophisticated tests of this possibility. This includes paying greater attention to worker heterogeneity and compositional changes among early and late-retiring workers than I can afford to do here. It also bears repeating that these results are based on voluntary retirees and that the picture may well look different for involuntary retirees.

6.4 Summary and conclusions

In this chapter, I have provided a comprehensive empirical analysis of income changes around men's and women's exit from work in Germany and the United States. Throughout the chapter, I have focused on voluntary retirees who were not exposed to job loss or the onset of health problems in their preretirement years and whose retirement decisions will therefore mostly have been relatively unconstrained. Table 6.7 provides a stylized summary and assessment of the main hypotheses proposed in Chapter 5. Instead of recounting the detailed findings, I now provide a condensed summary as well as some preliminary conclusions.

¹⁵ The maximum retirement ages for workers belonging to the first tercile are as follows: German men: 60; American men: 62; German women: 59; American women: 60. More accurate timing (e.g., age in months) is difficult because the retirement indicator is based on annual work hours.

For German men, there are signs of growing income losses at the time of retirement and there is considerable evidence that this trend is primarily attributable to a gradual decline in the generosity of public retirement benefits. Declining generosity of public pensions seems to have been broadly shared across educational subgroups and across different types of workers more generally and partly for this reason has not (yet?) led to greater numbers of men facing economic marginalization or very large declines in their income at the time of retirement, though there is some evidence that income drops of more than a third occurred more frequently in recent years. However, this does not mean that all is well in Germany: The economic situation of low-skilled workers was precarious throughout the observation period. Almost a third of low-educated men with pre-retirement incomes above the poverty line fell below this threshold during the first years of retirement. This proportion is similar to the entry rate of low-skilled Americans during the 1980s and early 1990s and attests to the lack of redistribution in the German public pension pillar.

Results for American men are very different: Average post-government losses have also increased for this group and there is also evidence that declining public replacement rates have been one factor behind this trend. The main story, however, is one of *growing inequalities* in the income trajectories experienced by retirees. This is indicated by a dramatic increase of the proportion of men suffering precipitous declines in their income and by a growing share of workers ending up below the poverty line. Disaggregated results by retirees' level of education show that no educational group has been immune to these trends. Several findings, however, suggest that the most vulnerable group, workers with a low level of education, were hit hardest. I have also presented considerable evidence that growing inequalities in complementary pension income were a major force behind this trend. As discussed in Chapter 5, these changes in the realm of complementary pensions were likely reinforced by cohort differences in working-life inequalities.

Overall, these results square well with other recent findings, in particular the growth of inequalities in pension wealth documented by Edward Wolff's (2011) comprehensive analysis based on the Survey of Consumer Finances. Ironically, America's system of complementary pensions thus became more holey at a time when – due to declining public pension generosity and growing inequality of lifetime earnings – American men and especially low-skilled American men needed it all the more.

One possibility that future research should investigate is that the trends for American men are partly driven by a tendency to consume retirement

Table 6.7 Main findings – Chapter 6

Hypothesis	Prediction	Supported for...	Relevant Figures/Tables	Details
HVR 1	Private pension and asset income more important in us	All groups	Figures 6.2, 6.3, 6.4, 6.5; Table 6.4	–
HVR 2	Public pension and income more important in Germany	All groups	Figures 6.2, 6.3, 6.4, 6.5; Table 6.4	–
HVR 3	Declining public replacement rates in both countries	German and American men; German women when controlling compositional changes	Tables 6.4, 6.A.3, 6.A.4	Increases in German women's work experience main reason for absence of decline in unadjusted results
HVR 4	Americans more likely to enter poverty	Women; partial confirmation for men	Figures 6.4, 6.5	Expected difference for men only in final period
HVR 5	Poverty entry increasingly common in both countries	American men only	Figures 6.4, 6.5	–
HVR 6	Growing relative income losses in both countries	German and American men; German women when controlling compositional changes	Figures 6.2, 6.3	Increases in German women's work experience main reason for absence of decline in unadjusted results
HVR 7	Greater within-cohort variability in us	Confirmed	Table 6.5	–
HVR 8	Growing within-cohort variability, particularly in us	American men	Table 6.5	Trend for American women in expected direction (especially before taxes/transfers), but not statistically significant; some evidence for declining variability among German men and women
HVR 9	Large income losses more common in us	Confirmed	Figures 6.6, 6.7	No clear difference for men in first period

Hypothesis	Prediction	Supported for...	Relevant Figures/Tables	Details
HVR 10	Growing prevalence of large income losses	American men; partly confirmed for German men	Figures 6.6, 6.7	Some increase in losses > 33% for German men, no clear increase in losses > 50%
HVR 11	Greater between-cohort variability in us	Confirmed	Table 6.5	-
HVR 12	Less-educated workers more likely to enter poverty	Confirmed	Figure 6.8	-
HVR 13	Greater educational differential in poverty entry in us	Women; not confirmed for men	Figure 6.8	-
HVR 14	Growing educational inequalities in poverty entry, especially in us	Supported for American men; no support for other groups	Figure 6.8	Additional evidence for growing educational inequalities in other outcomes for American men and American women
HVR 15	Growing losses for early retirees, especially in Germany	Not supported	Figure 6.9	-

savings in non-annuitized form (which may be more common with DC than DB plans). It seems unlikely that such a trend explains all of the increase in relative losses and the prevalence of large losses, especially among less-educated workers, who generally have very little wealth in DC accounts (Munnell and Sunden 2004; Wolff 2011). Nevertheless, taking a closer look at trends in household wealth and their association with income changes at retirement can arguably provide a more complete picture of the American situation and in particular of changes over time.¹⁶

Trends for women look more favorable than for men. In Germany, women's longer work careers and therefore higher lifetime earnings (partly attributable to the entry of East German women) seem to have been a crucial factor. When changes in women's employment biographies are taken into account, trends in German women's income trajectories become more similar to men's. In the US, women's improved access to employer-provided pensions seems to be more important.

For reasons outlined in Section 6.2 and Chapter 2, I have followed the standard approach of mobility research and focused on individual-level trajectories. Relatedly, and due to a concern for conciseness and sample size restrictions, I have not attempted to differentiate individuals with respect to household type. Hence, the estimates presented in this chapter are (weighted) averages of the income changes experienced by men and women (as well as potential family members) in different types of households. More concretely, ignoring the complication of household instability (and a few relatively uncommon household types), the estimates for men reflect the experiences of men in three principal types of households: single households, male-breadwinner couple households, and dual-earner households. By contrast, estimates for women are primarily based on income changes of single women and of women in dual-earner households, as female breadwinner households were a rare phenomenon in the cohorts studied here.

Given that the above analysis has consistently documented more favorable trends for income changes around women's retirement, natural next steps would be to examine differences in the impact of retirement across household types and to investigate whether more favorable trends for women have offset the trend toward larger income losses for men in dual-earner couples, particularly in the US. Such an investigation would

16 The PSID collected information on household wealth in 1984, 1989, 1994, and in every wave since 1999, which could be used for such an analysis. Unfortunately, however, information on savings in employer-sponsored defined-contribution and individual retirement accounts is not available before 1999.

not be a trivial one, because the joint retirement trajectories of dual-earner couples will often be complex and occur over extended periods of time, thus substantially increasing data requirements, in particular concerning the length of individual panels (which complicates investigation of changes over time). Nevertheless, such an analysis could presumably shed further light on recent trends in the impact of retirement on economic well-being. It should also address the possibility that educational homogamy, in combination with the trend toward greater educational differentials documented above (see Figure 6.8), may have exacerbated inequalities *within* the group of dual-earner couples.

As for country differences, most expectations were confirmed, but with a crucial twist: Consistent with previous research, complementary pensions and other types of private income were found to account for a much larger share of retirement income in the US. I also conjectured that greater reliance on private savings would result in greater inequalities within and across retirement cohorts and that vulnerable groups, in particular low-skilled and low-wage workers, would fare worse under the American regime. The twist is that these expectations received much stronger support for more recent retirement cohorts than for workers retiring in the 1980s. In comparison to the 1970s or 1980s, the fundamental transformation of the complementary pension landscape has turned the US into a much more 'American' country – in terms of the stereotypical depictions pervading public and academic discourse.

American trends underline the need for political reform addressing retirement income security, especially, though not only, for low-skilled and low-wage workers (see, for example, Halperin and Munnell [2005] and Ghilarducci [2008]). It is also worth repeating that the consequences of the shift toward DC pensions were in some sense examined under best-case conditions in this study, as the 1990s were characterized by strong labor and financial market performance. Future work will have to show how the experiences of American retirees evolve under less favorable conditions (for a review of research on the impact of the stock market decline between 2007 and 2009, see Wolff 2011: 70ff.).

The American results may seem to bode ill for the future of retirement income security in Germany. As briefly discussed in Chapter 3, future retirement cohorts will be facing lower public replacement rates and are encouraged – but not legally required – to close the growing gap between preretirement earnings and public benefits by participating in second- and (subsidized) third-pillar pensions. In addition, educational inequalities in employment chances and earnings have risen during recent decades,

particularly since the mid-1990s (Giesecke and Verwiebe 2008; Dustmann et al. 2009; Giesecke et al. 2015). Against this background, avoiding a US-style trend toward growing inequalities will require careful and ongoing attention by current and future generations of policymakers.

Some aspects of the German situation are mildly encouraging: As discussed in Chapter 3, German second- and third-pillar pensions are typically either pure DB plans or feature a strong DB component. In addition, empirical data suggest that, compared with participation in third-pillar pensions in many other countries, participation in *Riester*-type plans is somewhat more equally distributed across the income distribution (OECD 2012: 119-121). Nevertheless, it is imperative to closely monitor and (re)evaluate these trends. And, of course, the fact that participation in *Riester*-type pension plans is slightly less skewed does not imply that there are no more effective and equitable approaches for achieving retirement income security and preventing old-age poverty (for a critical perspective, see Himmelreicher and Viebrok 2004). Finally, as emphasized above, current educational inequalities in Germany are by no means small to begin with.

The above analysis has focused on the short- to mid-term changes in income around retirement. An important question is how the income of retirees evolve in the longer run. Hungerford's (2003) analysis follows German and American retirees until twelve years after retirement. He finds that in the US, but not in Germany, inflation-adjusted income gradually declines after the fourth or fifth year after retirement. His primary explanation is that complementary retirement benefits account for a larger portion of retirement income in the US. Whereas public retirement benefits in the US and Germany, as well as in most other economically developed countries, have historically been tied to inflation or wage growth, complementary benefits are often nominally constant or grow more slowly than inflation. As complementary pensions are becoming more important in Germany, so is the issue of how these benefits evolve over the retirement period (Künemund et al. 2010; Schmähl 2010; Künemund et al. 2013). Another important question concerning longer-term trends in economic well-being is how the financial needs of retirees change over the course of retirement. A common view is that needs are more likely to increase than to fall, mainly due to increasing health- and care-related expenses (e.g., Schmähl 2010). Finally, as discussed in Chapters 2 and 3, public retirement benefits are generally paid as lifetime annuities (including provisions covering potential survivors), thus providing protection against the 'risk' of longevity (Diamond 2004; Burkhauser et al. 2009). By contrast, complementary pension wealth is often at least partly consumed in the form of lump-sum payments or via so-called

'installment options' (Blostin 2003) that provide benefits for a fixed period of time rather than until the beneficiary's death.

As discussed at some length in Chapter 2, the primary outcome variable examined in this chapter, needs-adjusted disposable income, is only a proxy for economic well-being. It is conceivable or even likely that for many workers modest declines in disposable income at retirement do not lead to a decline in economic well-being. In particular, retirees may be able to draw on savings to finance their consumption and retirement may be associated with a reduction in income needs. For example, retirees no longer incur work-related expenses and no longer need to save for retirement. However, as just noted, other types of expenses such as health care costs may go up, especially in the longer run. In addition, the above findings show that, particularly in the US, a sizable (and growing) proportion of workers see their income drop by more than a third or even more than half at the time of retirement. It seems unlikely that these substantial drops should not involve a decline in economic well-being for many of these workers.

Importantly, such large drops in disposable income appear to be quite common even among workers whose retirement is not preceded by involuntary job loss or negative health shocks. As discussed in Chapters 2 and 3, country differences and recent changes in welfare state arrangements may have been (even) more consequential for workers whose late careers are interrupted by unexpected adverse events such as job displacement. The findings for involuntary retirees presented in this chapter, though not the main focus, provide initial evidence for this view, particularly in the case of Germany. Regardless of the outcome considered, trends for German men retiring involuntarily practically always turned out less favorable than for men whose retirement was not preceded by job loss or a decline in health. By and large, this also holds for German women. The following part of the study will take a closer look at these trends by exploring the consequences of late-career job loss.

6.5 Additional results

Table 6.A.1 Period differences in retiree composition – male voluntary retirees

	Germany			United States		
	85-91	92-97	98-07	81-87	88-94	95-02
Retiree characteristics						
Age at exit (mean)	61.3	60.6	62.1	63.4	63.3	63.5
% East Germany	8.5	20.6	15.4			
% civil servant ($t - 2/t - 1$)	12.8	11.0	14.5			
% migration background/ black	12.2	18.0	14.0	7.3	5.6	10.3
% intermediate education	69.3	68.2	62.2	39.6	53.7	50.0
% high education	15.6	12.4	26.0	21.0	26.2	33.6
% living with partner ($t - 2/t - 1$)	92.7	86.4	87.7	91.5	90.1	87.5
% with work exp. ≥ 35 yrs ($t - 2/t - 1$)	82.8	76.2	72.7	78.9	84.7	76.9
% working full-time ($t - 2/t - 1$)	79.7	69.3	69.7	68.1	61.5	60.4
% poor ($t - 2/t - 1$)	4.7	2.7	2.9	7.5	4.3	6.7
% near poor ($t - 2/t - 1$)	21.9	14.3	15.8	7.4	7.9	13.9
% middle earnings tercile ($t - 2/t - 1$)	37.4	31.2	32.6	27.1	23.8	27.3
% top earnings tercile ($t - 2/t - 1$)	40.6	42.5	46.7	59.6	52.2	43.0
Partner characteristics (if partner present at $t - 2/t - 1$)						
Age (mean)	56.5	55.5	56.9	58.6	57.8	58.8
% intermediate education	42.0	53.8	59.0	52.3	49.8	46.1
% high education	5.5	8.1	11.8	20.9	38.2	36.2
% works part-time	15.1	18.9	20.6	15.2	22.5	9.8
% works full-time	17.7	21.2	17.8	24.2	36.1	37.9
Change in presence/employment of partner (if partner present at $t - 2/t - 1$)						
% whose partner leaves PT work	8.3	9.2	14.2	12.6	14.2	5.8
% whose partner leaves FT work	9.3	10.4	6.6	13.1	17.6	18.7
% losing partner	3.9	2	4.5	2.8	4.2	4.3
N four-year change	239	239	466	161	122	142
N six-year change	210	229	282	146	111	93

Sources: SOEP, PSID, CNEF, own calculations

Table 6.A.2 Period differences in retiree composition – female voluntary

	Germany			United States		
	85-91	92-97	98-07	81-87	88-94	95-02
Retiree characteristics						
Age at exit (mean)	59.8	59.3	60.6	62.0	63.4	61.6
% East Germany	0.6	24.9	28.6			
% civil servant ($t - 2/t - 1$)	2.2	2.9	5.8			
% migration background/ black	10.5	12.5	6.6	10.5	11.5	12.0
% intermediate education	44.8	50.8	66.6	56.8	57.4	65.2
% high education	10.8	13.2	17.3	16.5	25.0	25.0
% living with partner ($t - 2/t - 1$)	70.0	68.4	72.4	68.7	66.8	69.3
% with work exp. \geq 35 yrs ($t - 2/t - 1$)	35.5	45.4	49.0	21.4	32.6	31.1
% working full-time ($t - 2/t - 1$)	55.5	46.0	51.0	42.1	49.4	47.9
% poor ($t - 2/t - 1$)	5.9	7.1	3.0	5.9	5.9	6.5
% near poor ($t - 2/t - 1$)	17.7	17.7	15.5	17.1	14.8	15.2
% middle earnings tercile ($t - 2/t - 1$)	18.8	30.1	36.6	30.5	33.1	25.2
% top earnings tercile ($t - 2/t - 1$)	13.3	9.8	18.9	12.8	20.6	21.4
Partner characteristics (if partner present at $t - 2/t - 1$)						
Age (mean)	59.8	60.4	60.5	61.4	63.8	61.6
% intermediate education	67.2	71.8	68.4	33.8	32.5	30.3
% high education	13.5	12.3	22.1	35.2	42.6	51.6
% works part-time	11.2	7.7	9.4	16.6	17.3	11.8
% works full-time	43.7	40.4	42.2	55.1	41.7	46.5
Change in presence/employment of partner (if partner present at $t - 2/t - 1$)						
% whose partner leaves PT work	8.4	6.1	7.4	12.9	14.2	5.0
% whose partner leaves FT work	24.1	22.6	26.9	26.3	26.0	17.3
% losing partner	6	5.3	4.1	9.1	19	5
N four-year change	107	149	331	129	110	127
N six-year change	1047	136	184	126	84	88

Sources: SOEP, PSID, CNEF, own calculations

Table 6.A.3 Changes in income components around retirement – voluntary retirees only – composition-adjusted estimates (excluding partner's employment status and retirement)

	(a) Men					
	Germany			United States		
	85-91	92-97	98-07	81-87	88-94	95-02
% with individual earnings loss (IEL)	98	99	98	95	97	97
% with household earnings loss (HEL)	95	95	98	95	96	97
Change in private non-labor income (PNLI)						
% with increased PNLI given HEL	64	56	52	77	60	73
Average replacement rate	20	13	14	38	47	47
Median replacement rate	8	5	7	33	29	35
Change in public pension and transfer income (PPTI)						
% with increased PPTI given HEL	94	90	92	80	81	63
Average replacement rate	59	56	53	37	34	31
Median replacement rate	51	49	45	26	26	22
Change in household taxes (HHT)						
% with decreased HHT given HEL	91	96	92	98	93	95
Average replacement rate	27	26	29	27	28	29
Median replacement rate	28	27	29	26	26	26

	(b) Women					
	Germany			United States		
	85-91	92-97	98-07	81-87	88-94	95-02
% with individual earnings loss (IEL)	98	97	94	98	95	99
% with household earnings loss (HEL)	96	96	93	95	93	90
Change in private non-labor income (PNLI)						
% with increased PNLI given HEL	65	40	56	58	57	68
Average replacement rate	25	18	17	39	50	49
Median replacement rate	16	6	8	30	29	27
Change in public pension and transfer income (PPTI)						
% with increased PPTI given HEL	92	86	89	74	71	59
Average replacement rate	61	61	53	30	37	53
Median replacement rate	49	47	43	25	26	32

	(b) Women					
	Germany			United States		
	85-91	92-97	98-07	81-87	88-94	95-02
Change in household taxes (HHT)						
% with decreased HHT given HEL	95	92	92	96	92	90
Average replacement rate	28	26	29	30	26	30
Median replacement rate	28	25	30	27	23	25

Replacement rates are expressed in percentage terms and calculated as the increase in PNLI/ PPTI or decrease in HHT divided by the absolute value of the decline in household labor earnings. Replacement rates capped at +200 per cent. Average and median replacement rates calculated over observations with non-zero replacement rates (i.e., over observations with an increase in the given income component).

Sources: SOEP, PSID, CNEF, own calculations

Table 6.A.4 Changes in income components around retirement – voluntary retirees only – composition-adjusted estimates (including partner's employment status and retirement)

	(a) Men					
	Germany			United States		
	85-91	92-97	98-07	81-87	88-94	95-02
% with individual earnings loss (IEL)						
% with individual earnings loss (IEL)	98	99	97	95	97	97
% with household earnings loss (HEL)						
% with household earnings loss (HEL)	95	95	98	95	95	96
Change in private non-labor income (PNLI)						
% with increased PNLI given HEL	63	55	52	76	60	73
Average replacement rate	20	13	15	37	45	47
Median replacement rate	8	5	6	32	29	35
Change in public pension and transfer income (PPTI)						
% with increased PPTI given HEL	94	91	92	80	79	65
Average replacement rate	58	56	53	37	35	31
Median replacement rate	51	49	45	26	27	22
Change in household taxes (HHT)						
% with decreased HHT given HEL	92	96	92	98	93	95
Average replacement rate	26	26	30	27	28	29
Median replacement rate	28	27	29	26	25	26

	(b) Women					
	Germany			United States		
	85-91	92-97	98-07	81-87	88-94	95-02
% with individual earnings loss (IEL)	98	97	94	98	94	99
% with household earnings loss (HEL)	96	96	93	94	92	91
Change in private non-labor income (PNLI)						
% with increased PNLI given HEL	63	39	56	55	55	68
Average replacement rate	24	18	17	40	48	50
Median replacement rate	14	6	8	30	29	28
Change in public pension and transfer income (PPTI)						
% with increased PPTI given HEL	91	87	89	72	70	61
Average replacement rate	59	61	52	31	37	53
Median replacement rate	48	47	43	26	25	32
Change in household taxes (HHT)						
% with decreased HHT given HEL	94	92	92	95	91	89
Average replacement rate	28	26	29	30	26	30
Median replacement rate	28	25	30	26	23	25

Replacement rates are expressed in percentage terms and calculated as the increase in PNLI/PPTI or decrease in HHT divided by the absolute value of the decline in household labor earnings. Replacement rates capped at +200 per cent. Average and median replacement rates calculated over observations with non-zero replacement rates (i.e., over observations with an increase in the given income component).

Sources: SOEP, PSID, CNEF, own calculations

Table 6.A.5 Variability of income changes – voluntary retirees only – composition-adjusted estimates (excluding partner’s employment status and retirement)

	% of retiring workers with post-gov. loss > 33%	% of retiring workers with post-gov. loss > 50%	Change in pre-gov. income			Change in post-gov. income		
			Average within-year SD of changes	Time trend of within-year SD	Cross-year SD of median change	Average within-year SD of changes	Time trend of within-year SD	Cross-year SD of median change
Germany								
Men	26	9	36.8	-0.33*	4.2 (3.9)	30.7	-0.15	4.6 (3.2)
Women	20	7	40.8	0.06	6.9 (6.8)	30.7	-0.45*	6.0 (5.5)
United States								
Men	35	16	38.8	0.63*	7.9 (7.7)	35.6	0.67	8.1 (7.3)
Women	35	15	45.0	0.28	11.4 (9.2)	37.3	-0.01	8.6 (8.4)

Estimates in parentheses based on detrended estimates (i.e., residuals from a regression with a linear time trend). SD = Standard deviation. †: p < .1; *: p < .05; **: p < .01. Sources: SOEP, PSID, CNEF, own calculations

Table 6.A.6 Variability of income changes – voluntary retirees only – composition-adjusted estimates (including partner's employment status and retirement)

		Change in pre-gov. income			Change in post-gov. income		
		Average within-year SD of changes	Time trend of within-year SD	Cross-year SD of median change	Average within-year SD of changes	Time trend of within-year SD	Cross-year SD of median change
% of retiring workers with post-gov. loss > 33% > 50%							
Germany							
Men	27	36.7	-0.32*	4.0 (3.6)	30.7	-0.17	4.2 (3.3)
Women	20	40.6	-0.03	6.8 (6.7)	30.6	-0.46*	5.7 (5.3)
United States							
Men	34	39.3	0.57*	6.6 (6.4)	35.7	0.72 ⁺	8.1 (7.6)
Women	37	46.1	0.28	12.5 (11.3)	38.2	0.02	8.6 (8.3)

Estimates in parentheses based on detrended estimates (i.e., residuals from a regression with a linear time trend). SD = Standard deviation. ⁺: p < .1; *; p < .05; **; p < .01. Sources: SOEP, PSID, CNEF, OWN calculations

Part III
Economic consequences of late-career job loss

7 Literature review and research questions

In the previous two chapters, I have examined income trajectories around labor force exit, focusing on voluntary retirees whose retirement choices are not constrained by job displacement or declines in health. This part of the study complements this analysis by taking a closer look at employment and income trajectories around late-career job loss. Consistent with the counterfactual conceptualization of causality articulated in Chapter 4, I will not only examine the trajectories of displaced workers, but also compare them to a control group of observationally similar non-displaced workers. This DID matching strategy identifies the additional employment/income effects of late-career job loss, that is, beyond those attributable to voluntary retirement dynamics. This chapter prepares the empirical analysis by providing some additional conceptual and theoretical background, by formulating a set of research questions and hypotheses, and by reviewing previous empirical research.

