**Universität Bamberg**
**Fakultät für Sozial- und Wirtschaftswissenschaften**


# Labor Market Participation of Older Workers: Employment beyond Retirement and Old Age Poverty

**Dissertation**

zur Erlangung des Grades eines Doktors der
Sozial- und Wirtschaftswissenschaft

vorgelegt von
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# Acknowledgements

Over the past five years, as I moved from an idea to a completed study, I have received support and encouragement from a great number of people. Many thanks go to my advisor, Prof. Dr. Olaf Struck, for his guidance on this research. His dedication to my work and encouraging support is very much appreciated. I am also grateful to the members of my dissertation committee Prof. Dr. Johannes Giesecke and Prof. Dr. Sandra Buchholz for their interest in my research and their advice.

This thesis was prepared during my time at the Institute for Employment Research and the University of Michigan. I thank all my colleagues for their support. Furthermore, I have profited a lot from helpful suggestions and comments on my research from the participants of the PhD Workshops at the University of Bamberg and the Quantitative Sociology Workshop at the University of Michigan. Part of my thesis has been written within the project "Biographical Data of selected Insurance Agencies in Germany". The financial support of the German Federal Ministry of Education and Research, and the support of all members within this collaboration is gratefully acknowledged.

Many thanks go to Carola Burkert, Dana Müller and Anja Wurdack for the pleasant and encouraging collaboration. In addition, I would like to thank Stefan Bender, Gwen Fisher, Stefan Fuchs, Martina Huber, Peter Jacobebbinghaus, Elke Jahn, Patrycja Scioch and Rüdiger Wapler for generously sharing their time and ideas. I have learned much through our conversations. Special thanks go to Marion König, who has provided valuable statistical advise and spent countless hours listening to me talk about my research. Tracy Simmons and Cynthia Doniger have done an amazing job of language editing.

Final thanks go to my family and friends. My parents and my sister continuously supported me in realizing my dissertation. I would like to thank Anja, Claudia, Coni, Dana, Jasse, Lauren, Marion, Martina, Meredith, Nina, Pami, Patty, Regina, Ruth, Stefan, Till, Tilsitter, Tina, and Tracy for accepting nothing less than completion from me and all the conversations we shared on my research and beyond. I am very grateful to your belief in me throughout the entire time.

Ann Arbor, MI, July 2013

Daniela Hochfellner

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# Chapter 1

# Introduction

Low fertility rates, increasing life expectancy, and a low net migration rate accelerate demographic change in Germany. The resulting demographic forecast is characterized by a striking decline and rapid aging of the population of working age, as well as an increasing share of the population of ages 65 and above. These trends put stress on the labor market, the social security system, and individuals.

Labor shortages will influence processes in the labor market. Social security is facing shortfalls resulting in lower benefits and replacement rates (see Börsch-Supan and Wilke, 2006; Bonin, 2009; Kerschbaumer, 2013). Individuals are confronted with reduced pension income and therefore the risk of living in old-age poverty when retired (see Bäcker, 2011; Goebel and Grabka, 2011; Kumpmann, Gühne, and Buscher, 2010; Noll and Weick, 2009; Seils, 2013). The aforementioned scenarios will all require individuals to work longer and firms to meet the demands of an older workforce (see Kalleberg, 2003; Räder, 2013). The social security and pension budgets may have to be stabilized by longer contribution periods. Individuals might have to extend their late careers or stay in the labor market whilst claiming pension benefits to augment additional income (see Bönke, Schröder, and Schulte, 2010; Fields and Mitchell, 1984; Hershey, Henkens, and van Dalen, 2010a; Komp, van Tilburg, and van Groenou, 2010; Lain, 2011).

The recent demographic developments do not only affect individuals, firms, and institutions, they also shape society on a macro-level. Established structures and life course trajectories of the past decades dissolve slowly and clear the way for realignments in post-modern societies (see Amrhein, 2004; Guillemard, 1991; Kohli, 2000; Riley and Riley, 1994). For instance, the well-established male-breadwinner-employment model, defined as stable and

three-part employment career of men to support their families, becomes less important in favor of heterogeneous life course arrangements. In addition, interruptions of employment careers and more flexible life course transitions replace continuous working biographies and promote the evolution of patchwork biographies (see Frommert, Heien, and Loose, 2013; Geyer and Steiner, 2010; Giesecke and Heisig, 2010; Reynolds, Ridley, and Horn, 2005; Simonson, Gordo, and Kelle, 2011; Simonson, Kelle, Gordo, Grabka, Rasner, and Westermeier, 2012).

One type of these new arising patchwork biographies is the flexible transition into retirement and staying in the labor market beyond retirement (see Kohli and Künemund, 1996; Sendler, 2011). Previous studies show that the willingness to continue working whilst being officially retired in Germany has increased over the past years (e.g., Dittrich, Büsch, and Micheel, 2011; Maxin and Deller, 2010; Micheel, Roloff, and Wickenheiser, 2011; Panova, 2013). The German government announced that in 2010 the share of employed retirees who were between the age of 65 and 75 increased by 30 percentage points in comparison to 2000. Table 1.1 displays the labor force participation of people at the age of 65 and above in 2010.

**Table 1.1:** Labor market participation beyond normal retirement age of 65 in 2010

| Age | 65 | 66 | 67 | 68 | 69 |
|---|---|---|---|---|---|
| Employed (in percent) | 9.6 | 8.0 | 6.8 | 6.2 | 5.2 |

*Source: German Institute for Old-Age Provision (http://www.dia-vorsorge.de/524-0-Gleitender+Uebergang+ins+Rentenalter.htm, accessed on 11/15/2012)*

The economic socialization of retirement observed in the society is a devel-

opment which can be supported by public policy to disburden social security. By providing incentives for people to work longer, for instance, contributions can be raised. To find the right incentives the understanding of changes in biographies, in particular the arise in post-retirement employment within the society is essential.

The outlined changes on the macro-level can be explained by studying outcomes on the micro-level and the link between these two levels (see Coleman, 1990; Raub and Voss, 1981). By studying post-retirement employment trajectories on the micro-level public policy will know what factors support working beyond retirement and where incentives have to be placed to increase the labor force participation of older individuals. Studying individual behavior on the micro-level is the key to find ways to deal with the impacts of population aging on the macro-level. By transferring micro-level outcomes to the society level, the rising difficulties of population aging on the macro-level can be countervailed.

Different push-and-pull-factors determine different employment outcomes within or beyond the retirement transition (see Clemens and Himmelreicher, 2008; Davis, 2003; Hanson Frieze, Olson, and Murrell, 2011; Radl, 2007; Shultz, Morton, and Weckerle, 1998; Wang, Zhan, Liu, and Shultz, 2008). For instance, workers may leave the labor force directly from their career job or transition step wise through bridge jobs. Another alternative is to retire and start claiming pension benefits without leaving the labor force. To develop long-lasting efficient changes in public policy, understanding employment trajectories and transitions in employment beyond retirement is important. However, different motivations for the engagement in post-retirement employment and different outcomes of post-retirement employment are not understood in their

complexity so far, particularly in Germany. There is little research on this topic in Germany. On the contrary, in the United Kingdom and the United States post-retirement employment is addressed in more detail.[1]

Individuals' motivations to work beyond retirement are discussed in public, politics, and social sciences. Two arguments oppose each other in the discourse: It is possible that post-retirement employment, while necessary to earn additional income, is a burden for people facing the risk of old-age poverty. On the other hand, it is possible that post-retirement employment is a preferred activity, for example for highly-skilled retirees who are highly committed to working (see Haider and Loughran, 2001; Kohli and Künemund, 1996; Komp, van Tilburg, and van Groenou, 2010; Maestas, 2010; Radl, 2012; Reynolds, Ridley, and Horn, 2005; Scherger, Hagemann, Hokema, and Lux, 2012).

The argument supporting the first explanation of post-retirement employment implies that public pension benefits serve as a main source of income at a mature stage of life to preserve standards of living beyond retirement (Schulze and Jochem, 2007). However, pension income often does not cover maintenance. Due to pension cuts, more and more people show a pension wealth which comes close to OECD poverty measures (see Blank and Buschoff, 2013; Stöger, 2011). Thus, the risk of being affected by old-age poverty is considered to be a problem in the German society (see Seils, 2013; Zaidi, 2010; Zhu, Weißenborn, and Buscher, 2011). The problem will increase in the future because the German population is continuously aging, which will affect pension expenditures. To keep expenditures on a moderate level, the "Riester Reform" in 2001 implemented pension cutbacks. In particular, retirees in the

[1] Chapter 2 contains a section on the review of literature on employment beyond retirement.

near future will suffer from pension losses, because they only have little time left to accumulate private savings to substitute their pension losses (Börsch-Supan, Gasche, and Lamla, 2013). One way of avoiding old-age poverty is to stay in the labor force beyond retirement.

The argument of voluntarily continuation of work is derived from concepts called “the new elderly" or “active aging" (see Grabka, 2013; Graefe and Lessenich, 2012; Jansen, 2013; Kohli and Künemund, 1996; Nowossadeck and Vogel, 2013; van Dyk, Lessenich, Denninger, and Richter, 2013). These conceptions of maturity refer to wealthy and healthy, educated and open minded people at older age who are able and willing to stay in productive activities. Increasing life expectancy and the on average better health condition of the older generation nowadays, enable an energetic life-style for the elderly beyond retirement. The activation of the elderly is discussed as one possibility to deal with the aftermaths of the demographic change (see Burkert and Sproß, 2007; Dorbritz and Micheel, 2010; Lessenich, 2012a; McNair, 2006; Naegele, 2013). In theory, society and individuals benefit at the same time. Society benefits from the resources of the elderly, and the elderly benefit because their work is appreciated by society.

Hence, the discussed reasons for post-retirement employment are economic or psycho-social preferences. Although there are different opinions on the motivation to engage in post-retirement employment, there is consensus within the debate on the reasons of post-retirement employment: the situation prior to retirement influences the transition and the life beyond retirement (see Chapter 2 for a detailed literature review).

Being aware of the individuals' positions in the labor market prior to retirement is important, because social inequalities throughout the life course are transferred into retirement (see Bönke, Schröder, and Schulte, 2010; Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Cotter, Hermsen, and Vanneman, 2002; Heribert, 2006).

Affected by transmission of social inequality into later life due to path-dependency, changes in the labor market have increased uncertainty for specific demographic groups. These inequalities are then transferred into retirement and influence post-retirement decision making. Public policy discusses mainly two groups which are most affected by uncertainty in older age. Firstly women, because they are more likely to experience interrupted employment histories (see Aisenbrey, Evertsson, and Grunow, 2009; Beblo, Bender, and Wolf, 2009; Frommert, Heien, and Loose, 2013; Gangl and Ziefle, 2009). They often work part-time or in atypical employment to reconcile family formation and working life (see Dobrič, 2000; Simonson, Gordo, and Titova, 2011). Secondly, immigrants are facing problems in the labor market (see Deutsches Zentrum für Altersfragen, 2006; Frick, Grabka, Groh-Samberg, Hertel, and Tucci, 2009; Kalter, 2005). They often work in less qualified or unstable jobs, because of their not accredited foreign education or missing language skills (Englmann and Müller, 2007).

This doctoral thesis is one of the few existing studies on motivations and influencing factors of post-retirement employment in Germany. It is the first study which implements a longitudinal micro-macro perspective. My research contributes new insights to the relationship of individuals' and firms' attributes and post-retirement employment, while comparing different demographic groups affected by uncertainty in the labor market. Another

contribution to literature is the examination of actual employment behavior in retirement instead of only focusing on expectations of how people think they would behave once they are retired.

The theoretical model shows how changes within the society influence individual behavior and the development of post-retirement employment as one type within the concept of emerging patchwork biographies in society. By explaining individual behavior regarding post-retirement employment my research identifies attributes which can be used by public policy to support changes within the society. On the micro-level I pursue a two-stage research framework. First, I examine the probability of pursuing post-retirement employment. Conditional on being in the labor force in retirement, in the second stage, I study transition times into different post-retirement jobs trajectories.

Thus, my dissertation comprises different research questions. First, I am interested in explaining post-retirement employment outcomes. The goal is to explain what factors drive employment in retirement, in particular if there is evidence for the arguments of the outlined policy debate. Is the probability of post-retirement employment higher for people with lower income profiles (economic preferences) or simply the continuation of the employment career (psycho-social preferences)? This implies analyzing retired individuals. In the second step, I restrict my study to the retirees in the labor force and compare their transition times into different post-retirement employment trajectories. In addition, pre-retirement employment histories of older workers are discussed, because they are considered to be an important factor to predict post-retirement employment.

My study is done by using administrative data called BASiD (see Hochfellner, Müller, and Wurdack, 2011). The data allows me to identify employed retirees, and to trace individuals' whole employment careers. Furthermore, the number of 25.000 retirees in the sample enable detailed analyses to gain new evidence on gender and ethnic differences in respect to post-retirement employment behavior. I apply logistic and linear probability models, as well as proportional hazard models accounting for competing risks in the empirical estimations of the theoretical model.

In sum, my research shows that a considerable portion of retirees in Germany are employed. The probability of holding a post-retirement job is declining with increasing pension incomes. Retirees with higher labor market attachment show the highest probabilities of staying in their work environment after retirement. In contrast, retirees who are exposed to old age poverty are more likely to switch their working environments in retirement. I show that preferences for post-retirement employment are not mutually exclusive. This indicates that the political debate on post-retirement employment has to shift from discussing the reason for post-retirement employment and the "one size fits all" policy approach, towards a debate on the heterogeneity of the workforce beyond retirement, and how different groups can be supported efficiently by a mix of different policy strategies.

The dissertation is arranged in eight chapters, which build upon each other and discuss institutional settings, theories, data and methods, results and implications for public policy. The following paragraphs give a brief overview on the content of each chapter.

Institutional and theoretical knowledge about retirement is mandatory

when examining post-retirement employment trajectories, because this is considered as one of the components, which comprises the framework of individuals' decision-making on the micro-level (see Engelhardt, 2012; Blossfeld, Buchholz, and Hofäcker, 2006). Policy regulations might put constraints on peoples' decisions in retirement, and transitions into retirement are characterized differently in different academic disciplines. Chapter 2 outlines the institutional background in Germany and defines the concept of retirement I use in my thesis. In addition, the current state of research addressing transitions into retirement and post-retirement employment is discussed.

Chapter 3 outlines the theoretical micro-macro model I use for the empirical analyses (see Coleman, 1990). I transfer the classical Coleman approach to model the micro-macro relationship of individual post-retirement outcomes and changes within society. After describing changes and influencing factors on the macro-level the theories used to study outcomes of individual behavior on the micro-level are discussed (e.g., Atchley, 1989; Burtless and Moffitt, 1985; Elder, 1995; Kohli and Rein, 1991). The chapter concludes with introducing hypotheses on push-and-pull factors of post-retirement employment behavior which are then empirically examined by using administrative data.

Data which support studies on post-retirement employment in Germany are rare. I use unique German social security data of the Federal Employment Agency in Germany, which I linked to pension accounts for studying determinants of various employment patterns beyond retirement within the project "Biographical Data of Selected Social Insurance Agencies" (see Hochfellner, Müller, and Wurdack, 2011). Chapter 4 describes the routines and methodologies used for generating the data. In addition, data characteristics and the procedure for selecting the population to be studied in the remainder of

the dissertation is described. The second part of Chapter 4 focuses on the explanation of the econometric methods used in the empirical estimations.

Studies investigating labor market participation beyond retirement typically agree on the important influencing factors of continued work: The employment biography and the position in the labor market during the career job before retirement (see Chapter 2 for a detailed discussion of literature). Pre-retirement labor force participation also sets conditions for individuals' decision-making regarding post-retirement employment behavior (Beehr, 1986). Thus, Chapter 5 describes pre-retirement employment characteristics of older people, which are also included as explanatory variables in the multivariate analyses to account for differences in pre-retirement employment of the observed demographic groups.

In Chapter 6, I discuss if post-retirement employment in Germany is related to the necessity of gaining additional earnings to prevent against old-age poverty or the continuation of employment in the sense of "active aging". By applying logistic and linear regression models of the probability of being employed beyond retirement, I answer the question which factors influence post-retirement employment. I suggest that post-retirement workers differ in their characteristics. First, there are employed retirees who are pushed into the labor market because of their low pension incomes. Second, there are employed retirees who are pulled into the labor market because of the their higher labor market attachment. The higher labor market attachment provides them access to qualified jobs, and entices them to remain in or re-enter the labor market even though their retirement income is high.

The knowledge of attributes influencing the probability of holding post-retirement jobs leads to various follow-up questions. Do retirees continue their careers in retirement, or is it more likely to switch firms or occupations? Do transition times into different post-retirement trajectories differ with observable characteristics? Chapter 7, addresses these questions. I examine to what extent employment histories, individuals' attributes, and firm characteristics influence the likelihood of pursuing different kind of jobs beyond retirement. In order to do this I employ a proportional sub-hazard model accounting for competing risks.

My findings are important for public policy and the implications for public policy are discussed in detail in Chapter 8. They can be used to design public policy reforms which are aligned to particular demands of different post-retirement workers. By knowing individual preferences and push-and-pull factors to engage in post-retirement employment public policy is able to support retirees according their specific needs, for instance, job search training or the improvement of age-based work places. By aggregating individual outcomes it is possible to provide evidence how these individual outcomes are transferred to society. I outline how the identified outcomes on the micro-level can be aggregated to explain changes within the society, as well as where public policy can place incentives to support changes within the society such as extending working lives to countervail the impacts of demographic aging and support social security.

# Chapter 2

# Institutional Background and Current State of Research

## 2.1 Overview

Post-retirement employment is a topic which has gained a lot of interest recently, both from politics and academia. So far, there has been no demand to discuss if retirees need additional income in retirement, because the inter-generational contract implied in the German pension system worked well. But changes in the composition of the population and workforce put pressure on the social systems (see Börsch-Supan, 2003; Engelhardt, 2012; Geyer and Steiner, 2010; Giesecke and Heisig, 2010; Struck, 2006; Trischler, 2012). In addition, globalization is influencing developments on the labor market (Blossfeld, Buchholz, and Hofäcker, 2006; Mills, 2009). This is why the demand on studies on aging and retirement is continuously rising. In addition, employment shares of people above the age of 65 have been rising lately, so is the interest in explaining post-retirement employment.

This matter of fact is not only true for Germany. Countries within the European Union, as well as the United Sates and Canada have to deal with the same impacts of population aging and the pressure within the social systems (see Börsch-Supan and Wilke, 2009a; Gonzalez-Eiras and Niepelt, 2012; Gruber and Wise, 2004; OECD, 2011; Schulze and Jochem, 2007). The impacts might differ slightly across countries, however the improvement of labor force participation of the elderly is the same goal for all modern societies (Taylor, 2010). Whereas in the United States research on different forms of employment in older age has started a decade ago, in Germany this kind of research is in its early stages. The reason for the delayed interested in post-retirement employment in Germany goes back to the structures in the labor market. In contrast to the United States, the German labor market is more regulated and the pension benefits are not dependent on the economy in the same extent as

in the United States. Thus, the phenomenon of post-retirement employment has not been that visible in Germany so far. But with the recent changes in society and on the labor market post-retirement employment is getting more apparent in Germany.

Research as well as politics have addressed the extension of employment careers in general (e.g., Brussig, 2010; Bundestag, 2010; Burkert and Sproß, 2007; Phillipson and Smith, 2005). Public Policy has implemented changes within the German pension system, for instance the “Riester-Rente" (Börsch-Supan and Wilke, 2006). Academic research mainly focuses on motivations and constraints of individuals to extent their working life (for a detailed discussion of previous studies see Section 2.4). Keywords for these studies are working longer, bridge employment, flexibility of employment careers in old-age, and phased retirement. Within the academic discussion, post-retirement is addressed as one alternative to extent working life (e.g., Dorbritz and Micheel, 2010).