Unlike with planned or voluntary retirement, there can be little doubt that job loss often has serious negative effects on well-being. A sizable literature documents that the unemployed are disadvantaged in numerous respects, including their financial situation and psychological well-being, and longitudinal studies provide compelling evidence that a large portion of these differences is attributable to the causal effect of job loss or unemployment rather than to other differences between the employed and the unemployed (e.g., in personality or baseline levels of happiness). Some studies have looked at the consequences of job loss for disposable household income (DiPrete and McManus 2000; Ehlert 2012) and several studies have analyzed its impact on subsequent earnings, that is, after reentering employment.¹ These latter studies show that reemployed displaced workers have lower earnings than similar non-displaced workers even several years after job loss (e.g., Arulampalam 2001; Gangl 2004b, 2006; Farber 2005). The consequences of job loss may thus extend beyond the ensuing period of unemployment, and research suggests that these longer-term ‘scar’ effects, too, are not confined to earnings (see, for example, Young’s [2012] analysis of

¹ In addition, job loss has been found to be a major trigger of poverty entries in research on poverty dynamics (McKernan and Ratcliffe 2002).

long-term changes in psychological well-being). In addition, some workers of course remain unemployed for very long periods of time.

Previous research on the consequences of job loss has mostly studied prime-age workers, but there is also some work on older workers in their 50s and 60s, which I will review below. In Chapter 3, I already discussed several reasons why the labor market situation of older workers is special and how this is related to labor market and welfare state institutions. This chapter further extends these ideas in order to prepare the empirical analysis in the next chapter. The next section provides a brief discussion of the employment and earnings/income effects of job loss, with a special focus on the situation of older workers. Against this background, Section 7.2 then draws on the institutional information provided in Chapter 3 to formulate a number of research questions and hypotheses. Section 7.3 concludes with an overview of related empirical research.

7.1 Employment, earnings and household income after late-career job loss

To get an analytical grip on the economic consequences of job loss it is useful to make a stylized distinction between workers who eventually return to work and those for whom displacement triggers a long-term or even permanent exit from employment.² Permanent exits occur at all ages, but previous research shows that older workers are considerably more likely not to return to work (Farber 2005; Frosch 2006; Johnson and Mommaerts 2011). This is consistent with the finding that job displacement is a primary trigger of involuntary early retirement (Lachance and Seligman 2010).

In this section, I first provide a brief general discussion of the financial risks associated with these two pathways (return to work vs. permanent exit). In a second step, I then address a crucial related question: How do contextual/institutional factors affect the likelihood that a displaced older worker will end up on one of these pathways rather than the other?

2 The stylized distinction between long-term/permanent leavers and returners is of course a simplification. For example, returners could be usefully differentiated with respect to the length of the intermittent non-employment spell, the change in work hours, or the stability of their postdisplacement jobs. Nevertheless, the distinction between long-term leavers and returners is a useful one, particularly in the present context, because it captures the crucial decision displaced older workers are facing: Whether to seek reemployment or leave the labor market permanently and retire earlier than planned.

By definition, workers who do not return to work after losing their job will no longer have access to earnings from their own employment. The impact of this decline in earnings for economic well-being will depend on what other sources of income they can tap into. While workers can be expected to rely on a large and heterogeneous array of income sources – including spousal earnings, asset income, and severance payments – public support programs for the unemployed as well as complementary and public retirement benefits will often be of primary importance. As noted in Chapter 3, research also suggests that job loss may induce some workers to apply for disability benefits, a group whom Autor and Duggan (2003) refer to as ‘conditional applicants’ because their application is conditional on having experienced job displacement.

For workers who eventually return to work, the economic consequences of job loss accrue in two broad phases. During the first phase, workers are not employed, but many will be actively searching for a new job. The length of this episode may differ considerably across workers and some may transition more or less seamlessly to a new position. The majority, however, will spend some time out of employment. During this phase, earnings drop to zero and, just as for long-term leavers, public benefits and alternative private income sources become crucial for maintaining economic well-being. Returners enter a second phase after becoming reemployed. While the loss of labor income during unemployment may be the most conspicuous economic consequence of job displacement, research on long-term scar effects shows that for the typical displaced worker negative economic effects persist long beyond eventual reemployment (e.g., Farber 2005).

Job loss affects earnings beyond eventual reemployment because post-displacement earnings are usually lower than they would have been in the absence of displacement. The most obvious reason is that postdisplacement earnings tend to be lower than before displacement. Earnings declines tend to be particularly large for older workers because the latter have often been long-tenured on their prior jobs and because employer/job tenure is positively related to earnings (Couch 2011).³ Importantly, however, the

3 The empirical regularity that earnings rise with employer tenure is well-established, but some debate remains concerning the sources of this relationship. Human capital theory emphasizes the acquisition of employer-specific skills. By definition, these skills are not transferable across employers and will therefore no longer be remunerated after job loss (Becker 1962; Mincer 1962). Another explanation for ascending wage-tenure profiles comes from efficiency wage theory, which argues that employers will devise labor contracts with deferred compensation to promote employee loyalty (Lazear 1981): Workers will be paid a wage below their marginal productivity in younger years and receive a wage exceeding their marginal productivity in

statement that earnings are lower ‘than they would have been in the absence of displacement’ highlights that the total scar effect of losing a job may be larger than suggested by a simple comparison of reemployed workers’ pre- and postdisplacement earnings. More specifically, the potential outcomes framework outlined in Chapter 4 suggests that any earnings (and associated income) increases that did not occur because of displacement (but would have occurred in its absence) must be included in the overall effect of job loss. In other words, the ‘earnings decline’ component must be augmented by a ‘foregone earnings increase’ component (see, for example, Farber 2005). DID designs provide a straightforward way of including losses due to foregone earnings increases in the estimated effect of job loss. In one exemplary study using a DID approach, Farber (2005) examines the earnings effects of job loss among American workers aged 20 to 64 from the mid-1980s to the mid-2000s. He finds that foregone increases account for a substantial portion of the total effect of job loss on earnings, for more than a third on average (Farber 2005; Figure 12).⁴

As in the part on retirement, the empirical analysis in the next chapter will focus on the impact of job loss two/three and four/five years after displacement. These effects are longer-term in the sense that displaced workers will have had plenty of time to search for a new job. In addition to the benefits available to older workers, the consequences of late-career job loss will therefore crucially depend on whether displaced workers return to work and on how their postdisplacement earnings differ from those of non-displaced workers.

How does the likelihood of returning to work differ across workers and how is it related to contextual factors? A straightforward expectation is that the probability of returning to work will depend on the availability of reemployment opportunities, and on their attractiveness compared to permanent exit/retirement. In other words, it will depend on the relative attractiveness and accessibility of the ‘work path’ compared to the ‘non-employment/early retirement path’ (see Burkhauser and Daly [2002] for similar arguments in the context of disability onset/health shocks). While various kinds of non-pecuniary considerations influence the relative attractiveness of work

later years. Finally, the earnings-tenure relationship could result from a job matching process whereby workers’ wages depend on the quality of the worker-job match (Jovanovic 1979). Irrespective of their relative importance, all of these explanations suggest that earnings losses due to displacement rise with employer tenure (Couch 2011; Johnson and Mommaerts 2011).

4 Farber’s findings also suggest that the ‘foregone earnings increase’ component was relatively more important in the 1990s than in the 1980s, perhaps due to procyclicality.

vis-à-vis retirement, the expected financial implications of choosing one option over the other can be expected to be a crucial factor.

Economic models of job search provide a somewhat more elaborate justification for these expectations. Search models assume that workers influence their chances of (and time until) finding reemployment through their level of search effort (cf. Maestas and Li [2006], on which the following summary is based). Yet, while highlighting the role of individual effort, economic search models also emphasize that the optimal level of search effort is itself dependent on (demand side) factors beyond the worker's immediate control: There is no point in searching for a new job if there are no good jobs out there. And there is little (economic) need to search for a job if public benefits make up for most of the earnings loss.

More generally, standard search models assume that workers face a (known) wage offer distribution $F(w)$, that is, a distribution of potential wage offers. The wage offer distribution essentially captures the demand side of the labor market. For example, if older workers are subject to (statistical) discrimination their wage offer distribution will be less favorable than for comparable younger workers. A worker's search effort positively influences the arrival rate, that is, the rate at which a worker receives (random) offers from the wage offer distribution. A worker will accept a job offer if the expected utility from working at the offered wage is greater than the expected utility from remaining unemployed. The wage above which this is the case is usually referred to as the reservation wage. A worker's reservation wage will be higher when the wage offer distribution is more favorable (because a given wage offer will then compare less favorably with potential future job offers) and when utility during non-employment is greater, for example, because of higher public benefits or private non-labor income.⁵

Search models assume that workers take these relationships into account when deciding on their level of search effort. As search effort entails (direct and opportunity) costs, workers will choose a limited amount of search effort. Other things being equal, they will exert greater search effort when the wage offer distribution is more favorable and when their level of well-being during non-employment is lower, because in both cases the expected gains from intensified job search will be greater. Again, this essentially means that search intensity will depend on the relative attractiveness of reemployment

5 As noted by Maestas and Li (2006), while the terms 'wage offer distribution' and 'reservation wage' suggest a narrow focus on remuneration, the model is general enough to accommodate richer definitions of job quality and their possible interaction with worker characteristics such as health (Blau 1991).

opportunities compared to remaining non-employed and retiring earlier than planned. It also bears repeating that, despite emphasizing the (supply-side) search decision of the worker, search models do incorporate the demand side of the labor market via the wage offer distribution and the relationship between search intensity and the arrival rate. Both the wage offer distribution and the arrival rate likely differ according to individual characteristics, including age, and contextual factors. Importantly, one American study suggests that demand-side constraints may prevent older workers from becoming reemployed even if they exert considerable search effort (Maestas and Li 2006).

Chapter 3 identified several factors – (perceived) obsolescence of skills, age discrimination, and labor market boundaries – that may limit the demand for older workers. On the supply side, public and complementary (early) retirement and other benefits may often provide a financially viable long-term alternative to reemployment that younger workers are lacking. Importantly, the discussion in Chapter 3 also suggests that the salience of these factors differs between Germany and the US as well as over time. In the next section, I recapitulate the most important insights from that discussion to arrive at a set of research questions and hypotheses for the empirical analysis in the next chapter.

7.2 Institutional context and the impact of late-career job loss on employment and income: research questions and hypotheses

Chapter 3 identified various institutional differences between the US and Germany that are likely to result in very different employment trajectories after late-career job loss. In particular, displaced German workers should be less likely to return to work than their American counterparts. On the demand side, while displaced older workers presumably are in a more difficult situation than their younger counterparts in both countries, the German labor market appears especially unaccommodating. Important reasons for expecting displaced older German workers to face very limited job opportunities are a low participation in continuing training, pronounced labor market boundaries that limit opportunities for occupational mobility, strict employment protection legislation, and a ‘culture’ of early retirement that may foster ageist stereotypes and (statistical) age discrimination. On the supply side, Germany’s generous ‘welfare-sustaining early exit policies’ (DiPrete et al. 1997) can be expected to pull displaced older workers toward

retirement. This suggests the following expectation, with the label HJL denoting that the hypothesis refers to the consequences of job loss:

HJL 1: German workers are more likely to leave employment after late-career displacement. Americans are more likely to return to work.

HJL 1 also has obvious implications for the relative importance of different types of income among displaced older workers, suggesting the following hypothesis:

HJL 2: German workers receive a larger portion of their postdisplacement income from public sources. American workers receive a larger portion of their income from their own earnings.

As discussed in Chapter 2, recent literature on household income mobility has highlighted the insurance function of income pooling within the family. The greater prevalence of two-earner families in the US (cf. Chapter 3) suggests that, on average, American workers see a greater portion of their earnings losses offset by this ‘family buffer’, as has already been shown to be the case among prime-age workers (Ehlert 2012). In the following empirical chapter, I will approach the role of family buffering in two principal ways. The first is to analyze changes in spousal labor supply, or so-called ‘added worker effects’, around late-career job loss. I will discuss this issue shortly. The second is to adopt Ehlert’s (2012) approach and compare the relative decline in displaced workers’ own earnings to the relative decline in pre-government income, that is, income after all types of private or market income, *including the private incomes of other household members*, have been included.

It should be noted, however, that this difference (the reduction in average relative losses through including all types of market income) is a relatively rough indicator of family buffering, particularly among older workers. This is because pre-government income includes private income that accrues to the displaced worker herself rather than to other household members. Complementary pension income presumably is the most important income of this sort, but other forms of market income (e.g., from assets) may also be crucial. Among prime-age workers, the importance of market incomes other than earnings may be quite limited, but among older workers it presumably is not, especially in the US where complementary pensions likely are an important resource for cushioning the impact of job loss. To acknowledge this fact, I will refer to the difference between individual earnings losses and

losses in household pre-government income as 'private income buffering', while noting that 'family buffering' through the market incomes of other household members is an important factor contributing to the overall extent of private income buffering.

A second reason why the difference between individual earnings losses and pre-government household income losses is an imperfect measure of family buffering is slightly more subtle. To grasp this issue, note that the most compelling conceptualization of family buffering would arguably define it in terms of a comparison of two states of the world: the actual state of the world where some (displaced) workers coreside, and pool their income with, additional household members, and the counterfactual state of the world where the same workers live on their own. This suggests that the most compelling measures of family buffering income would be based on comparing actual income changes with hypothetical income changes under the relevant counterfactual. The simplest strategy for obtaining a first approximation to the relevant counterfactual would be to exclude all income that flows to the household *only because of the presence of other household members* from the calculation of income changes.⁶ Importantly, this aggregate (i.e., income flowing to the household by virtue of other household members' presence) should also include *public* pension and transfer income that accrues to household members other than the focal (displaced) worker. This differs from Ehlert's (2012) approach to gauging family buffering which treats it as restricted to the sphere of market income.⁷ I considered constructing a more compelling measure of family buffering along the lines sketched above, but this was not feasible using the data at hand.⁸

These issues make it difficult to pin down the precise extent of family buffering. However, with respect to the extent of private income buffering (as defined above), the greater salience of complementary pension income and greater prevalence of dual-earner couples in the US suggest the following expectation:

6 Such an approach would of course rest on the implicit assumption that the focal workers' income is independent of the incomes of other family members, which is unlikely to hold in practice (e.g., because the labor supply decisions of household members are interdependent).

7 Again, such an approach is more readily defensible in the case of younger workers, but the importance of public transfers such as unemployment or disability benefits for at least some younger households suggests that the more rigorous conceptualization of family buffering might lead to different conclusions even for this age group.

8 In particular, labor earnings are the only income component that is provided at the individual level by the CNEF. All other income components, including private and public pension income, are only provided as household-level aggregates.

HJL 3: Compared to their German counterparts, displaced workers in the US see a larger portion of their earnings losses cushioned by other types of market income, that is, by their own private non-labor income and the earnings and private non-labor income of other family members.

An analysis of changes in spousal labor supply around late-career job loss, that is, of an ‘added worker effect’ (AWE), can provide less ambiguous evidence on the role of the family in buffering income losses. As noted in Chapter 3, a generic form that the AWE might take among older couples is that of delayed retirement (cf. Coile’s [2004] study of added worker effects after late-career health shocks). Research on prime-age workers has focused on transitions from non-employment to work and on increases in work hours (see, for example, Stephens 2002; McGinnity 2004; Cullen and Gruber 2000; Ehlert 2012). Among older ‘added’ workers, delaying retirement may turn out to be more important than hours increases or entries into employment, as opportunities for the latter may be limited by the very factors that depress the employment prospects of displaced older workers themselves.

On closer inspection, the economic rationale for an AWE seems particularly compelling for older workers. As noted above, displaced older workers may be facing especially large wage scars: The wage of a working non-displaced spouse may thus often exceed the wage a displaced older worker could expect to earn after reemployment. This simple economic incentive for an added worker effect may be further reinforced by certain features of the earnings replacement benefits available to displaced older workers. Often these will be individualized insurance-type benefits that do not involve household means-testing, but have no or very limited earnings disregards (i.e., do not allow recipients to combine transfer income with earned income). For a displaced worker drawing such benefits, the effective marginal tax rate will often be much higher – that is, the net gain from earning another Dollar or Euro will be much smaller – than for his/her partner or spouse. Of course, this also applies to younger workers who receive similar benefits; yet younger workers typically have a much longer career horizon. When comparing a wage offer with the alternative of remaining unemployed, younger workers should therefore factor in that they will work in the prospective job (or in subsequent jobs that may only become available if they do not stay unemployed for too long⁹) for many years after their earnings-related benefits would be exhausted. The

9 This could, for example, be because long unemployment leads to depreciation of human capital or sends a negative ‘signal’ to prospective employers (Spence 1973).

shorter career horizon of older workers, by contrast, may often not extend far beyond the time when their benefits would expire.

While there may thus be compelling economic reasons for an AWE, several factors may limit its empirical relevance. A first obvious (supply-side) factor is the alleged preference for joint leisure that is often invoked to explain the phenomenon of coretirement discussed in Chapter 6 (cf. Coile 2004). The role of public and complementary earnings replacement benefits may also be more ambiguous than suggested in the previous paragraph. In particular, economic literature on the AWE suggests that public benefits may reduce the need for, and thus 'crowd out', spousal labor supply responses (Cullen and Gruber 2000). On the demand side, the very factors that depress older displaced workers' reemployment prospects (e.g., skill obsolescence or discrimination) may also limit the scope for added-worker-type processes. As for country differences, this suggests that, if they exist at all, added worker effects should be stronger in the US (where replacement rates are lower and where the employment prospects of older workers are arguably better):

HJL 4: Increases in spousal labor supply after late-career job loss are larger in the US than in Germany.

Hypotheses HJL 1 to HJL 4 address German-American differences in the employment/retirement trajectories of displaced older workers and their spouses and in the relative importance of different income *sources*. It is more difficult to predict how changes in disposable income or poverty status differ between the two countries. This is because demand-side factors and the generosity of earnings replacement benefits work in different directions. As noted repeatedly, there are several reasons to expect that the reemployment prospects of displaced workers are better in the US, whereas earnings replacement benefits, including early retirement options, are more generous in Germany. While this leads to clear predictions concerning the reemployment rates and 'income packages' of displaced older workers, the net effect on disposable income is ambiguous.

The pessimistic perspective on the American context is that displaced older workers are in a difficult situation in any country and that late-career job loss therefore often is a devastating event that the American welfare state does little to cushion. Older workers would then be left with a choice between retiring on rather unfavorable terms and returning to work at the cost of suffering considerable wage scars. In a stylized description of the American life course regime, Mayer (2005: 37) expresses this pessimistic

view when he writes that 'older workers can be fired easily, and on the other hand, older workers continue to work even at lower wages because of the low level of expected pension income'. The optimistic perspective is that the flexible American labor market offers reasonably good reemployment opportunities for displaced older workers and that the American approach has therefore been well-balanced, at least during the observation period of this study when the American economy was mostly strong.

The pessimistic perspective on the German context would be that welfare-sustaining policies, while being generous, have presumably not eliminated the consequences of late-career job loss altogether and are therefore at most a 'second best' (and costly) solution in a country whose rigid labor market provides little opportunities for displaced older workers. The optimistic perspective would be that the German approach, albeit only a 'second best', is much more attractive than the harsh American model of 'market-induced employment maintenance' (Buchholz et al. 2011) which pushes workers back into work at the cost of substantial earnings scars.

The upshot of this discussion is that it is quite difficult to formulate clear expectations concerning country differences in the impact of job loss on disposable income and I will therefore leave this issue as an open, though very important, question.

One might be tempted to hypothesize that displaced German workers are better off *conditional on leaving employment* after late-career job loss, as they can rely on a broader and more generous set of benefits. The rationale behind such a prediction would again be that Germany sustained much more generous programs facilitating early exit from work throughout the observation period. However, the discussion of search models in the previous section highlights the likely selectivity of the older workers' retirement/reemployment trajectories with respect to expected retirement income. Particularly if job opportunities for displaced older workers are good, those who leave work after late-career job loss may be a selective subgroup who can expect comparatively high levels of income conditional on taking the 'retirement path'.¹⁰ More specifically, if the reemployment opportunities of displaced older Americans really are much better than those of their German counterparts, Americans who retire after late-career job loss might be a selective subgroup with good access to alternative income sources.

10 In a related vein, Schils (2008) argues that early retirement in general (i.e., regardless of whether related to employment interruptions) is more selective in countries with a less generous public pillar.

This would work against the seemingly straightforward prediction that involuntary retirees suffer smaller losses in Germany. By a similar argument, even assuming that the reemployment prospects of older workers are much more favorable in the US, workers who actually return to work after late-career job loss might well be better off in Germany: Given that retiring likely is a more attractive alternative for the average displaced worker in Germany, those German workers who actually return to work may be a selective group of workers who received exceptionally good job offers. As in the case of displaced workers as a whole, it therefore seems difficult to formulate clear expectations concerning country differences in income changes by postdisplacement employment/retirement trajectory. Nevertheless, separate analysis of 'involuntary retirees' who leave employment and 'returners' who become reemployed after late-career job loss will provide interesting additional detail on the processes shaping the income trajectories of displaced older workers.

A major goal of this study is to ascertain whether recent welfare state change has led to greater economic insecurity. Chapter 3 identified several changes in welfare state programs that are directly relevant to the economic situation of displaced older workers. In Germany, financial penalties for drawing public pension benefits early rose noticeably over the course of the observation period. In the US, the shift from defined-benefit plans (which often provide generous early retirement options) to defined-contribution benefits (which are actuarially neutral by construction) has presumably raised the costs of retiring early. Finally, alternative public transfer programs such as long-term unemployment or disability benefits were also cut back, especially in Germany. These policy changes were accompanied by other reforms intended to raise work incentives (not only, but also for older workers): Prominent examples are expansions the Earned Income Tax Credit in the US (which is, however, of greater importance for households that include dependent children) and of in-work benefits in Germany.

Germany has thus clearly begun to shed its tradition of providing generous options for early retirement, thereby raising the importance of income from (re)employment for the economic well-being of displaced older workers. Institutional changes in the US, including those in the complementary pension pillars, likewise seem to have further heightened the importance of reemployment for maintaining economic well-being.

How have these changes affected the employment and income trajectories of displaced older workers? A straightforward expectation is that increased emphasis on the (re)activation of displaced older workers has actually raised their probability of returning to work:

HJL 5: Over time, German and American workers have become less likely to leave employment after late-career job loss.

Turning to period differences in the impact of late-career job loss on economic well-being, the pessimistic perspective on the German case would be that generous early retirement in Chapter 5 options are functional requirements of a system that is characterized by marked labor market boundaries and other features that depress the reemployment prospects of displaced older workers (cf. Chapter 3). This perspective would suggest that displaced older workers in Germany find it very difficult to conform to the new paradigm of late retirement. It receives additional credibility from the fact that overall labor market conditions in Germany were relatively unfavorable during the 1990s and early 2000s. Against this background, it seems likely that the economic consequences of late-career job loss have become more severe for German workers.

Recent discussions about an increase in economic insecurity suggest a similar trend for displaced older workers in the US. However, there are at least three reasons why such a prediction is less obvious in the American case: First, retrenchment of public policies cushioning the impact of late-career job loss was not as marked as in Germany, even though changes in complementary pensions have presumably raised the costs of retiring early. Second, as noted repeatedly, weaker labor market boundaries and other institutional differences arguably make the American labor market more accommodating to displaced older workers. In other words, displaced American workers should find it easier to conform to increased pressures to return to work. Third, overall labor market conditions were relatively benign during the 1990s and early 2000s and better, on average, than in the 1980s.

On the whole, these considerations suggest that the effectiveness of welfare state buffering has declined over time and that – partly because of this trend – the economic consequences of late-career job loss have become more severe, particularly in Germany:

HJL 6: Over time, public taxes and transfers (including pensions) have become less effective in buffering the economic consequences of late-career job loss, especially in Germany.

HJL 7: The impact of late-career job loss on disposable income and poverty status has become more severe over time, especially in Germany.

7.3 Previous empirical research

I will now review previous research on the consequences of late-career job loss in Germany and the United States. As in my review of research on income dynamics around retirement, I will mostly limit the discussion to longitudinal studies. In addition to research on income changes, I will also summarize studies on the consequences of late-career job loss for subsequent employment/retirement. I will also discuss a few studies of changes in spousal labor supply around job loss, even though none of them has explicitly looked at older workers.

Employment effects. Chan and Stevens (2001) study the impact of late-career displacement (at ages 50 and older) on subsequent employment in the US. They analyze men and women separately, but broad patterns are similar for both genders. Chan and Stevens find that displacement has a marked and long-lasting negative effect on employment rates. Displaced older workers have much lower employment rates than non-displaced workers for many years after job loss, even though the gap declines over time as some displaced workers become reemployed and as non-displaced workers retire. Nevertheless, for workers displaced at age 55, a noticeable gap persists until the early to mid-60s (Chan and Stevens 2001: 510, Figure 4). Chan and Stevens (2001) also analyze a subgroup of displaced workers who become reemployed quickly after displacement. These quickly reemployed displaced workers initially have lower employment rates than nondisplaced workers. Interestingly, however, their employment rates begin to exceed those of nondisplaced workers when they reach their early 60s (for workers displaced at age 55) or their mid-60s (for workers displaced at age 60). This suggests that late-career displacement induces some American workers to postpone retirement, perhaps to compensate for wage scars, foregone earnings, or lower pension claims.

In another American study, Johnson and Mommaerts (2011) compare the incidence of, and employment patterns after, job loss across age groups. They show that older workers in their 50s and 60s are less likely to experience job displacement than younger workers, yet this difference is fully accounted for by age differences in job tenure. This finding is extended by a recent study (Zhivan et al. 2012) which finds that age differentials in displacement risks have narrowed between the mid-1980s and mid-2000s and that declining age differences in employer tenure are an important

reason for this convergence.¹¹ Johnson and Mommaerts (2011: 18-19) also find that reemployment rates after job loss are considerably lower for older workers. For example, they estimate that six (twelve) months after job loss 69 (87) % of workers aged 25-34, but only 58 (79) % of those aged 50 to 61 and 48 (63) % of those aged 62 and above were reemployed.

Mauer and Mosley (2009) use social insurance records to study employment and benefit trajectories of German workers who entered (registered) unemployment at ages 50 to 64 in the early 2000s. One year after entering unemployment only 21% of workers in their sample were working in unsubsidized employment relationships (Mauer and Mosley 2009: 33). Frosch (2006) uses the same data to study age differences in reemployment rates. She finds that 79% of workers aged 35 to 49, but only 67% of workers aged 50-54 and a mere 29% of workers aged 55-59 became reemployed within two years after job loss. She also finds that reemployment rates decline more steeply with age for engineers than for other occupations. Her primary explanation for this result is that, due to different rates of technological innovation, skills become outdated more quickly in engineering than in most other occupations.

Using the SOEP, Rinklake and Buchholz (2011) calculate the proportion of older workers who become reemployed following the first unemployment spell after age 50. They also compare reemployment rates across birth cohorts. They find that 23 (20) % of the oldest male (female) birth cohorts (1934-39) were eventually reemployed. For the youngest cohorts (1946-51) these proportions are 51 (52) %, which constitutes a rather dramatic increase in the propensity of displaced older workers to return to work (Rinklake and Buchholz 2011: 42, Table 2.1). However, they do not control for differences in the age at unemployment, which may partly account for these cohort differences (their observation window ends in 2007, when workers from the 1946-51 cohorts were aged 56 to 61). Again using the SOEP, Giesecke and Kind (2012) also find that reemployment rates of displaced older workers have increased in recent years. They conclude that this trend is at least partly due to changes in early retirement options.

Spousal labor supply. There seem to be no studies of spousal labor supply responses to job loss that have looked specifically at older workers. In one influential American study, Stephens (2002) investigates wives' responses to husbands' job loss. His sample is restricted to couples where both partners

¹¹ However, in terms of absolute rates, convergence is driven by declining displacement risks for younger rather than increasing risks for older workers.

are between ages 25 and 65 and he does not differentiate by age of husband and/or wife. Stephens finds modest increases in labor supply among the wives of displaced workers, which partly occur already before the displacement event. In another American study, Cullen and Gruber (2000) focus on the possibility that unemployment benefits crowd out spousal labor supply. Their sample comprises couples where both partners are between ages 25 and 54. Consistent with the crowd out hypothesis, they find that the wives of unemployed husbands work less when the husband's potential unemployment benefits are higher. In additional analyses, they split their sample into older and younger couples (where both spouses are under 40). Their estimates suggest that the wife's labor supply response is weaker in older couples. Cullen and Gruber tentatively attribute this result to the greater savings of older couples, which would allow them to smooth consumption without drawing on increased earnings by the wife. These two American studies have thus documented a limited AWE after displacement, with one study suggesting that it may be weaker for older workers. A systematic analysis of AWE-type processes among older couples, however, remains yet to be done.

Recent evidence on the AWE after job displacement in Germany (and the US) comes from Ehlert's (2012) German-American comparison of the consequences of becoming unemployed. He shows that women who did not work prior to their partner's job loss increase their (absolute) work hours in both countries, with the effect being larger in the US. Increases in hours are smaller for women working part-time before their partner's job loss – in Germany they are essentially zero. A further study documenting a limited AWE after job loss in Germany is McGinnity (2004), who does not find an AWE in Great Britain, a result that she attributes to British earnings replacement benefits being means-tested at the household level (both displaced worker and spouse thus face similar effective marginal tax rates). Prieto-Rodriguez and Rodriguez-Gutierrez (2003) provide a comparative study of added worker effects in 11 European countries. In the German case, they find an AWE for wives of inactive men, but not for wives of unemployed men (perhaps because transitions to inactivity are more likely to be longer-term exits, a possibility that they do not examine more closely). Their results also suggest that the strength of the AWE declines with the age of the wife, but this finding is based on a simple linear interaction of the husband's employment status with the wife's age.

Earnings and income effects. Research on the financial consequences of late-career displacement has primarily focused on its impact on earnings. For American men (women) displaced at ages 50 to 61, Johnson and Mommaerts

(2011: 50, Tables 10 and 11) estimate that median monthly earnings after reemployment are 21 (17) % lower than before job loss, with practically all of the change being attributable to changes in hourly earnings (as opposed to changes in the number of hours worked per month). At least among men, these losses are considerably greater than for younger workers. Regression results show that longer predisplacement job tenure is associated with greater earnings losses for both men and women, but age differences in tenure do not seem to account for a large portion of the observed age differences in wage losses. The finding that older workers suffer particularly large earnings losses confirms earlier studies such as Farber (1997), who also shows that this pattern is robust across different levels of education.

Couch et al. (2009) use administrative data to study earnings changes among workers in Connecticut who were displaced in the course of 'mass layoffs' during 1999-2004 and who were aged 40 and above at the time of displacement. Their results are difficult to compare with those of Johnson and Mommaerts (2011) because of the regionally specific sample and differences in study design. In particular, the approach of Couch et al. (2009) differs from Johnson and Mommaert's in that they compare the earnings trajectories of displaced workers with a control group of nondisplaced workers. Their most important results are that relative earnings losses are very persistent, remaining considerable six years after job loss, are broadly similar for men and women¹², tend to rise with age at displacement, and are larger for workers who change industry (presumably because these workers no longer see their industry-specific skills rewarded).

Turning to household income, Couch (1998) calculates that workers displaced at ages 51 to 60 in 1990 had an average annual household income of approximately \$45,000 in 1991, which was 24% lower than for current workers as a whole. However, his data do not contain information on predisplacement income, so this difference may partly reflect the fact that displacement is concentrated among low-income households. O'Rand and Hamil-Luker (2011) find that the number of times a worker is unemployed after age 50 is associated with significantly lower public and private pension income. Johnson et al. (2005) study a sample of Americans aged 51 to 61 in 1992 and investigate how exposure to adverse events affects the probability of having low income in 2001. One of their measures is an indicator variable for having been laid off after 1992. In group-specific probit regressions, the estimated effects of this variable on the risk of having low income are generally positive, but mostly small and statistically insignificant. The one

12 In absolute terms, losses are greater for men due to their higher predisplacement earnings.

exception are single men for whom the estimated marginal effect is around 14 percentage points and highly significant.

Compared to the US, evidence on the financial consequences of job loss for older workers in Germany is even more scant. There is some work on the consequences of job loss for wages or earnings (e.g., Burda and Mertens [2001]; Gangl [2004b]; Strauß and Hillmert [2011]) and a smaller literature on changes in household income and poverty dynamics (McGinnity 2004; Ehlert 2012). However, most of these studies are restricted to prime-age workers, and even when they are not, age differences are usually not explored systematically.

One noteworthy exception is Strauß and Hillmert's (2011) recent study of earnings losses after unemployment using administrative data. They exclude workers aged 50 and older, but provide age-specific results for workers below this threshold. Results for men confirm that older workers (ages 45-49) experience greater earnings losses than younger age groups. Age differences are noticeably larger when they include spells with zero earnings in the outcome measure rather than comparing earnings conditional on employment. This suggests that there are important age differences in the length of unemployment and/or in the stability of post-unemployment jobs. Perhaps some workers who are displaced at ages 45-49 even leave employment permanently. For women, earnings losses are found to be largest in the youngest (age 30-34) and the oldest age group (45-49).

As discussed already in Chapter 5, Rinklake and Buchholz (2011) analyze SOEP waves 1984-2007 and find that the negative relationship between late-career unemployment at age 58 and absolute (inflation-adjusted) pension income is substantially stronger for the youngest birth cohort (1946-51) than for those born between 1934 and 1945.

In summary, previous research on the consequences of job loss for older workers, while not including direct German-American comparisons, does suggest that reemployment rates are substantially higher in the United States. Studies also show that even within the group of older workers, age at job loss has a strong negative effect on the likelihood of returning to work. This is not surprising because older workers have a shorter career horizon. Further, age directly influences access to early retirement benefits or the possibilities for using other resources (e.g., unemployment benefits or private savings) to bridge the time until retirement benefits become available. In my implementation of the DID matching approach in the next chapter, I will therefore match displaced workers to comparison workers with the same age, that is, I will perform exact matching on age. For Germany, there

is also some preliminary evidence that displaced older workers have become more likely to return to work in recent years.

Research on spousal labor supply responses to job displacement has documented a limited AWE for both countries. So far, no study has explicitly focused on older workers, even though some findings suggest that added worker effects may be smaller among older couples. In general, research on the AWE has focused on the labor supply responses of 'wives' to the unemployment of their 'husband'. This is natural given their focus on prime-age workers: Because most prime-age men already work full-time, the potential for a 'male' AWE is very limited. Among older workers, there may be greater scope for labor supply responses by husbands: Some men might already have reduced their work hours and the AWE could also take the generic form of delayed retirement. In the next chapter, I will therefore explore the existence of added-worker-type processes for both genders.

As for previous research on the earnings and income effects of late-career job loss, one clear finding of German as well as American studies is that older workers who do become reemployed tend to suffer greater earnings losses than younger workers. Given the lack of genuinely comparative studies, it is more difficult to draw conclusions about German-American differences in the impact of late-career job loss on earnings or even on household income. In addition, there is practically no evidence on how the financial consequences of late-career job loss have changed over time. To provide such explicit comparisons across space and time is the main goal of the next chapter.

8 The changing economic consequences of late-career job loss

This chapter provides an empirical analysis of employment and income trajectories around late-career job loss. It is structured as follows. The next section discusses a few essential details of the analysis sample and the implementation of the DID matching approach. Section 8.2 contains the empirical findings. I first analyze the impact of late-career job loss on subsequent employment and retirement (Section 8.2.1). I then examine income and poverty dynamics among displaced workers as a whole (Section 8.2.2). Section 8.2.3 analyzes changes in spousal labor supply. As a final step, Section 8.2.4 presents additional analyses that differentiate between men who return to work and men who retire after late-career job loss (results for women are not discussed due to small sample sizes). Section 8.3 concludes by summarizing the main findings of the chapter.

8.1 Sample characteristics and details of estimation approach

In this chapter, late-career job loss is defined as an involuntary separation from an employer between ages 51 and 65. Separations are treated as involuntary if they occurred for one of the following reasons: closure of a business or establishment, being fired, or the end of a fixed-term contract if the latter was accompanied by at least one month of unemployment (cf. Chapter 4). I exclude self-employed workers from the analysis because the event is not well-defined for them (wage and salary workers who become self-employed after job loss are included). I also restrict the analysis to workers who worked at least ten hours per week (annual average) before losing their job.

As in the analysis of income trajectories around voluntary retirement in Chapter 6, I will analyze four-year changes from $t - 2/t - 1$ to $t + 2/t + 3$ and six-year changes from $t - 2/t - 1$ to $t + 4/t + 5$, with t denoting the year of job loss. The reference year used (i.e., $t - 2$ or $t - 1$) depends on the year of job loss. I use $t - 2$ for workers displaced in even-numbered and $t - 1$ for workers displaced in odd-numbered years. This somewhat unconventional approach is necessitated by the PSID's adoption of two-year interview intervals in 1997 (cf. Chapter 4). In my analysis of income dynamics around retirement, there were no systematic differences between four-year and six-year changes

and I therefore did not report separate estimates. Here, I will often do so because the differences tend to be larger.

Identifying the effect of late-career job loss requires estimation of the counterfactual trajectories displaced workers would have experienced if they had not lost their job. As set out in Chapter 4, I use Coarsened Exact Matching (CEM; Iacus et al. 2012) with additional regression-based adjustments to improve the comparability of displaced and non-displaced workers. As in Chapter 6, I also apply entropy balancing (EB) to obtain composition-adjusted estimates, that is, estimates that are purged of period differences in the composition of displaced workers (cf. Chapter 4).¹

Table 8.1 provides further information on the variables included in CEM, EB, and/or the additional regression-based adjustment. The ticks in the three rightmost columns indicate where a given variable enters the analysis. Age is listed first because it presumably plays a crucial role for the consequences of late-career displacement: Most importantly, age is directly related to eligibility for (early) retirement and some other types of earnings replacement benefits and it may also crucially influence available reemployment opportunities. I therefore perform exact matching on age measured in years.² I include the following additional characteristics in the CEM procedure: civil servant status (Germany only), residence in East or West Germany (Germany only), race/migration background, education, presence of a partner, work hours, household income (poverty or near-poverty), and sector/industry. All time-varying characteristics are measured in the predisplacement reference year (i.e., in $t - 2$ or $t - 1$, depending on the year of displacement).

The set of variables included in the EB procedure is almost identical to that used in CEM. There are only two differences. First, civil servant status, which is only defined for German workers, is not included in EB because CEM effectively leads to the exclusion of civil servants from the analysis. This is because there are practically no civil servants who experience displacement, which is consistent with most of these workers enjoying lifetime employment contracts (see Tables 8.2 and 8.3 below). Second, I include a measure of whether a worker had accumulated at least 30 years of work experience in the predisplacement reference year. I do not include

1 As in Chapter 6, the reference distribution used in the EB procedure is given by the average country-specific composition of displaced workers over the whole observation period.

2 For example, to estimate the impact of displacement at age a on the four-year income change from $t - 2$ to $t + 2$, I compare income changes from age $a - 2$ to $a + 2$ between workers who were displaced at age a and similar workers who were not displaced between ages $a - 2$ and $a + 2$.

this variable in CEM to limit the number of displaced workers that cannot be matched (see below). However, findings in Chapter 6 suggest that it is important to account for period differences in the length of work careers, particularly among women.

Another decision that deserves brief discussion is to adjust the composition of displaced workers with respect to age at the time of job loss (more specifically, to adjust the composition with respect to three 5-year age groups; cf. Table 8.1). I did not include (retirement) age in the EB procedure for voluntary retirees because retirement age is arguably endogenous to the institutional changes that I am interested in (cf. Chapter 6). In the case of job loss, the situation is less clear. It seems plausible that changes in social policy have no strong influence on the risk of experiencing job loss conditional on working. However, the likelihood of (still) working at a given age and thus of being 'at risk' of losing one's job presumably is influenced by these changes. The rationale for adjusting the composition of displaced workers with respect to age is therefore ambiguous, and I will return to this issue when discussing the findings for German men, the one group where the inclusion of age has a clear influence on the impact of the compositional adjustment.

The covariate set used in CEM is rather restricted and may not be sufficient for meeting the unconfoundedness assumption required for unbiased estimation of the causal effect of job loss (cf. Chapter 4). Employing a richer set of covariates and/or finer coarsenings unfortunately results in prohibitively small sample sizes (and compromises representativeness) because many displaced workers can no longer be matched. As discussed in Chapter 4, I therefore follow the recommendations of Iacus et al. (2012) and use (weighted) linear regression and linear probability models (for dichotomous outcomes) to control for remaining differences in key variables after CEM. The final column in Table 8.1 indicates the variables included in these regressions: household income quintile, health status, work experience, employer tenure, and earnings tercile as well as a number of key partner/couple characteristics for workers living with a partner at $t-1/t-2$. This combined matching-plus-regression approach can be expected to be less sensitive to specification choices than traditional applications of regression analysis which do not 'preprocess' the data via matching. See Ho et al. (2007), Iacus et al. (2012), and Chapter 4 for further discussion.

Table 8.1 Characteristics included in coarsened exact matching (cem), entropy balancing (eb), and additional regression-based adjustment

Characteristic	Coarsenings/Details	Included in...		
		CEM	EB	Regression-based adjustment
Age at time of job loss	Exact matching on age in CEM; EB applied with respect to age groups (51-55, 56-60, 61-65) and average age	✓	✓	
Civil servant status	DE only	✓		
East/West Germany	DE only	✓	✓	
Migration background/race	DE: migration background vs. no migration background; us: black vs. non-black	✓	✓	
Education	DE: No degree/general schooling only vs. vocational degree vs. tertiary degree; us: Less than high school vs. high school/some college vs. college degree	✓	✓	
Presence of partner $t - 2/t - 1$	Yes vs. no	✓	✓	
Work hours in $t - 2/t - 1$	10-30 vs. 30+ (full-time)	✓	✓	
Household income in $t - 2/t - 1$	Below 150% of poverty line (poor or near poor) vs. at least 150% of poverty line	✓	✓	
Industry/sector in $t - 2/t - 1$	Primary/manufacturing vs. private service sector vs. public sector	✓	✓	
Work experience in $t - 2/t - 1$	Fewer than 30 years vs. 30+ years		✓	✓
Health problems in $t - 2/t - 1$	Presence of health problems			✓
Household income in $t - 2/t - 1$	Income quintile			✓
Labor earnings in $t - 2/t - 1$	Earnings tercile			✓
Employer tenure (ET) in $t - 2/t - 1$	$ET < 5$ vs. $5 \leq ET \leq 15$ vs. $15 < ET$			✓
Partner's age in years	Linear, squared, and cubic term			✓
Age difference (AD) between worker and partner	$AD < -5$ vs. $-5 \leq AD \leq 5$ vs. $5 < AD$			✓
Partner's education	As for focal worker			✓
Partner's work experience in $t - 2/t - 1$	As for focal worker			✓
Partner's work hours (WH) in $t - 2/t - 1$	$WH < 10$ vs. $10 \leq WH < 30$ vs. $30 \leq WH$			✓
Year of job loss	Full set of dummies for year of job loss			✓

CEM = Coarsened Exact Matching; EB = Entropy Balancing. Civil servant status not included in EB because only six workers with civil servant status experience job loss.

8.2 Empirical results

Tables 8.2 and 8.3 provide details on the male and female samples used in the analysis. I differentiate German and American workers – or, more precisely, episodes³ – with respect to their treatment and matching status (with vs. without job loss and matched vs. unmatched). Information on period differences in the composition of matched displaced workers is provided in Tables 8.A.1 and 8.A.2 in the appendix to this chapter.

The final rows of Tables 8.2 and 8.3 show that the number of matched displaced workers is quite small. The number of 4-year panels ranges from 387 for German men to a mere 156 for American women. Numbers are even smaller for 6-year changes. Unfortunately, these small sample sizes leave little possibility for disaggregating beyond year/period of job loss and postdisplacement work status (involuntary retirement vs. returning to work).

The primary comparison of interest in Tables 8.2 and 8.3 is that between matched workers with and without job loss, that is, between matched treated and comparison/control workers. By construction, the two groups are perfectly balanced with respect to the coarsened matching variables, as can be seen by inspecting the first block of variables in the tables. In addition, CEM ensures that the two groups are comparable with respect to all possible interactions between these variables (cf. Chapter 4). I will discuss remaining differences with respect to other characteristics shortly. Before doing so, I briefly compare the matched to the unmatched episodes.

Clearly, unmatched workers who did not experience job loss, differ considerably from matched displaced workers. By excluding these workers from the analysis, CEM considerably reduces imbalances between treated and control units (Iacus et al. 2012). For example, compared to unmatched non-displaced workers, displaced workers have lower levels of education and are more likely to have worked in the primary sector or manufacturing prior to job loss. As noted above, they are also much less likely to have civil servant status.

Another interesting comparison is between matched and unmatched displaced workers (i.e., displaced workers who are discarded because the data contain no reasonably similar non-displaced workers). The bottom rows of Tables 8.2 and 8.3 show that less than a tenth of displaced men cannot be

3 One and the same worker may contribute multiple episodes to the analysis sample (cf. Chapter 4). As throughout the study, standard errors are clustered on the personal level to account for the resulting dependencies among observations.

Table 8.2 Men – worker and partner characteristics by treatment and matching status

	Germany				United States			
	Matched episodes		Unmatched episodes		Matched episodes		Unmatched episodes	
	With JL	W/o JL	With JL	W/o JL	With JL	W/o JL	With JL	W/o JL
Worker characteristics – matching variables								
Age at job loss (mean)	56.5	56.5	57.1	57.2	57.4	57.4	60.7	57.7
% Eastern Germany	29.6	29.6	36.7	13.9				
% civil servant	1.2	1.2	0.0	21.2				
% migration background/black	22.8	22.8	44.7	16.7	5.9	5.9	32.6	12.0
% intermediate education	70.5	70.5	36.7	49.4	51.4	51.4	62.8	42.0
% high education	9.2	9.2	25.1	35.1	25.0	25.0	14.2	36.5
% living with partner	90.6	90.6	52.7	84.9	93.5	93.5	72.7	86.7
% working full-time	97.5	97.5	64.5	88.7	94.5	94.5	42.0	87.0
% primary sec./manufacturing	70.3	70.3	44.5	31.2	44.4	44.4	38.2	33.2
% private service sector	21.5	21.5	39.5	20.5	46.7	46.7	45.8	28.6
% public sector	8.2	8.2	16.0	48.3	8.9	8.9	16.1	38.3
% poor/hear poor	21.0	21.0	67.3	20.5	22.2	22.2	46.5	23.9
Worker characteristics – additional variables								
Avg. work experience (years)	33.4	33.2	31.1	32.7	33.6	33.6	36.1	33.8
Avg. employer tenure (years)	17.6	20.5	11.4	21.5	10.6	16.9	6.6	15.5
% with health problems	13.9	13.9	24.5	17.9	12.6	12.9	4.4	13.9
% middle earnings tercile	48.1	45.4	39.4	33.9	30.0	28.7	4.1	30.8
% top earnings tercile	38.5	47.3	19.8	57.6	56.7	61.8	37.5	56.7

	Germany				United States			
	Matched episodes		Unmatched episodes		Matched episodes		Unmatched episodes	
	With JL	W/o JL	With JL	W/o JL	With JL	W/o JL	With JL	W/o JL
Partner characteristics (if partner present at $t - 2/t - 1$)								
Age (mean)	51.3	51.6	48.4	52.0	52.1	52.2	56.4	52.4
% intermediate education	57.5	57.6	64.4	53.8	47.3	46.5	70.2	43.2
% high education	10.2	10.4	2.2	17.8	32.3	33.1	29.0	38.3
% works part-time	24.8	24.4	31.1	26.7	14.6	20.0	8.3	21.8
% works full-time	36.7	32.5	36.8	25.8	45.1	43.7	27.7	41.7
Avg. work experience (years)	20.0	19.0	10.1	16.3	16.6	16.9	13.6	16.5
N four-year change	385	5116	29	7901	198	2134	18	5131
N six-year change	310	3892	25	5981	162	1789	16	4071

JL = Job Loss. W/o = Without. All time-varying variables measured before job loss at $t - 2/t - 1$. Matching and longitudinal survey weights applied.
 Sources: SOEP, PSID, CNEF, own calculations

matched. For women, this proportion is somewhat higher in both countries. Given the small number of unmatched displaced workers any conclusions concerning their socioeconomic profile are tentative, but it seems that they are more likely to have been single, to have worked part-time and to have been poor/near poor before job loss. It is reassuring that this general pattern is stable across the two countries and across men and women. This suggests that any differences between the Average Treatment Effect for all displaced workers (i.e., including unmatched displaced workers) and the Feasible Average Treatment Effect for matched displaced workers, which is the quantity estimated in this chapter, will be broadly in the same direction.