This chapter aims at providing background information which is necessary and often referred to in the field of research on older people in the labor market and in retirement. Section 2.2 provides an overview of the German pension system and the changes already implemented by the government. Section 2.3 discusses different concepts of retirement across different research disciplines and defines the concept used in my dissertation. To conclude this background information chapter, Section 2.4 discusses literature addressing retirement decisions and the extension of employment careers, focusing on post-retirement employment.

## 2.2 The German Pension Insurance

The German pension system is currently designed as a pay as you go scheme to provide the standard of living in retirement for all private and public sector employees entitled to social security. It has been the first established insurance system in the world, founded by Bismarck. His system for social insurance, coming into force in 1891, aimed at providing income security for industrial workers starting at the age of 70. This specific group of workers received little pension payments, because they typically had no farms or savings to rely on in older age (Künemund and Kolland, 2007). Nowadays the pension system covers about 90 percent of the German workforce (Richter and Himmelreicher, 2008). The budget of the pension insurance is separated from the government budget, but subsidized: 70 percent is financed by contributions, 30 percent by indirect taxes and subsidies of the government. Contributions are currently 18.9 percent of gross wages and are shared equally by employers and employees through payroll taxes up to a varying contribution limit (Börsch-Supan and Wilke, 2006).

The pension benefits received are linked to lifetime income, as they are proportional to labor income averaged over the individuals' life course. The yearly income from employment individuals earn is rewarded with a specific amount of earning points. Pension benefits received differ according various pension types, eligibility, and retirement age. They are calculated as a function of four indicators:

$$P_{t,i} = EP_i * CY_i * AF_i * PV_t \tag{2.1}$$

Earning points $EP$, which display the relative position on the earnings distribution, years of contributions $CY$, which regulate when individuals can start

their claims, an adjustment factor $AF$, which adjusts the benefits to the respective pension type, and a pension value $PV$, which acts as macroeconomic reference. It refers to the income distribution between the current worker and the stock of retirees.

So far, the German pension system provided insured individuals a high level of retirement income at reasonable contribution rates and was long seen as an important reason for the social and political stability in Germany. It may be seen as an political instrument within the German welfare state that guarantees a reciprocity and solidarity function (Leiter and Lessenich, 2003). Reciprocity works over time between different generations: the younger generation is responsible for the older one, and as reward will have the younger generation support them. Solidarity is implemented through coverage. Coverage is extended to people who do not contribute, such as unemployed or sick people. In addition, people with low earnings receive a minimum pension payment. Table 2.1 summarizes the different solidarity and reciprocity elements.

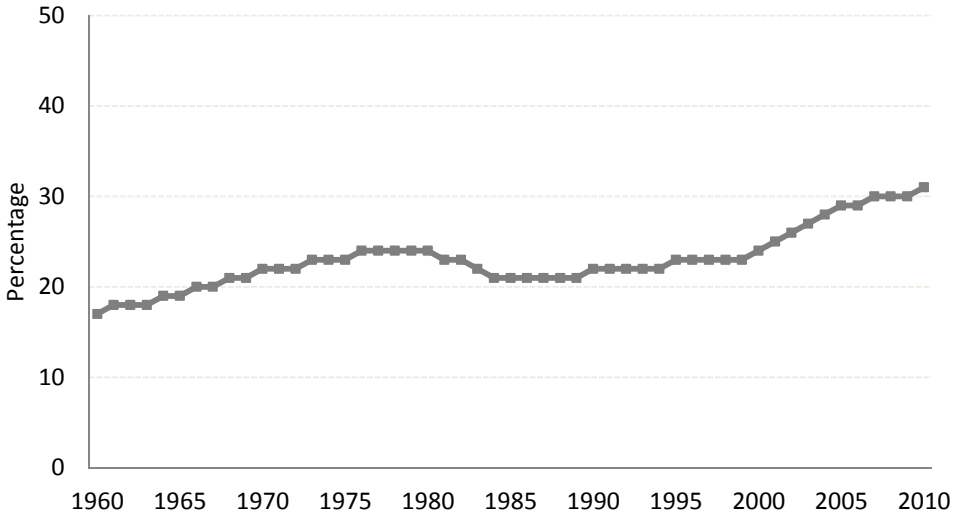
**Table 2.1:** Elements of reciprocity and solidarity in the public pension insurance

| dimensions | reciprocity | solidarity |
|---|---|---|
| coverage | employees | extensions |
| requirement | contributions | exemptions |
| entitlement | related to contributions | exemptions |
| benefits | related to lifetime earnings | |
| financing | payroll taxes | subsidies |

*Source: Leiter and Lessenich (2003)*

But expenditures are continuously rising. In 2001 public pension expenditures made up 21 percent of public spending and 11.8 percent of GDP[2] (Börsch-Supan and Wilke, 2006). The rising age dependency rate, the ratio of individuals aged 65 and above to the working population aged 15 to 64, makes the described untenable in the future. Fewer workers will be assigned to finance the benefits of more recipients. Figure 2.1 shows the change of the age dependency rate over time.

**Figure 2.1:** Age dependency ratio between 1960 to 2010, Germany




*Source: worldbank online data base*

In the future, the dependency rate in Germany will likely continue to climb. It is projected to nearly double, from 24 percent in 2000 to 43 percent in 2030 (Börsch-Supan and Wilke, 2006). This dramatic increase could cause serious problems for the social security system. The largest government expenditures address health and pensions, which are mostly used by individuals of an

[2] The gross domestic product (GDP) comprises the monetary value of all goods and services produced within a country's borders in a certain period of time. Typically GDP is calculated on an annual basis.

older age. If the society is continuously aging, adjustments to the existing system will have to be considered for future stability. Preliminary changes have already been made in three consecutive reforms to change the generous pension system of the 1970's (see, Bonin, 2009; Börsch-Supan and Wilke, 2006; Kerschbaumer, 2013; Künemund and Kolland, 2007).

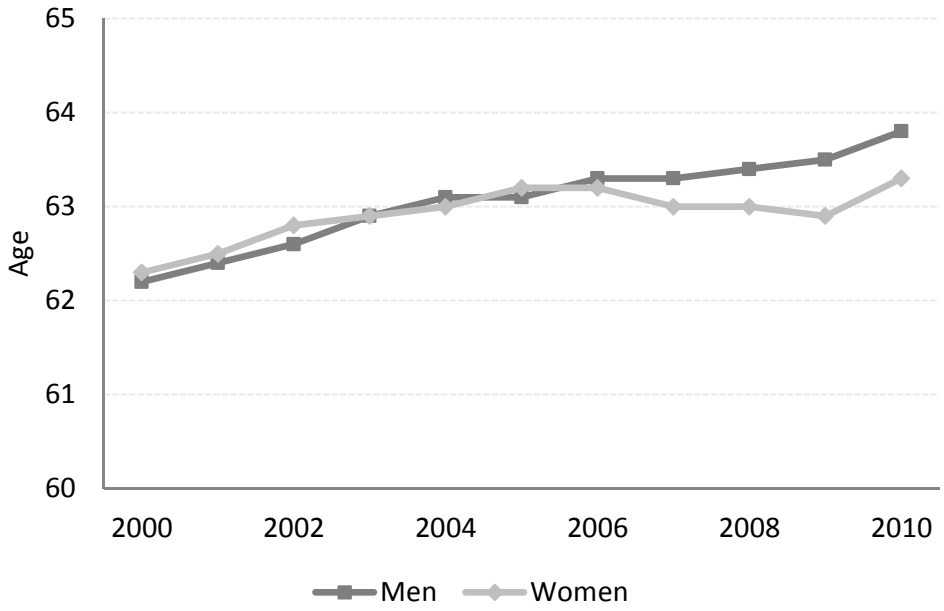
In 1992, the indexation of benefits was changed to net wages instead of gross wages. Overall, this change resulted in reduced benefits, because of increasing contributions and taxes. The normal retirement age was set to 65 years for all insured individuals. Benefit deductions in case of early retirement were introduced. In 1999, pension eligibility for the unemployed and women was increased from 60 to 65 years of age (Börsch-Supan and Wilke, 2006).

In 2001, with the "Riester Reform" major changes were made to the German pension insurance. The aim was to stabilize contribution and replacement rates. Until 2030, the contribution rate must stay below 22 percent. The replacement rate will be reduced from 70 percent to between 67 and 68 percent until 2030. Finally, the formula to calculate the pension value $PV$ was changed. A term reflecting private savings was introduced into the formula to calculate the $PV$. Overall, this lowers public pension receipt by approximately 10 percent. As a result, the reduced pension incomes have to be compensated by private pension plans, which are subsidized by the German government (Börsch-Supan and Wilke, 2006; Kerschbaumer, 2013).

The "Rürupp Kommission" suggested that the reform in 2001 was planned too optimistically. In 2003, an improvement regarding the pension value $PV$ was executed. A sustainability factor has been added. It takes into consideration the ratio of contributing individuals to retired individuals. In

addition, the normal retirement age will increase gradually from 65 to 67 by the year 2035. As Figure 2.2 shows, actual retirement age has increased over recent years, but on average individuals still retire earlier than the normal retirement age of 65 (Börsch-Supan and Wilke, 2006).

**Figure 2.2:** Average actual age at retirement, 2000 to 2010, Germany




*Source: German Pension Insurance*

Hence, raising retirement age cannot be the only reform to reduce expenditures. This measure will only help reduce expenditures if at the same time the extension of individuals' working lives is actively supported by public policy.

In sum, the outlined changes can be explained by shifting the logic the pension system is based on (Leiter and Lessenich, 2003), which is outlined in table 2.1. The dimension shift in their reciprocity or solidarity logic. In the dimension benefits the shift of logic takes place from switching from the concept of providing living standards to the concept of providing basic security.

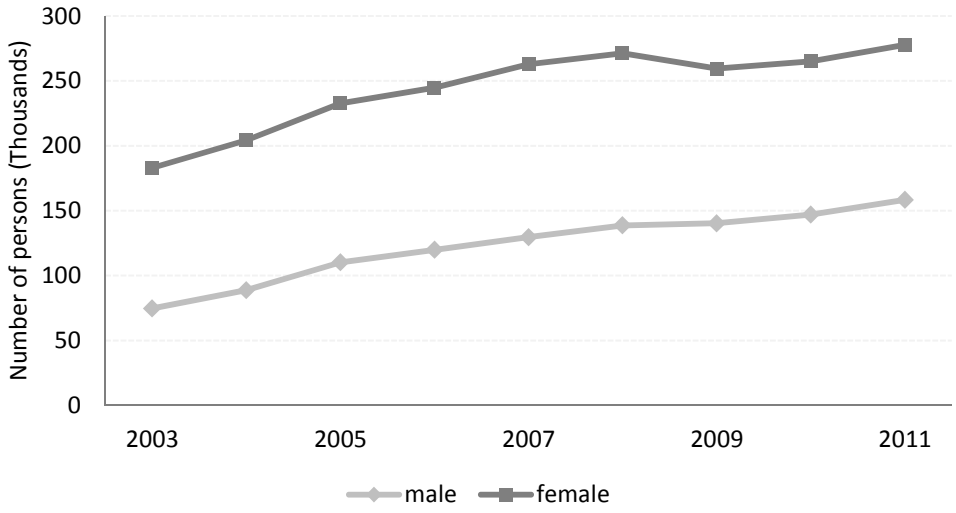
In addition, the pension system is modified according to an insurance policy mix. For instance, people who receive basic security are outsourced from the pension system to a new insurance policy called “Grundsicherung", which is financed by taxes. This means that minimum pension payouts do not exist in the pension budget anymore. The coverage dimension is strengthened in its reciprocity logic. People have to invest in private savings, but only the better off are able to do this. Turing to the coverage, only people who can invest in private savings are covered by the additional private insurance (Leiter and Lessenich, 2003).

The German pension insurance has changed in two dimensions: in the overall mix between assistance and insurance programs and in the balance between elements of reciprocity and solidarity within insurance programs (Leiter and Lessenich, 2003). These movements indicate that the main goal of providing financial stability in old age has become less central and less reliable for the elderly. Currently, the German pension system still pays high replacements rates compared to other countries (Bonin, 2009). According to the Statistik der Deutschen Rentenversicherung (2013), the old-age pension payment for the average retiree [3] in 2012 per month was about 1,263.15€ in West Germany and 1,121.40€ in East Germany. The average retiree is by default gender neutral. However, pension payments for women are typically lower, because women tend to not contribute for 45 years due to family formation. Thus women and people retirees living in East Germany are primarily in danger of old age poverty (see Kerschbaumer, 2013). I consider the pension system an important attribute regarding post-retirement employment. For instance, lower pension incomes might lead to economic preferences.

[3] The average retiree is defined as receiving an regular old age pension payment after contributing 45 years (Statistik der Deutschen Rentenversicherung, 2013)

Future retirees are the ones who are mostly affected by the changes within the pension system. They receive lower benefits, but have not had the chance to invest in private plans throughout their working lives.[4] This would be an additional burden for individuals living at the poverty threshold, which is outlined in Figure 2.3.

**Figure 2.3:** Recipients of state benefits due to poverty of individuals age 65 and older, 2003 to 2011, Germany




*Source: Genesis, online database*

The number of people age 65 and above receiving financial support along with their pension benefits because their benefits are below the poverty threshold increased from almost 260,000 in 2003 to approximately 410,000 in 2010.[5] An

[4] The replacement rate is defined as the percentage of workers lifetime income that is paid out by the pension system upon retirement. A worker with average lifetime income who was employed for 45 years currently receives about 70 percent of pre-retirement net earnings Börsch-Supan and Wilke (2006).

[5] Numbers retrieved from the genesis online database on December 05, 2012.

explanation for this goes back to the way benefits are calculated. Interruptions of employment or reduced working hours result in lower contributions and therefore directly affect the amount of benefits received (see Blank and Buschoff, 2013). Individuals have to accept high benefit reductions if they do not follow the standard employment biography of being full time employed for 30 years. This mostly affects women (see Frommert, Heien, and Loose, 2013) and immigrants (see Mika and Tucci, 2006), and therefore I assume differences in post-retirement employment behavior regarding gender and ethnicity.

Transitions into retirement can be done in different ways. The pension system, for instance, allows early retirement or partial retirement if people want to transition smoothly. However, in the case of early retirement individuals' wages have to stay below a threshold, which makes full-time work impossible. This might affect people who want to stay active in their search for continuity. The different ways of conceptualizing retirement transitions is reflected in the individual and academic perception of retirement. Different disciplines operate in different ways with the definition of retirement. The next section discusses various perspectives used in academia to describe retirement transitions.

## 2.3 Perception of Retirement

The new understanding of retirement as a balanced relationship between work, leisure and learning (Maxin and Deller, 2010; Riley and Riley, 1994) involves different perceptions and definitions across disciplines. Sociology defines retirement as complete withdrawal from working life with economic consequences for society (Künemund and Kolland, 2007). This implies a dynamic definition which is not bound to a specific age at which the tran-

sition takes place. However, the normative retirement age is set through institutions(see Kohli, 1989). Retirement in an institutional sense happens at one point in time. It is directly related to the receipt of pension benefits. When applying this definition, retirement can be described within specific age boundaries. Following these perceptions, statutory retirement is not equal to complete withdrawal from working life. It is possible to retire and start claiming benefits while staying in the labor market.

Both the discrete and continuous perception of retirement are discussed in literature. Previous studies include concepts of early retirement (e.g., Alexsandrowicz, Fasang, Schömann, and Staudinger, 2010; van Dam, van der Vorst, and van der Heijden, 2009; Feldman, 1994; Kohli and Rein, 1991; Shultz, Morton, and Weckerle, 1998; Siegrist, Wahrendorf, von dem Knesebeck, Jürges, and Börsch-Supan, 2006; Wübbeke, 1999), delayed retirement and continued work (e.g., Hanson Frieze, Olson, and Murrell, 2011; Lain, 2012; Phillipson and Smith, 2005; Saba and Guerin, 2005; Shacklock and Brunetto, 2011; Smeaton and McKay, 2003; Stenberg, de Luna, and Westerlund, 2012), bridge jobs or bridge employment (e.g., von Bonsdorff, Shultz, Leskinen, and Tansky, 2009; Cahill, D.Giandrea, and Quinn, 2005; Davis, 2003; Hébert and Luong, 2008; Kim and Feldmann, 2000; Quinn and Kozy, 1996; Shultz, 2001, 2003; Wang, Zhan, Liu, and Shultz, 2008; Wang, Adams, Beehr, and Shultz, 2009; Wang and Shultz, 2010; Wannell, 2007), phased retirement (e.g., Beehr, 1986; Cahill, Giandrea, and Quinn, 2006; Hutchens, 2007; Mehraban Pienta and Hayward, 2002; Phillipson, 2004; Radl, 2006), un-retirement or reverse retirement (e.g., Maestas, 2010; McNair, 2006; Ruhm, 1990), or post-retirement employment

(e.g., Burtless and Moffitt, 1985; Deller and Maxin, 2009; Komp, van Tilburg, and van Groenou, 2010; Larsen and Pedersen, 2012; Micheel, Roloff, and Wickenheiser, 2011; Panova, 2013; Pleau, 2010; Reynolds, Ridley, and Horn, 2005; Schellenberg, Turcotte, and Ram, 2005), and silver workers (e.g., Barnes, Parry, and Taylor, 2004; Brussig, 2010; Dittrich, Büsch, and Micheel, 2011; Dorbritz and Micheel, 2010; Haider and Loughran, 2001; Maxin and Deller, 2010; Roloff, 2010). Different studies use these expressions in slightly different ways. For instance, some studies define bridge jobs as jobs following career employment prior to statutory retirement (e.g., Ruhm, 1990). Other studies analyze bridge jobs in a wider perspective, which also includes paid work in retirement (e.g., Hébert and Luong, 2008).

In my research, I use the retirement definition in an institutional sense, to have an exact measure of when to classify a person as retired. I classify a person as retired when I observe a notification of receipt of regular old-age pension payments in my data. For the population of retirees this can be people starting at the age of 60. One has to keep in mind that early retirees receive deductions in their old-age pension payments. I consider a retiree as employed if the data also shows a notification of employment after the date of the notification of benefit receipt. I call these jobs post-retirement jobs rather than bridge jobs, to avoid confusion with the various definitions of bridge employment, as discussed earlier. The type of post-retirement job is generated in respect to the change of employer and/or establishment. I examine the likelihood to engage in post-retirement employment, as well as the transitions in different post-retirement jobs.

## 2.4 Predictors of Employment beyond Retirement

There is little research addressing post-retirement employment in Germany, whereas in the United Kingdom or the United States this topic is addressed in more detail. Recent findings on post-retirement employment in Germany are derived from surveys (e.g., Alexsandrowicz, Fasang, Schömann, and Staudinger, 2010; Deller and Maxin, 2009; Dorbritz and Micheel, 2010; Roloff, 2010) and focus on individuals' expectations on continuing their careers beyond retirement instead of actual behavior.

Previous studies focus on timing of retirement and push-and-pull factors that affect an individual's decision making (e.g., Burtless, 1986; Fields and Mitchell, 1984; Radl, 2007; Stock and Wise, 1990) such as age, wage, health, or social security. However, push-and-pull factors are mainly considered when referring to labor market exits, not when studying extending working careers. Only a few studies analyze employment patterns of the older workforce in a longitudinal perspective (e.g., Hébert and Luong, 2008; Maestas, 2010; Pleau, 2010; Smeaton and McKay, 2003). Most of these studies compare two points in time, and apply discrete methods (e.g., von Bonsdorff, Shultz, Leskinen, and Tansky, 2009; Cahill, D.Giandrea, and Quinn, 2005; Shultz, Morton, and Weckerle, 1998; Wang, Zhan, Liu, and Shultz, 2008).