The lower parts of Tables 8.2 and 8.3 characterize workers with respect to the covariates included in the additional regression-based adjustment after CEM. I distinguish between worker characteristics and couple/partner characteristics. Controlling for the partner's work hours in the predisplacement reference year might be suspect because previous research suggests that anticipation of job displacement may trigger increases in spousal work hours already before its actual occurrence (Stephens 2002). My own analysis of changes in spousal labor supply, however, does not suggest that such anticipation is common in the sample of older workers analyzed here (see Section 8.2.3 below).

Comparing matched displaced and comparison workers with respect to these characteristics reveals that some differences remain after matching, suggesting that there is a certain need for additional regression-based adjustments. At the same time, matching considerably reduces differences between displaced and non-displaced workers for at least some of the variables that were not included in the matching procedure (i.e., differences between matched displaced and matched non-displaced workers are smaller than differences between matched displaced workers and unmatched non-displaced workers). Examples are the proportion of workers with bad health or the partner's level of education. Only very rarely are differences for the matched sample greater than between displaced and non-displaced workers as a whole. Overall, Tables 8.2 and 8.3 thus suggest that CEM as applied here effectively reduces dissimilarities between displaced and non-displaced workers while avoiding massive pruning of treated workers.

8.2.1 Employment patterns after late-career displacement

Figure 8.1 explores the impact of late-career job loss on subsequent employment. I focus on the proportion of workers who are not or only marginally employed (annual average of < 10 hours per week) four and six years after

the predisplacement reference year t_r which, depending on the year of displacement t , is either $t - 2$ or $t - 1$.⁴ For simplicity, I will refer to these two postdisplacement measurements as $t_r + 4$ and $t_r + 6$. I will also refer to workers as ‘not working’ or ‘not employed’ even though the 10-hour threshold is compatible with working a small number of hours.⁵

Results for men are depicted in the upper and results for women in the lower row of Figure 8.1. I use circles to represent results for $t_r + 4$ and triangles to represent results for $t_r + 6$. For both men and women, the left pair of graphs depict the proportion of matched displaced workers who work less than 10 hours per week. I will refer to these results as ‘non-differenced estimates’. The right pair of graphs depict DID matching estimates based on comparisons with a matched control group and additional regression-based adjustments. In each case, I report results based on actual worker composition (black markers) and composition-adjusted results (white markers). Unless explicitly mentioned otherwise, the discussion refers to the unadjusted results.

Looking at men first, a comparison of the non-differenced estimates in Subgraphs I and II shows that German men are much more likely than American men to leave employment after late-career job loss. This difference could simply reflect the fact that German workers retire earlier anyway, but DID estimates in Subgraphs III and IV show that this is not the case. There are clear country differences in the *effect* of job loss on subsequent employment.

In both periods, and both four and six years after the predisplacement reference year, German men who have lost their job are considerably more likely not to be working than similar non-displaced workers. For example, in the first period, the proportion of German men with no/marginal employment is 34 percentage points higher than for similar non-displaced workers at $t_r + 4$. The difference declines somewhat from $t_r + 4$ to $t_r + 6$, but it remains substantial at 29 percentage points. Inspection of non-differenced estimates (Subgraph I) shows that this decline is not due to displaced workers returning to work, but to retirement dynamics among non-displaced workers. DID estimates for American men are strikingly different in that

4 Because the sample is restricted to workers who worked at least 10 hours per week in t_r and because the majority works 30+ hours at this point (cf. Table 8.2 and Table 8.3), persons working less than 10 hours after displacement will usually have reduced their work hours substantially.

5 Results are very similar when I use the retirement indicator from Chapter 6. I report results for work hours in the given postdisplacement year, as they would reveal if a large number of displaced workers returned to working longer hours after an intermittent spell of no/marginal employment. Figure 8.1 suggest that this is not a widespread phenomenon.

Table 8.3 Women – worker and partner characteristics by treatment and matching status

	Matched episodes		Unmatched episodes		United States			
	With JL	W/o JL	With JL	W/o JL	Matched episodes With JL	Matched episodes W/o JL	Unmatched episodes With JL	Unmatched episodes W/o JL
Worker characteristics – matching variables								
Age at job loss (mean)	55.8	55.7	56.4	56.4	56.9	56.9	59.8	57.3
% Eastern Germany	28.1	28.1	45.5	17.2				
% civil servant	0.9	0.9	0.0	6.9				
% migration background/black	15.2	15.2	23.3	16.6	8.0	8.0	29.3	13.3
% intermediate education	67.4	67.4	45.9	48.8	65.0	65.0	47.4	56.2
% high education	5.2	5.2	20.0	24.0	14.8	14.8	14.8	28.4
% living with partner	79.6	79.6	66.4	73.6	70.8	70.8	54.6	65.9
% working full-time	58.8	58.8	38.5	58.6	68.6	68.6	58.4	70.6
% primary sec./manufacturing	36.7	36.7	37.1	19.0	23.5	23.5	44.2	13.7
% private service sector	47.0	47.0	35.1	31.7	64.5	64.5	44.2	49.4
% public sector	16.3	16.3	27.7	49.4	12.0	12.0	11.6	36.9
% poor/near poor	20.9	20.9	61.4	19.3	32.3	32.3	66.3	26.5
Worker characteristics – additional variables								
Avg. work experience (years)	27.8	27.0	28.5	27.7	23.4	23.8	27.0	25.0
Avg. employer tenure (years)	12.3	14.3	11.3	16.0	8.2	10.4	11.0	12.2
% with health problems	15.3	12.7	20.3	15.2	15.7	13.9	20.0	12.1
% middle earnings tercile	34.5	31.7	19.0	36.9	38.7	39.5	28.7	42.3
% top earnings tercile	9.9	16.4	3.6	23.2	11.4	15.0	8.9	21.7

	Matched episodes		Unmatched episodes		United States			
	With JL	W/o JL	With JL	W/o JL	Matched episodes With JL	Matched episodes W/o JL	Unmatched episodes With JL	Unmatched episodes W/o JL
Partner characteristics (if partner present at t - 2/t - 1)								
Age (mean)	56.5	56.1	58.3	56.6	57.4	58.8	62.9	57.7
% intermediate education	76.3	67.9	81.1	61.5	38.0	39.8	40.8	32.5
% high education	13.1	17.0	14.6	25.6	37.9	35.0	17.5	46.5
% works part-time	9.4	8.4	3.4	7.4	10.0	14.5	23.1	12.1
% works full-time	56.8	63.7	35.6	60.6	69.4	64.1	18.8	67.1
Avg. work experience (years)	26.2	26.6	23.1	23.9	23.6	25.5	19.3	22.7
N four-year change	215	1548	40	7229	156	1066	30	6130
N six-year change	176	1083	30	5169	126	863	24	4921

JL = Job Loss. W/o = Without. All time-varying variables measured before job loss at t-2/t-1. Matching and longitudinal survey weights applied.
 Sources: SOEP, PSID, CNEF, own calculations

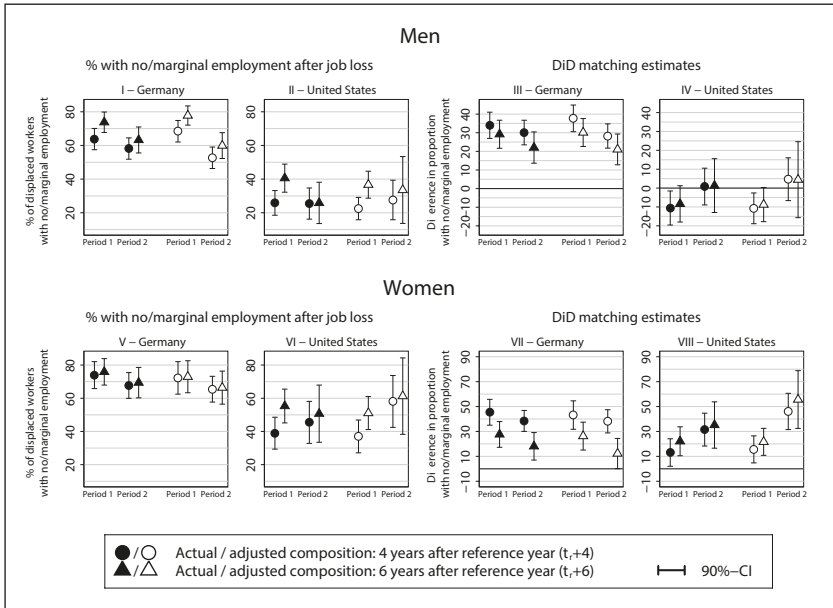
they do not indicate any (!) positive effect of displacement on the likelihood of not being employed. This result holds for both subperiods and for both postdisplacement measurements (i.e., for $t_r + 4$ and $t_r + 6$). These results provide compelling evidence for hypothesis HJL 1 which predicts that German workers are less likely to return to work after losing their job.

Before turning to changes over time within the two countries, I dwell a little longer on the absence of a clear displacement effect for American men, as this result appears to be at odds with previous research on the employment effects of late-career job loss (Chan and Stevens 2001; Johnson and Mommaerts 2011) and its role as a trigger of involuntary early retirement (Lachance and Seligman 2010). It is beyond the scope of the present analysis to fully explore potential explanations for this seeming divergence, but a few points are worth noting. First, the changes analyzed here are relatively long-term compared to the postdisplacement observation window of Johnson and Mommaerts (2011: cf. Figure 3 on p. 35 of the paper). Further analysis of American men (results not shown) indeed reveals the expected effect of displacement on employment two years after the predisplacement reference year, that is, in $t + 0$ or $t + 1$. Second, Johnson and Mommaerts (2011) simply describe the postdisplacement employment trajectories of displaced workers. They do not compare them to the trajectories of non-displaced workers and their estimates should therefore be compared to my non-differenced estimates which do show that a considerable share of displaced workers is not working at the two postdisplacement observations. Chan and Stevens (2001) provide differenced estimates at various points in their paper, yet they do not control for heterogeneity between displaced and non-displaced workers during most of their analysis. The one exception is a hazard rate model presented toward the end of their paper. That model, too, indicates a positive effect of late-career job loss on exit from work. However, it is difficult to compare these estimates to my own results.⁶

As for the relationship between job loss and involuntary retirement, my findings are compatible with job loss triggering involuntary early retirement for some older men if other workers respond by retiring later than

6 Another possible explanation is that Chan and Stevens (2001) model monthly employment rates whereas my outcome measure is based on the total number of hours worked in a given calendar year. In principle, displaced workers could be substantially more likely not to be working in any given month (e.g., because their postdisplacement jobs are unstable), yet mostly meet the threshold of 520 hours (i.e., 10 per week) underlying the measure used here. Further analysis of the work hours variable or the number of weeks worked in a calendar year does not provide strong support for this explanation, however.

Figure 8.1 Proportion of displaced workers with no/marginal employment and differences to matched control group (DID matching estimates)



Period 1 – Year of job loss: 1985–1996 (DE); 1981–1992 (US). Period 2 – Year of job loss: 1997–2007 (DE); 1993–2002 (US).

Sources: SOEP, PSID, CNEF, own calculations

planned (e.g., to compensate for displacement-induced earnings losses). As noted in Chapter 7, some of the results reported in Chan and Stevens (2001) suggest such a pattern and the disaggregated analysis by postdisplacement employment status in Section 8.2.4 below will provide further evidence for this interpretation.

How have men’s postdisplacement employment trajectories changed over time? Hypothesis H_{JL} 5 predicts that older displaced workers in both Germany and the US have become more likely to return to work, as institutional changes made early retirement increasingly unattractive. Looking at non-differenced estimates first (Subgraph I), results for German men indeed suggest a limited trend in this direction: Among German men who suffered job loss between 1985 and 1996 (Period 1), 64% were no longer working a substantial number of hours at $t_r + 4$ and this proportion increased to 74% until $t_r + 6$. The corresponding estimates for German men displaced between 1997 and 2007 are 58% and 64%, respectively. The period difference in the non-employment rate at $t_r + 6$ approaches statistical significance

($p < 0.1$).⁷ Period differences are noticeably larger and reach conventional significance levels ($p < 0.05$) when worker composition is held constant. However, as noted above, the impact of the compositional adjustment must be viewed with caution in this particular case: It is partly attributable to differences in the age composition of displaced workers, which likely is partly endogenous to institutional changes.⁸

These results provide some initial support for HJL 5, which predicts that workers have become more likely to return to work over time. However, the decline in displaced German men's propensity to leave employment is clearly far from enormous. This is underlined by the DID estimates in Subgraph III: Job loss clearly remained an important trigger of early retirement for German men in the later period, that is, in the late 1990s and 2000s. The percentage point difference in non-employment rates between displaced men and comparison workers declined from the first to the second period, from 34 to 30 percentage points in $t_r + 4$ and from 29 to 22 percentage points in $t_r + 6$. These period differences are smaller than for non-differenced estimates, suggesting that trends in the latter estimates partly reflect the broader trend toward later retirement (that is also found among non-displaced comparison workers) rather than a weakening of the impact of late-career job loss (cf. Chapter 3). Unadjusted period differences in the DID estimates also fail to reach statistical significance. As in the non-differenced case, period differences in DID estimates are somewhat larger when the composition of displaced workers is held constant.

Non-differenced estimates for American men in Subgraph II indicate no period differences in the fraction of displaced workers who are out of work in $t_r + 4$, while showing a substantial decline for $t_r + 6$. However, even more than for German men, this period difference appears to reflect changes in broader retirement patterns rather than changes in the impact of late-career displacement: The DID estimates in Subgraph IV do not suggest a weakening impact of job loss (if anything, DID estimates suggest a slight *negative* effect

7 As in Chapter 6, I mainly use 90% confidence intervals based on person-level cluster-robust standard errors to illustrate statistical uncertainty. When I report formal significance tests of period differences, the underlying p-values were obtained using the *suest* command in *Stata 12* (with the *vce(cluster)* option).

8 On average, German workers were older at the time of displacement in the second period, which would presumably have resulted in more workers leaving employment after job loss if other things had remained equal (cf. Table 8.A.1 in the appendix to this chapter). The impact of the compositional adjustments is weaker for the DID results in Subgraph III, where differences in the age structure are partly already accounted for by the comparison with a control group.

of late-career job loss on non-employment rates for the early period, whereas estimates for the late period are essentially zero).

Subgraphs V to VIII depict results for German and American women. Again, country differences in non-differenced estimates are in the expected direction: German women are more likely than their American counterparts to leave employment after late-career job loss (Subgraphs V and VI). Country differences are less clear for the DID estimates in Subgraphs VII and VIII, implying that retirement trends among comparison workers differ considerably across the two countries. While DID estimates for the first period are consistent with the expectation of stronger employment effects in Germany, at least in $t_r + 4$, estimated employment effects for the second period are broadly similar across the two countries.

This complex pattern of results is related to country differences in changes over time. As with German men, period differences for German women are in the direction predicted by HJL 5, which expects declining exit rates after job loss. This holds for non-differenced and DID estimates, but the period differences are modest in size and statistically insignificant. For American women, non-differenced estimates are similar across the two periods, whereas DID results seem to suggest a *stronger* exit-accelerating effect of late-career job loss in the second period. The lack of a clear trend in the non-differenced estimates implies that this is due to later retirement of comparison workers in the second period. Period differences in adjusted estimates show an even stronger increase, suggesting that this trend was mitigated (rather than driven) by compositional changes. Given the small number of cases, this apparent trend should not be overinterpreted, however.

In sum, this analysis of employment/retirement trajectories after late-career job loss has shown that German men are much more likely than American men to leave employment after a late-career job loss. Averaging (unadjusted) estimates across the two periods and across the two postdisplacement observations, 65% of German men were not or only marginally employed after late-career job loss, compared to only 29% of American men. The difference is perhaps even more striking when displaced workers are compared to observationally similar non-displaced workers via DID matching. Averaging estimates as before, the non-employment rate of displaced German men is 29 percentage points higher than in the comparison group, whereas the difference for American men even is slightly negative, at -4 percentage points. Country differences for women are somewhat less clear, especially when displaced women are compared to a matched control group, but overall hypothesis HJL 1 – which predicts that German workers are more

likely to leave employment after late-career job loss – is well-supported by the above findings.

Support is weaker for hypothesis HJL 5 which predicts that over time workers in both countries have become less likely to leave employment. Overall, HJL 5 receives more support for German workers: For both men and women, non-differenced and DID estimates are in the expected direction. However, DID estimates in particular are far from reaching conventional significance levels, and job loss clearly continued to have a strong positive effect on the non-employment rates of German workers during the second half of the observation period. In the case of American workers, there is no clear support for HJL 5. For both men and women, trends in DID estimates even are in the opposite direction than predicted HJL 5. However, not only are these period differences quite small relative to their level of uncertainty, it also bears repeating that for American men no positive effect of job loss on non-employment rates can be found in either period.

With these findings in mind, I now turn to the main questions of this chapter: How do the financial consequences of late-career displacement differ between Germany and the US, how have they changed over time, and to what extent can changing welfare state provisions account for these differences?

8.2.2 Financial consequences of late-career displacement

Figures 8.2, 8.3, 8.4, and 8.5 present the main results concerning income changes around late-career job loss. Figures 8.2 and 8.3 depict non-differenced and DID matching estimates of average relative income changes for men and women, respectively. I report changes for displaced workers' own labor earnings and for needs-adjusted household pre- and post-government income. To facilitate comparisons across countries and between non-differenced and differenced estimates, all graphs pertaining to a given income type share the same scale. However, scales vary across the different income types, which must be taken into account when comparing, say, losses before and after taxes and transfers. Figure 8.4 examines the incidence of poverty entries among workers who were not poor in the predisplacement reference year and Figure 8.5 depicts the proportion of workers with very large income losses of more than 50% after taxes and transfers. Again, I use black markers to represent results based on actual worker composition and white markers to represent composition-adjusted estimates. As before, I will focus on unadjusted results and only discuss composition-adjusted findings when they differ meaningfully from the former.

Relative income changes

How do individual earnings and household income change when a man loses his job? In discussing the relevant results in Figure 8.2, I will concentrate on German-American differences first and then turn to within-country trends later on.

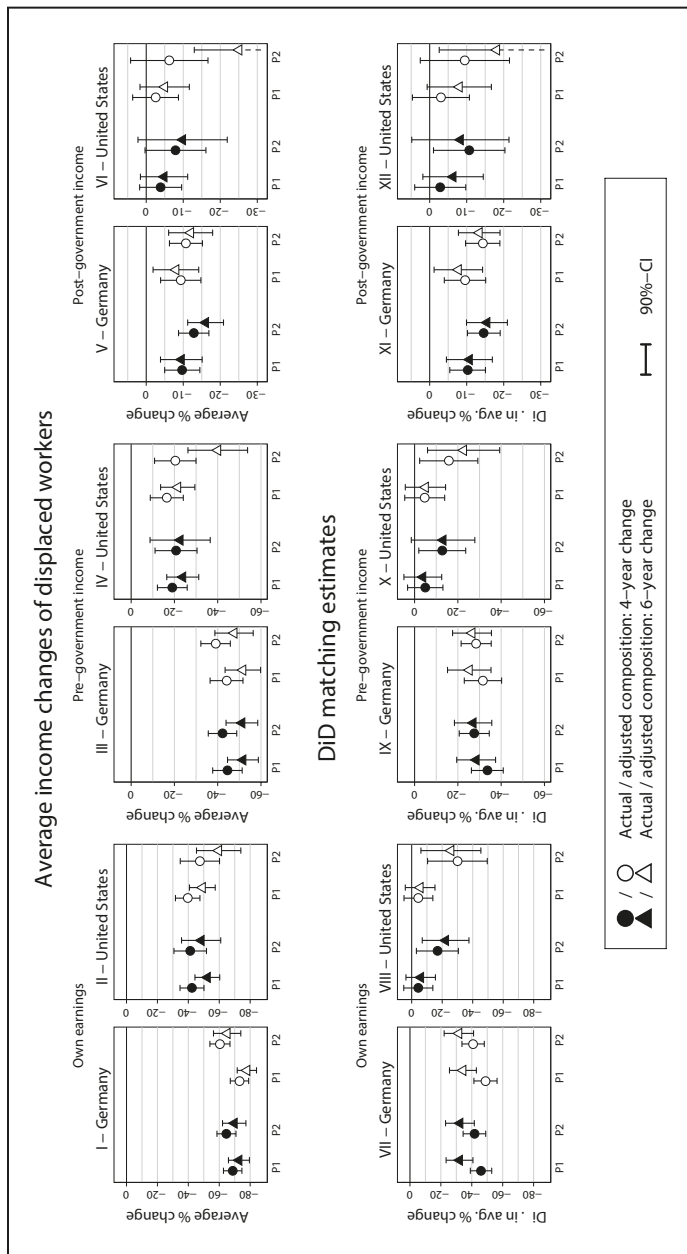
Non-differenced results in Subgraphs I and II show that, compared to predisplacement levels, German and American men had considerably lower earnings in the years following job loss. For example, in period 1, the average 4-year change in earnings was -69% for German men and -42% for American men, that is, German (American) men's earnings in $t + 2/t + 3$ were on average 69% (42%) lower than four years earlier (with t denoting the year of job loss).

The corresponding DID estimates in Subgraphs VII and VIII show that a good portion of this decline can be attributed to the impact of job loss, at least in Germany: Again focusing on estimated 4-year changes in period 1, the average decline in labor income among displaced German men is 46 percentage points larger than for matched non-displaced workers. In stark contrast, American men's losses are only 4 percentage points larger than for the comparison group and the difference between matched displaced and non-displaced workers is not statistically significant. Importantly, however, DID estimates for American men indicate larger and statistically significant losses for the later period. Non-differenced estimates in Subgraph II are very similar across the two periods, implying that the period difference in DID estimates reflects more positive earnings trends among comparison workers in the second period. One likely explanation for this finding is the trend towards later retirement in the comparison group. In addition, these results may also reflect the growing contribution of foregone earnings increases (as opposed to earnings declines) to the overall impact of job loss that was found by Farber (2005) for workers aged 20 to 64.

The much larger earnings losses of German men are consistent with the stronger employment effects reported above. However, despite the absence of clear employment effects in Figure 8.1, DID estimates also indicate substantial earnings losses for American men, at least during the second half of the observation period. Lower postdisplacement wages, foregone earnings increases, shorter working hours, and/or declines in job stability result in earnings losses for displaced older American men and these losses persist at least until 6 years after the predisplacement reference year, that is, until 4 or 5 years after job loss.

Subgraphs III and IV depict changes in displaced workers' needs-adjusted pre-government income. Pre-government income clearly declines less

Figure 8.2 Men – income changes around late-career job loss and differences to matched control group (did matching estimates)



P1 = Period 1 (Year of job loss: 1985-1996 (DE); 1981-1992 (US)), P2 = Period 2 (Year of job loss: 1997-2007 (DE); 1993-2002 (US)). Dashed branches of confidence interval shortened for better displayability.

Sources: SOEP, PSID, CNEF, own calculations

sharply than displaced workers' own earnings, attesting to the insurance effect of income pooling within the household and of other private income sources such as complementary pensions. Consistent with their much larger earnings losses and probably also due to more limited access to private non-labor income and spousal earnings, German men experience much larger declines in pre-government income. These country differences are also clearly visible in the corresponding DID estimates in Subgraphs IX and X.

Finally, the rightmost graphs in Figure 8.2 depict average changes in needs-adjusted disposable income. Non-differenced and DID estimates are mostly quite similar, implying that relative changes in disposable income follow no strong trends in the comparison groups. Both sets of estimates suggest that German men experience somewhat larger losses relative to predisplacement disposable income. This holds for both non-differenced and differenced estimates and for both periods and postdisplacement observations. In general, the losses of German men are larger by 4 to 8 percentage points. For example, averaging DID results for $t_r + 4$ and $t_r + 6$, average relative losses for displaced German men are estimated at -10.5% for the first and at -15.0% for the second period. The corresponding averages for American men are -4.6% and -9.5%, respectively.