Generalization of previous results is often not possible, because former studies mainly examine isolated populations, such as people of older age in specific occupations or industries (e.g., Adams and Rau, 2004; Davis, 2003; Hanson Frieze, Olson, and Murrell, 2011; Kim and Feldmann, 2000; Saba and Guerin, 2005; Shultz, Morton, and Weckerle, 1998). The most influential

factors of maintaining employment during retirement transitions according to the literature referred to above are: experiences in the employment history prior to retirement, labor market attachment, financial status, and health. Another important factor, which so far has not been analyzed in detail, is the labor demand side. Firm characteristics may also function as pull factors.

The detailed review of literature is arranged separately for the outlined factors, because the theoretical model of my research, introduced in Chapter 3, includes these constructs as predictors of the probability of being employed beyond retirement, as well as to compare the differences between different post-retirement job trajectories. I discuss why these constructs influence post retirement employment in referring to studies which are comparable to my research.

### 2.4.1 Pre-Retirement Employment History

Retirement behavior is affected by individual employment histories (see Fasang, 2012; Kohli, 2000). These histories also have an effect on attained earning points and therefore on the entire financial situation in retirement (Bönke, Schröder, and Schulte, 2010; Geyer and Steiner, 2010). Thus, characteristics of individuals' employment histories make a significant contribution to the probability of being employed during retirement. Brussig (2009) suggests that a higher attachment to work increases the opportunity for continuous work histories, which leads to a better financial protection in old-age and renders occupational activity during retirement unnecessary.

In contrast, long and frequent periods of unemployment throughout the life-cycle lead to a higher likelihood to retire early and therefore the receipt of deducted pension benefits (e.g., Micheel, Roloff, and Wickenheiser, 2010;

Saba and Guerin, 2005). Thus, longer periods of unemployment might result in the necessity to continue working beyond retirement in order to avoid old-age poverty or catch up on pension losses. Not only longer periods of unemployment during the life course, also the distribution of unemployment is important for the financial situation in retirement. Different groups on the labor market are affected differently by unemployment (Möller and Schmillen, 2008), which later transfers into inequality in retirement.

Including characteristics of pre-retirement employment histories in the analyses allows me to draw conclusions about how social disparities in employment behavior beyond retirement are influenced by previous life events and histories. This is important because life course theory suggests path dependency, which means that different life spheres are influenced by others (Wang, Zhan, Liu, and Shultz, 2008) and different stages within the life course influence later stages (see Elder, 1995; Kohli, 1985; Trischler, 2012). For instance, I expect people with unstable employment careers to continue work beyond retirement due to financial reasons. But they might have problems finding a job due to their history, which influences the type of post-retirement job they work in. Another possibility is that individuals stay employed because of they want to maintain their usual daily routine. If this is true the probability of post retirement employment will be higher for people with stable, continuous employment biographies.

### 2.4.2 Labor Market Attachment

Individuals with higher labor market attachment are familiar with the structure and requirements of the labor market. They can integrate themselves much faster than individuals who are less attached. Individuals with lower labor market attachment have less negotiating power (Phillipson and Smith,

2005), which results in fewer opportunities to find a job or continue a job beyond retirement (Lain, 2011). Unemployment experiences involve a loss of general and occupational specific human capital. The longer the duration of unemployment the higher the loss of human capital (Becker, 1993).

In particular, the employment state prior to retirement is considered as important factor when examining retirement transitions. Schellenberg, Turcotte, and Ram (2005) find that men and women returning to paid employment have all worked full-time prior to retirement. Smeaton and McKay (2003) state that the best predictor of being employed beyond retirement is to be employed prior to retirement. Maestas (2010) finds higher un-retirement rates among individuals who retired early. Women experience more interruptions in their working careers and thus might be less attached to the labor market (Barnes, Parry, and Taylor, 2004; von Bonsdorff, Shultz, Leskinen, and Tansky, 2009). Post-retirement workers, by the definition of the “active aging" concept, are often highly qualified, which is in line with a higher labor market attachment (Crawford and Tetlow, 2010; Lain, 2012; Maxin and Deller, 2010; Scherger, Hagemann, Hokema, and Lux, 2012; Smeaton and McKay, 2003; Wang, Zhan, Liu, and Shultz, 2008).

In reference to my analyses on post-retirement jobs I consider labor market attachment a relevant factor influencing the decision of going back to work, as well as the decision on the type of post-retirement job retirees are holding. Ruhm (1990) and Hébert and Luong (2008) showed that the time of being out of the labor market has an influence of going back onto the labor market. The longer the time individuals are not on the labor market, the less likely they are going back to work. Regarding the type of post-retirement job I think labor market attachment might influence if people stay with the same

employer or switch workplaces. For instance, I assume that the probability of staying with the same employer is much higher when individuals start their post-retirement job close to their retirement date.

### 2.4.3 Financial Situation

The financial situation of each individual is an important predictor of outcomes in retirement and working longer (Davis, 2003; Kim and Feldmann, 2000; Phillipson, 2004; Saba and Guerin, 2005; Wang, Zhan, Liu, and Shultz, 2008). However, the direction of the financial impact is seen differently in literature. Some studies connect working longer to lower incomes (e.g., Dittrich, Büsch, and Micheel, 2011; Dorbritz and Micheel, 2010; Hanson Frieze, Olson, and Murrell, 2011; Hershey, Henkens, and van Dalen, 2010b; Hochfellner and Burkert, 2013; Kim and Feldmann, 2000; Micheel, Roloff, and Wickenheiser, 2010; Shacklock and Brunetto, 2011). In this case post-retirement employment is necessary to gain additional income. Thus, individuals who face the risk of old-age poverty might be more likely to work when they are retired. This applies, for instance, to divorced women or individuals with outstanding mortgages (Scherger, Hagemann, Hokema, and Lux, 2012; Smeaton and McKay, 2003), and minorities in general (Quinn and Kozy, 1996).

However, other studies suggest that working longer is not a result of low wealth accumulation (Maestas, 2010; Scherger, Hagemann, Hokema, and Lux, 2012; Wang, Zhan, Liu, and Shultz, 2008). Cahill, Giandrea, and Quinn (2006) find that leaving career jobs for a bridge job instead of complete retirement is also more likely for individuals at the upper end of the wage distribution. Wealthy people can spend more money without the need to generate additional income through paid work (Komp, van Tilburg, and van Groenou, 2010). Hence, they are more likely to extend their working life simply because they

enjoy working, or because they want to increase their quality of life (McNair, 2006). This is in line with the concept of “active aging" (Nowossadeck and Vogel, 2013).

Addressing the political debate on old age poverty the financial situation in retirement has to be included in the empirical analyses of the probability to engage in post-retirement employment. Including a measure for the financial situation will help to gain evidence if retirees are working because of economic preferences. I assume two possibilities. Retirees with low pension income have to work to gain additional income, whereas retirees in the middle income range might continue to work not because they necessarily need additional income in retirement but they want to maximize their consumption.

### 2.4.4 State of Health

Previous research states that health has a significant impact on the decision to continue work after retirement (Phillipson and Smith, 2005; Saba and Guerin, 2005), including the fact that a person’s disability to continue work after retirement (e.g. physical limitations and health problems) may inhibit pursuing paid work after retirement (Beehr, 1986; Davis, 2003; Dorbritz and Micheel, 2010; Feldman, 1994; Taylor, 2010; Wang, Zhan, Liu, and Shultz, 2008). Individuals extending their working careers are generally in better health (Cahill, Giandrea, and Quinn, 2006; Crawford and Tetlow, 2010; Kohli and Künemund, 1996; Komp, van Tilburg, and van Groenou, 2010; Scherger, Hagemann, Hokema, and Lux, 2012). Kim and Feldmann (2000) determine that the effect of health on working later in life is reversely related to age. Hébert and Luong (2008) find that the probability of entering bridge employment does not vary due to health reasons.

My data allows me to include information addressing the health condition of individuals. The data include a health measure which is preferable to health questions in surveys. I do not record non-response or survey errors, because people do not answer a question. In the data I can see when employers report a worker being sick longer than six weeks to the health insurance. By accumulating these days over the employment history I can generate the total amount of sick days for every retiree in the sample. This information will be included to measure the impact of health on post-retirement employment.

### 2.4.5 Impact of Establishments

In addition, establishment characteristics influence work beyond retirement. The larger the firm the less likely the employees are to work beyond retirement (Dorbritz and Micheel, 2010; Micheel, Roloff, and Wickenheiser, 2010; Smeaton and McKay, 2003). In the last 20 years, mostly only large companies used early retirement policies in Germany to reduce costs (Wübbeke, 1999). This clearly underlines that selection at the firm level has to be considered as well (see Buss and Kuhlmann, 2013). Employers do not offer post-retirement jobs in an equal distribution across their employees. First, they may attract or displace specific workers (Lui Ping Loi and Shultz, 2007). For instance, it is more likely that workers with long tenure will be made an offer to extend employment (Hutchens, 2007). Second, some establishments might not be able to provide a workplace which is suitable for older employees (Dorbritz and Micheel, 2010). Smeaton and McKay (2003) find that extending working careers is connected to specific industries, such as distribution, hotels and restaurants, and other services, whereas this is less common in industries like construction and manufacturing. I am able to account for firm characteristics because the data holds information on every establishment the individuals worked in. This allows me to include establishments as additional agents who

can influence individual outcomes in my models.

### 2.4.6 Gender Differences

Previous research has shown that gender-specific behavior occurs regarding characteristics of entry into retirement (e.g., Allmendinger, 1994; Clemens, 2006; Hank, 2004; Talaga and Beehr, 1995). Gender differences in entry into retirement are explained by different working histories of men and women. Whether this can be applied to holding post-retirement jobs or not has not been shown explicitly by any research papers to date. There are findings that show gender differences, as well as analyses that cannot find any significant effects (e.g., Pleau, 2010; Shacklock, Brunetto, and Nelson, 2009; Wang and Shultz, 2010). The estimations of the probability of being employed beyond retirement in the empirical Chapter 6 and Chapter 7 include controls for individuals' employment histories. This means that the models in general account for gender differences resulting from different employment careers of men and women.

Woman are more likely to experience interrupted employment histories. They often work part-time or in atypical employment, and suffer from penalties due to family formation (e.g., Aisenbrey, Evertsson, and Grunow, 2009; Beblo, Bender, and Wolf, 2009; Dobrič, 2000; Frommert, Heien, and Loose, 2013; Gangl and Ziefle, 2009; Hank, 2004; Simonson, Gordo, and Titova, 2011). These differences result in lower wealth accumulation in older age. Beblo, Bender, and Wolf (2009) find that women suffer from wage penalties due to birth of the first child. In addition, women often reduce working times after having children. This translates in lower accumulated earning points and thus in lower pension benefits received. I see women as a group exposed to old-age poverty to a higher extent compared to males, which might affect

their engagement in post-retirement employment.

### 2.4.7 Immigration History

In particular immigrants suffer from reduced benefits, because they spend part of their employment history not in Germany and therefore are not entitled for German pension benefits. Mika and Tucci (2006) show considerable differences considering the amount of pension benefits received by ethnicity. However, ethnic Germans are better of compared to other immigrants. They are considered immigrants with special treatment in the pension insurance, because they immigrated from regions which were German territory before World War II (see Baaden, 1997; Glitz, 2012).[6] Starting in the 1950s, after proof of their German origin, ethnic Germans have been allowed to enter Germany. Between 1950 and 2010 about 4.5 million ethnic Germans immigrated to Germany. Upon arrival ethnic Germans receive a German passport and full citizenship rights. This includes entitlements to pension benefits for their complete employment biography (Hirsch, Jahn, Toomet, and Hochfellner, 2013). As consequence, they receive higher pension benefits compared to other immigrants, but lower pension benefits compared to Germans. This indicates that the situation in old-age is not the same for people with different ethnicity, and therefore shows that immigrant are, like women, exposed to a higher extent to old-age poverty.

All attributes discussed in this section are included in the theoretical model and it's empirical estimation. In my theoretical model outlined in Chapter 3 these attributes are defined to influence the individual decision to engage in post-retirement and the respective individual post-retirement outcome. The

[6] The majority of them lived in the Soviet Union, Poland, and Romania. Other countries of origin comprise former Czechoslovakia, Hungary, and former Yugoslavia.

discussed attributes find their way into the model as push-and-pull factors. Gender and Ethnic differences are included as well. I consider them as groups who are faced with differing conditions in society in which their decision making for a post-retirement job takes place. The empirical Chapter 6 and Chapter 7 include these attributes as dependent variables to account for the mentioned differences.

## 2.5 Contribution of the Dissertation

In general, the design of the German pension system supports standardized employment histories, which are not pursued by every individual anymore. Either because people want to form their lives more flexible and individualistic (Riley and Riley, 1994), or because they are facing problems of finding their standing within the labor market (Simonson, Kelle, Gordo, Grabka, Rasner, and Westermeier, 2012). Steiner and Geyer (2010) predict that future pension incomes will decline due to unstable working careers, especially in the eastern part of Germany. This scenario worsens when replacement rates are reduced (Bäcker, 2011; Geyer and Steiner, 2010; Noll and Weick, 2009). Thus, extending working life for the purpose of paid work after retirement is one possibility for individuals to catch up on pension entitlement losses throughout their working career, or protect against old-age poverty. Public policy already implemented changes to maintain workers in the labor market, but there have to be further developments made, in particular addressing immigrants and women due to their higher exposure to interrupted employment biographies (see Köppe, 2010; Mika, Rehfeld, and Stegmann, 2009; Simonson, Kelle, Gordo, Grabka, Rasner, and Westermeier, 2012; Trischler, 2012).

The studies discussed in Section 2.4 agree on the influencing factors of

predicting post-retirement employment outcomes, but do not always agree on the way these factors are influencing the probability of extending working lives. The majority of studies, as shown in Section 2.3 do not specifically focus on post-retirement employment, but more on the various ways to exit the labor market or stay in the labor market, where post-retirement employment is one possibility. There is no conses on individual motivations referring to post-retirement employment in academia. Some studies suggest post retirement employment as voluntarily, for high qualified people with high labor market attachment (e.g., Nowossadeck and Vogel, 2013; Haider and Loughran, 2001; Kim and Feldmann, 2000; Kohli and Künemund, 1996; Scherger, Hagemann, Hokema, and Lux, 2012), whereas other studies find evidence for involuntary employment, because people have to work for additional income (e.g., Brussig, 2010; Hochfellner and Burkert, 2013; Lain, 2011; McNair, 2006).

As most of the studies discussed in Section 2.4 and Section 2.3 are addressing the situation the United States, there is clearly high demand for research on this topic in Germany. Only few studies referring explicitly to post-retirement employment in Germany exist so far (e.g. Deller and Maxin, 2009; Geyer and Steiner, 2010; Hochfellner and Burkert, 2013; Maxin and Deller, 2010; Micheel, Roloff, and Wickenheiser, 2010, 2011; Panova, 2013; Roloff, 2010; Schellenberg, Turcotte, and Ram, 2005; Scherger, Hagemann, Hokema, and Lux, 2012).

In addition, public policy is discussing changes to the pension system, due to the fact that people want or have to work longer. Thus public policy needs more research on post-retirement employment. Finding evidence regarding the motivations and push-and-pull factors to engage in post-retirement employment will help public policy in designing customized reforms to uniquely support individuals. More evidence on post-retirement employment will also

help to find ways to maintain older workers on the labor market. This will help social systems with their future financial burdens.

The contribution of my thesis is that I study actual behavior in retirement, analyze different demographic subgroups, use administrative data which provide an accurate measure of wages and pension receipt, and apply longitudinal analyses to study post-retirement employment in Germany. I am not aware of any other research paper which comprises all these features to study post-retirement employment trajectories. My empirical work hereby concentrates on answering two main questions.

What factors influence individuals to engage in post-retirement employment, in particular, if I can find evidence whether people engage in post-retirement employment because of economic preferences or psycho-social preferences. The goal is to explain what factors drive employment in retirement, in particular, if there is evidence for the arguments of the outlined policy debate. Is the probability of post-retirement employment higher for people with lower income profiles or simply the continuation of the employment career?

Conditional on holding a post-retirement job, when do retirees decide to engage in post-retirement and what kind of job are they pursuing? I restrict my study to the retirees in the labor force and compare their transition times into different post-retirement trajectories which are in the same environment compared to the job prior to retirement or in a different field compared to their pre-retirement job.

My research interest and the empirical implementation focus on explaining

individual behavior in retirement within a micro-macro theory approach following Coleman (1990). This theoretical model shows how changes within the society influence individual behavior and the development of post-retirement employment in society. My study primarily addresses the micro-level (see Raub, Buskens, and van Assen, 2011; Schelling, 1978) and draws conclusions for society. On the micro-level I pursue a two-stage research framework. First, I examine the probability of pursuing post-retirement employment. Conditional on being in the labor force in retirement, in the second stage, I study transition times into different post-retirement jobs trajectories. In both empirical estimations I include variables to measure the impact of different push-and pull factors, discussed in the previous Section 2.4.1, on post-retirement employment outcomes.

As controls, I include measures of pre-retirement characteristics of the population under study in the analyses. Hence, descriptives of pre-retirement characteristics are outlined before the empirical estimations are conducted. In addition, my study will account for heterogeneity of the labor force. The descriptives and empirical estimations account for gender differences and ethnicity to gain evidence if post-retirement employment varies between demographic groups in the labor market.

Whereas the focus is on individual behavior on the micro level, I am transferring individual outcomes to the macro level, to explain how society will be affected or is changing due to the observed individual behavior. By explaining the relationship between individual behavior regarding post-retirement employment and the impact for society my research identifies attributes which can be used by public policy to support changes within the society. The theoretical considerations and implications for the empirical study are outlined in

detail in the following Chapter 3.

# Chapter 3

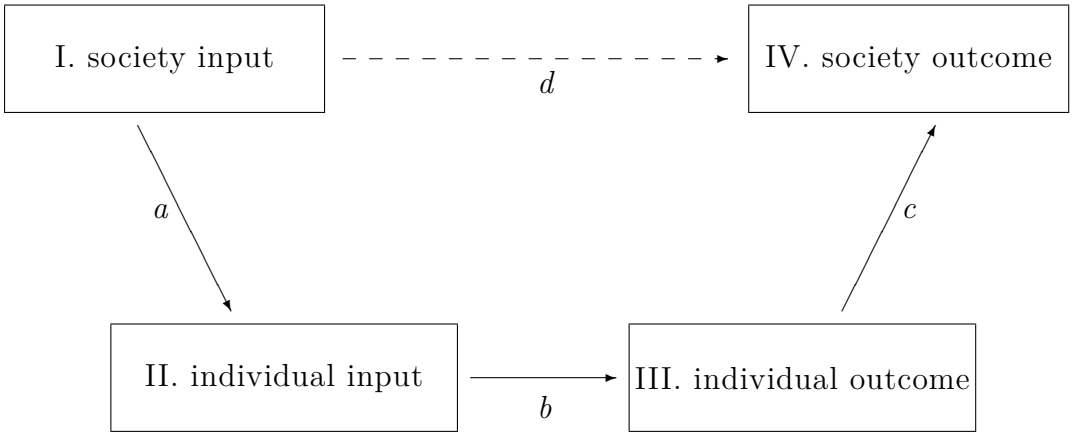
# Theoretical Considerations and Hypotheses

## 3.1 Micro-Macro Approach on Post-Retirement Employment

Analyzing micro-macro relationships to gain new evidence on developments within societies as a result of the behavior of individual agents plays a central role in sociology. Modern sociological theories explaining changes or relationships in society primarily refer to a micro-marco model approach, introduced by Coleman and adopted by many other sociologists (see, Coleman, 1986, 1990; Frings, 2007; Lindenberg, 1977, 1990; Opp, 2009; Raub, Buskens, and van Assen, 2011; Schelling, 1978). Micro-Macro models are based on the methodological individualism represented, for instance, by works of Weber, Hayek, or Popper. They are often applied to study the development of societies and processes within societies from various perspectives, and to explain social phenomena. In general, theory suggests that phenomena on the macro-level can be explained by studying changes in individuals' behaviors on the micro-level (Schelling, 1978). In a follow-up, conclusions about how changes in individual behavior influence societies on the macro-level can be drawn. This way of explaining macro-phenomena is preferable to an approach that tries to provide explanations exclusively in terms of macro-assumptions (Coleman, 1990). Figure 3.1 illustrates the dependence of macro-level outcomes on micro-level assumptions graphically.

Box I and IV represent propositions describing macro-conditions and macro-outcomes. It implies that paradigms of societies change over time, which is outlined by the dashed line between these boxes. This relationship can, but does not have to be causal (Opp, 2009). The model's main goal is to explain changes within societies on the macro-level. The dashed line $d$ indicates assumptions addressing the relationship between macro-conditions

**Figure 3.1:** Micro-macro model of the methodological individualism




*Source: own illustration referencing Coleman (1986)*

and macro-outcomes. These assumptions are also used to describe changes on the macro-level. However, if changes in societies are only described by assumptions on the macro-level inference is not reliable (Opp, 2009). The probability to miss relevant connections, and thus draw wrong conclusions, is high. Whereas on the micro-level there is stability in the sense that actors behave similarly under the same conditions, relationships between macro-conditions and macro-outcomes are less stable (see Coleman, 1990; Lindenberg, 1977; Raub, Buskens, and van Assen, 2011).

Thus, a better way of explaining societal changes is to switch from the macro-level to the micro-level. Changes on the macro-level then are explained by studying individual behavior, which shapes the development within societies (Raub, Buskens, and van Assen, 2011). Arrow *a* outlines the link from the macro-level to the micro-level, which represents assumptions on how social conditions affect individuals' perspectives. For instance, social conditions shape incentives related to different alternatives of action, as well as infor-

mation available for individuals within their decision-making. Lindenberg (1977) calls assumptions on social conditions which are used to switch from macro-to-micro-level bridge assumptions.

On the micro-level, box II stands for assumptions concerning regularities of individual behavior, values, or norms, and therefore represents the conditions on the micro-level (Coleman, 1986). Based on their given conditions, individuals' behave differently. Different behavior results in various micro-outcomes. Arrow *b* incorporates theories which explain individual behavior differing according peoples' characteristics or demographic groups, and their results in individual specific outcomes, represented in box III. That is, how the actions of the individual actor can be observed, and thus be described by specific individual behavior. By aggregating individuals' behavior, which equals the step of switching back to the macro-level again, conclusions in reference to outcomes on the macro-level can be made. Lindenberg (1977) calls assumptions on how actors' behavior generates macro-outcomes transformation rules. In Figure 3.1, they are represented by arrow *c*.

Overall, the model shows that descriptions of macro-outcomes IV, or associations between macro-conditions and macro-outcomes *d*, can be explained by comprising assumptions on individual behavior *b*, macro-conditions I, bridge assumptions *a*, and transformation rules *c* (Raub, Buskens, and van Assen, 2011). This scheme can be applied to explain various social phenomena (Coleman, 1990).

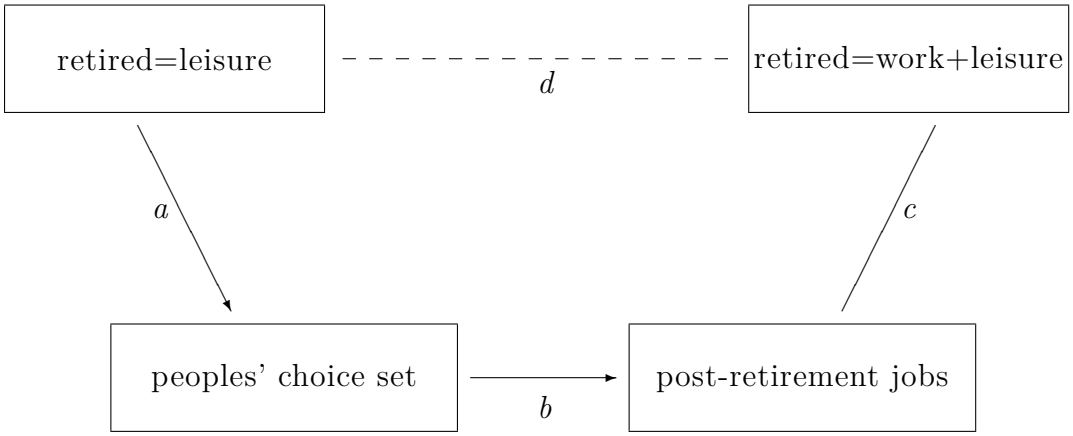
I exploit this general theoretical micro-macro model according to Coleman (1986) to study the effects of individual behavior regarding post-retirement employment. Whereas my empirical study is based on the individual micro-

level, I use the relationship of micro and macro-level proposed by the model to discuss the influence of the society on individuals on the one hand, and the meaning of individual outcomes for society on the other hand.

The first objective refers to possibilities how society influences people to take up post-retirement jobs. In this case, societal input may be the regulations within institutional settings in Germany. For instance, the pension system limits the amount of work in retirement for certain retirees, which is an example of how different institutional settings may promote post-retirement employment for certain people (see Chapter 2 for a detailed description of the German pension system) and find ways to maintain older workers on the labor market (see Lessenich, 2012a).

The second objective addresses the derivation of society outcomes from individual outcomes. For instance, this includes statements of how employment biographies in society change. There is plenty of literature that employment histories have gotten more and more flexible, unstable and diverse (e.g., Giesecke and Heisig, 2010; Guillemard, 1991; Kohli, 2000; Simonson, Gordo, and Titova, 2011; Simonson, Gordo, and Kelle, 2011; Steiner and Geyer, 2010; Struck, 2006; Struck, Grotheer, Schröder, and Kohler, 2007). These patterns might also prolong into retirement, which then leads to the disappearance of fixed life course boundaries between working life and retirement defined as leisure time. By knowing the processes on the individual micro-level public policy can learn how and where to place incentives to direct changes in society. The way I apply this micro-macro approach to post-retirement employment is illustrated graphically in Figure 3.2.

**Figure 3.2:** Micro-macro model of explaining post-retirement job trajectories




*Source: own illustration based on Coleman (1986)*

In this scenario post-retirement employment is considered as a case of collective behavior within a post-modern society, which is characterized through patchwork biographies, defined as macro-outcomes. I define patchwork biographies as anomalies from the historically established standardized biographies within modern societies. The observed relationship on the macro-level is that the structure of peoples' life courses is changing towards patchwork biographies (see Amrhein, 2004; Kohli, 2000), in particular, employment biographies prolong into retirement. Retirement is not only considered as time for leisure, but time for leisure and work (Deller and Maxin, 2009). The macro input, then represents structures within the society which are classified as starting point of the observed change of patterns (see Engelhardt, 2012; Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Rinklake and Buchhholz, 2011).

In case of post-retirement employment this involves a description of the individuals' position in the labor market, both pre- and beyond retirement, and institutional settings like welfare regimes (see Esping-Andersen, 1990) and, in

particular, the German pension system (see Börsch-Supan and Wilke, 2006). For instance, it is important to know how the pension system is organized or in what way the labor market is regulated by policies. This typically is reflected in a certain welfare system of a state, and can be classified according the typology of Esping-Andersen (1990). Different welfare systems offer different conditions for people's lives, and therefore function as frameworks which give input to individuals decisions on a society level.

These society inputs are considered the baseline for individuals' actions. They form individual values, preferences and the choice set, which represent the input on the micro-level (see Coleman, 1986; Raub, Buskens, and van Assen, 2011). By this I mean assumptions on different alternatives available for individuals to form their biographies, as well as assumptions on the preferences individuals follow in their rational decision-making (see Burtless, 1986; Esser, 1993; Markman and Brendl, 2000; Simon, 1978). I assume that people either have economic (see Cocco, Gomes, and Maenhout, 2005; Fields and Mitchell, 1984; Hansen, Slagsvold, and Moum, 2008; Hershey, Henkens, and van Dalen, 2010a) or psycho-social (see Atchley, 1989, 1992; Haider and Loughran, 2001) preferences which lead to post-retirement employment. Therefore, post-retirement employment is pursued by people who want to maximize their consumption or keep their daily structures and social life prior to retirement. In a first stage retirees have to decide if they want to pursue post-retirement employment. In the second stage they have to decide what kind of job trajectory they want to enter. In addition, this point of the model includes assumptions on the actors' incentives for choosing one of the alternative post-retirement job trajectories.

I consider two incentives according to the assumed preferences. Individuals

will earn additional income, which leads to a higher consumption (Dinkel, 1988; Wübbeke, 2005b), or they are able to maintain their networks and social life by staying active in retirement (Haider and Loughran, 2001; Grabka, 2013). Conditional on the individual input, specific individual output is observed. The specific output I observe for the first decision is if individuals engage in post-retirement employment. Concerning the second decision, I observe different post-retirement job trajectories individuals work in and the time between retirement and start of the post-retirement job. Theories on the micro-level help to find evidence if the observed behavior is in line with the assumed preferences.

The bridge assumption, outlined in arrow *a* suggests, that conditional on the regulations on the macro-level, the actors are involved in a situation that resembles a Prisoner's Dilemma with "post-retirement employment" as a dominant strategy for each actor (Raub, Buskens, and van Assen, 2011). If individuals preference are either maximizing consumption or psycho-social features, they will choose to engage in post retirement employment, because they will get rewarded the highest incentives for choosing these alternatives (see Blossfeld, 1996; Hill, 2002). The situation in the labor market and prior to retirement (discussed in more detail in Chapter 5) as well as the regulations of the public pension system (discussed in more detail in Chapter 2) comprise the conditions based on which individuals make their decisions. They either push or pull people into post-retirement employment.

Arrow *b* represents theories on individual behavior, as well as the assumption of equilibrium behavior in the sense of non-cooperative game theory (see Davis, 1997). Different micro-theories allow to distinguish between various push and pull factors influencing the dominant strategy chosen by the individ-

ual, and more important the success of it (e.g. Endres and Martiensen, 2007; Kunz, 2004; Shultz, Morton, and Weckerle, 1998; Wang and Shultz, 2010). The micro-theories I apply to explain post-retirement employment as individual outcome are described in Section 3.1.3 in more detail. Line $c$ is then conceived as a transformation rule specifying that the macro-outcome “post-retirement employment" results from the behavior of individuals. Hence, the assumptions jointly imply the macro-outcome “post-retirement employment" as well as the macro-level regularity that specific motivations result in post-retirement employment (see Raub, Buskens, and van Assen, 2011).

Currently, I do not consider post-retirement employment as a macro-phenomenon, because the assumption of equilibrium behavior outlined above might not be met to date. I think, there are still retirees whose preferences stick to the concept of standardized employment careers. They might be more likely to maximize their leisure and therefore not choose post-retirement employment as the dominant strategy. This affects the aggregation of the individual outcomes to macro-outcomes. It leads to a weaker inference on the macro-level (see Opp, 2009; Raub, Buskens, and van Assen, 2011). The original arrow $c$ in the Coleman model is changed to a line in this micro-macro model of post-retirement employment, because no causal interference can be made regarding macro outcomes to date.

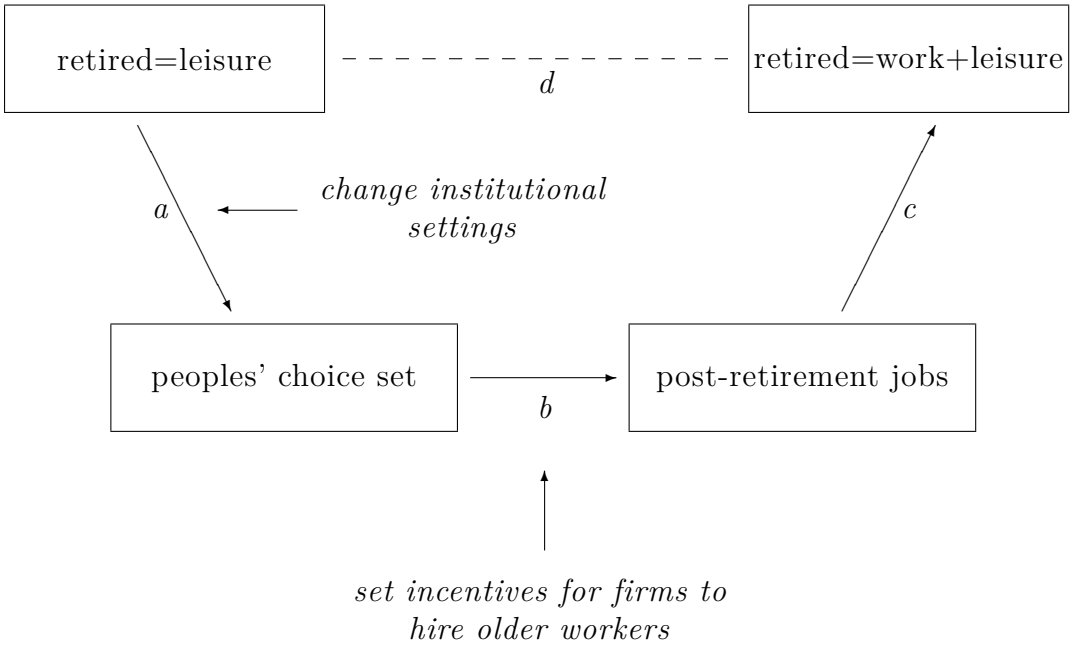
However, society is continuously changing (Börsch-Supan, 2003; Buss and Kuhlmann, 2013), which means there is the potential that the relationship between micro and macro-level will get stronger. Then post-retirement employment can be considered a new characteristic of post-modern societies. So far the micro-macro model of post-retirement employment can show that there is a trend towards changes to patchwork biographies, in particular extending

employment careers, but inference from micro to macro-outcomes should only be made with caution. However, by aggregating individual outcomes from working retirees one can see if within society either economic or psycho-social dominate. By this, a conclusion can be made whether old-age poverty or active aging is the dominate reason for post-retirement employment in the German society.

The outlined model also shows that institutions and settings on the macro-level shape the development of societies (Coleman, 1986, 1990). This means by studying motivations and constrains of post-retirement employment on the micro-level, public policy can learn where to set the right incentives to make sure that the dominant choice for every individual is post-retirement employment (see Dorbritz and Micheel, 2010). If public policy wants individuals to extend their employment careers to support social security, the government can change, for instance, institutional settings, regulations in the labor market, and the behavior of firms (see Eichhorst and Sproß, 2005; Lessenich, 2012a). Precise placement of incentives will help direct individuals to the desired outcome. Figure 3.3 shows where public policy can place incentives to actively maintain people on the labor market.

Elements of a successful governmental activation strategy are not only connected to the restructuring of institutional settings or changing policies. In general, the activation concept suggests that individuals realize that they are responsible for society and therefore have to engage in activities which benefit the society (see Lessenich, 2012b,a). Therefore, making individuals aware of their position in society is part of the governmental support for individuals to extend their employment biographies.

**Figure 3.3:** Public policy interventions within the micro-macro model




*Source: own illustration based on Coleman (1986)*

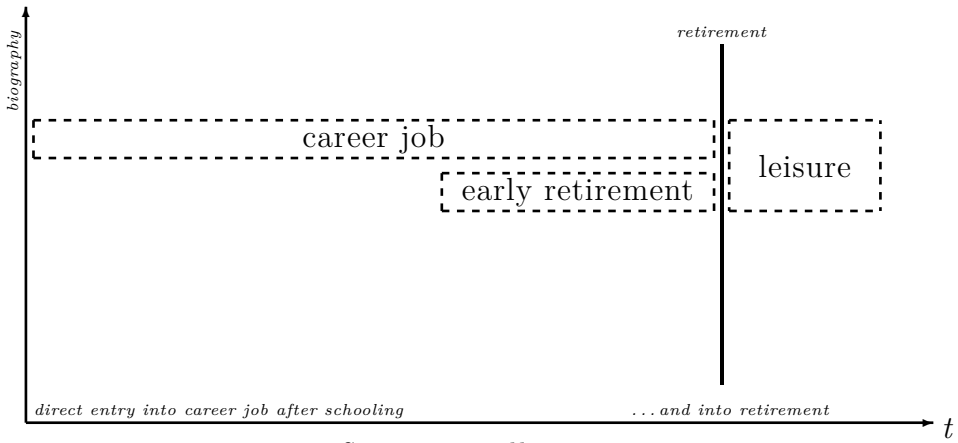
Overall, the theoretical model shows under which conditions post-retirement employment can be explained as a macro-outcome by using different theories addressing each stage in the model. Although post-retirement is present it is most likely that the aggregation from the individual level to the macro-outcome might not be causal at current state. In this case the model can be used to comprise different theories on post-retirement employment and produce evidence for public policy how to get more people involved into post-retirement employment to establish a new macro-outcome as one strategy to extend working lives. In the remainder of this chapter, for each stage within the micro-macro-model I outline in detail which assumptions and theories I use to explain post-retirement employment trajectories and how these are related to each other.

### 3.1.1 Changes on the Macro-Level

The hypothesis on the macro-level states that life course trajectories, in particular job trajectories change over time. Static structures within the life course vanish and inequality is rising (see Blossfeld, Buchholz, and Hofäcker, 2006; Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Guillemard, 1991; Mills, 2009; Rinklake and Buchhholz, 2011). Post-retirement employment may be seen as one of the new phenomena resulting from the transition to flexible life course trajectories and as a reaction to increasing social inequality. The life course model (Kohli, 1985, 1989, 2000) separates individual's biographies in sequences within theoretically fixed transition boundaries: education, employment, and retirement. This three-part concept is mainly based on institutional frameworks that have emerged in western societies over time. Hence, this model binds individuals to the structured and sequential patterns arising from the defined standard biography. In modern societies social life is centered among the employment system, whereas retirement is centered among other values, for instance family and leisure (see Backes and Clemens, 2003; Grabka, 2013; Jansen, 2013). Figure 3.4 illustrates the structure of peoples' life courses from a static perspective.

However, elements of this life course model experience increasing destandardization; for instance the transition from work to retirement (see Heribert, 2006; Guillemard, 1991; Micheel, Roloff, and Wickenheiser, 2010; Radl, 2007; Riley and Riley, 1994; Shultz, 2001; Wang, Zhan, Liu, and Shultz, 2008). The socialization of modern societies through the economy leads to the centralization of social life around working life and influences individuals' values and norms. In a sociological perspective the economy is a system which socializes people by providing them with income and respective chances on

**Figure 3.4:** Standardized biographies in modern societies




*Source: own illustration*

consumption. But it also confronts people with tasks and demands their competences, structures their daily lives, embeds individuals in social relationships, conflicts, or inter-dependencies, assigns them positions within the society, and forms their identities. The socialization through the economic system is important in modern societies. It resembles the process of learning the consequences of economic decisions, for instance, decisions regarding acceptable alternatives on consumption, or social values of consumption alternatives (Denhart and Jeffress, 1971).