Overall, results in Figure 8.2 are an important first piece of evidence for hypothesis HJL 2, which predicts that German workers are more likely to rely on public transfers after job loss, while American workers are more likely to rely on their own earnings. Further support for HJL 2 comes from Table 8.4. The first row of the Table reports the proportion of displaced workers whose postdisplacement earnings are at least 10% lower than in the predisplacement reference year. Subsequent rows then give (a) the proportion of workers with earnings losses of more than 10% whose losses are at least partly offset by increases in other types of income and (b) the corresponding average and median replacement rates. As in the corresponding Table in Chapter 6 (Table 6.4), I pooled 4- and 6-year changes and only counted gains in a given income component if they exceeded 5% (in terms of the level of that income component in the predisplacement reference year). All results in Table 8.4 are non-differenced, that is, they represent changes in the different income components among displaced workers and do not involve comparisons with matched non-displaced workers.

Table 8.4 clearly documents that American men rely more on their own earnings and on private non-labor income after late-career job loss, whereas Germans have a larger portion of earnings losses offset by public transfers. Cushioning through a declining tax burden also seems to be more important

for German men, which is plausible given that American men draw a larger share of their postdisplacement income from earnings which tend to be taxed at higher rates than public transfer income.

Table 8.4 Changes in income components around late-career job loss

	Men				Women			
	Germany		us		Germany		us	
	85-96	97-07	81-92	93-02	85-96	97-07	81-92	93-02
% with ind. earnings loss (IEL)	85	86	77	67	84	86	75	64
Change in private non-labor income (PNLI)								
% with increased PNLI given IEL	53	35	60	69	37	48	49	63
Average replacement rate	12	10	36	40	14	17	72	81
Median replacement rate	4	3	21	23	5	6	40	54
Change in public pension & transfer income (PPTI)								
% with increased PT given EL	92	82	59	50	81	78	56	54
Average replacement rate	49	50	54	35	77	73	81	(50)
Median replacement rate	42	42	40	29	56	51	54	(34)
Change in household taxes (HHT)								
% with decreased HHT given IEL	91	95	92	94	87	89	79	72
Average replacement rate	42	52	35	38	61	58	66	44
Median replacement rate	35	44	29	29	38	41	36	31

Replacement rates are expressed in percentage terms and calculated as the increase in PNLI/PPTI or decrease in HHT divided by the absolute value of the decline in individual labor earnings. Replacement rates capped at +200% Average and median replacement rates calculated over observations with positive replacement rates (i.e., over observations with an increase in the given income component). Estimates in parentheses based on fewer than 30 observations.

Sources: SOEP, PSID, CNEF, OWN calculations

Some previous studies (e.g., Goodin et al. 1999; DiPrete and McManus 2000; Ehlert 2012) have compared average relative income losses before and after taxes and transfers to construct alternative measures of the overall extent of ‘welfare state buffering’ through public taxes and transfers. In addition, Ehlert (2012) proposes to treat the difference between changes in displaced workers’ own earnings and changes in needs-adjusted household pre-government income as a measure of ‘family buffering’. Relative changes in household pre-government or market income will typically be smaller than changes in worker’s own earnings because of the stabilizing effect of other household members’ earnings and private non-labor income, including private pension income. The difference between earnings losses and

pre-government losses thus partly reflects the ‘insurance function’ of the household (cf. Chapter 2) of other household members’ incomes. However, especially when dealing with older workers, it is important to acknowledge that pre-government income also includes more individualized forms of private insurance, for example, from complementary pension plans. As discussed in Chapter 7, I will therefore use the label ‘private income buffer’ instead of ‘family buffer’.

Table 8.5 Income buffering through private income and the welfare state

	Non-differenced estimates		DID estimates	
	Period 1	Period 2	Period 1	Period 2
Men, Germany				
Private income buffer	23 (37)	20 (39)	8 (28)	10 (44)
Welfare state buffer	38 (63)	32 (61)	21 (72)	12 (56)
Men, United States				
Private income buffer	26 (60)	23 (64)	1 (120)	7 (68)
Welfare state buffer	17 (40)	13 (36)	-0 (-20)	3 (32)
Women, Germany				
Private income buffer	20 (35)	20 (35)	16 (55)	15 (48)
Welfare state buffer	37 (65)	38 (65)	13 (45)	16 (52)
Women, United States				
Private income buffer	33 (72)	35 (72)	19 (94)	25 (92)
Welfare state buffer	13 (28)	14 (28)	1 (6)	2 (8)

Private income buffer (PIB) is the percentage point difference between the average change in displaced workers’ own earnings and the average change in needs-adjusted household pre-government income. Welfare state buffer (WSB) is the percentage point difference between average changes in household needs-adjusted pre-government income and needs-adjusted post-government income. Figures in parentheses represent the relative contributions of PIB and WSB to total buffering, i.e., PIB/(PIB + WSB) and WSB/(PIB + WSB). See text and note 10 for further details. Sources: SOEP, PSID, CNEF, own calculations

Table 8.5 presents two simple measures of private income and welfare state buffering that are based on comparing average relative changes in individual earnings, pre-government, and post-government income. The non-parenthesized measures are simply the percentage point differences between average changes in individual earnings and needs-adjusted household pre-government income (‘private income buffer’; PIB) and between needs-adjusted household pre-government and post-government income (‘welfare state buffer’; WSB). The parenthesized measures are constructed using Ehlert’s (2012) approach. They standardize the non-parenthesized measures by dividing through the combined buffering effect of family and

welfare state buffering.⁹ I present estimates based on non-differenced and DID matching estimates of income changes. For simplicity, I again report average buffering effects for four-year and six-year changes.

Results for men in the upper part of Table 8.5 confirm that private income buffering is more important for American men, while welfare state buffering plays a larger role in Germany. This is especially clear when considering the relative contribution of the family and the state to total buffering, as captured by the standardized estimates in parentheses. These findings are consistent with previous studies of prime-age workers (DiPrete and McManus 2000; Ehlert 2012) and support hypothesis HJL 3 which predicts that private income buffering is more important for older Americans.

How have the economic consequences of late-career job loss changed over time? Have the diffusion of DC-type pensions, growing penalties for early take-up of public retirement benefits, and the retrenchment of (long-term) unemployment and disability benefits exacerbated the financial consequences of late-career job loss, above and beyond the broader trends in retirement income dynamics documented in Chapter 6? For brevity's sake, I focus on findings for post-government or disposable income, which is of primary interest because of its direct relevance to workers' economic well-being. I only selectively discuss findings for the other income variables to better understand the underlying processes.

On the whole, results for German men suggest that the economic consequences of late-career job loss have worsened somewhat over the course of the observation period, as predicted by hypothesis HJL 7. According to DID matching estimates for the first period, the 'displacement effect' was in the neighborhood of 10% both 4 and 6 years after the predisplacement reference year. In other words, on average, 4- and 6-year changes in disposable income, expressed in terms of income in the predisplacement reference year, were smaller by approximately 10 percentage points for displaced German men than for similar non-displaced workers. The corresponding estimates for the second half of the observation period are close to 15 percentage points. Non-differenced estimates are very similar.

9 More formally, let δ_{oe} , δ_{pre} , and δ_{post} denote non-differenced or DID estimates of, respectively, average percentage changes in workers' own earnings, pre-government, and post-government income. The unstandardized measures of the private income buffer (PIB) and the welfare state buffer (WSB) are then simply $PIB = \delta_{oe} - \delta_{pre}$ and $WSB = \delta_{pre} - \delta_{post}$. Ehlert's (2012) standardized versions (reported in parentheses in Table 8.5) are $PIB_s = \frac{\delta_{oe} - \delta_{pre}}{\delta_{oe} - \delta_{post}} = \frac{PIB}{PIB + WSB}$ and

$$B_s = \frac{\delta_{pre} - \delta_{post}}{\delta_{oe} - \delta_{post}} = \frac{WSB}{PIB + WSB}$$

Can these changes be attributed to a decline of public income support, as suggested by Hypothesis HJL 6? Overall, estimated replacement rates in Table 8.4 and buffering measures in Table 8.5 indeed suggest that public financial support for displaced older men in Germany has decreased, though changes mostly appear relatively modest: More specifically, Table 8.4 shows that the share of men whose earnings losses were cushioned by growing public pension and transfer income fell noticeably, from 92% to 82%, from the first to the second period. However, replacement rates for those seeing some increase in public transfers remained more or less constant. The income-stabilizing effect of progressive household taxation even appears to have grown somewhat over time. The increasing role of taxes as opposed to public transfers in buffering earnings losses is consistent with more German men returning to work (at lower earnings than on their prior job) rather than leaving work in the later period. The alternative indicators in Table 8.5 likewise suggest a limited decline of welfare state buffering for German men. For example, according to non-differenced estimates, welfare state taxes and transfers reduced relative income losses of displaced German men by 38 percentage points on average in the first period, compared to a reduction of only 32 percentage points in the second period. On the whole, these results seem to indicate a weakening, but by no means a massive erosion, of public income support for displaced older workers.

How have the income trajectories of displaced American men changed over time? Non-differenced estimates in Subgraph VI of Figure 8.2 suggest that job loss was associated with larger declines in disposable income in the second period. At least for $t_r + 4$ such a trend is also visible in the DID estimates (Subgraph XII). However, due to smaller sample sizes (and perhaps also because of more heterogeneous income trajectories), estimates are even more uncertain than in the German case, and period differences are therefore nowhere near statistical significance. In fact most of the period-specific estimates of income losses are not even significantly different from zero, as is evident from the 90% confidence bands crossing the zero line.

That said, there is some evidence for a decline of welfare state buffering. First, non-differenced estimates in Subgraph VI of Figure 8.2 indicate growing losses after taxes and transfers, while relative changes in earnings and pre-government income are quite similar across the two periods (Subgraph IV). Estimated public transfer replacement rates in Table 8.4 likewise suggest that the importance of public income support for maintaining income after late-career job loss has declined: The share of American men whose earnings losses were mitigated by increasing public transfers was lower in the second period, as were replacement rates conditional on experiencing a

transfer gain. If constructed on the basis of non-differenced estimates, the alternative indicators of welfare state buffering in Table 8.5 also suggest a decline of welfare state buffering. The DID-based versions of these indicators do not carry much meaningful information in this case, because DID estimates of earnings and pre-government losses for the first period were very small to begin with.

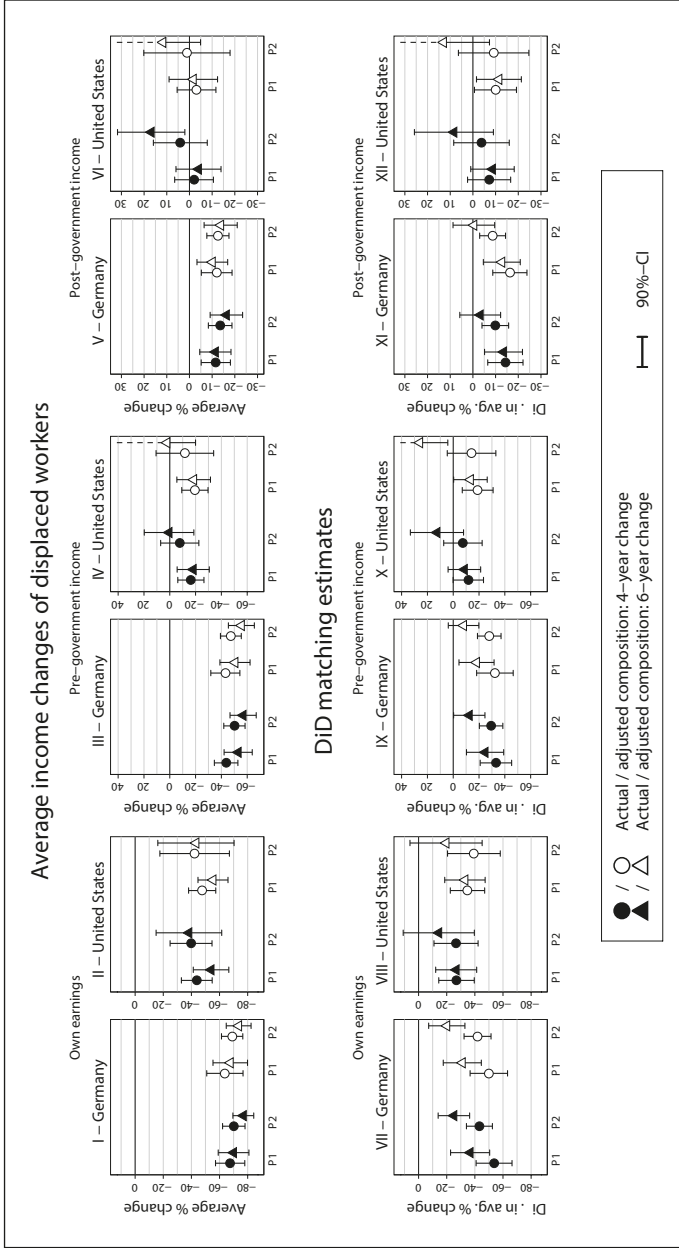
In Figure 8.3, I turn to income changes around women's job loss. As with men, American women experience substantially smaller declines in labor earnings and household pre-government income than their German counterparts (Subgraphs I to IV). In fact, pre-government losses for American women are very small (and generally statistically insignificant) in the later period. This illustrates that, due to men's higher personal income, private income buffering is more important for women than for men. This result, which again resembles findings for prime-age workers (e.g., DiPrete and McManus 2000; Ehlert 2012), is underscored by the buffering measures in Table 8.5 which show that private income buffering is more important for women than for men, especially in the United States. Non-differenced estimates of changes in post-government income show substantial and statistically significant income losses for German women (Subgraph V). Subgraph VI contains no clear evidence that job loss is associated with declines in disposable income for American women.¹⁰ Due to the very limited number of displacement events for American women, these estimates are very uncertain, however.

Turning to DID estimates in Subgraphs VII – XII in Figure 8.3, declines in earnings and pre-government income are generally attenuated relative to the non-differenced estimates, especially for German women. This is similar to the findings for men and presumably attributable to voluntary retirement leading to declines in earnings and pre-government income among comparison workers. The effect of the DID comparison on changes in post-government is more ambiguous. Overall, however, German-American differences are qualitatively similar to those found for non-differenced estimates, that is, losses are smaller for American than for German women (estimates for American women in Period 2 are even suggestive of income gains, especially for six-year changes).

Turning to trends over time and again concentrating on changes in disposable income, there is little to suggest that the impact of women's late-career job loss has become dramatically more severe. As in the case

10 Estimated median (rather than average) changes are very similar, suggesting that this result is not attributable to outliers (results not shown).

Figure 8.3 Women – income changes around late-career job loss and differences to matched control group (DID matching estimates)



P1 = Period 1 (Year of job loss: 1985-1996 (DE); 1981-1992 (US)), P2 = Period 2 (Year of job loss: 1997-2007 (DE), 1993-2002 (US)). Dashed branches of confidence intervals shortened for better displayability.

Sources: SOEP, PSID, CNEF, own calculations

of German men, German women's job loss was associated with somewhat larger declines of disposable income in the later period, but period differences are miles away from statistical significance (Subgraph V). Moreover, and in contrast to German men, this trend is not robust to the application of the DID comparison: The slight negative trend vanishes altogether when displaced women's income trajectories are compared to those of matched comparison workers, in fact, it is reversed. Changes in displaced women's own earnings and pre-government income follow no strong trend, either. This suggests that the level of public income support has not declined dramatically so far, an interpretation that is also supported by direct measures of buffering through public transfers and taxes in Tables 8.4 and 8.5.

For American women, there is no evidence whatsoever that the impact of job loss on disposable income has become more severe. In fact, neither non-differenced (Subgraph VI) nor DID estimates (Subgraph XII) suggest a clear negative effect of job loss on disposable income in either period and, if anything, income trajectories even appear somewhat more favorable in the later period.

Trends for women thus look more benign than for men in both countries. This corresponds to the patterns found for income trajectories around voluntary exit from work in Chapter 6. Unlike for voluntary retirement, however, comparisons of composition-adjusted and unadjusted estimates do not suggest that compositional changes with respect to the characteristics included in the entropy balancing procedure (cf. Table 8.1 above) are a major source of these divergent trends. In particular, there is little evidence that increases in women's work experience have been an important factor.¹¹ There is, however, some evidence that, as in the case of voluntary retirement, American women's improved coverage by complementary pension plans is a factor behind the positive trend found for this group (cf. results for private non-labor income replacement rates in Table 8.4).

Poverty entries

I now examine the risk of entering poverty after late-career job loss for workers who were not poor in the predisplacement reference year. As throughout this study, I define poverty as relative income poverty with a poverty threshold equal to 60% of median needs-adjusted disposable income for the adult population.

11 Table 8.A.2 in the appendix to this chapter in fact shows that average prior work experience has only risen for American, but not for German women suffering late-career job loss.

It is well-known that job loss is concentrated among vulnerable groups (less-educated workers, minorities, low-income workers; see, for example, Farber [1997]) and Tables 8.2 and 8.3 confirm that this also applies to the present sample of older workers. These groups may be quite likely to enter poverty upon losing their job. In addition, even a limited trend toward greater relative income losses (as was found for men in both countries) may make a huge difference for these workers, suggesting that the analysis of poverty dynamics may contribute to a more nuanced picture of changes over time.

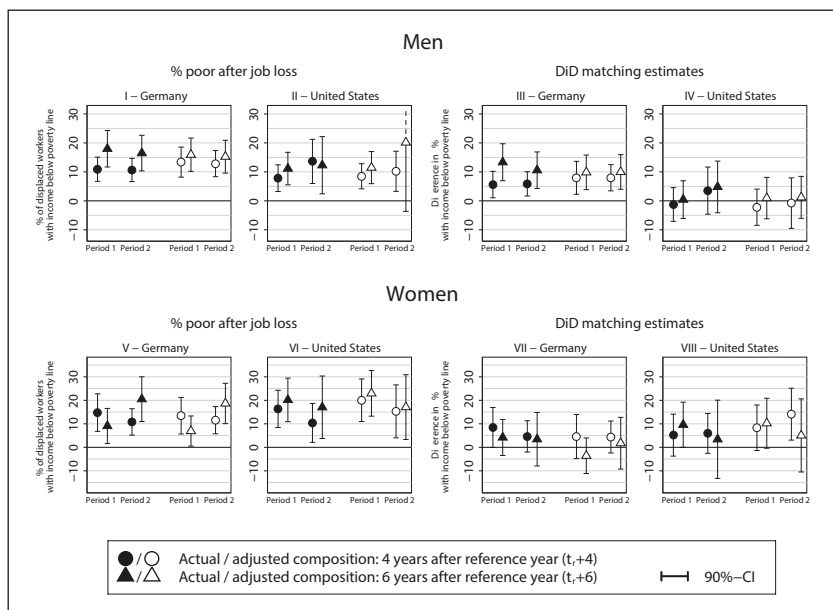
Results of the poverty analysis are displayed in Figure 8.4. I only show results for post-government income, as results for pre-government income contain very little novel information. Estimates for men in the upper row show that broadly similar proportions of men enter poverty in the US and Germany (Subgraphs I/II). However, DID estimates in Subgraphs III and IV imply that late-career job loss has a clear poverty-triggering effect only in Germany. American matched comparison workers are almost as likely to enter poverty (for reasons other than job loss) as their displaced counterparts. For both countries, comparisons across the two periods do not provide clear evidence that the risk of entering poverty after job loss has risen over time. Point estimates for American men do suggest a slight increase that is, however, very small relative to estimation uncertainty.

These findings are by and large consistent with the analysis of relative income changes, while also adding some interesting details: As in the analysis of relative income changes, the economic consequences of job loss appear to be somewhat more severe for German men, especially if the trajectories of displaced workers are compared to similar non-displaced men. Concerning trends over time, the limited trend toward larger relative income losses found for German men does not (yet?) seem to have led to more workers entering poverty after late-career job loss, a pattern that resembles findings for income dynamics around voluntary retirement in Chapter 6. Apparently, increases in relative income losses have been concentrated among workers whose predisplacement incomes are far enough away from the poverty line.¹²

Estimates for women in Subgraphs V to VIII likewise do not lead to fundamentally different conclusions from earlier results. Non-differenced estimates in Subgraphs V and VI show that a non-negligible number of

12 An exploratory analysis of relative income changes by income quintile in the predisplacement reference year indeed suggests that relative losses increased most strongly for workers in the fourth (i.e., second-highest) income quintile.

Figure 8.4 Poverty entries after late-career job loss and differences to matched control group (DiD matching estimates)



Period 1 – Year of job loss: 1985-1996 (DE); 1981-1992 (US). Period 2 – Year of job loss: 1997-2007 (DE); 1993-2002 (US).

Sources: SOEP, PSID, CNEF, OWN calculations

women enter poverty after job loss, yet DID estimates in Subgraphs VII and VIII suggest that many of these entries may not be directly attributable to job loss. When taking the uncertainty of estimates into account, no clear trends can be identified for either country.

Large income losses

Figure 8.5 examines the risk of suffering very large income losses of more than 50% after taxes and transfers. Findings for women in Subgraphs V-VIII are qualitatively similar to those for relative income changes and poverty entries and in the interest of brevity I will therefore concentrate on results for men. Here, changes over time are more noteworthy than country differences: For both countries, non-differenced as well as DID estimates suggest that the risk of suffering large income losses around late-career job loss has grown over time. Formal tests show that period differences do not quite reach conventional significance levels. However, when estimates for $t_r + 4$ and $t_r + 6$ are pooled (with standard errors again clustered on the

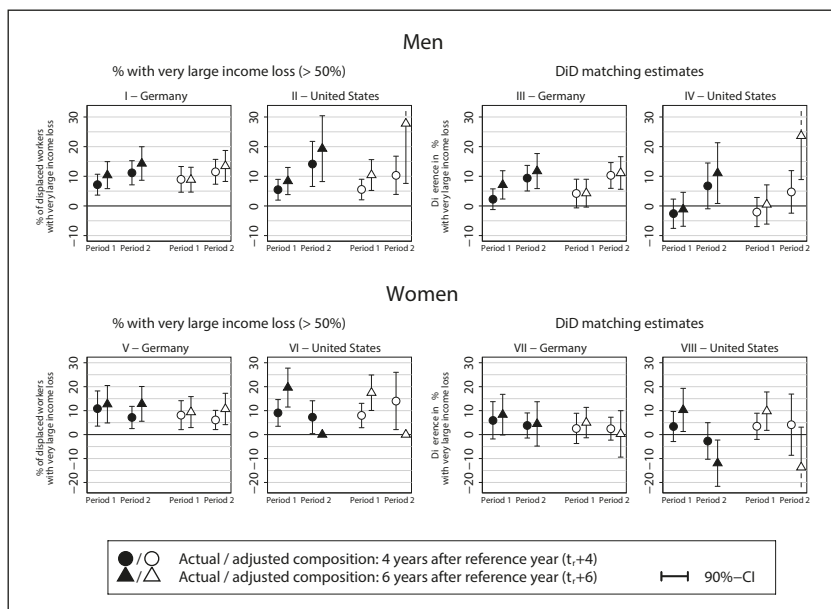
person level), period differences in DID matching estimates are significant at the 10%-level for men from both countries.

For men, within-country trends in the share of workers with very large income losses are thus clearer than for average changes in disposable income or poverty entries: A growing number of men experience substantial declines in economic well-being around late-career job loss. These trends are reminiscent of findings in Chapter 6, where I found that men's voluntary retirement is increasingly associated with large income losses, particularly in the US. In fact, it seems quite likely that these parallel developments partly have the same institutional sources, among them the decline in public pension replacement rates, growing penalties for early take-up of public benefits (especially in German), and the growing prevalence of DC-type pension plans in the US. At the same time, many of these changes have likely had a disproportionate impact on displaced older workers, as they entailed disproportionate increases in the costs of *early* retirement (see Chapters 2, 3, and 7).

Given that broadly similar trends are identifiable for voluntary retirees, it is important to note that the *trend* toward a growing prevalence of large losses is not attenuated when displaced workers are compared to similar non-displaced workers via DID matching. In other words, these findings suggest that at least for some men (and their household members) the consequences of late-career job loss have become more severe, above and beyond broader trends toward more precarious income trajectories at the transition from work to retirement. Given the findings of Chapter 6, it is likely that a growing proportion of comparison workers will experience a large income drop when they eventually retire, particularly in the US. In other words, the upward trend in the DID estimates might be weaker for (even) longer-term changes than I analyze here. Yet, even if the situation of displaced and non-displaced older men might converge in the longer term, there is no such trend until $t_r + 6$, that is, until 4 or 5 years after job loss, which implies a substantial loss of lifetime income.