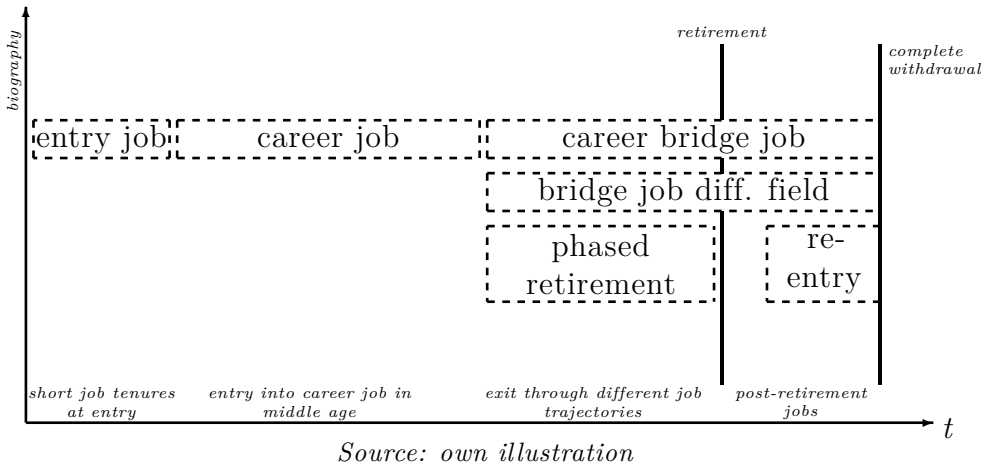
But if social life is focused on labor, how does this theoretically reflect to retirement, a stage in life which is characterized by not working for the rest of the life time? The boundaries of life course trajectories vanish and enable that the labor market mixes with leisure in retirement (see Kohli and Künemund, 1996). For instance, continuing employment beyond retirement dissolves the fixed boundaries of different stages in life. It offers more alternatives for transitioning between life course sequences and enables individuals to pursue

their own plan of life (see Beck, 1986). It can be seen as socialization of the last part of individuals' life courses. Originally, this phase is planned as leisure time for individuals after spending so much time in the labor market, but individuals prefer on not spending their time only on leisure (Roloff, 2010; Sackmann, 2008; Scherger, Hagemann, Hokema, and Lux, 2012). This transformation of life course trajectories and the development of post-retirement activities can be described best as the change towards patchwork biographies. Figure 3.5 illustrates how life courses look like in post-modern societies.

Comparing Figure 3.4 and Figure 3.5 shows that changes on the macro-level result in economic socialization of old-age. This is achieved by introducing institutionalized forms of employment to retirement. The post-retirement employment trajectories show the same characteristics as occupational activities in the usual phase of working life. Besides paid work this can also include voluntary unpaid work. Scherger, Nazroo, and Higgs (2011) focus on explaining voluntary activities beyond retirement, whereas my dissertation focuses on explaining paid work in retirement.

The government can actively shape the changes outlined above. The academic discussion therefore is focused on activating within welfare states. Since the German reunion, politics concentrated on reforms to mobilize individuals to be active on the labor market (Lessenich, 2012a). The goal is to strengthening people's relationships to markets and labor. The latter on is important in the context of post-retirement employment, because it refers to advancing employability of workers (Bäcker, Naegele, Bispinck, Hofemann, and Neubauer, 2008). For politics this means to adjust policies to the image of gainful employment being the way to safeguard individual existence and inte-

**Figure 3.5:** Patchwork biographies in post-modern societies




*Source: own illustration*

gration in society (Lessenich, 2012a). Thus public policies have to strengthen employabiliy on the individual level, to support people to stay active on the labor market, but also to expand the labor market, for instance by increasing labor market participation rates on the macro level (Räder, 2013). Improving employability of individuals, defined as safeguarding that every person can make use of her available resources on the labor market, is not only about supporting people. It also comprises demanding the provision of work from people in the society (Lessenich, 2012b). First implementations can be seen in the “Hartz-Reforms". If individuals receive benefits, for instance, they have to contribute by actively supplying labor. If they do not collaborate they are rewarded sanctions.

To explain the outlined changes of working biographies in society and to find out where public policy can set incentives to promote employability and active policy support on the macro-level, it is necessary to examine individual outcomes. Thus, I provide evidence on individual post-retirement employment

behavior. Because I want to derive implications for society on the macro level I have to connect structures on the micro-level to structures on the macro-level. I do this by applying sociological theories to switch between the micro and macro-level. Therefore the next Section 3.1.2 discusses bridge assumptions and transformation rules used to explain the micro-macro relationships addressing post-retirement employment.

### 3.1.2 Transfers between Micro-level and Macro-level

The link from the macro-level to the micro-level is given in bridge assumptions (see Lindenberg, 1977). The connection from the micro-level back up to the macro-level is stated in transformation rules (see Lindenberg, 1977). Both relationships can include empirical assumptions, or analytic statements such as definitions (Raub, Buskens, and van Assen, 2011). This includes assumptions of how society influences processes on the individual micro-level and how in turn individuals outcomes shape or change society. The following sections provide examples for bridge assumptions as well as transformation rules in the context of post-retirement employment behavior. This is important for the empirical strategy and interpretation of the results in Chapter 6 and Chapter 7. Bridge assumptions are addressing influential factors of individual behavior, which have to be accounted for in the regressions. Transformation rules are needed to interpret the results of the estimations. This means to understand the consequences of the outcome of individual behavior for society (Coleman, 1986, 1990). By understanding how individual behavior affects society and vice versa, public policy can align politics to meet the requirements of individuals and the welfare state (see Lessenich, 2012a; Naegele, 2013).

### From Macro to Micro

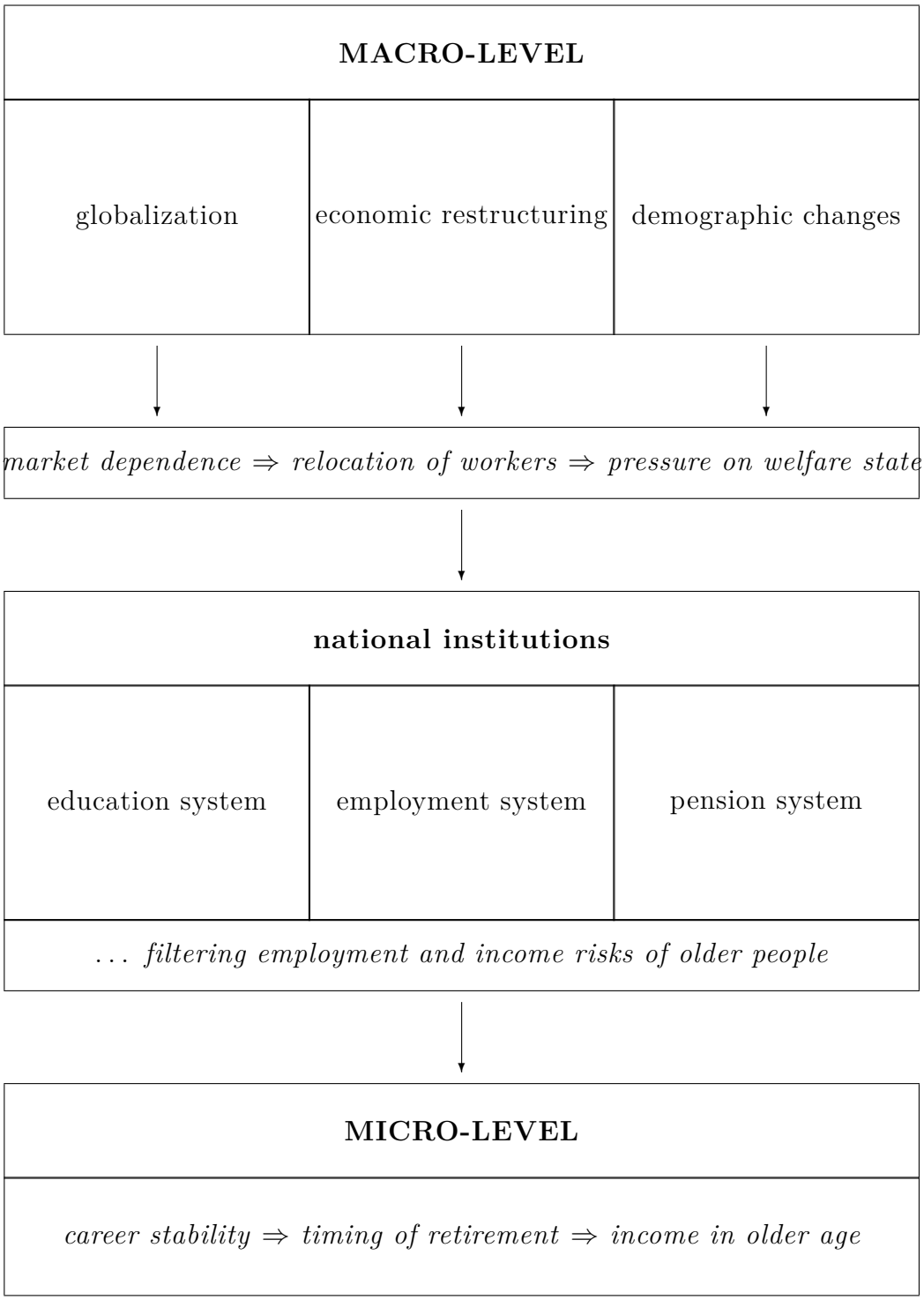
Before examining individual behavior on the micro-level researchers have to think about how conditions on the macro-level influence individual behavior and outcomes, and thus form their bridge assumptions to state the relationship between macro and micro-level. Sociological considerations on retirement focus on comparative institutional life course approaches to identify the relation between the macro and micro-level influencing retirement transitions in society (Engelhardt, 2012). Furthermore, research frameworks are applied to country specific backgrounds to produce evidence on how variations in policies, that affect peoples' life courses, translate into their late careers and retirement (e.g., Blossfeld, Buchholz, and Hofäcker, 2006; Esping-Andersen, 1990; Radl, 2007; Mayer, 2004). The main argument is that primarily focusing on the pension system like the economical theories mostly do is not sufficient when studying late careers and retirement (Engelhardt, 2012).

Further influencing factors on the macro-level of society have to be considered, such as industrial relations (see Adler and Hilber, 2009; Bellmann, Gewiese, and Leber, 2006; Bellmann and Stegmaier, 2007; Kalleberg, 2003), occupations (see Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Cotter, Hermsen, and Vanneman, 2002), the education system (see Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Clemens and Himmelreicher, 2008), and the regulation of the economy and welfare system (see Börsch-Supan, 2003; Breen, 1997; Brussig, 2009; Coile and Gruber, 2000; Leiter and Lessenich, 2003; Mika, Rehfeld, and Stegmann, 2009). The outlined factors all affect peoples decision making regarding post-retirement employment.

Thus, individual decisions to retire and stay in the labor force is affected by the whole life course (see Allmendinger, 1994; Geyer and Steiner, 2010; Simonson, Kelle, Gordo, Grabka, Rasner, and Westermeier, 2012; Trischler, 2012) and institutional settings (see Blossfeld, Buchholz, and Hofäcker, 2006; Engelhardt, 2012) in various ways. These conditions are captured in bridge assumptions and therefore discussed in this section. Figure 3.6 outlines the relations between society structures, institutional settings and consequences for individuals' macro-conditions. According to Blossfeld, Buchholz, and Hofäcker (2006) changes on the macro level affect individual behavior. The authors define macro-conditions as globalization, economic restructuring of the society, and the demographic change. These events happening in society affect markets. In turn, uncertainty within market transactions is transferred onto individuals and the welfare state and affects individuals' positions within the social system (Blossfeld, Buchholz, and Hofäcker, 2006; Mills, 2009). The social system of the welfare state itself is comprised by different institutions, structured through life course spheres Kohli (1989). The institutions' legal mandate is to support individuals in different stages of life and filter their income risks and uncertainty shocks. As these system are affected by events happening on the macro-level, institutions might not be successful in accomplishing their tasks, which then affects people on the individual level.

How future pension reforms will transfer uncertainty from the national level to individuals is outlined in detail in Chapter 2. The education system plays a minor role in absorbing uncertainty for older individuals, because older people have been in the education system long ago. One argument addressing the education system and why it might not absorb uncertainty for older individuals is the missing opportunities of further education for older people (see Rinklake and Buchhholz, 2011). I consider the employment system

**Figure 3.6:** Relationship of macro-level and micro-level




*Source: own illustration following Blossfeld, Buchholz, and Hofäcker (2006)*

the most important system transferring uncertainty on older individuals for several reasons, therefore I concentrate on this one in the following.

The German labor market is defined as insider-outsider labor market (Breen, 1997). Older workers are guaranteed a great deal of job security in the insider market, because of their seniority. This is supported by institutional settings, for instance employment protection regulations, and the de-commodification of the German labor market. Employment relationships in the insider market are considered as stable and long-lasting in which both employer and employee profit from each other (see Blossfeld, Buchholz, and Hofäcker, 2006; Breen, 1997; Rinklake and Buchhholz, 2011). Being employed in the insider market throughout the individual's whole employment career results in a financially secure situation in old-age (see Bönke, Schröder, and Schulte, 2010; Fasang, 2012; Hansen, Slagsvold, and Moum, 2008; Statistik der Deutschen Rentenversicherung, 2013). On the contrary, older people who have been working in the outsider market throughout their careers (see Gebel and Giesecke, 2011; Simonson, Kelle, Gordo, Grabka, Rasner, and Westermeier, 2012) suffer from spillovers of their unstable employment relationships (see Giesecke and Heisig, 2010; Simonson, Gordo, and Titova, 2011; Simonson, Gordo, and Kelle, 2011; Struck, Grotheer, Schröder, and Kohler, 2007) later in life. The result is lower wealth accumulation for retirement (Trischler, 2012). Thus, outcomes in retirement are determined by individuals' standing within the labor market, such as the quality of their occupations and employment relationships (see Chapter 5 for descriptive measures of pre-retirement labor market indicators).

In the last decades, globalization changed employment relationships and occupations (Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009;

Mills, 2009). The demand of firms for flexible work arrangements has risen. De-stabilization and de-standardization of employment biographies have increased. An overview of the impact of the change in employment histories is given in Struck (2006). Technological change has resulted in an increasing service sector, while the production and agricultural sector have been shrinking. Occupations have been changing (Rinklake and Buchhholz, 2011) and require new skills. In addition, the German labor market is highly connected to occupational certificates. Employers require occupation specific training certificates for the jobs they offer, which makes mobility across occupations more difficult (see Allmendinger, 1989). Older workers are often employed in declining occupations and industries (Blossfeld, Buchholz, and Hofäcker, 2006). This makes it difficult for older workers to hold their jobs beyond retirement.

The described changes in structures on the labor market and institutional systems impact the conditions of individuals' decision making, and therefore form individuals outcomes (Coleman, 1986, 1990). The individualization of life courses, the institutional settings and the structures on the labor market are assumed to be social elements, which lead to individual decision alternatives on the micro-level. The actors observe that they can individually decide if they want to start working in retirement based on the objective social situation on the macro-level. In consequence, the outlined macro-conditions play an important role in the micro-macro model of post-retirement employment.

The bridge assumption in my post-retirement employment micro-macro model therefore states that labor market conditions and the public welfare system influence individual decision making and outcomes. For instance, the pension system only allows individuals to work fully in retirement if individu-

als retire at the normal retirement age (see Börsch-Supan and Wilke, 2006) (a detailed overview of the German pension system can be found in Chapter 2). This could have an effect on transition times in retirement. An example for influencing conditions in the labor market is the behavior of firms. The image of older people working is still connected to unproductive workforce, so firm politics might be in favor of younger people (see Buss and Kuhlmann, 2013; Eichhorst and Sproß, 2005) and layoff the older workforce. Being unemployed prior to retirement leads to a weaker labor market attachment and might result in a longer job search for a post-retirement position. Thus, Chapter 5 investigates the pre-retirement situation of older individuals on the labor market in more detail.

A more complex bridge assumption I am suggesting is that the same macro-conditions put different constraints on different actors or shape their preferences differently. I assume, following Cahill, Giandrea, and Quinn (2006), that the population is heterogeneous rather than homogeneous. As already discussed in Chapter 2 women and immigrants are affected differently by the existent macro-conditions compared to men and natives (see Frommert, Heien, and Loose, 2013; Mika and Tucci, 2006; Kalter, 2005; Simonson, Gordo, and Titova, 2011). They show less stable and more interrupted employment careers, which leads to a higher exposure of inequality. This leads to differences among actors in their respective costs and benefits associated with choices they make (Raub, Buskens, and van Assen, 2011).

In the case of explaining post-retirement employment being part of a group which is affected by uncertainty and inequality on the labor market will be reflected in individual preferences and restrictions. For instance, the weaker labor market attachment of immigrants and women will result in lower pension

benefits. Hence, I assume that immigrants and women might continue to work because of economic preferences. Not only preferences can be systematically different across demographic groups. Also push-and-pull factors, influencing individual outcomes might be distributed heterogeneously. For example, immigrants might have more problems finding a job, because employers do not know their degrees obtained in the country of origin (Phelps, 1972). Chapter 5 is descriptively addressing the outlined bridge assumptions in this section, by examining the pre-retirement situation on the German labor market. To support the heterogeneity argument the analyses are executed separately for the outlined demographic sub-groups. In the empirical estimations in the later Chapter 6 and Chapter 7 the models also account for heterogeneity across ethnicity and gender.

### From Micro to Macro

Another important relationship in the micro-macro model, as already discussed above, is the aggregation of individual outcomes to explain society outcomes. Compared to bridge assumptions these assumptions are formulated in the opposed direction, namely from the micro to the macro-level (Lindenberg, 1977). The relationship between micro and macro-level is the process through which individual preferences become collective choices (Coleman, 1986), and therefore is called transformation rule.

The individual patterns are aggregated to describe the outcome on the macro-level (Kunz, 2004). This transformation is following a certain logic of aggregation. It is necessary to establish an analytic link between individual outcomes and consequences for the society on the macro-level (Raub and Voss, 1981). This is usually done by aggregation of individual outcomes, such as describing frequencies, averages, or distributions (Diekmann and Voss, 2004).

In case of post-retirement employment the transformation rule would address the way how preferences, holdings of private goods, and the interaction with institutions create post-retirement employment and how the individual orientations towards post-retirement employment combine to produce the structure of patchwork biographies in post-modern societies. On a societal level this will remove pressure from the social systems and also tightening the concept of flexible life course trajectories. In addition, it will advance the economic socialization of old-age, but it is also a way to prevent old-age poverty. As described in Section 3.1 the aggregation of the observed individual behavior might not be strong enough to allow a causal inference on the marco-level. However, it will provide evidence that society is in the process of changing, and where public policy can set incentives to accelerate societal change.

The aggregation logic I use to transfer micro-level outcomes to the macro-level is explained in detail in the methods section in Chapter 4. I use two econometric approaches to estimate outcomes on the micro-level. In the first empirical Chapter 6, I interpret the average marginal effects of the probability to engage in post-retirement employment. This means, the estimated results are calculated for the average retiree in my sample. Thus, the aggregation on the macro-level is done by describing averages. In the second empirical Chapter 7, I interpret the sub-hazard ratios of competing risks proportional hazard models. I estimate the probability of transitioning in a specific post-retirement job, which I assume is not independent of accepting a different post-retirement job. In this case the aggregation to describe society impacts on the macro-level is done by describing distributions.

Finally, macro-outcomes are typically the result of interdependence between actors. Human nature is relatively stable in the sense that actors behave similarly under the same conditions, while associations between macro-conditions and macro-outcomes are less stable (Coleman, 1990; Lindenberg, 1977; Raub, Buskens, and van Assen, 2011). Classical game-theory assumes inter-dependencies in the sense that the outcomes of individual behavior depend on own choices and on the behavior of other actors in the game (see Davis, 1997). Thus, the intentions an actor pursues do not have to coincide with the outcomes of the actor's behavior (Raub, Buskens, and van Assen, 2011). In the post-retirement model presented in Figure 3.3 institutions, represented by the government and firms can be considered as additional actors.

For instance, changes in public policy might affect people differently. If the pension system limits the possibility to work full-time in retirement to specific ages, people who are not above the age-threshold are not able to take-up a post-retirement job, although they might want to. On the other hand, institutional settings supporting inequality in older age might push people, who would not have considered to work beyond retirement, back on the labor market to prevent old age poverty. In addition, firms may influence individual outcomes, for example, by demanding certain workforce characteristics.

Overall, additional actors can set and manipulate push-and-pull factors to influence individual behavior. Regarding post-retirement employment, I assume that institutions and firms are important players in the micro-macro model. Characteristics of the pension system are included in the empirical analyses in Chapter 6 and Chapter 7 by adding dummies for retirement cohorts and the age at retirement, and all empirical analyses include controls for firm

characteristics. This way the influence of different actors in the theoretical model is included in the empirical implementation of the micro-macro model of post-retirement employment, which in turn helps to find out where policy can place incentives to manipulate processes on the individual level for the benefit of society. Hence, the next section, which outlines the micro-level perspective of post-retirement employment, also includes hypotheses on how different push-and-pull factors influence individual outcomes. This way, bridge assumptions addressing the conditions on the labor market and institutional settings are modeled to influence peoples' outcomes. In reference to transformation rules additional agents are allowed to manipulate processes on the micro-level to change the aggregated outcome on the macro-level.

### 3.1.3 Decision-Making on the Micro-Level

While aiming at the explanation of macro-outcomes or macro-regularities, the theoretical core of the explanation of post-retirement employment behavior involves micro-level assumptions. Processes on the micro-level are explained by individual hypotheses, which are the most important parts in micro-macro models. Without examining processes on the micro-level no valid descriptions of macro-events can be made (Coleman, 1986, 1990). Their goal is to forecast individual behavior. Theories which are mostly applied are rational choice theory (e.g., Blossfeld, 1996; Diekmann and Voss, 2004; Esser, 1993; Frings, 2007; Hill, 2002; Kunz, 2004; Simon, 1978) and game theory (see Davis, 1997). Individuals choose to work in retirement or not, given the macro-conditions at the time of their decision making, resources, preferences and alternatives. In principle individuals choose the actions with the highest utility (see Coleman, 1986, 1990; Diekmann and Voss, 2004; Opp, 2009; Raub and Voss, 1981; Raub, Buskens, and van Assen, 2011).

In my model, on the micro-level of post-retirement employment individuals have different alternatives to choose from. In the first stage they have to decide if they are going to work beyond retirement, in the second stage, in case they take-up a post-retirement job, individuals have to decide for a certain post-retirement job. In my model, they can change work environments, which means they can change establishments or occupations, or even both. However, individuals can also stay in the same work environment. What might differ is the time until take-up of the post-retirement job, which for instance is expressed in the length of the respective job-search. Individuals can continue directly after retirement or come back onto the labor market after being retired for some time.

Thus, in the micro-macro-model of explaining post-retirement employment outlined in Section 3.1 and displayed in Figure 3.2, arrow b represents the assumption of equilibrium behavior, which means that each actor maximizes her own utility, given the strategies of the other actors (see Davis, 1997). This application requires the use of additional assumptions on utility maximization or equilibrium behavior. For instance assumptions addressing the actors' feasible alternatives, preferences, and information are needed (Raub, Buskens, and van Assen, 2011). In theory of action they are typically expressed in push-and-pull factors, which results in micro-macro models that succeed in combining assumptions on alternative decision rules and behavioral heuristics (see Coleman, 1990; Homans, 1958). Assumptions on decision rules are addressed by rational choice theory and as well by a broad range of economic literature, and are discussed in Section 3.1.3 in my dissertation.

The decision of pursuing post-retirement employment, as well as the decision on the type of job depends on push-and-pull factors. Pull-factors can

be influenced by individuals, whereas push-factors cannot (Radl, 2007). By changing pull-factors individuals maximize their utilities. Push-factors influence individual decision making as well, although these factors cannot be manipulated by individuals. This is why they are considered as restrictions in the decision process. Both, push-and-pull factors can have the same or opposed impacts on the decision to pursue post-retirement employment (Shultz, Morton, and Weckerle, 1998).

In my thesis, I conceptualize the micro-level of my post-retirement employment model by studying the influences of preferences, restrictions, and push-and-pull factors on the probability to pursue post-retirement employment and on the probability of entering different job trajectories. Thus, for every individual or specific sub-population, their behavior in retirement is examined. Hence different patterns of behavior such as the distribution of individuals on post-retirement employment, or the change of patterns over time' like changes in labor supply can be explained on the individual level. With the help of transformation rules, discussed in Section 3.1.2, I use the estimated individual outcomes to describe outcomes for society on the macro-level.

In consequence, my micro-level hypotheses are the basis of my study. I assume either economic preferences, measured by financial variables, or psychosocial preferences, measured by variables taking up the individual demand for continuity influencing the engagement in post-retirement employment. I expect women and immigrants to differ in their outcomes, because they experience more insecurity in the labor market and are exposed to different conditions on the macro-level (for a detailed discussion refer to Chapter 2). I construct my measures for individual preferences based on a mixture of sociological, psychological and economical theories. The way I exploit these to

explain individual behavior regarding post-retirement employment is discussed in the following section.

### Economic Preferences in Retirement

Individual motivations which lead to the engagement in post-retirement employment, I assume, are economic preferences. By the time individuals retire they find that their income is not sufficient to make a living, or less than expected. To make up for income losses during the life course the agent's strategy is to continue work whilst receiving pension benefits. This strategy refers to rational agents, as for example, economic theory or rational choice theory do.

Retirement decisions in economic theory are typically described within life-cycle models of consumption and labor supply (e.g., Cocco, Gomes, and Maenhout, 2005; Shefrin and Thaler, 1988; Thaler, 1994). Economic theory suggests that individuals seek maximization of their lifetime income, conditional on their constraints. Peoples' budget constraints are determined by earnings, as well as non-work income such as public and private pension plans. The optimal retirement age is chosen in respect to individuals' financial opportunities and the amount of time which can be spent on leisure (e.g., Burtless and Moffitt, 1985; Fields and Mitchell, 1984; Stock and Wise, 1990). Older workers are most likely to leave the labor force at the earliest possible point in life, because they tend to value leisure over staying on the job. The earliest point in time for their retirement would therefore be the time at which pension benefits received will compensate adequately for the earning they would have made if they would have stayed on their job (Gruber and Wise, 2004). This usually is considered to be the official retirement age.

The neo-classical basic economic retirement model, which explains the timing of retirement, suggests two goods the individual agent uses to divide her life-cycle: work and leisure. Within this framework, the rational agent maximizes her consumption of leisure and work (Endres and Martiensen, 2007). This means, the earlier a person withdraws from the labor market the more leisure she can spent and the longer she receives pension benefits. But this will also limit her consumption, because she is receiving less money compared to staying employed in the labor market. The agent retires as soon as both goods are maximized. Graphically this can be seen in the classical economic approach, at the point where the budget constraint is tangent to the indifference curve (Endres and Martiensen, 2007). In dynamic models this point can shift over time, because with every additional year of work improves individuals' incomes and thus consumption in old-age (see Radl (2007) for an example of a dynamic retirement model).

Explaining post-retirement employment within this classical economic framework is somewhat difficult, because leisure is referred to as "retirement" and work is referred to as "employed in the labor market". In a way the classical economic approach describes the three part life course model (see Kohli, 1985). But with life course transitions becoming more flexible, the case of economic preference to engage in employment whilst being retired does not necessarily exist in these models. In the classical economic approach the rational agent would not retire, or delay retirement when knowing that her income would be not sufficient to make a living. There are only few economic papers which address that agents might un-retire due to economic preferences (see Ruhm, 1990; Maestas, 2010).

Rational choice theory might be more flexible in explaining individual

decision making, and at the same time underlying similar behavioral concepts of the principal agent and a similar direction of thought compared to the classical economic model. The Rational Choice Theory's agent-based model suggests that on the individual level agents have certain preferences and restrictions (Blossfeld, 1996; Kunz, 2004; Opp, 1999) and select their decision in a way that they benefit more from the chosen action compared to alternative actions (Hill, 2002). Referring to retirement decisions, instead of maximizing work and leisure, the agent maximizes her labor supply, which in turn depends on individual preferences and constrains, for instance income (see Wübbeke, 2005b). In the case of post-retirement in a rational choice framework, individuals preferences can either be to maximize their consumption or their leisure time, or they just want to stay active. These factors pull them onto the labor market. Labor market attachment, health, or financial supply can function as restrictions. The goal is to examine which impact restrictions as well as preferences have on the behavior of individuals.

Thus, according rational choice theory, the explanation of the engagement in post-retirement employment consists of the relative effects of each of these push-and-pull factors on the likelihood to work in retirement and the type of post-retirement job. In the economic model, influencing variables such as push-and-pull factors, affect the value of the peoples leisure in retirement. The participation in the labor market depends on the comparison of that leisure value with the amount they can earn on the labor market. This shows the slightly different perspective of sociological and economic theories. However, the main argument of an rational agent is the same in both fields. Because rational choice theory and the classical economic approach both include the same basic concept to explain economic preferences regarding post-retirement employment, they both fit in my micro-macro model of post-retirement em-

ployment.

My explanation for economic preferences of staying in the labor market beyond employment is that people working beyond retirement value their additional income more than the time they can spend on leisure, or that their consumption in retirement is higher in comparison to their expected lifetime income in retirement. For instance, an older worker with an expected retirement income goal of 1,200€ to sustain her lifestyle who is unexpectedly laid off by her employer will suddenly be faced with a lower retirement income than expected. She can make up for the loss in several ways, either by delaying her retirement, reducing consumption, or earning additional income in retirement. Not only people who want to augment their pension income but also people who have to earn additional money because they are at the risk of old-age poverty, for instance women or immigrants (see Chapter 2 for a detailed discussion), follow this strategy and engage in post-retirement employment.

In the empirical estimations of the individual outcomes on the micro-level in Chapter 6 and Chapter 7 I will measure economic preferences by including variables on the financial situation in retirement, such as pension income and pre-retirement wages. A detailed discussion of the literature which proofs that the economic situation matters in retirement decisions is given in Section 3.2.

#### Psycho-Social Preferences in Retirement

Institutional systems stimulate the separation of working life and retirement, although individualization and pluralization of the modern society offer more possibilities for individuals to arrange their lives. Both, Kohli and Rein (1991) and Riley and Riley (1994) consider the concept of working continuously to

accumulate savings to spend on leisure in retirement obsolete. Individuals do not tend to assign working and leisure time to different phases in their life courses. Due to an increase of alternative ways to transition between different stages in life, it is possible to combine work and leisure time. For instance, being employed beyond retirement is one way of doing so. Motivations for this are discussed in various theoretical concepts.

Post-retirement employment is considered as a result of individual life plans. Life course theory suggests path dependency (Elder, 1995), which means that different life spheres are influenced by others (Wang, Zhan, Liu, and Shultz, 2008). For instance, social inequality is transferred (Fasang, 2012) through this dependency. This concept, when applied to retirement transitions, suggests that individuals will perceive retirement in different ways that are influenced by previous events in their lives. For instance, people who are working part-time before retirement, or are in partial-retirement, might be more likely to not engage in post-retirement employment, because they already had time to adjust to new daily routines.

The continuity theory (Atchley, 1989, 1992) is important to consider when studying how people make decisions about when to retire and life after retirement. It emphasizes that people, despite changes occurring in their lives, maintain the same preferences and habits evoked by their personalities. Individuals experience stress and discomfort when familiar structures and daily routines provided by working life change once they are retired. Maintaining these after retirement supports a smooth complete withdrawal from the labor market (Kim and Feldmann, 2000). This behavior is considered to be a strategy of successful and active aging (Backes and Clemens, 2003). Individuals choose to continue working beyond retirement, because being employed sets

structures and daily routines they need for their well-being. Continuing employment also helps individuals to stay engaged in social relationships and pursue active lifestyle patterns (Wang and Shultz, 2010). However, achieving continuity is conditioned by age (Kim and Feldmann, 2000).

Continuity theory addresses psycho-social preferences to continue working in retirement, such as staying active and keep social roles that have been important for individuals in their life course. This argument is in line with the concept of productive aging, discussed in gerontology (Nowossadeck and Vogel, 2013). Individuals behavior can be described as selective disengagement form their working life (Künemund and Kolland, 2007). The discussed theoretical considerations in this section, lead to the assumption that retirees staying in the same work environment follow continuity theory.

The outlined psycho-social theories clearly state that individuals' preferences to engage in post-retirement employment do not only have to be economically, like it is primarily discussed in politics and media. Longevity and "active aging" enables people to continue work in retirement because of psycho-social motives (see Nowossadeck and Vogel, 2013; Grabka, 2013; Scherger, Nazroo, and Higgs, 2011; Scherger, Hagemann, Hokema, and Lux, 2012). Because of this I consider psycho-social preferences in addition to economic preference in my micro-macro model of post-retirement employment. Both of them are located on the micro-level and are influencing individual outcomes regarding post-retirement employment.

In the empirical part of this dissertation I will include various dependent variables in the estimations to measure continuity behavior of individuals. This is primarily done by accounting for analysis time in the models. For

instance, the survival analyses conducted in Chapter 7 aim at studying transition times into post-retirement jobs. I expect individual seeking for continuity to show shorter transition times. Furthermore, I assume that individuals searching for continuity do not switch work environments, because they are interested in maintain their social network. In Chapter 6 the lengths of time between the last job prior to retirement and the first post-retirement job is included to measure continuity. In addition, I include different variables on the situation prior to retirement. For instance, if people are employed full-time, part-time or in partial retirement before transition into retirement. Indicators for individuals biographies - if biographies are considered as stable or interrupted - will show if people who experienced non-continuity during their working lives, also easier adjust to the withdrawal of the labor market. The hypotheses addressing these assumptions are discussed in detail in Section 3.2.

Whereas these concepts reflect individual preference concerning post-retirement employment, there are also restrictions which might affect individuals in their search for post-retirement employment. For instance, not all individuals whose strategy is to earn additional money will also find a job to do so. Turning to continuity theory, it might not be possible to achieve continuity for some individuals, because older age is linked to more constraints (Elder, 1995). Poor health, for instance, can put constraints on individuals in their search for continuity. If preferences can be transferred into the desired outcome depends on factors that push-and-pull individuals from or into the labor market, which are also addressed in my hypotheses.

## 3.2 Hypotheses on Post-Retirement Employment

This chapter so far discussed the theoretical micro-macro approach explaining post-retirement employment. One conclusion is that the individual component is the main part of studying macro-outcomes, and that processes on the individual level are influenced by push-and-pull factors, which comprise preferences and restrictions. The previous Section 3.1.3 reviewed individuals preferences I assume influencing the take-up of post-retirement jobs by applying micro-theories from different disciplines. In the next step hypotheses on possible push-and-pull factors are provided separately for the first and second stage decision outcomes, which are studied on the micro-level. This way bridge assumptions between the micro and macro-level are included in the model.

Studying the participation of retirees in the labor force introduces various possible “determinants" of post-retirement employment, such as the employment biography prior to retirement, labor market attachment in general, monetary influences, health, and the influence of other actors such as establishments (see Chapter 2 for a detailed discussion). I comprise these macro-conditions and individual preferences in push-and-pull factors for the empirical analyses. I consider preferences as push factors, because they can be manipulated by individuals. Restrictions, like institutional settings and macro-conditions, and conditions on the labor market, are part of the model on the micro level, because other agents influence individual outcomes (see Davis, 1997).

My hypotheses concerning push-and-pull factors on people’s engagement

in post-retirement employment are discussed separately for the two decisions individuals have to make. In the first stage they have to decide to engage in post-retirement employment, in the second stage they have to decide for a specific type of post-retirement job. Both stages are influenced by push-and-pull factors on the individual level. The outlined hypotheses will be empirically examined in Chapter 6 and Chapter 7. The individual outcomes on the micro-level can then be transferred to the macro-level to describe post-retirement behavior within the German society.

### 3.2.1 First Stage: The Likelihood of Pursuing Paid Work

Financial stability in retirement from public pension benefits seems to be getting more difficult. For many people, benefits received are not sufficient to cover subsistence costs completely. In 2010, 412,081 retirees above the age of 65 claimed social assistance payments from the German government. Almost 22 percent of them were foreign recipients.[7] Retirees whose employment histories consist of rather short periods of contribution payments or who obtain minimal earnings are most heavily affected. Factors that lead to this include: unstable employment careers, working in less qualified employment, and long-term unemployment (see Bönke, Schröder, and Schulte, 2010; Frommert, Heien, and Loose, 2013; Simonson, Gordo, and Titova, 2011; Simonson, Gordo, and Kelle, 2011). All of the described characteristics result in fewer earning points at the time of retirement. This leads to lower retirement benefits (Blank and Buschoff, 2013) and as consequence a higher likelihood of being exposed to old-age poverty, and thus can be considered as an explanation of individuals'

[7] Statistisches Bundesamt (2011). Empfänger und Empfängerinnen von Grundsicherung im Alter und bei Erwerbsminderung: Deutschland, Stichtag, Nationalität, Altersgruppen, Geschlecht. `https://www.destatis.de/DE/Publikationen/StatistischesJahrbuch/Sozialleistungen.pdf?__blob=publicationFile`, accessed on 10/21/2011.

decisions to engage in post-retirement employment (Börsch-Supan, Gasche, and Lamla, 2013).

Public pension income might not be the only income source in retirement. Retirement income may also consist of additional pillars, such as occupational pensions and private pensions or assets, and is usually combined at the household level (Bäcker, 2011; Goebel and Grabka, 2011). The administrative data used in this study, described in Chapter 4, only include public pension income on the individual level resulting from accumulated earning points, and therefore might not reflect the overall pension income. However, for the generation of retirees I observe public pension income is about 81 percent of total household income (Börsch-Supan and Wilke, 2009b), and individual income is about two thirds of household income (Mika and Tucci, 2006). Thus, for the majority of the observed retirees public pension income represents total pension income, because this generation of retirees hardly invested in private pension plans. Consequently, individual public pension income can be used as proxy to map peoples' standards of living in retirement.

Under the assumption that people try to improve their financial situation for themselves before claiming governmental support, retirees who receive lower public pensions might hold post-retirement jobs to gain additional income. This leads to the first hypothesis referring to economic preferences in individuals decision-making to engage in post-retirement employment.

- Employment in retirement serves to gain additional earnings, in particular for retirees who are more likely to be affected by old-age poverty (I).

The outlined situation in hypothesis I is found more often for immigrants.

On average, they are less integrated in the labor market (Brück-Klingberg, Burkert, Damelang, Deeke, Haas, Schweigard, Seibert, and Wapler, 2009; Baykara-Krumme and Hoff, 2006; Kalter, 2005; Kogan, 2004). Immigrants receive lower pension benefits resulting from lower earnings throughout their employment histories (Mika and Tucci, 2006; Mika, Rehfeld, and Stegmann, 2009). Furthermore, immigrants often hold less-qualified employment relationships resulting from missing or not-accredited educational degrees (Englmann and Müller, 2007; Köppe, 2010). Moreover, first-generation immigrants experience shorter employment careers in Germany induced by their own migration history. This results in shorter contribution periods to the German pension insurance.