This finding that American men have become more likely to experience large income losses after late-career job loss echoes results by Gosselin and Zimmerman (2008), who find that among Americans aged 25 to 64 unemployment of the household head has increasingly been associated with large income losses. Importantly, Gosselin and Zimmermann (2008) only present non-differenced estimates. Within the confined focus on older workers, my results are thus an important piece of evidence that this trend really reflects a growing negative effect of job loss rather than a more general trend toward increased income volatility.

Figure 8.5 Proportion of workers with very large income losses (> 50%) after late-career job loss and differences to matched control group (DID matching estimates)



Period 1 – Year of job loss: 1985–1996 (DE); 1981–1992 (US). Period 2 – Year of job loss: 1997–2007 (DE); 1993–2002 (US).

Sources: SOEP, PSID, CNEF, own calculations

The analysis so far has generated several insights, with results being clearer for men than for women. German men are much more likely than their American counterparts to leave employment after late-career job loss, both in absolute terms and in comparison to similar non-displaced workers (HJL 1). These differences in employment patterns translate into marked differences in the composition of household income after late-career job loss. German men and their families rely more on income from public sources, whereas own earnings from reemployment as well as private income buffering through private non-labor income and spousal earnings play a greater role for their American counterparts (HJL 2 & HJL 3). German-American differences in the decline of disposable income relative to predisplacement levels are quite small, however, with point estimates suggesting that the average decline for German men was larger by about five percentage points. In addition, DID estimates also suggest a stronger poverty-triggering effect of displacement for German men. These country differences are certainly not negligible, but they are also not large, given that German men consistently

were much less likely than their American counterparts to return to work. In this sense, the results confirm that Germany sustained quite generous ‘welfare-sustaining employment exit policies’ (DiPrete et al. 1997: 328) throughout the observation period.

Have the consequences of late-career job loss become more severe over time? And to what extent can such trends be attributed to an erosion of public income support and other forms of collective insurance, for example, via employer-provided pensions? Results for women show no clear trends, with parts of the analysis even suggesting a trend toward smaller losses for American women. Even though the tight sample size restrictions certainly are partly responsible for these ambiguous results, the lack of clear and consistent trends in point estimates is noteworthy.

The analysis of income trajectories around men’s job loss yielded some clearer findings. For both countries, but more so for Germany, results suggest a limited trend toward greater relative income losses. In addition, there is relatively clear evidence that in both countries job loss was more frequently associated with very large income losses of over 50% in the second half of the observation period. For men, hypothesis HJL 7, which suggests that the economic consequences of late-career job loss have become more severe, is thus reasonably well-supported by the data. More direct measures of welfare state buffering also suggest that a decline of public income support indeed contributed to this trend in both countries, though changes are clearly not dramatic (HJL 6). However, these trends do not (yet?) seem to have resulted in more men entering poverty after late-career job loss.

In the remaining parts of the chapter, I extend the analysis in two main ways. I first take a closer look at the importance of ‘family buffering’ by exploring changes in spousal labor supply for displaced workers living with a partner. In a final step, I will then differentiate displaced men with respect to their postdisplacement employment trajectories (for women further disaggregation is not feasible due to small sample sizes). In particular, I will distinguish ‘involuntary retirees’ who do not return to work from ‘returners’ who do.

8.2.3 Changes in spousal labor supply

To better understand the role of the family in buffering income losses, I now explore the impact of late-career job loss on spousal labor supply, retirement, and earnings. For obvious reasons, I restrict this part of the analysis to respondents living with a partner. I also exclude couples that dissolved due to separation or death between $t - 4/t - 3$ and $t + 4/t + 5$.

In keeping with the unbalanced panel design employed throughout this study, couples that left the study for other reasons (e.g., due to attrition or reaching the end of the observation period) are included in the sample. Going back to $t - 4/t - 3$ enables me to investigate anticipation effects, that is, changes in spousal labor supply prior to the occurrence of job loss (Stephens 2002). I find no consistent evidence of such anticipation, which suggests that choosing $t - 2/t - 1$ as the reference years for the analysis of income mobility is not a problem.

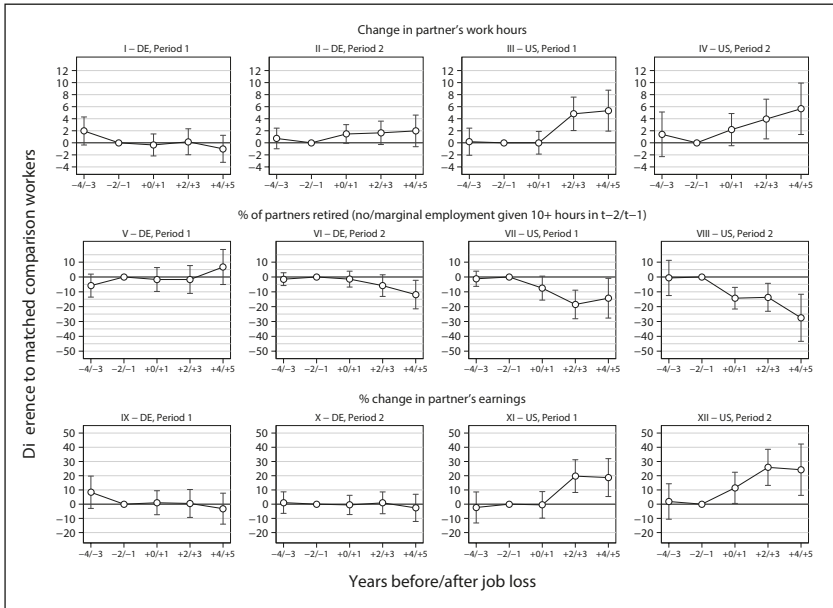
Figure 8.6 explores changes in women's labor supply and earnings around men's late-career job loss.¹³ I only present results based on actual worker composition and I only show DID matching estimates (with additional regression-based adjustments), that is, I try to answer the following question:¹⁴ Do changes in spousal labor supply and earnings differ between displaced and observationally similar non-displaced workers? I examine three outcome variables: the absolute change in the partner's weekly work hours, the proportion of partners with no/marginal employment, and the percentage change in the partner's earnings. All changes are computed relative to $t - 2/t - 1$. When looking at the proportion of partners with no/marginal employment, I only consider workers whose partner worked 10 hours or more in $t - 2/t - 1$. This outcome variable therefore essentially captures differences in spousal retirement behavior, with retirement again being defined in terms of leaving or at least substantially reducing one's hours of paid work.

On the whole, Figure 8.6 suggests that men's late-career job loss has sizable added-worker-type effects on spousal labor supply in the United States. Evidence for an AWE is considerably weaker in the German case, though there are hints of an AWE emerging in the later period. This pattern is consistent with Hypothesis HJL 4 which expects the AWE to be stronger in the US. More specifically, results for the first period in Germany (Subgraphs I, V, and IX) indicate that changes in spousal labor supply and earnings were very similar for displaced and non-displaced workers. DID estimates for the second period (Subgraphs II, VI, and X) are suggestive of a small AWE, with the 'wives' of displaced men working about two additional hours per week compared to those of non-displaced men (Subgraph II). There is also some evidence that the share of men with 'retired' wives who no

13 The German sample includes a few same-sex couples. For simplicity, I nevertheless refer to the partners of men as 'women' or 'wives' and to the partners of women as 'men' or 'husbands'.

14 In non-differenced estimates, potential added worker effects would be dominated by reductions in labor supply associated with retirement dynamics among spouses.

Figure 8.6 DID matching estimates of changes in partner’s labor supply and earnings around men’s job loss



Period 1 – Year of job loss: 1985–1996 (DE); 1981–1992 (US). Period 2 – Year of job loss: 1997–2007 (DE); 1993–2002 (US).

Sources: SOEP, PSID, CNEF, own calculations

longer worked a substantial number of hours was lower in the treatment group (Subgraph VI). However, not only is the magnitude of these effects relatively small, even though they mostly approach or even reach statistical significance at the 10% level. There is also no evidence that men’s job loss had an effect on changes in spousal earnings relative to the predisplacement reference year (Subgraph X).

As noted above, there is considerable evidence for a sizable and persistent AWE in the case of American men’s job loss. In both periods, the ‘wives’ of displaced American men worked substantially longer hours and were less likely to leave employment than the partners of similar non-displaced workers. Graphs in the bottom row show that these different employment/retirement trajectories also translate into the ‘wives’ of displaced men having higher earnings relative to the predisplacement reference year (i.e., $t - 2/t - 1$). Effects are larger for $t + 2/t + 3$ and $t + 4/t + 5$ than immediately following displacement (i.e., in $t + 0/t + 1$). This is because the AWE often takes the form of delayed retirement rather than increases in the number of hours worked, as can be seen in Subgraphs VII and VIII.

Differences between the partners of displaced workers and the partners of non-displaced comparison workers thus grow as more and more partners in the latter group leave employment.

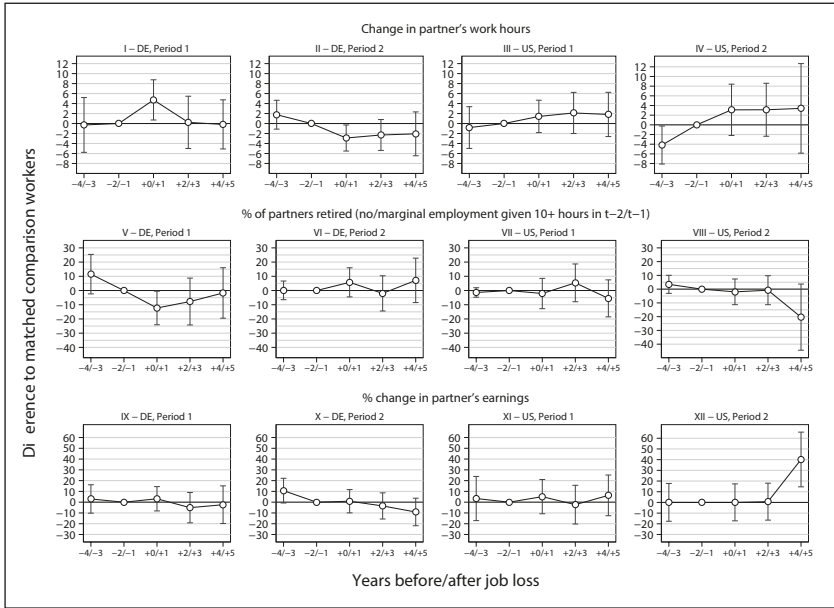
According to estimates in Subgraphs III and IV, the partners of displaced American men work an additional 4 to 6 hours per week in $t + 2/t + 3$ and $t + 4/t + 5$. This corresponds to approximately 200 to 300 hours per year and is in the neighborhood of Ehlert's (2012) estimates for prime-age workers. Importantly, these differences in labor supply translate into economically meaningful differences in spousal earnings trajectories: Subgraphs XI and XII suggest that, in terms of earnings in $t - 2/t - 1$, partners of displaced workers earn between 20% and 30% more in $t + 2/t + 3$ and $t + 4/t + 5$ than they would have earned in the absence of displacement.

Not only has previous research on changes in spousal labor supply around job loss mostly focused on younger/prime-age workers, it has also largely restricted attention to the partners of unemployed men. The primary reason for concentrating on 'wives' is that the vast majority of prime-age men work full-time, leaving very little room for additional increases in labor supply. As noted in Chapter 7, the scope for a 'male AWE', that is, for labor supply responses by the 'husbands' of displaced women, may be greater toward the end of working life: in particular, older 'husbands' might postpone retirement (rather than increase the number of hours per week) and some men might have begun to work part-time as part of a gradual transition from work to retirement.

However, even though some of the results in Figure 8.7 may be suggestive of a 'male' AWE, overall there is no clear evidence that this is a common phenomenon in either Germany or the US. In the German case, there is very little evidence for a male AWE. Estimates for the second period even suggest that the 'husbands' of displaced women reduce their hours compared to the partners of non-displaced women (Subgraph II). Estimates for the first period are suggestive of an AWE in $t + 0/t + 1$ (Subgraphs I and V), but the effects dissipate quickly thereafter or even vanish altogether. Results for the work hours of American 'husbands' are in the direction of an AWE in both periods (Subgraphs III and IV). At about two hours per week, the magnitude of this effect is quite small, however. More importantly, results for the other outcome measures do not provide consistent evidence for an AWE – with the exception of $t + 4/t + 5$ in the second period, but the uncertainty of these estimates is substantial.

My data thus contain no clear evidence for a male AWE around older women's job loss. The analysis of changes in women's labor supply around men's job loss, however, corroborates the result that 'family buffering' is a more important strategy for coping with the financial consequences of

Figure 8.7 DID matching estimates of changes in partner’s labor supply and earnings around women’s job loss



Period 1 – Year of job loss: 1985–1996 (DE); 1981–1992 (US). Period 2 – Year of job loss: 1997–2007 (DE); 1993–2002 (US).

Sources: SOEP, PSID, CNEF, own calculations

late-career job loss in the United States: American women increase their labor supply in response to spousal job loss, with the magnitude of the estimated effects being sizable and similar to Ehlert’s (2012) estimates for prime-age workers. Among older American couples, the income shock associated with a man’s job loss appears to quite often trigger a recalibration of the wife’s career and retirement plans. German women’s labor supply, by contrast, appears unresponsive to spousal job loss.

As discussed in Chapter 3, one possible explanation for the absence of a clear AWE among German wives would be that they may often be long-term ‘inactives’ (e.g., homemakers) whose job opportunities may be very limited. However, if this was the primary explanation, one would expect to find clearer evidence for an AWE when looking at the retirement behavior of German wives who worked in the predisplacement reference year (i.e., in Subgraphs V and VI of Figure 8.6).

Another possibility is that public income support ‘crowds out’ private responses to the income shock associated with late-career job loss (Cullen and Gruber 2000). Yet, while unambiguously confirming that public

income support is more important for displaced German men, the above analysis of income trajectories also shows that they suffer substantial and persistent declines in disposable income – declines that, if anything, are larger than for American workers (cf. Figures 8.2, 8.3, 8.4, and 8.5). Of course, these differences already incorporate the labor supply responses of American wives. Nevertheless, the noticeable and persistent income losses faced by displaced German men and their families might be seen as creating considerable incentives for an AWE among German couples. This suggests that, at least in part, the absence of a clear AWE may also be attributable to low overall demand for older workers: The difficult labor market situation of older German workers may not only depress reemployment prospects of displaced older workers themselves – it may also restrict the scope for labor supply responses by partners or spouses. Thus, employers' reluctance to hire older workers may limit possibilities for increasing work hours if this requires a change of job and mandatory retirement clauses may make it difficult to respond to a partner's job loss by delaying retirement. Further research is needed to clarify whether the absence of an AWE in Germany primarily reflects the absence of (financial) need or a lack of opportunities.

8.2.4 Financial consequences for involuntary retirees and returners

In a final step, I now differentiate workers with respect to their employment/retirement trajectories after job loss. I restrict this part of the analysis to men, because the female samples are too small for further disaggregation (for completeness, I report results for women in Table 8.A.5 in the appendix to this chapter). As for men, the findings so far provide modest support for the idea that the financial consequences of late-career displacement have become more severe and that a decline of public insurance mechanisms has been a factor behind this trend.

Perhaps, however, the aggregates examined above are hiding growing inequalities within the group of displaced older workers and in particular the deteriorating situation of those who do not become reemployed after late-career displacement. It seems plausible that, by strengthening the link between employment and economic well-being, reforms promoting later retirement and 'activation policies' more generally have had this effect – even though clear predictions are difficult because these reforms have presumably also affected the selectivity of retirement after late-career job loss. Therefore, I now take a closer look at how income trajectories differ by postdisplacement retirement status.

Table 8.6 Men – income dynamics by employment trajectory after late-career job loss

	Germany				United States			
	Non-differenced estimates		DID matching estimates		Non-differenced estimates		DID matching estimates	
	85-96	97-07	85-96	97-07	81-92	93-02	81-92	93-02
Workers retiring/leaving work								
% change own earnings	-98 (0.5)	-96 (1.5)	-56 (2.5)	-56 (3.8)	-99 (0.7)	-96 (3.6)	-53 (5.9)	-50 (11.9)
% change pre-gov. income	-70 (4.0)	-71 (3.6)	-45 (4.7)	-40 (4.8)	-52 (6.7)	-59 (7.4)	-30 (8.4)	-37 (11.1)
% change post-gov. income	-14 (3.6)	-24 (2.5)	-14 (3.9)	-20 (3.1)	-17 (7.3)	-24 (8.5)	-20 (8.4)	-22 (10.5)
% entering poverty	20 (3.7)	20 (4.2)	14 (3.9)	12 (4.5)	17 (7.0)	28 (11.4)	8 (7.5)	14 (13.4)
% with income loss > 50%	11 (2.4)	17 (3.6)	6 (2.6)	13 (13.7)	11 (6.1)	24 (9.3)	5 (6.2)	20 (9.4)
Workers returning to work								
Change in work hours	-10 (2.5)	-11 (2.2)	-0 (2.9)	-1 (2.4)	-11 (1.8)	-4 (2.2)	4 (2.1)	6 (2.6)
% change hourly wage	-8 (5.2)	-14 (4.0)	-22 (5.7)	-21 (4.4)	-11 (4.3)	-24 (5.3)	-13 (4.8)	-29 (5.9)
% change own earnings	-27 (5.6)	-31 (5.9)	-12 (6.7)	-13 (6.7)	-31 (4.2)	-28 (6.0)	5 (5.0)	-9 (7.1)
% change pre-gov. income	-13 (5.2)	-17 (5.5)	-12 (6.7)	-9 (5.9)	-12 (4.2)	-10 (6.7)	0 (5.0)	-8 (7.4)
% change post-gov. income	-3 (4.3)	-2 (3.8)	-9 (5.0)	-6 (4.0)	-0 (3.6)	-4 (5.7)	-2 (4.2)	-9 (6.2)
% entering poverty	6 (2.7)	6 (2.5)	3 (3.1)	2 (2.7)	7 (2.4)	9 (4.2)	-1 (3.4)	3 (4.7)
% with income loss > 50%	6 (2.7)	8 (3.2)	4 (2.7)	6 (3.3)	6 (1.8)	15 (5.3)	-2 (2.4)	8 (5.5)

Standard errors in parentheses.

Sources: SOEP, PSID, CNEF, own calculations

Table 8.6 differentiates men with respect to their level of employment after late-career job loss. I classify workers as having retired if they worked less than 10 hours per week in $t_r + 4$ and $t_r + 6$ where, as before, t_r is the pre-displacement reference year (either $t - 2$ or $t - 1$). Workers who worked 10 or more hours in at least one of these years are treated as ‘returners’.¹⁵ To obtain

¹⁵ For some workers, information is only available for one of the two postdisplacement years (i.e., $t_r + 4$ or $t_r + 6$). These cases were classified on the basis of work hours in that year.

DID matching estimates of the consequences of involuntary retirement and job loss followed by return-to-work, I again apply CEM using the covariate set in Table 8.1. I account for the likely selectivity of work status with respect to the matching variables by applying CEM separately by postdisplacement work status.

The disaggregated analysis of 'involuntary retirees' and 'returners' is based on rather small samples, particularly in the US. This necessitates two changes compared to the analysis above. First, I do not apply the additional regression-based adjustment when constructing DID estimates, as comparisons of DID estimates with and without additional control variables suggest that the regressions suffer from substantial overfitting.¹⁶ Second, I do not present composition-adjusted estimates, because the entropy balancing procedure produces unreliable results with small sample sizes. For simplicity, I also present average effects for 4-year and 6-year changes.

Table 8.6 contains the results of the disaggregated analysis. Results for involuntary retirees are presented in the upper and results for returners in the lower part of the table. I first discuss period differences for each of the two countries and then turn to German-American differences later on.

Strikingly, results for German men suggest that the trend toward larger income losses observed above has largely been confined to involuntary retirees who did not return to work after losing their job. According to the estimates in Table 8.6, risks of entering poverty have not changed much for either 'leavers' or 'returners', which is consistent with the absence of a clear trend in Figure 8.4. However, leavers seem to have experienced substantially larger relative income losses in the second period. Thus, the estimated average decline in needs-adjusted households income among German men leaving employment grew from 14% to 24% from the first to the second period. DID matching estimates are qualitatively similar, although the increase is somewhat smaller (from 14% to 20%). The proportion of retiring workers with very large income losses likewise appears to have increased, from 11% to 17%. Again, DID estimates suggest a similar and in this case even slightly stronger trend (from 6% to 13%). By contrast, there are no clear trends toward greater income losses for returners. Both non-differenced and DID estimates suggest that average relative losses in post-government income were if anything smaller in the second period. The share of returners with very large losses grew slightly, by 2 percentage points, according to both non-differenced and

16 Estimates obtained using additional regression-based adjustments often differed dramatically from those without such adjustments, much more so than for displaced workers as a whole. Results were also implausibly sensitive to the precise set of additional covariates included.

DID estimates, an increase that is, however, smaller than for involuntary retirees. As throughout the chapter, all of these estimates are quite uncertain (as indicated by the standard errors in parentheses) and must therefore be considered as preliminary. Only in one case does the period difference reach conventional significance levels ($p < 0.05$): the increase in non-differenced average relative losses after taxes and transfers for involuntary retirees.

Table 8.7 Changes in income components for men retiring after late-career job loss

	Men			
	Germany		United States	
	85-96	97-07	81-92	93-02
% with ind. earnings loss (IEL)	100	98	100	97
Change in private non-labor income (PNLI)				
% with increased PNLI given IEL	53	40	66	75
Average replacement rate	13	7	29	(24)
Median replacement rate	4	2	25	(26)
Change in public pension & transfer income (PPTI)				
% with increased PT given EL	98	93	78	78
Average replacement rate	52	48	46	(33)
Median replacement rate	46	43	30	(29)
Change in household taxes (HHT)				
% with decreased HHT given IEL	92	99	100	99
Average replacement rate	38	43	26	(26)
Median replacement rate	33	41	27	(23)

Replacement rates are expressed in percentage terms and calculated as the increase in PNLI/PPTI or decrease in HHT divided by the absolute value of the decline in household labor earnings. Replacement rates capped at +200 percent. Average and median replacement rates calculated over observations with positive replacement rates (i.e., over observations with an increase in the given income component). Estimates in parentheses based on fewer than 30 observations.

Sources: SOEP, PSID, CNEF, OWN calculations

Tables 8.7 and 8.8 quantify the extent of public and private buffering among involuntary retirees using the indicators introduced in Section 8.2.2.¹⁷ Results in Table 8.7 suggest that public transfers were indeed somewhat less effective in compensating for earnings losses due to involuntary retirement in the second period. Buffering through the tax system, however, appears to have increased slightly. The alternative buffering indicators are provided

17 The corresponding estimates for women are available on request.

in Table 8.8. These measures provide somewhat stronger evidence for a decline of welfare state support: Based on non-differenced (DID matching) estimates, average relative losses after taxes and transfers were 56 (31) percentage points smaller than before taxes and transfers in the early period. In the second period the reduction amounted only to 46 (21) percentage points.

Turning to American men, estimated income changes for involuntary retirees in Table 8.6 are very imprecise, because the sample of displaced men is small to begin with and because so few workers actually leave employment after late-career job loss. Point estimates do suggest that retiring American men faced greater economic risks in the later period. In particular, retiring workers were more likely to enter poverty, both in absolute terms and compared to matched comparison workers. Standard errors are too large to justify firm conclusions, however. Interestingly, and in contrast to results for German men, there is also some evidence that the situation of workers returning to work deteriorated from the first to the second period. In particular, returners seem to have faced somewhat greater risks of suffering very large income losses in the later period.

Table 8.8 Income buffering through private income and the welfare state for men retiring after late-career job loss

	Non-differenced estimates		DID matching estimates	
	Period 1	Period 2	Period 1	Period 2
Men, Germany				
Private income buffer	28 (33)	26 (36)	12 (28)	14 (41)
Welfare state buffer	56 (67)	47 (64)	31 (72)	21 (59)
Men, United States				
Private income buffer	47 (58)	37 (52)	18 (72)	17 (53)
Welfare state buffer	35 (42)	35 (48)	7 (28)	15 (47)

Private income buffer (PIB) is the percentage point difference between the average change in displaced workers' own earnings and the average change in needs-adjusted household pre-government income. Welfare state buffer (WSB) is the percentage point difference between average changes in household needs-adjusted pre-government income and needs-adjusted post-government income. Figures in parentheses represent the relative contributions of PIB and WSB to total buffering, i.e., $PIB/(PIB + WSB)$ and $WSB/(PIB + WSB)$. See text and note 9 for further details.