Ethnic Germans are the exception when compared to other people with immigration history (see Chapter 2 for a detailed description). Because of their authorized German citizenship, they are eligible for benefit receipt according to the German foreign pension law called "Fremdrentengesetz".[8] This law treats eligible foreigners with German ancestry as people who have spent their whole life in Germany, although they actually lived part of it in another country (Mika, Hering, and Hochfellner, 2010). Any period of employment, held in both their home countries and in Germany, is taken into account for calculating ethnic Germans' annuities. However, entitlements for employment which has not been held in Germany are deducted. Jobs held in Germany are fully accredited.

This induces higher pension benefits for ethnic Germans when compared to other immigrants, but lower benefits when compared to Germans. It can be

[8] Fremdrentengesetz in der im Bundesgesetzblatt Teil III, Gliederungsnr. 824-2, veröffentlichten bereinigten Fassung, das zuletzt durch Art. 8 des Gesetzes vom 19. Dezember 2007 (BGBl I S 3024) geändert worden ist.

assumed that immigrants as well as ethnic Germans are more likely to hold a post-retirement job than Germans, but that ethnic Germans show a lower probability to be engaged in post-retirement employment than immigrants. Thus, macro-conditions, in particular institutional settings, transmitted through bridge assumptions affect ethnic Germans, Germans and immigrants differently. This leads to the second hypothesis, that specific demographic-groups are more likely to engage in post-retirement employment because of economic preferences.

- People with immigration history participate more often in post-retirement employment than Germans (II).

In addition, the theoretical considerations and literature discussed in Chapter 2 show that the whole individual employment history influences employment in retirement. People who have experienced difficulties in the labor market during their careers will also find it difficult to get a job beyond retirement (Clemens and Himmelreicher, 2008). People, who are exposed to poverty, might not engage in post-retirement employment, because they are less attached to the labor market. This makes finding a job much more difficult and will result in lower job finding rates or longer job search.

Following continuity theory (Atchley, 1989), people who have held stable and good positions in the labor market will show a higher likelihood to participate in post-retirement employment compared to less attached people. This situation proves to be true for highly-qualified people or retirees who are able to keep on working in their former highly-qualified occupations (Pleau, 2010). Brussig (2010) illustrates with data of the German Mikrozensus that labor participation rates have increased in retirement age especially for highly qualified people. Highly-skilled retirees reach, at a rate of about 10

percent, nearly twice the participation rate as low-skilled retirees. Brussig (2010) supposes that these retirees meet the individual requirements in order to continue their jobs. This leads to the third hypothesis, which reflects psycho-social preferences, in particular the search of continuity, influences the engagement in post-retirement jobs and whether people want to be part of an active aging workforce (see Haider and Loughran, 2001; Grabka, 2013; Maxin and Deller, 2010; Nowossadeck and Vogel, 2013).

- Experiences during the employment history, particularly former personal working patterns, influence post-retirement careers (III).

### 3.2.2 Second Stage: The Likelihood of Transitioning in Different Job Trajectories

The study of the second stage on the micro-level is done by survival analysis. This method allows to study the amount of time that it takes before a particular event happens (see Blossfeld, Golsch, and Rohwer, 2007; Allison, 1984). Applying this method by using the time elapsed from retirement until the start of the first post-retirement job (PRJ), this setting offers a perfect opportunity to study psycho-social preferences, expressed in the demand for continuity (Atchley, 1989, 1992), within the micro-macro model of post-retirement employment. It will provide new evidence regarding transition times in different types of PRJ. In addition, push-and-pull factors, which influence the transition in PRJ in the same work environments (PRJ-SE) versus switching to PRJ in different work environments (PRJ-DE) are studied (see von Bonsdorff, Shultz, Leskinen, and Tansky, 2009; Wang, Zhan, Liu, and Shultz, 2008). The conducted analyses on the second stage are conditional on being in the labor force, because people already decided in the first stage if they want to work beyond retirement. The transition time until take-up of a

post-retirement job will be used a a measure for psycho-social preferences. I assume that individuals searching for continuity will transition shortly after being retired.

In addition, I consider four indicators as push-and-pull factors which influence the entry to different post-retirement job trajectories. They are derived from the discussed literature in Section 2.4 and the theoretical parts within the different stages of the micro-macro model of post-retirement employment outlined in Section 3.1: the financial situation of the individual, their labor market attachment, health, and employer characteristics. Hypotheses addressing each of the mentioned push-and-pull factors are outlined as follows.

**Financial Situation**

To measure economic preferences two indicators are used: the amount of pension benefits received, and the wage of the last job prior to retirement. Financial security is perceived as a push factor for individuals living at the poverty threshold. It pushes individuals into the labor market who need additional income. Previous studies (see Chapter 2 for a detailed discussion) show that retirees with lower pension payments tend to either extend their working life or continue working in retirement (e.g., Dittrich, Büsch, and Micheel, 2011; Dorbritz and Micheel, 2010; Hanson Frieze, Olson, and Murrell, 2011; Hershey, Henkens, and van Dalen, 2010b; Hochfellner and Burkert, 2013; Kim and Feldmann, 2000; Micheel, Roloff, and Wickenheiser, 2010; Shacklock and Brunetto, 2011). For these individuals transition times are expected to be short.

The necessity of additional earnings leads to a high reliability on being

employed. This will influence the decision for the type of post-retirement job. People who rely on their jobs will rather stick to the job they have, because they know the workplace, their salary and if they can fulfill the requirements of the employer. In addition, changing to a different field often leads to reductions in earnings (von Bonsdorff, Shultz, Leskinen, and Tansky, 2009). Thus, changing work environments is linked to uncertainty. Individuals will decide more carefully risk-averse in respect of switching work environment. People who rely on being employed are less likely to take the risks associated with job changes. For wealthy individuals, financial security is not perceived as push-factor to stay in the labor market beyond retirement. I expect individuals with higher pension payments to take more risks in respect to switching jobs. If they consider their new job as mismatch, they will search a new one or can quit easily because they don't need the additional income. This makes them more flexible in their decision for a PRJ. The outlined relationships are tested by the following hypotheses:

- The likelihood to transition to a PRJ-SE is higher for individuals living on the poverty threshold (I).
- Individuals who are financially better off are more likely to change their employment environment in retirement taking a PRJ-DE (II).

#### Labor Market Attachment

I distinguish between two different measures following prior studies which underline the importance of the previous employment history when studying transitions into retirement and beyond (e.g., Crawford and Tetlow, 2010; Lain, 2012; Maxin and Deller, 2010; Scherger, Hagemann, Hokema, and Lux, 2012; Smeaton and McKay, 2003; Wang, Zhan, Liu, and Shultz, 2008): labor market attachment in the short run versus the long run. If individuals are continu-

ously employed throughout their life course they accumulate human capital, which allows them to transfer knowledge more easily between different jobs. They are familiar with the structures in the labor market, through continuous working on the job they automatically adjust to new technologies. Overall, labor market attachment in the long run makes people more attractive to employers, due to their higher experience.

In addition, the specific labor market attachment prior to retirement is important (Schellenberg, Turcotte, and Ram, 2005). If people are employed before transitioning into retirement they have the option to continue their jobs or search for an new one, whereas people who are unemployed prior to retirement have to search for a job before they can start working and thus have less alternatives to choose from (Pleau, 2010). This will impact transition times into post-retirement employment. Time creates distance to jobs. The longer the time from retirement to a PRJ, the higher the search intensity has to be (Adams and Rau, 2004).

I measure labor market attachment in the short run by characteristics of the last job prior to retirement and the gap between the last job and retirement. Labor market attachment in the long run is measured by creating indicators addressing the whole employment career prior to retirement, such as experience, lengths of total unemployment, or the number of jobs individuals worked in. The outlined relationships are tested by the following hypotheses:

- Individuals who are employed prior to retirement are more likely to stay in their PRJ-SE, whereas individuals who are not employed show a higher probability of switching environments (III).

- The likelihood of entering a PRJ-SE is higher for retirees with shorter

gaps between their last job and their entry to retirement (IV).

- The likelihood of entering a PRJ-DE increases with increasing unemployment experience (V).

### State of Health

Health is an important predictor, as discussed in Chapter 2, when studying employment in older age. Literature agrees on the negative impact of health on continuing employment beyond retirement (e.g., Beehr, 1986; Cahill, Giandrea, and Quinn, 2006; Crawford and Tetlow, 2010; Davis, 2003; Dorbritz and Micheel, 2010; Feldman, 1994; Komp, van Tilburg, and van Groenou, 2010; Scherger, Hagemann, Hokema, and Lux, 2012; Taylor, 2010; Wang, Zhan, Liu, and Shultz, 2008). The data allows me to create a health measure based on employer notifications, instead of self-indications. I accumulate the days workers are on sick leave throughout their careers. Because employers have to notify sickness leave starting after six weeks, this measure is able to identify people suffering from serious or chronic diseases.

Individuals with poor health are more likely not to work at all in retirement. The analysis sample only includes retirees in the labor force, which means that I observe a selection of healthier retirees. Nevertheless, I expect transitions in different PRJ trajectories to vary by health. Individuals with health constraints are less flexible on the labor market, because they may encounter only a limited number of jobs within their constraints.

This means that conditional on working, I assume that it is more convenient for people with poor health to stay in the work environment they are familiar with, because they cannot be sure to meet the requirements of a new work

environment. Of course, there is also the possibility that individuals are forced to switch work environment because they are not capable of working in their old job due to health limitations. However, referring to these cases, I would consider it as more likely that laid off individuals with poor health are more likely to transition to retirement only. The outlined relationships are tested by the following hypothesis:

- For individuals with poor health the likelihood of holding a PRJ-SE is higher than the likelihood of changing to a PRJ-DE (VI).

### Impact of Firms

Establishment characteristics, as well as their political and strategical alignments, determine if establishments tend to hold on to their personnel and to offer them the possibility to continue work beyond retirement (e.g., Dorbritz and Micheel, 2010; Hutchens, 2007; Lui Ping Loi and Shultz, 2007; Micheel, Roloff, and Wickenheiser, 2010; Smeaton and McKay, 2003; Wübbeke, 1999). Because there is few evidence on the influence of firm characteristics on post-retirement I will include general and specific firm characteristics, but focus on two main hypotheses to explain the impact of employers' practices on PRJ outcomes.

Establishments might be more likely to layoff older workers. In particular the generation of the retires I am analyzing has been affected by the German institutional influence of offering early retirement programs (Rinklake and Buchhholz, 2011; Wübbeke, 1999). People working in establishments who made use of the early retirement programs might come back to the labor market after some time of being retired, which also leads to a change in work environment and longer transition times (see Wübbeke, 2005a).

Another personnel strategy of employers might be to maintain a heterogeneous age structure. So depending on the establishments age structure firms will employ more or less older workers (see Bellmann, Gewiese, and Leber, 2006; Schmidt, Tisch, and Engelhardt, 2012; Sendler, 2011).

Thus employers' characteristics and practices, in particular of the employer of the last job prior to retirement, influence later employment outcomes of retirees (see Bellmann, Leber, and Stegmaier, 2007; Adler and Hilber, 2009; Micheel, Roloff, and Wickenheiser, 2010). Characteristics of a work place might also support psycho-social preferences to engage in post-retirement employment. If people are comfortable at their workplace and get along well with their co-workers, they might want to stay active in retirement to maintain their social network. The outlined firm effects will be captured by generating firm characteristics on the establishment in which the retiree worked before claiming pension benefits, such as the age and qualification structure within the establishment, industry, size, and establishment closure marker. Special interest is given to following hypotheses:

- This probability of entering PRJ-SE is higher for individuals employed at smaller establishments before retirement. Individuals employed in larger firms show a higher likelihood to enter PRJ-DE (VII).
- If the share of older workers in the establishment prior to retirement is higher, it is more likely that retirees transition to a PRJ-DE (VIII).

Overall, the outlined hypotheses are used to find individual preferences on the micro-level which push individuals into post-retirement employment. Furthermore, the hypotheses will help to test which additional endogenous push-factors and exogenous pull-factors, described as bridge assumptions, influence post-retirement outcomes on the individual level. By studying these

influencing factors, we learn about the impact institutions, firms, conditions on the labor market, and individual biographies have on individual outcomes regarding post-retirement employment. This is important to shed new light on the current public policy discussion. By aggregating the individual outcomes to the macro-level public policy learns where to place incentive to support the extension of working life.

Before turning to the empirical part of this dissertation, which examines the outlined hypotheses on the micro-level to produce evidence of changes on the macro-level, the data and methods used are described in the following Chapter 4.

# Chapter 4

# Data and Methods

## 4.1 Data for Studies on Older Workers

The majority of social science studies on older workers and retirement transitions make use of survey data, such as the Mikrozensus, the German old-age Survey, the Survey of Health, Ageing and Retirement in Europe, the Health and Retirement Study (SHARE), or the English Longitudinal Study of Ageing (ELSA). These comprehensive data enable the realization of various research topics. However, a disadvantage of surveys is related to analyses of small populations. Limitations in sample size impede differentiated analyses of specific subgroups in the labor market.

This is only one of the reasons why the mentioned survey data can not be used to study the topic I am interested in. In most of the existing surveys people self report their retirement state. However, as discussed in Section 2.3, perceptions of retirement may vary. Wheres some individuals report they are retired when they receive pension benefits others might not if they are employed while receiving pension benefits. My research requires a consistent measure of retirement, otherwise the transition times can not be interpreted properly. Although it is possible to identify the accurate retirement date, for instance in SHARE, the number of individuals engaging in post-retirement employment is to little to conduct detailed analyses for the demographic sub-groups, such as gender and ethnicity, I include in my study. In wave 1 of SHARE only about 200 retirees can be considered as post-retirement workers. In addition, most of the survey data do not include information on the employing establishment.

Because of the limitations of survey data to study post-retirement employment trajectories I use register based data sources in my dissertation.

Register-based samples offer a better possibility for these kinds of analyses, because they include a higher number of observed individuals in comparison to survey data. This is one reason why administrative data get more and more important in social science. Nowadays, about 80 percent of micro-economic evaluation studies in Europe are based on administrative data sources (Card, Kluve, and Weber, 2010; Scioch and Oberschachtsiek, 2009). In addition to the benefits of a larger sample size, they contain precise information on characteristics like wages, employment or unemployment periods, and social security transfers. Another advantage of administrative records is the absence of measurement error due to panel mortality, non response, panel attrition, or panel conditioning (Kluve, 2006).

However, one problem arises in administrative data of the two main social security providers in Germany - the German Pension Insurance (GRV) and the German Federal Employment Agency (BA) - when studying employment behavior of retirees. The studied subgroup is not identifiable in the single data sources. Only the linkage of both data sources enables the identification of retirees who re-enter the labor force. As a consequence, the data used in this study had to be generated in a first step. This was done within the project "Biographical Data of Social Insurance Agencies in Germany (BASiD)", funded by the Federal Ministry of Education and Research. The method of how the data linkage was executed is described in the following sections. In addition, the information available in the developed data and used to identify the population under study is outlined in this chapter.

### 4.1.1 The BASiD Collaboration

The intention of this collaborative research endeavor was to create innovative data by linking multiple data sources of the GRV and the BA. Both agencies

process data coming from the same social security notification procedure. During this procedure, employers have to report various information about their employees: Information which is necessary for calculating social security contributions and information which is solely collected for statistical purposes (Wichert and Wilke, 2010). Furthermore, the agencies process information collected in the course of achieving their legal mandates. Each agency stores information on persons needed for its own administrative tasks. All stored information can be combined over time and biographies for individuals on a daily basis can be created at each agency.

The main area of responsibility of the BA is the calculation of unemployment benefits. Therefore, social security records are processed. Another task is the placement and consultation of the unemployed. During these administrative processes, various supplemental data records are generated. The Institute for Employment Research (IAB) of the BA, is allowed to generate and archive historical data from all existing records. The Research Data Centre (RDC) of the BA provides samples drawn from the historical data archive for scientific research purposes.

Approximately 90 percent of the German population is registered within the public pension system, because contributing is mandatory for most individuals. Only self-employed individuals and civil servants are excluded. The individuals' pension accounts contain all relevant information regarding annuity computations. For instance, the amount of entitlements and benefits received for each contribution period is stored. The GRV also provides a huge advantage addressing data quality by clarifying the content in the individuals' accounts. Employees subject to social security receive an information letter on a regular basis starting at the age of 30 which contains

the entitlements accumulated so far. In this way, implausible reports are corrected by the insured individuals (Richter and Himmelreicher, 2008). The GRV data is available for scientific research endeavors at the RDC of the GRV.

The BASiD collaboration enabled the linkage of individual employment histories from the two outlined social security agencies. Accounts of one percent of all insured individuals between the age of 15 and 68 living in Germany on December 31st, 2007 were combined. The aim was to reduce existing gaps in the individuals' biographies stored with each provider. For example, the BA does not need to know if a person is on sick leave for accomplishing its legal mandate. Therefore, in the individuals' biographies in the BA data this information is missing. The GRV stores information on sickness leave, because it is relevant for annuity computations. In this case the information of the GRV may be used to fill up gaps in the IAB data. There are also circumstances where this can be done the other way round. Table 4.1 shows the available information which is combined in the BASiD collaboration by data source.

The BASiD data contributes to a wide range of analyses in social science. Studies of employment histories, starting with the entry into the labor market including the retirement transition and beyond (Hochfellner, Müller, and Wurdack, 2012) may be pursued.

### 4.1.2 Description of the Original Data

BASiD comprises several single data sources to maximize the amount of information on the individuals. The different sources used in the data linkage are outlined in Figure 4.1.

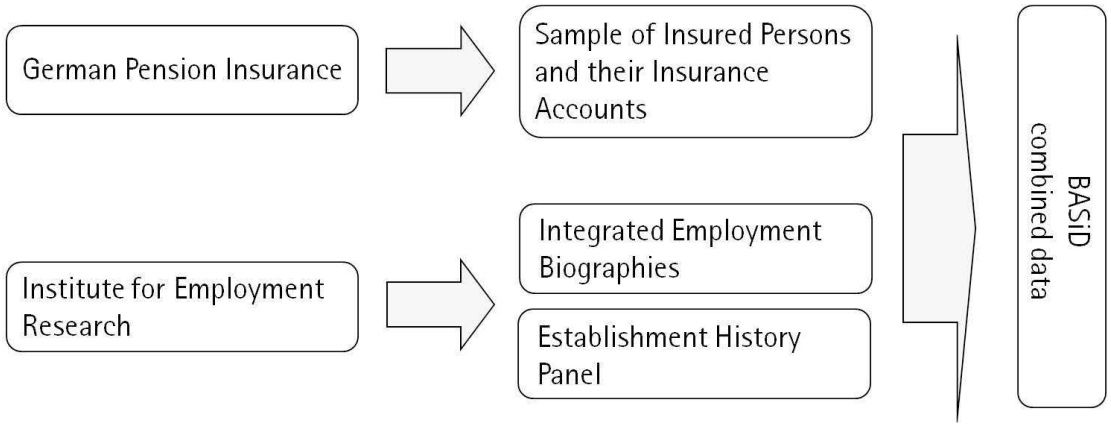
**Table 4.1:** Complementary information of IAB and GRV

| | IAB | GRV |
|---|---|---|
| Employment/benefit history West Germany (1951-1974) | | X |
| Employment/benefit history West Germany (1975-present) | X | X |
| Employment/benefit history East Germany (1951-1992) | | X |
| Employment/benefit history East Germany (1993-present) | X | X |
| Education (military and civil service) | | X |
| Times of illness | | X |
| Information on occupation | X | |
| Job search and training measures | X | |
| Job payments | X | X |
| Earning points and retirement characteristics | | X |
| Motherhood and number of children | | X |
| Regional and establishment information | X | |
| Demographic information | X | X |

The Sample of Insured Persons and their Insurance Accounts (VSKT) is an annually generated sample. It is drawn from all persons who show at least one contribution in their insurance account at the end of the sampling year. The data provide daily information about every circumstance that is relevant for pension computations of the insured individuals (Himmelreicher and Stegmann, 2008). This implies that every state in their life courses may be traced at different points in time. The available histories start with information on schooling and end with the transition in retirement.