Sources: SOEP, PSID, CNEF, OWN calculations

Comparing the results across countries, there is no clear evidence that involuntary retirees who leave employment after late-career job loss are better off in Germany where, despite recent cutbacks, they can rely on a broader and more generous array of public policies. While buffering measures in Tables

8.7 and 8.8 confirm that public transfers cushion a larger portion of income losses for German men, more effective 'private income buffering' through spousal earnings and private non-labor income appear to largely make up for any holes in the American public safety net. These findings suggest that retirement after late-career job loss is quite selective in the US. Put bluntly, American displaced workers seem to retire primarily if they can afford to. This still renders their retirement involuntary in the sense that it would presumably have occurred later in the absence of job loss. However, those workers who would have been worse off if they had chosen the 'retirement path' seem to have mostly been able to find reemployment. While not being logically incompatible with it, this result stands in some tension to Maestas and Li's (2006) finding that a considerable fraction of older American job searchers cannot find work and become 'discouraged workers'.

However, this is not to say that all is well in the US. In particular, it is worth considering two additional outcomes reported for returners in Table 8.6: the (absolute) change in work hours and the change in the hourly wage. The results for hourly wages show that late-career job loss leaves considerable wage scars in the US (and also in Germany). Results for the change in work hours are perhaps even more noteworthy. Even though non-differenced estimates suggest that American returners decrease their work hours on average (by 11 hours per week in the first and by 4 hours per week in the second period), DID estimates indicate a positive impact of job loss on the change in work hours among returners. This suggests that returners work noticeably longer hours (approximately 5 per week) after late-career job loss than they would have worked in the absence of displacement. In other words, American workers partly pay the price for late-career job loss in the form of foregone leisure and later retirement rather than in the form of lower disposable income. Results for German returners suggest no such pattern.

8.3 Summary and conclusions

In this chapter, I have used longitudinal data to study the impact of job loss between ages 51 and 65 on subsequent employment, spousal labor supply, and household income. Consistent with the twofold comparative perspective taken throughout this study, I have not only investigated German-American differences in the consequences of late-career job loss, but also examined within-country changes over time.

As in Chapter 6, I provide a condensed summary of the hypotheses formulated in the previous chapter and of the relevant empirical findings in

Table 8.9. In the following verbal summary, I will aim for a somewhat higher level of abstraction and concentrate on the central and most reliable findings of this chapter. I will mostly focus on the findings for men, which were generally clearer and more consistent. This may partly be due to larger samples, but likely also reflects the fact that women's contribution to household income is more variable across household types. As in the case of (voluntary) retirement that was analyzed in Chapter 6, disaggregated analysis by household type and household earnings arrangement might, in principle, be a promising way to proceed. However, in the present study the possibilities for such an analysis were limited by sample sizes and the need to contain the complexity of results.

Despite noticeable changes over time, which I will summarize below, my analysis highlights marked and persistent differences between the US and Germany. More specifically, I have documented striking differences in the impact of late-career job loss on subsequent employment. These differences result in pronounced differences in the types of income displaced older workers rely on, with public benefits playing a much larger role for Germans and private income sources, including own and spousal earnings, being more important for Americans. The greater importance of the family in buffering the economic impact of late-career job loss is underlined by the analysis of changes in spousal labor supply. In the US, women increase their labor supply noticeably when their partner suffers late-career job loss. For German women, no such effect can be detected. Men do not show unambiguous responses to spousal job loss in either country. These findings highlight the greater salience of private income buffering and, in particular, of buffering through the incomes of other family members in the American context (Ehlert 2012; Western et al. 2012).

Changes in disposable income for the average displaced worker do not vary as strongly between the two countries. Estimates suggest that men's job loss is associated with somewhat larger relative income losses in Germany than in the US, with some evidence suggesting that losses have grown over time in both countries (see below). Results also indicate that late-career job loss more often leads to poverty entries in Germany than in the US. Whereas non-differenced rates of poverty entry are broadly similar for displaced men in Germany and the US, DID estimates (which help account for overall differences in poverty dynamics between the two countries) suggest a clear poverty-triggering effect only for German men. Finally, late-career job loss also elevated the risk of suffering very large income losses of more than a half for men in both countries, at least in the later periods.

At first glance, the results in this chapter suggest that, at least during recent decades, the American approach of providing limited public support

Table 8.9 Main findings – Chapter 8

Hypothesis	Prediction	Supported for...	Relevant Figures/Tables	Details
HJL 1	German workers more likely to leave employment after late-career job loss	Strong support for men, somewhat mixed for women	Figure 8.1	–
HJL 2	Public transfers and retirement benefits more important for postdisplacement income in Germany. Earnings more important in US.	Men & women	Figures 8.2, 8.3; Tables 8.4, 8.5	–
HJL 3	Private income buffering more important in the US	Men & women	Figures 8.2, 8.3; Tables 8.4, 8.5	–
HJL 4	Stronger added worker effects in US	Women's labor supply & earnings around men's late-career job loss	Figures 8.6, 8.7	American women only group who clearly increase labor supply after spousal job loss. No clear increases among German women and no clear evidence of 'male' AWE around women's job loss in either country
HJL 5	Reemployment rates after late-career job loss increased over time	More support in Germany (esp. men), though period differences do not reach statistical significance; mixed results in US	Figure 8.1	Trends as expected for German men and women (both non-differenced and DID estimates), but period differences are not statistically significant; US: mixed results, trends in DID estimates generally in the 'wrong' direction, no clear effect of job loss on non-employment rates of men in either period

Hypothesis	Prediction	Supported for...	Relevant Figures/Tables	Details
H1.6	Welfare state buffering has declined over time	Some support for men in both countries, no clear trends for women	Tables 8.4, 8.5, 8.7, 8.8	For German men support mostly comes from buffering measures based on comparing average losses before and after taxes and transfers (Tables 8.5, 8.8), estimated replacement rates (Tables 8.4, 8.7) suggest offsetting effects of public pension/transfer income vs. household taxes
H1.7	Impact of job loss on disposable income and poverty status has become more severe	Support clearer for men, and in particular German men, but period differences mostly not statistically significant	Figures 8.2, 8.3, 8.4, 8.5; Table 8.6	Germany: trends in relative income as expected for German men and women (both non-differenced and DID estimates), but unadjusted period differences are not statistically significant; no clear trends in risk of poverty entry; relatively clear increase in the incidence of very large income losses for German men US: expected trend only found for men; clearest for very large losses

to displaced older workers has been relatively well-balanced in the sense that those displaced workers who could not afford to retire have mostly been able to find reemployment. However, while changes in disposable income are superficially consistent with such a favorable interpretation, some findings in this chapter suggest that American workers and their families partly pay the price for late-career displacement in ‘currencies’ other than disposable income – for example, in terms of foregone leisure and perhaps also lower job quality. More specifically, late-career job loss seems to induce displaced workers and/or their spouses to work longer hours and/or retire later than planned. This pattern is broadly consistent with Mayer’s (2005: 37) remark that in the US ‘older workers continue to work even at lower wages because of the low level of expected pension income’ and with Buchholz et al.’s (2011: 23) related conjecture that older workers in liberal welfare states ‘may even be forced to work beyond retirement age in the case that they failed in accumulating enough pension savings’. Future research should further investigate these issues by tracking displaced workers for longer periods of time and by taking a closer look at outcomes other than earnings and household income.

It is also worth stressing that the reemployment prospects of Americans have likely been helped by the strong overall performance of the American economy during the observation period, and particularly during its second half (cf. Chapter 3). Future research will have to investigate how displaced older workers fare when macroeconomic conditions are less benign. For recent research on the labor market outcomes and financial situation of older Americans during the ‘Great Recession’, see Altindag et al. (2012), Johnson (2012), and Rutledge et al. (2013).

As for the German context, the findings of this chapter suggest that the employment prospects of older workers, and the reemployment prospects of displaced older workers in particular, should (continue to) feature high on the agenda of German policymakers. The comparison to the US highlights that late-career job loss remained an important trigger of early retirement in the late 1990s and early 2000s. As noted above, the absence of spousal labor supply responses to late-career job loss could be read as further evidence that employment opportunities available to older workers are limited. An alternative interpretation of course is that high levels of public benefits reduce the need for returning to work as well as for spousal labor supply responses. While I could not disentangle the relative importance of reemployment prospects and retirement incentives, a two-pronged approach that seeks to improve demand for displaced older workers (e.g., by supporting continued training) in addition to raising work incentives certainly appears more balanced than one that just emphasizes the supply side.

As for changes over time, the impact of men's late-career job loss on disposable income seems to have become more severe in both countries, with attempts to capture the buffering effect of welfare state taxes and transfers more directly supporting the notion that a decline of public income support at least partly explains this trend. For men, the increase in average relative income losses around late-career job loss is in the neighborhood of 5 percentage points in both the US and Germany, whereas risks of entering poverty show no clear trend. Probably the most striking finding is that displaced men's risk of suffering very large income losses has risen markedly in both countries, both in absolute terms and in comparison to similar non-displaced workers. Due to small sample sizes, all of these results are quite uncertain and must therefore be regarded as preliminary: Only for the increase in the proportion of workers with very large income losses do period differences come close to reaching conventional significance levels.

Even taking period differences at face value, they may perhaps not appear as dramatic as suggested by popular claims about increasing economic insecurity. It is important to stress, however, that trends are generally robust to comparisons with matched non-displaced workers, especially since Chapter 6 documented a broader trend toward larger income losses around men's (voluntary) retirement. In particular, gaps between displaced older workers and similar non-displaced comparison workers persist until 4 to 5 years after job loss, which implies substantial and growing losses in terms of lifetime income. In this sense – and, again, within the constraints implied by the relatively small number of cases – the findings of this chapter are consistent with the idea that recent changes in social policy have had a disproportionate effect on workers whose late careers are interrupted by involuntary job loss. Future research will have to investigate whether these differences persist even longer. It should also explore how the impact of declines in health, the second major event interrupting late careers, has developed over time.

Finally, it is worth noting that many of the policy changes that have arguably made late-career job loss and involuntary early retirement more costly were introduced only gradually (e.g., benefit adjustments for early retirement in Germany) and/or toward the very end of the observation period (e.g., the abolition of second-tier unemployment benefits in Germany or increases in the full retirement age in both countries). The fundamental transformation of the American system of complementary pensions likewise has not yet reached its endpoint. The results in this chapter should therefore be considered as snapshots during an era of transition, snapshots that need to be updated as the current reform process and other institutional changes progress.

8.4 Additional results

Table 8.A.1 Men – period differences in worker composition – matched workers experiencing job loss

	Germany		United States	
	85-96	97-07	81-92	93-02
Worker characteristics – matching variables				
Age at job loss (mean)	55.7	57.0	58.1	56.4
Age at job loss 51-55	57.2	38.7	32.7	62.2
Age at job loss 56-60	36.2	45.8	37.3	12.6
Age at job loss 61-65	6.5	15.5	30.0	25.2
% Eastern Germany	32.0	27.8		
% civil servant	0.4	1.9		
% migration background/black	24.9	21.3	4.3	8.1
% intermediate education	70.9	70.1	46.5	58.2
% high education	7.1	10.8	20.9	30.6
% living with partner	89.3	91.6	96.3	89.6
% with health problems	15.2	13.0	17.2	6.2
% working full-time	98.8	96.5	94.2	95.0
% poor/near poor	22.1	20.2	26.0	16.8
Worker characteristics – additional variables				
Avg. work experience (years)	33.1	33.6	34.5	32.3
% middle earnings tercile	50.2	46.7	27.3	33.7
% top earnings tercile	36.3	40.1	53.3	61.3
% primary sec./manufacturing	76.2	66.0	51.5	34.7
% private service sector	14.3	26.7	38.9	57.4
% public sector	9.5	7.3	9.7	7.8
Age (mean)	51.0	51.5	52.7	51.1
Partner characteristics (if partner present at $t - 2/t - 1$)				
% intermediate education	54.3	59.6	48.7	45.3
% high education	4.7	14.1	26.0	41.8
% works part-time	13.1	32.9	16.8	11.4
% works full-time	37.7	35.9	39.0	54.1
Avg. work experience (years)	18.1	21.5	14.8	19.0
N four-year change	181	204	127	71
N six-year change	169	141	117	45

Sources: SOEP, PSID, CNEF, own calculations

Table 8.A.2 Women – period differences in worker composition – matched workers experiencing job loss

	Germany		United States	
	85-96	97-07	81-92	93-02
Worker characteristics – matching variables				
Age at job loss (mean)	55.1	56.2	57.3	56.4
Age at job loss 51-55	64.2	52.1	44.8	53.4
Age at job loss 56-60	31.3	40.2	31.5	32.7
Age at job loss 61-65	4.6	7.7	23.6	13.9
% Eastern Germany	30.6	26.5		
% civil servant	0.0	1.4		
% migration background/black	19.6	12.5	10.6	5.1
% intermediate education	57.2	73.3	68.3	61.1
% high education	2.2	7.0	6.4	24.4
% living with partner	77.4	80.8	72.4	68.9
% with health problems	12.9	16.7	13.0	18.7
% working full-time	61.4	57.3	55.6	83.5
% poor/near poor	21.6	20.5	33.6	30.8
Worker characteristics – additional variables				
Avg. work experience (years)	28.2	27.7	21.6	25.4
% middle earnings tercile	28.1	38.3	37.8	39.7
% top earnings tercile	10.6	9.5	4.3	19.6
% primary sec./manufacturing	49.0	29.5	25.5	21.2
% private service sector	34.6	54.3	69.8	58.6
% public sector	16.4	16.1	4.7	20.2
Age (mean)	55.1	57.3	57.3	57.6
Partner characteristics (if partner present at t – 2/t – 1)				
% intermediate education	68.3	80.8	42.3	32.8
% high education	10.0	14.9	28.8	48.8
% works part-time	6.4	11.0	11.1	8.6
% works full-time	63.3	53.2	64.9	75.1
Avg. work experience (years)	25.8	26.5	24.3	22.9
N four-year change	92	123	104	52
N six-year change	88	88	95	31

Sources: SOEP, PSID, CNEF, OWN calculations

Table 8.A.3 Changes in income components around late-career job loss – matched workers only – composition-adjusted results

	Men				Women			
	Germany		us		Germany		us	
	85-96	97-07	81-92	93-02	85-96	97-07	81-92	93-02
% with ind. earnings loss (IEL)	88	84	76	76	80	84	78	73
Change in private non-labor income (PNLI)								
% with increased PNLI given IEL	53	36	60	65	38	46	53	60
Average replacement rate	14	10	36	31	13	18	81	115
Median replacement rate	6	3	20	20	3	6	47	115
Change in public pension & transfer income (PPTI)								
% with increased PT given EL	95	83	59	40	82	80	58	61
Average replacement rate	48	52	48	31	76	70	81	(57)
Median replacement rate	44	44	32	31	56	50	65	(26)
Change in household taxes (HHT)								
% with decreased HHT given IEL	89	95	91	94	89	89	81	68
Average replacement rate	42	52	36	30	59	57	62	48
Median replacement rate	33	44	29	29	37	41	34	30

Replacement rates are expressed in percentage terms and calculated as the increase in PNLI/ PPTI or decrease in HHT divided by the absolute value of the decline in individual labor earnings. Replacement rates capped at +200 per cent. Average and median replacement rates calculated over observations with positive replacement rates (i.e., over observations with an increase in the given income component). Estimates in parentheses based on fewer than 30 observations.

Sources: SOEP, PSID, CNEF, OWN calculations

Table 8.A.4 Income buffering through private income and the welfare state – composition-adjusted results

	Non-differenced estimates		DID estimates	
	Period 1	Period 2	Period 1	Period 2
Men, Germany				
Private income buffer	28 (41)	19 (38)	13 (40)	9 (39)
Welfare state buffer	39 (59)	32 (62)	20 (60)	14 (61)
Men, United States				
Private income buffer	26 (60)	23 (64)	1 (120)	7 (68)
Welfare state buffer	17 (40)	13 (36)	-0 (-20)	3 (32)
Women, Germany				
Private income buffer	19 (35)	20 (35)	17 (67)	14 (47)
Welfare state buffer	35 (65)	38 (65)	8 (33)	15 (53)
Women, United States				
Private income buffer	33 (67)	37 (77)	20 (80)	35 (105)
Welfare state buffer	16 (33)	11 (23)	5 (20)	-2 (-5)

Private income buffer (PIB) is the percentage point difference between the average change in displaced workers' own earnings and the average change in needs-adjusted household pre-government income. Welfare state buffer (WSB) is the percentage point difference between average changes in household needs-adjusted pre-government income and needs-adjusted post-government income. Figures in parentheses represent the relative contributions of PIB and WSB to total buffering, i.e., $PIB/(PIB+WSB)$ and $WSB/(PIB+WSB)$. See text and note 9 for further details.

Sources: SOEP, PSID, CNEF, own calculations

Table 8.A.5 Women – income dynamics by employment status after late-career job loss

	Germany				United States			
	Non-differenced estimates		DID matching estimates		Non-differenced estimates		DID matching estimates	
	85-96	97-07	85-96	97-07	81-92	93-02	81-92	93-02
Workers retiring/leaving work								
% change own earnings	-96 (1.6)	-96 (1.4)	-65 (5.9)	-50 (4.6)	-98 (1.4)	-93 (3.7)	-66 (7.9)	-73 (6.9)
% change pre-gov. income	-64 (5.8)	-71 (4.7)	-40 (8.2)	-34 (6.4)	-43 (7.5)	-18 (17.1)	-35 (9.1)	-9 (17.8)
% change post-gov. income	-18 (4.1)	-22 (3.2)	-18 (5.2)	-13 (4.0)	-19 (5.9)	3 (12.9)	-26 (7.4)	-2 (13.6)
% entering poverty	17 (5.9)	21 (5.0)	8 (6.6)	14 (5.3)	21 (8.0)	22 (10.3)	14 (8.1)	9 (12.1)
% with income loss > 50%	15 (5.6)	13 (4.1)	8 (5.9)	8 (4.3)	19 (6.1)	6 (4.2)	13 (6.2)	-3 (5.0)
Workers returning to work								
Change in work hours	-8 (3.3)	-10 (2.5)	-1 (3.8)	-2 (3.1)	-6 (2.1)	-2 (2.1)	3 (2.5)	5 (2.5)
% change hourly wage	13 (7.7)	-9 (6.3)	-2 (8.6)	-12 (7.2)	2 (5.7)	14 (9.5)	-5 (6.5)	9 (10.5)
% change own earnings	-1 (11.6)	-33 (6.3)	6 (13.3)	-11 (8.6)	-16 (7.9)	5 (10.2)	9 (9.6)	17 (10.9)
% change pre-gov. income	-12 (9.5)	-21 (7.2)	5 (11.0)	-8 (9.0)	4 (8.6)	8 (8.8)	22 (9.8)	11 (9.6)
% change post-gov. income	3 (5.7)	-3 (6.2)	-1 (6.8)	1 (7.2)	11 (7.0)	16 (7.7)	14 (7.6)	8 (9.0)
% entering poverty	0 (0.0)	7 (3.6)	-2 (1.6)	-2 (6.0)	17 (5.0)	6 (4.3)	5 (8.1)	-2 (5.2)
% with income loss > 50%	3 (2.9)	5 (3.1)	1 (3.0)	-2 (5.5)	12 (3.9)	2 (1.9)	5 (4.2)	-5 (3.6)

Standard errors in parentheses.

Sources: SOEP, PSID, CNEF, own calculations

Part IV
Conclusion

9 Conclusion

The question how macro-level ‘institutions’ shape the life courses of individuals has received increasing attention from sociologists during recent decades. So far, however, much of this research has analyzed mid-life or early-career trajectories such as the transition from school to work. Comparative research on the later life course has predominantly focused on the timing of retirement and, to a lesser extent, on other types of labor market transitions. Few studies have taken a truly comparative perspective on the income trajectories of older workers and retirees, even though household income mobility undoubtedly is a crucial life course outcome (DiPrete 2002; Mayer 2005). This study has addressed this research gap by examining mobility processes among workers ages 50 and older in Germany and the United States – two countries that are important reference points in the literatures on *varieties of capitalism* (Hall and Soskice 2001b) and *welfare regimes* (Esping-Andersen 1990): Germany is usually considered as the prime example of a coordinated market economy with a conservative/corporatist welfare state and the US as a liberal market economy with a liberal/residual welfare state.

The present study was also motivated by more immediate concerns about the economic well-being of older workers and about the implications of recent welfare state change. The idea that welfare state retrenchment has led to a growth of economic insecurity is a recurrent theme in German and European debates, both inside and outside of academia. The United States have long served as a dystopian reference point in these debates, with commentators routinely invoking the specter of an ‘Americanization’ of the German welfare state (Butterwegge 2006; Starke et al. 2008). America, too, has been having its share of debates about a (further) erosion of its allegedly residual social safety net and about associated increases in economic insecurity. Jacob Hacker’s (2006) widely read book *The Great Risk Shift* is perhaps the best-known and certainly one of the most dramatizing statements in that debate. Again, however, relatively little is known about how levels of economic insecurity have actually developed during recent decades, particularly for older workers, and even fewer studies have tried to link economic insecurity to changes in the social safety net.

Against this background, I have combined an in-depth analysis of relevant welfare state programs and their employment-based functional equivalents with a thorough examination of income mobility around two crucial late-career trigger events: retirement in the sense of exit from work and late-career

job loss. Following DiPrete (2002), I have argued that the trigger events approach is particularly well-suited for investigating the (changing) impact of welfare state arrangements, as it zeroes in on those circumstances when the welfare state's role as an institution that smoothes income streams and ensures a minimum level of income becomes most salient. To be sure, modern welfare states serve many goals other than income smoothing. There can be little doubt, however, that income smoothing and minimum income provision belong to their core business and that these functions are the primary ones emphasized by current debates on growing economic insecurity.

Following an important strand of recent retirement research, I have emphasized differences in workers' level of control over retirement, employing a stylized distinction between voluntary and involuntary retirees. For want of more direct measures of individual control, I have operationalized this distinction by differentiating between a group of retirees who leave work after late-career job loss or the onset of health problems – the primary triggers of involuntary early retirement according to the literature – and a second group of retirees whose retirement is not preceded by either of these events. More concretely, I have focused on the latter group of 'voluntary retirees' in the empirical analysis of income dynamics around exit from work (Part II) and then taken a closer look at the impact of job loss as one crucial trigger of involuntary early retirement in Part III. A substantive reason for according a central role to individual differences in control over retirement is that workers with low levels of control may be disproportionately affected by recent changes in welfare state arrangements: For example, the scaling back of early retirement options likely has more far-reaching consequences for workers whose late careers are interrupted by job loss or disability onset than for workers whose careers unfold smoothly and who can therefore readily delay retirement.

In the next section, I summarize key findings of the study and relate them to the literature on welfare and life course regimes as well as to current debates about rising economic insecurity. I also identify what I take to be the key policy challenges highlighted by my analysis and discuss possible responses. Section 9.2 concludes with some open questions and promising directions for future research.

9.1 Key findings: welfare regimes and the 'Great Risk Shift' revisited

The empirical chapters of this study have produced a large number of interesting results. At this point, I will only recount what I take to be most

noteworthy findings. More detailed summaries were provided at the end of the individual chapters and I refer the interested reader to these accounts.

Two obvious questions are whether the findings conform to stylized and stereotypical depictions of the German and American welfare and life course regimes and whether they support the view that an erosion of collective insurance mechanisms has led to a massive increase in economic insecurity. Of course, the answers to these question will always, to some extent, be in the eye of the beholder. By how much must the income trajectories of German and American older workers differ to be truly distinctive? To what extent must they have changed for the label 'Great Risk Shift' to be justified? Despite these inevitable ambiguities, some positive conclusions seem warranted.

The Americanization of America's system of retirement income provision

A common assumption is that the American welfare state, and liberal welfare states more generally, do relatively little to cushion the consequences of trigger events and that this results in more volatile and heterogeneous income trajectories. With respect to the transition to retirement, it is often argued that low public replacement rates in combination with a patchy and stratified system of private pensions result in very heterogeneous income trajectories and high risks of falling below the poverty line. Some authors even suspect an amplification of working-life inequalities after retirement (e.g., Crystal and Shea 1990).

In this regard, one of the more intriguing findings of my study is that the US have become 'more American' over the course of the last two or three decades, at least as far as the system of retirement income provision is concerned. Findings for income trajectories around men's retirement suggest that average relative income losses, as well as rates of poverty entry around men's exit from work were broadly similar in Germany and the US during the 1980s. Toward the end of the observation period, the variability of income changes and in particular the prevalence of very large income losses had risen markedly in the US, as had the risk of entering poverty around retirement. From this perspective, the 'Transformation' of the American pension system has been an 'Americanization' in the sense that the current system more closely resembles stereotypical portrayals of the American mobility regime.

The findings for men's retirement support the views of authors such as Hacker (2006) and Gosselin (2009) who argue that the increasing

prevalence of defined-contribution plans (and the parallel decline of defined-benefits plans) has spawned greater economic insecurity. They also square well with related recent research, in particular with the work of Edward Wolff (2011) whose studies on the basis of the Survey of Consumer Finances document growing inequalities in complementary pension wealth.

It is often claimed that the alleged trend toward greater economic insecurity in the US has ‘not just affected the working poor and those in the great statistical middle, but has reached households long thought immune to dislocation’ (Gosselin 2009: 8), a notion that – as discussed in the introductory chapter of this study – is also familiar from German debates (e.g., about a ‘shrinking’ of the middle class; cf. Grabka and Frick 2008). On this issue, my findings are more ambiguous. On the one hand, the analysis of income trajectories around retirement in the US does suggest that workers with intermediate and high levels of education have not been completely sheltered from the trend toward greater income losses and increased risks of large declines. On the other hand, trends for workers with low levels of education appear as unfavorable or even worse than for the higher-educated, a finding that is again consistent with Wolff’s (2003; 2011) analysis, which documents growing educational inequalities in complementary pension wealth. The overall picture is thus one of a broad upward trend in economic insecurity that is accompanied by persistent or even increasing differences among social strata, which is an important finding when it comes to formulating priorities for political action. In particular, reform proposals should take seriously the challenge of providing adequate retirement income to low-income workers (for examples of such proposals, see Halperin and Munnell [2005], Ghilarducci [2008], and Wolff [2011]).

Another consistent finding for the US is that period differences in income dynamics around women’s retirement look quite different, often indicating a trend toward smaller losses that seems to be related to women’s improved access to complementary pension income. As noted in Chapter 6, these gender differences suggest that women’s declining losses have offset growing losses for men in dual-earner couples. More generally, recent trends in economic well-being after retirement may vary systematically by household/earnings type. A longitudinal analysis of this possibility is complicated by household instability and by the fact that partners in dual-earner couples often retire several years apart. Nevertheless, future research should investigate this issue, a point to which I return below.

Rising insecurity in Germany?

For German men, and to a lesser extent also for women, relative income losses at the time of retirement have grown noticeably from the mid-1980s onward and there is considerable evidence that this trend is primarily attributable to a gradual decline in the generosity of public retirement benefits. The decline in replacement rates seems to have been broadly shared across educational subgroups and across different types of workers more generally and partly for this reason has not (yet?) led to greater numbers of voluntary retirees facing economic marginalization (in the sense of entering poverty) or very large declines in their income at the time of retirement, though there is some evidence that income drops of more than a third occurred more frequently toward the end of the observation period.

However, this does not mean that all is well in Germany: First, my findings suggest that the consequences of late-career job loss and involuntary early retirement more generally have risen disproportionately, a point to which I return below. Second, almost a third of low-educated men with preretirement incomes above the poverty line fell below this threshold during the first years of retirement, even if their retirement was voluntary in the sense of not being triggered by job loss or declining health. This proportion is similar to the entry rate of low-skilled Americans during the 1980s and early 1990s and attests to the lack of redistribution in the German public pension pillar. Given scheduled declines in public replacement rates for future retirement cohorts (cf. Chapter 3), these findings strongly suggest that retirement income security and prevention of old-age poverty will become key policy challenges during the next decades (Motel-Klingebiel and Vogel 2013). Increasing labor market inequalities, especially since the mid-1990s (Giesecke and Verwiebe 2008; Dustmann et al. 2009), are likely to exacerbate this problem.

Against this background, the American trends documented in this study, and in particular those for less-educated workers, raise concerns about recent reforms that have strengthened second- and third-pillar pensions without expanding redistributive elements in the public pension pillar. The current landscape of complementary pensions in Germany certainly differs from the American: As discussed in Chapter 3, German second- and third-pillar pensions are typically either pure defined-benefit plans or have a strong defined-benefit component. Empirical data also suggest that participation in Riester-type third-pillar pension plans is somewhat more equally distributed than complementary pension participation in many other advanced economies (OECD 2012: 119-121). At the same time, participation in Riester plans remains highly stratified by earnings and there certainly may be

more effective and equitable approaches for achieving retirement income security and preventing old-age poverty (Himmelreicher and Viebrok 2004).

Chapter 5 discussed several reasons why vulnerable groups are less likely to invest in complementary pensions even conditional on being eligible, among them issues of financial literacy and motivational efficacy. At the very least, voluntary complementary pension schemes should thus be implemented in such a way as to maximize levels of participation (e.g., by implementing opt-out rather than opt-in designs; Madrian and Shea 2001, Chetty et al. 2012). However, as noted by Wolff (2011: 267) in the American context, 'one problem [...] is that a lot of low-income workers simply cannot afford a 401(k) or even an IRA [i.e., the most important types of complementary pension plans in the US, J.P.H.]'. More redistributive public or employer-provided subsidies to complementary pensions may alleviate this problem, especially if combined with opt-out designs and/or if employer contributions are made even if employees themselves do not save (Wolff 2011). Nevertheless, it is reasonable to ask whether redistribution cannot be more efficiently organized within the framework of the public system. As noted by Himmelreicher and Viebrok (2004), a key advantage of public PAYG schemes is that redistribution can be exceptionally well-targeted. This is because public benefits can be based on actually realized lifetime earnings (rather than income in a given year, as is the case with subsidies for private retirement savings). In the German context, the case for increased redistribution within the public tier appears particularly compelling, as the current system may actually be regressive (Breyer and Hupfeld 2009).¹

A related challenge is coverage of disability risks: Because of close linkages between public disability benefits and the overall level of public retirement benefits, changes affecting the latter tend to affect the former as well (Bäcker et al. 2011). In addition, recent reforms have enacted additional cuts in the level of public disability benefits in order to reduce incentives for early retirement via the disability pathway. These changes raise the importance of complementary disability insurance for protection against the economic consequences of health problems, yet such insurance is often outright unaffordable for low-income workers who typically face above-average risks of actually becoming disabled (which drives up premia for individualized insurance). Köhler-Rama et al. (2010) provide an insightful

1 More specifically, the relationship between lifetime benefits and lifetime contributions is regressive because of the interaction of two facts: Monthly benefits are approximately proportional to lifetime contributions (cf. Chapter 3), while the average number of months that a worker receives benefits rises with income (because of stratified mortality risks).

discussion of this problem and evaluate different reform options. Finally, it is important to acknowledge the close linkages between working-life earnings and retirement income (Allmendinger et al. 1991). Policies that tackle working-life inequalities such as minimum wage policies or training measures for low-wage workers can therefore play a crucial role in containing trends toward greater inequalities and poverty risks among future retirement cohorts (Wolff 2011; Motel-Klingebiel and Vogel 2013).

Employment exit and employment maintenance after late-career job loss

My analysis of employment trajectories after late-career job loss highlighted striking German-American differences in the propensity of older workers to return to work after late-career job loss. Again, findings were more consistent for men. In Germany, despite some evidence of increasing reemployment rates, late-career job loss clearly remained an important trigger of involuntary early retirement throughout the observation period from the mid-1980s to the mid-2000s. Averaging estimates from the different subperiods, the proportion of older men who no longer worked a substantial number of hours a few (i.e., between 2 to 5) years after late-career job loss was around two thirds in Germany, with the corresponding American share being closer to one third. Even more strikingly, comparisons with a matched control group indicate that the postdisplacement non-employment rate of German men was about 30 percentage points higher than for similar non-displaced men. Similar estimates for American men indicate no unambiguous exit-accelerating effect of late-career job loss. Some results for the US also suggest an interesting bifurcated pattern: Job loss seems to induce some men to retire earlier than planned, while other workers appear to delay their retirement in response to late-career job loss, presumably in order make up for the associated financial losses. My analysis of changes in spousal labor supply around late-career job loss underscores this finding: The 'wives' of displaced American men work substantially longer hours and delay their retirement compared to the 'wives' of similar non-displaced men.

These markedly different employment trajectories are accompanied by pronounced differences in the income packages of older workers after job loss. They do not, however, translate into equally clear differences in needs-adjusted disposable income. Taking estimates at face value, displaced German men's disposable income was between 4 to 8 percentage points lower relative to predisplacement income than for American men. In this sense, Germany's generous early retirement policies have been a relatively effective, albeit costly, means of cushioning the impact of late-career job loss.

These findings are consistent with characterizations of Germany as an ‘employment exit regime’ and of the US as a regime of ‘market-induced employment maintenance’ (e.g., Hofäcker 2010; Buchholz et al. 2011). While this distinction usually refers to different approaches to older workers and early retirement more generally, my analysis of employment trajectories after late-career job loss impressively confirms that these labels capture real differences between the German and American regimes.

In Chapter 3, I discussed the more elementary institutional differences underlying the distinction between ‘employment exit’ and ‘market-induced employment maintenance’. Building on previous research, I emphasized German-American differences in the following dimensions: skill specificity and the strength of labor market boundaries, labor market regulation in the form dismissal protection, continuing training participation, and – last, but by no means least – retirement income provision and social policy more broadly. I also hinted at the ways in which these more elementary differences depend on, and likely reinforce, one another. Not only do these differences generally work in the same direction: For example, Germany’s specific skills regime arguably results in marked labor market boundaries that limit the opportunities for reemployment, while more generous public benefits pull displaced older workers toward retirement. It is also often suggested that these institutional elements are interrelated in a deeper sense: Thus, Estevez-Abe et al. (2001) suggest that more generous, welfare-sustaining social policies help to overcome workers’ reluctance to invest in specific skills.

Regardless of how convincing such explanations are, the empirical fact of institutional covariation (or clustering) makes it difficult to attribute overall differences in life course outcomes to more elementary institutional factors (and their interaction). On a somewhat higher level of abstraction, however, the findings of this study provide compelling evidence that ‘institutions matter’: The institutional ‘packages’ captured by the distinction between employment exit and employment maintenance have clearly shaped the employment/retirement trajectories of displaced older workers and their families in distinctive and expectable ways, at least during the last three decades.

Have recent reforms raised the costs of career interruptions and involuntary early retirement?

A common and plausible assumption is that the retrenchment of early retirement options and other recent changes in social policy have disproportionately affected workers whose late careers are interrupted by job loss

or the onset of health problems – and that such workers may fall further behind as social policy continues to emphasize later retirement (Bäcker et al. 2009; Köhler-Rama et al. 2010; Johnson 2011; Kingson and Morrissey 2012). There are also reasons to suspect that such changes have been (and will be) particularly consequential in the German context where various factors depress the reemployment prospects of displaced older workers. In other words, the very reasoning that suggests institutional affinities between, say, an emphasis on specific skills and generous early exit policies also suggests that retrenchment of the latter may be more consequential in the presence of the former.

To address this issue, I have followed other recent studies (e.g., Szinovacz and Davey 2005; Lachance and Seligman 2010; Barrett and Brzozowski 2010) and adopted a basic distinction between involuntary retirees who retire after a late-career job loss or the onset of severe health problems and voluntary retirees whose retirement is not preceded by either of these events.

Definitive conclusions were hampered by small sample sizes, but especially for German men there is relatively clear evidence that the gap between involuntary and voluntary retirees has widened and that the effect of late-career job loss on economic well-being has become more severe in recent years. More specifically, the analysis of income changes around exit from work in Chapter 6 consistently revealed more unfavorable trends for German men who retired involuntarily (i.e., after job loss or a decline in health) than for German men classified as voluntary retirees. The analysis of the consequences of job loss in Chapter 8 corroborated this result. Here, I found that differences in relative income changes between displaced German men and similar non-displaced workers were larger in the second half of the observation period, even though period differences did not quite attain statistical significance. For both German and American men, I also found that the risk of suffering very large declines of more than half of disposable income rose over time, both in absolute terms and compared to similar non-displaced workers – and that these growing gaps persist at least until 4 to 5 years after late-career job loss.

These findings, while somewhat preliminary, suggest that, especially in Germany, workers whose late-careers were interrupted by job loss or declining health have indeed fallen behind as early retirement options have been scaled back. Closely tracking the situation of these workers thus appears imperative, especially since many of the policy changes that have arguably made late-career job loss and involuntary early retirement more costly were introduced only gradually (e.g., benefit adjustments for early retirement

in Germany) and/or toward the very end of the observation period (e.g., the abolition of second-tier earnings-related unemployment benefits in Germany or increases in the full retirement age in both countries).

In general, as noted by Richard Johnson (2011), a key challenge facing policymakers who wish to 'Raise the Retirement Age' is to 'Protect those Who Can't Work'. One should add that another crucial task is to help older workers, who can work, but are so unlucky as to lose their job, find decent reemployment. The American results suggest that at least some older workers and their families have to go to considerable lengths to limit the extent of downward mobility after late-career job loss – despite facing a labor market that arguably offers relatively good opportunities for older workers and despite macroeconomic conditions being quite favorable during the observation period.

9.2 Implications and directions for future research

This study has addressed a large number of questions, yet some interesting issues had to be excluded from the outset, due to lack of suitable data and/or limits of scope. The analysis also generated several findings that call for further research, but could not be pursued within the confines of this study. In this concluding section, I discuss what I consider the most important issues to be subjected to further scrutiny.

Investigating retirement income dynamics by household/earnings type

A general result of my analysis of income changes around retirement is that trends over time have been more favorable for women, especially in the US. Borrowing a phrase from Blau and Kahn (1997), women have been 'swimming upstream'. For simplicity and conciseness, I have focused on average effects of men's and women's retirement across different household types. In view of the gender-specific trends, one might expect improvements for women to have at least partly offset the trend toward larger income losses for men in dual-earner couples where both partners have substantial labor force attachment and therefore belong to the population that is at risk of retirement (as defined in this study). By the same token, one would expect to find the clearest negative trends for single men (a relatively small group) and male-breadwinner couples.

Unfortunately, a full-fledged analysis that differentiates retirees with respect to household earnings arrangements and joint retirement

trajectories was beyond the scope of this study. Exploring the net effect of gender-specific trends for dual-earner couples is particularly vexing, not only because of the general problem of household instability, but also because the two partners may often retire several years apart. The most compelling longitudinal approach to retirement-related income dynamics in dual-earner couples would thus require tracking households for rather long periods of time. Analyzing the full retirement trajectory appears crucial because couples' retirement decisions are interdependent and because educational homogamy and assortative mating may result in strong correlations between spouses' retirement outcomes. For example, the trend toward greater educational inequalities in complementary retirement wealth suggests that the extent to which women's gains have offset the losses of men may be very limited in couples where both partners have low levels of education. To the extent that such comprehensive analyses are not feasible, longitudinal analyses of individual retirement events that differentiate by household type or even cross-sectional analyses of 'fully retired' couples may be useful first steps.

Using alternative measures of (economic) well-being

At the beginning of Chapter 2, I discussed a number of factors that render income a less-than-perfect proxy for individual economic well-being. In particular, a decline in income around retirement need not imply lower economic well-being, as individuals may also experience a decline in work-related expenses, no longer need to save for retirement, and may be able to draw on non-annuitized savings to finance consumption.

A popular alternative to using income measures, especially in economics, therefore is to look at changes in expenditure which are often believed to provide a better approximation to consumption levels. As discussed in Chapter 2, the case for focusing on changes in expenditure may be less compelling than is often suggested. In particular, income may better capture individuals' access to resources in the longer run, particularly if they are 'underannuitized' or overconsume in their early retirement years. In addition, relating changes in expenditure/consumption to changes in economic well-being requires strong assumptions concerning changes in household needs. For example, one would expect non-discretionary expenses on (work-related) travel or clothing to fall at retirement. Yet one would not expect expenditure on these commodities to drop to zero and few data sets contain enough information to credibly differentiate between necessary and discretionary expenses. Often, data restrictions even force

researchers to focus on expenditure for a narrow set of commodities such as food (Smith 2006; Barrett and Brzozowski 2010). However, there may be ample room for declines in expenditure on goods that are 'less essential' than food.

In short, other approaches to measuring changes in economic well-being tend to have their own set of limitations. Nevertheless, it is certainly worth trying to triangulate the findings of this study using other outcome measures. More generally, surveys should seek to collect alternative measures of individuals' economic situation. Respondents' own evaluation of their economic situation or indicators of financial hardship or difficulties to 'make ends meet' might provide useful additional information, as might more direct measures of standard of living (e.g., in the spirit of the relative deprivation approach of Townsend [1979]).

Another valuable extension of the analysis would be to incorporate information on retirees' non-annuitized wealth, including housing wealth. For many households, wealth undoubtedly plays a crucial role in maintaining economic well-being during retirement, and clearly growing income losses will be of less concern to workers who can rely on a sizable amount of assets. At the same time, it seems unlikely that wealth is distributed in such a way as to effectively cushion recent and projected trends toward greater economic insecurity and poverty risks for vulnerable groups such as less-educated workers (Motel-Klingebiel and Vogel 2013).

Some of the findings concerning the consequences late-career job loss also suggest that displaced American workers and their families may often sacrifice leisure time in order to limit the impact of job loss on economic well-being. The positive reading of this finding is that the American labor market provides sufficient opportunities for older workers. The negative reading is that limited public insurance forces displaced workers and their families to make sacrifices in other domains such as leisure time and job quality in order to contain declines in economic well-being. Against this background, it would be interesting to investigate this trade-off between economic well-being and other relevant domains more directly. Analyses of the impact of job loss on overall subjective well-being or life satisfaction, which at least until recently was unfortunately not collected by the PSID, might add important details to the picture.

Studying longer-term changes

A related question is how the income situation of retirees and displaced older workers changes in the longer run. Given my focus on within-country

trends, it was not feasible to look at changes beyond the fourth or fifth year after the event in question. The study by Hungerford (2003) suggests that long-term changes are more favorable for German retirees, as they draw a larger portion of their retirement income from public sources, which tends to be indexed at higher rates than private retirement income. By the same token, as complementary pension income is becoming more important in Germany, so will be the question how these benefits evolve in the longer run (Künemund et al. 2010, 2013).

Another interesting issue is to what extent the income scars associated with late-career job loss persist beyond my individual-level observation window which ends 4 to 5 years after late-career job loss. Findings for the average displaced man do not suggest that the disposable income gap narrows substantially between 2 to 3 and 4 to 5 years after job loss. However, it does seem likely that the gap eventually declines as more and more comparison workers leave employment. When and to what extent this is the case, and if the gap eventually vanishes completely or perhaps even reverses (as some displaced workers seek to make up for foregone earnings), are interesting questions for future research.

It also seems worthwhile to apply the trigger events approach to income dynamics after retirement age. The work of Zaidi and his colleagues (Zaidi et al. 2005; Zaidi 2008) makes first steps in this direction. A related question is how the financial needs of retirees change over the course of retirement. A common view is that needs are more likely to increase than to fall, mainly due to increasing health- and care-related expenses (e.g., Schmähl 2010).

Using a holistic approach to the late career

The clear differences in the propensity of German and American workers to return to work after late-career job loss suggest that involuntary retirement, as it is commonly operationalized, has quite different meanings in different contexts. In particular, as noted above, my results suggest a bifurcated pattern for the US, with job loss inducing earlier-than-planned retirement for one group, and later-than-planned retirement for a second group of workers.

A promising approach for capturing these and other complexities of late career patterns would be to take a more holistic perspective that nevertheless emphasizes the role of unexpected events. Arguably, a distinction between fragile late careers that are interrupted by job loss or declining health (and perhaps a few other events) and smooth careers that are not should be central to this approach. Building on this basic distinction, a

limited number of ideal typical career trajectories could then be identified, either on the basis of theoretical considerations or using a more inductive approach such as a combination of cluster and sequence analysis (Fasang 2008). While the prevalence of different career patterns would be interesting in itself, this approach could be fruitfully combined with an analysis of income trajectories within the trigger events framework. An obvious practical impediment to such an approach, and a major reason why it was not pursued in this study, is that its compelling application would require considerably longer individual panels than could be used in this study, where investigation of changes over time was an important priority.

Better understanding the job search of displaced older workers

Given the growing emphasis on late retirement, it is crucial to better understand the reemployment/retirement decisions of displaced older workers as well as their job search process. What factors determine whether a displaced older worker decides to look for work and how good are the chances that he/she eventually succeeds? What kinds of jobs are displaced older workers offered, both in terms of wages and in terms of non-monetary aspects of job quality, and how do these offers compare to their expectations and preferences?

Studies such as Maestas and Li (2006) which take a closer look at the job search process of older workers can shed light on these questions and help to design effective measures for improving the reemployment prospects of displaced older workers. However, Maestas and Li's analysis, which is based on the Health and Retirement Study, also highlights a problem with conventional panel data sets: Interview intervals are too long – two years in their case – to enable a thorough understanding of the job search process. Better data are therefore urgently needed. High frequency longitudinal surveys that conduct monthly or even weekly interviews with job searchers (cf. Krueger and Mueller 2011), though admittedly costly, would be an extremely valuable resource for obtaining a more detailed and useful picture of the job search process of displaced older workers.

List of acronyms

ALGII	Arbeitslosengeld II
AFDC	Aid to Families with Dependent Children
AIME	Average Indexed Monthly Earnings
ATE	Average Treatment Effect
ATN	Average Treatment Effect on the Non-treated
ATT	Average Treatment Effect on the Treated
AWE	Added-Worker Effect
BA	Bundesagentur für Arbeit
CEM	Coarsened Exact Matching
CME	Coordinated Market Economy
CNEF	Cross-National Equivalent File
DB	Defined-Benefit
DC	Defined-Contribution
DE	Deutschland (Germany)
DGUV	Deutsche Gesetzliche Unfallversicherung
DID	Difference-in-Differences
DRV	Deutsche Rentenversicherung
EB	Entropy Balancing
EM	Exact Matching
EITC	Earned Income Tax Credit
EPL	Employment Protection Legislation
EPR	Employment to Population Ratio
EU	European Union
FD	First-Difference
FE	Fixed-Effects
FPATT	Feasible Population Average Treatment Effect on the Treated
FSATT	Feasible Sample Average Treatment Effect on the Treated
FT	Full-Time
GAE	Grundsicherung im Alter und bei Erwerbsminderung
GDP	Gross Domestic Product
HEL	Household Earnings Loss
HH	Household
HHT	Household Taxes
HJL	Hypothesis – Job Loss
HRS	Health and Retirement Study
HVR	Hypothesis – Voluntary Retirement
IEL	Individual Earnings Loss

IRA	Individual Retirement Account
JL	Job Loss
LME	Liberal Market Economy
OAP	Old-Age Pension
OECD	Organisation for Economic Co-operation and Development
PATE	Population Average Treatment Effect
PATN	Population Average Treatment Effect on the Non-treated
PATT	Population Average Treatment Effect on the Treated
PAYG	Pay-As-You-Go
PIA	Primary Insurance Amount
PIB	Private Income Buffer
PNLI	Private Non-Labor Income
PPP	Purchasing Power Parity
PPTI	Public Pension and Transfer Income
PSID	Panel Study of Income Dynamics
PSM	Propensity Score Matching
PT	Part-Time
PTPT	Pre-Tax Post-Transfer
RAT	Retirement Age Tercile
SATE	Sample Average Treatment Effect
SATN	Sample Average Treatment Effect on the Non-treated
SATT	Sample Average Treatment Effect on the Treated
SD	Standard Deviation
SGA	Substantial Gainful Activity
SH	Sozialhilfe
SIPP	Survey of Income and Program Participation
SOEP	Socio-Economic Panel
SSA	Social Security Administration
SSI	Supplemental Security Income
SSW	Social Security Wealth
TANF	Temporary Assistance for Needy Families
TNSIT	TNS Infratest
UK	United Kingdom
US	United States
USD	United States Dollars
USDOL	United States Department of Labor
USHOR	United States House of Representatives
VOC	Varieties of Capitalism
WSB	Welfare State Buffer

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