The Integrated Employment Biographies (IEB) include information of different data sources. It contains daily information concerning employment liable to social security from 1975 on. Since April 1st, 1999 marginal part-time work is recorded additionally. The individual employment histories are supplemented with de-registration records of the receipt of unemployment benefits and unemployment assistance (Jacobebbinghaus and Seth, 2007). On January 1st, 2005 the receipt of unemployment assistance and maintenance benefit was pooled together and is now reported as unemployment benefit II.

**Figure 4.1:** Administrative data sources of BASiD




*Source: Hochfellner, Müller, and Wurdack (2012)*

In addition, the data contain references to times of job-search and times of participation in active labor market policies.

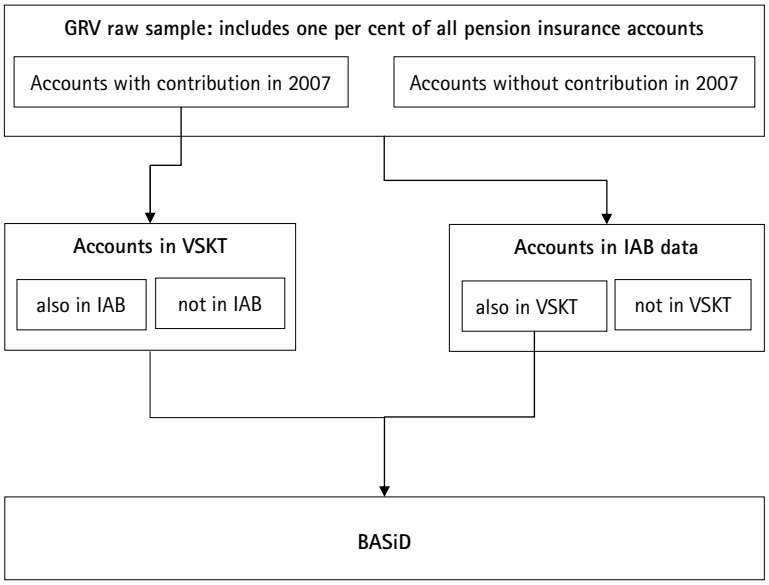
The Establishment History Panel (BHP) is generated by aggregating the individual information on June 30th by establishment ID and year. It contains every establishment in Germany that employs at least one worker liable to social security at that point in time. Since 1999, this is also true for establishments with at least one marginal part-time employee. The BHP is available since 1975 for West German establishments and since 1992 for establishments in East Germany (Spengler, 2008).

### 4.1.3 Sample Frame of the Linked Data

The VSKT serves as baseline for the linkage. The gross sample for the VSKT is drawn from the raw data of the GRV, but only accounts with reported contributions in 2007 are transferred into the VSKT. The sampling is disproportional, stratified by the type of insurance provider, gender, nationality,

and year of birth.[9] Figure 4.2 illustrates the sample frame.

**Figure 4.2:** Sampling design




*Source: own illustration*

All individuals of the gross GRV data are ascertained in the IAB data, but only the existing accounts in the VSKT are linked to the IAB data. Not every included person who has an account at the GRV also contributes to social security. For example, if a person is self-employed and is voluntarily insured in the German pension system, this person will only be found in the GRV data.

The data includes weights which extrapolate to the population in 2007. The panel structure implicates that only notifications of people who are within the population frame at the time of sampling are available in BASiD. If a

[9] For a detailed description refer to (Richter and Himmelreicher, 2008).

person drops out before 2007 (for instance due to death), the information concerning this person on earlier stages in time is not included in the data.

### 4.1.4 Data Linkage

The linkage of the different data sources is executed using the social security number as the primary identifier. It allows for a successful match of the individuals' accounts from both of the providers. Unfortunately, this identifier is not sufficient for linking the single notifications stored within the accounts. Additional identifiers have to be included: the begin and end date of the observed period, the actual state in the employment history, and the daily wage. In combination, these indicators enable a direct identification of perfect matches upon condition that the original data sources cover identical units. Because of different formats, only ten percent of the records match perfectly, although not every observation necessarily has to have a perfect match. The existence of parallel or additional information is possible. In consequence, data editing is needed to improve the match quality. Several steps have to be considered.

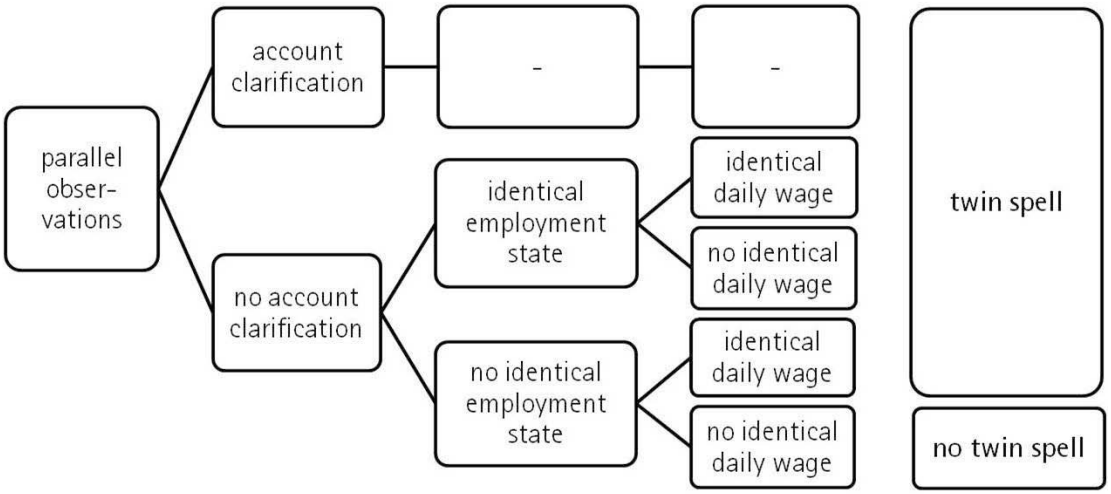
Notifications within individuals' accounts in each of the data sources have to be rearranged according to their lengths. An episode splitting has been conducted to break up observations that overlap in time. The splitting process involves duplicating segments of observed periods of time and aligning start and end dates, so they are identical in all data sources for identical notifications. The variables referring to the original observed periods are adjusted to reflect the newly split time intervals. Because the daily wage is used as an identifier in the linkage, the currency change from DM to € has to be harmonized in the data sources. The calculation of the daily wage is based on working days as well as calendar days, which has to be accounted for. The data

of the GRV contain the wage that transfers into pension entitlements, whereas the BA stores the actual earnings the employer reports. The two reported indications differ for individuals living in East Germany. Entitlements are calculated by multiplying the reported wage with the values corresponding to annex 10 SGB VI §256 for contribution periods in East Germany. In West Germany they are calculated directly from the wages reported by the employer. Thus, daily wages of employees in East Germany have to be converted to make them comparable to the ones in West Germany.

After harmonizing the identifiers, perfect matches in the different data sources can be defined. In the following they are called “twin spells". A twin spell consists of two identical records of the IAB and GRV data. For instance, for an employment notification in the GRV data the corresponding employment notification in the IAB data is matched. The linked notifications are considered a twin spell. Different combinations of the identifiers result in different twin spells. Therefore, the searching routine is executed by dividing the data in sub-samples which are contemplated separately. The searching routine is programmed as a loop running through all sub-samples until every possible match is found. Figure 4.3 illustrates the procedure.

The routine gives priority to the information of the GRV over the information coming from the BA and marks all observations as twin spells if insurance accounts are clarified. For simultaneous observations which are not clarified, the employment state and the daily wage are compared. In case of an identical employment state and daily wage, the simultaneous records are declared as twin spells. If the employment state is identical but the daily wage differs, a twin spell is assumed when the deviation in the daily wage between both data sources is not larger than one Euro. In these cases the daily wage is set to

**Figure 4.3:** Comparison of simultaneous observations




*Source: Hochfellner, Müller, and Wurdack (2012)*

the mean of the different wage indications. If the difference of the daily wage is larger than one Euro, the observations are defined as twin spells regarding the employment state. Their daily wage is then changed to missing.

Searching for twin spells in the case of no identical employment states is much more difficult. The executed routine differentiates between the attribute identical wage and no identical wage. If the wage is identical, the employment state is edited by comparing the records with respect to the Social Code of Law and the consistency within the individuals' accounts. Imagine both of the agencies report a wage of 1000€. The IAB reports marginal employment and the GRV regular employment. Compared to the wage, the notification of regular employment would be the plausible one. In addition, the Code of Social Law defines marginal employment as receiving wages up to 400€. In this case the routine would change the employment state to regular employed. The remaining spells are classified as "no twin

spells" because they differ in the employment state as well as in the daily wage.

For records marked as twin spells, the information of the two single notifications is compressed onto one single record. The information on the observation of the GRV is transferred onto the observation of the BA. After the transmission, the duplicate is deleted. This loop has to be executed several times, because the existence of multiple parallel twin spells is possible. The remaining no twin spells undergo a different routine, which implies analyzing sequences of different states that appear at the same time. A set of correspondence matrices for each number of observed parallel records is generated. Each matrix indicates for all identified simultaneous states if their parallel existence is valid regarding the German Code of Social Law. Exceptional cases are combinations which are only valid with restrains, e.g. the combination is only valid for a specific time because the Code of Social Law changed. Figure 4.4 gives an example for the case of five simultaneously observed states.

**Figure 4.4:** Existence of a “no twin spell"

| ID | SPELL | START | END | SOURCE | EMPLOYMENT STATE | |
|---|---|---|---|---|---|---|
| 1 | 1 | 01.01.2000 | 31.12.2000 | IAB/GRV | Employment | Obs. have to be out of the same source |
| 1 | 2 | 01.01.2000 | 31.12.2000 | IAB/GRV | Marginal part time employment | |
| 1 | 3 | 01.01.2000 | 31.12.2000 | GRV | Maternity leave | existence of additional information is always possible |
| 1 | 4 | 01.01.2000 | 31.12.2000 | IAB | Job seeker | |
| 1 | 5 | 01.01.2000 | 31.12.2000 | GRV | Pension payments | |

If the source of spell 1 & 2 = RV, it is only possible to have a pension payment if this is combined with an entitlement to an orphans pension. In case of a retirement pension the source of spell 1 & 2 has to be IAB.

*Source: Hochfellner, Müller, and Wurdack (2012)*

In the merged data there may be a person that is employed ($spell = 1$). It is possible that this person has a second job at the same time ($spell = 2$), which is only a marginal part-time job. Information concerning employment is stored in the GRV data as well as the IAB data. Consequently for both mentioned observations a twin spell has to be observed in the corresponding data source by the executed searching routine. If this is not the case, the two employment observations only exist in the data of the GRV or only in the data of the BA. This is true, for example, for individuals who have an insurance account but are not contributing to social security. The observations are kept in the data as parallel employment episodes. A marker is generated to indicate that no match was found. In addition the data of the German Pension Insurance contains allowance times, e.g. maternity leave ($spell = 3$). This record can be seen as additional information to the respective employment relationship and therefore is valid in every combination. Another notification shown in Figure 4.4 is a report of job-search ($spell = 4$). The employed person in this example is registered as a job-seeker although she is not unemployed. This situation is plausible, because people are allowed to register as job-seeker at any time. A further notification which can exist simultaneously, is an observation concerning pension benefits ($spell = 5$). In the displayed example, the pension state is only valid if pension payments are received due to an entitlement to an orphan's pension. A regular old-age pension payment is not valid, because of the parallel information indicating maternity leave ($spell = 3$).

After the comparison with the Code of Social Law the majority of the analyzed sequences can be seen to conform with the law and therefore stay in the data as parallel observations. Invalid combinations, approximately one percent, are corrected by looking at the whole employment career of the

individuals. Any observation which does not fit into the biography, is deleted. The BASiD data contains all notifications considered as twin spell or valid no twin spell, as well as a variable which flags the routine used to generate or correct these records.

### 4.1.5 Content of the Linked Data

The BASiD data contain longitudinal information on the life course of 568,468 individuals arranged in an episode format. The covered period of time spans from 1951 to 2009 for West Germany as well as East Germany. The observation period starts with entry into the education system and lasts until entry into retirement and beyond if individuals stay in the labor force. BASiD contains a variety of characteristics, which enable researchers to deal with research questions that could be answered for Germany only less precisely in the past.

The BASiD data have been used for the analyses in my dissertation, because they offer the possibility to analyze employment histories, starting with the entry into the labor market and progressing through the transition to retirement and beyond (Hochfellner, Müller, and Wurdack, 2012). The information used refers to the jobs individuals worked in, and include its duration, the daily wage, the occupation, the position, and characteristics of the respective employer, such as workplace, firm size, and industry. If individuals experience unemployment, the data set holds information on the amount of benefits received and the duration of each unemployment episode. Because employers have to notify if a worker is sick for more than six weeks, the data allow me to identify times in which workers are on sick leave. In addition, there is plenty of information available regarding pension receipt. This includes the date and type of retirement and the amount of benefits received. Demographic information on the individuals like gender, education,

date of birth, place of residence, and nationality is used as well. [10] The single analysis samples are described in detail in the empirical Chapter 5, Chapter 6, and Chapter 7.

The restricted data version (weakly anonymous) used for this doctoral thesis is BASiD 5109 v1.[11] By analyzing labor market participation in higher ages and beyond retirement with focus on individuals who are facing the risk of old-age poverty, this study uses two unique features of BASiD.

First, BASiD is the only administrative data which allows to identify post retirement workers. Retirees are identified by the type of pension receipt and the start of claiming old-age pension benefits. A retired person who is working whilst receiving benefits is identified by searching for a parallel employment notification. In Germany, it is mandatory for the employer to report the end of employment to social security at the normal retirement age. By default, all employment contracts end at the normal retirement age. In the case of continuing work, the employer has to extend the contract and turn in a second notification to social security. At the very least, continuing employment careers are interrupted by one day. For this reason, I follow the institutional definition and define an individual's beginning of retirement at the age at which she starts claiming pension benefits, not by the time of her complete withdrawal from the labor market, as outlined in Chapter 2.

Second, BASiD enables detailed comparisons of immigrants and ethnic Germans to natives. Immigrants and Germans are differentiated by citizen-

[10] For a detailed description of all variables in the BASiD data refer to Hochfellner, Müller, and Wurdack (2011).

[11] Data access was provided by the Research Data Center of the Federal Employment Agency of Germany at the Institute for Employment Research in Nuremberg, Germany and their on-site location at the University of Michigan in Ann Arbor, MI, USA.

ship: naturalized immigrants are treated as immigrants in this case. Using nationality to identify individuals with immigration history is discussed controversially in the field of migration research. For instance, second- and third-generation immigrants cannot be identified by nationality, because the majority of them hold German citizenship. However, the generations of retirees in this study are not affected by this. The retired immigrants in the analysis sample are from the generations of guest-workers moving to Germany in the late Seventies. Their place of birth is not Germany, which makes it possible to use nationality to refer to the immigration history of the retirees.

Ethnic Germans are identified by their contribution periods to German pension insurance, which are accredited by the German foreign pension law. They are the largest population group immigrating to Germany. They are not or only marginally identifiable in the surveys mentioned above, because they receive German citizenship immediately upon arrival. The German pension law grants ethnic Germans pension entitlements for their former life in their country of origins. Pension entitlements are assigned in exactly the same way as if ethnic Germans had been working in Germany at that time (Hirsch, Jahn, Toomet, and Hochfellner, 2013). This information is recorded in BASiD and is used to identify ethnic Germans for the analyses in this doctoral thesis.

## 4.2 Methodology

I use different methodologies in the empirical part of my dissertation to gain new insights on post-retirement employment in Germany. The empirical part of the dissertation is located on the micro-level within the theoretical micro-macro model of post-retirement employment discussed in Chapter 3. Chapter 5 does not include econometrics, because this chapter is considered a the descriptive part of describing the macro-conditions for the analyzed population. For the descriptive analyses I construct ratios and compare them over time and display Kaplan Meier point estimates. The methods used in Chapter 6 and Chapter 7 to estimate individual behavior are more complex and therefore described in detail in the next two sections.

### 4.2.1 Binary Probability Models

The first part of the analyses focuses on the probability of being employed whilst claiming old-age pension benefits on the micro-level and the push-and-pull factors influencing the individual outcome (a detailed description of the empirical strategy is given in Chap 7). I therefore assume, that the probability of being employed in retirement follows a logistic distribution when estimating the binary probability model, which is noted as follows:

$$P(y = 1|\boldsymbol{X}) = \Lambda\left[\beta_0 + \boldsymbol{X}^T\boldsymbol{\beta} + \boldsymbol{\varepsilon}\right] \tag{4.1}$$

where $\Lambda$ is the cumulative distribution function of the logistic function, and $y$ denotes the employment status in retirement and adopts the value 1 for being employed and 0 for being unemployed. The vector $\boldsymbol{X}$ captures the covariates included in the model, which in my specification contain interaction terms to compare different ethnic groups (see Section 6.2 for the specific

empirical specification). For an intuitive interpretation, the derived average marginal effects are computed (see, Mood, 2010).

It has to be kept in mind that there is an academic discussion about the interpretation of marginal effects of interaction terms. For instance, Ai and Norton (2003) and Puhani (2012) suggest a way to derive average marginal effects from interaction terms. Another possibility is to estimate a linear probability model, because in an OLS estimation average marginal effects can be easily obtained and interpreted (Wooldridge, 2003). For my research I choose to display the average marginal effects of the logit model without computing it as suggested in the academic discussion, but to cross-validate the marginal effects by estimating a linear probability model in a second step. The estimated OLS follows this form for individual $i$:

$$y_i = \beta_0 + x_i\beta + \varepsilon \tag{4.2}$$

In general, a logit model should be preferred when analyzing categorical outcomes, because assuming a linear relationship for $y_i$ as a function of $x_i$ might be questionable when analyzing probabilities. The logistic distribution restricts probabilities to the range between zero and one. Linear models do not impose this restriction and therefore normally do not provide the best model fit when estimating categorical outcomes. However, it is not problematic to estimate a linear model if the predicted probabilities of $y$ are within the range of zero and one.

In regular OLS models the assumption of homoskedasticity has to hold, which is when the error term's variance $\boldsymbol{\varepsilon}$, conditional on all covariates, is constant. The OLS estimates of $\beta$ will be consistent if the condition

$var(\varepsilon_i|x_i) = cov(\varepsilon, x_i) = \sigma_i^2$ is satisfied. This assumption can not be met in a binary linear model, as shown in the following (see, Wooldridge, 2003).

The error term can be rewritten as

$$\varepsilon_i = y_i - x_i\beta \tag{4.3}$$

which can be rewritten as

$$\varepsilon_i = 1 - x_i\beta \qquad if \quad y_i = 1, and \tag{4.4}$$

$$\varepsilon_i = -x_i\beta \qquad if \quad y_i = 0 \tag{4.5}$$

These equations can be used to calculate the variance $var(\varepsilon_i|x_i)$ as follows

$$var(\varepsilon_i|x_i) = E(\varepsilon_i^2|x_i) = Pr(y_i = 0|x_i)(-x_i\beta)^2 + Pr(y_i = 1|x_i)(1 - x_i\beta)^2 \tag{4.6}$$

Noting that

$$Pr(y = 1|x_i) = E(y = 1|x_i) = x_i\beta, and \tag{4.7}$$

$$Pr(y = 0|x_i) = 1 - Pr(y = 1|x_i) = 1 - x_i\beta \tag{4.8}$$

leads to

$$\begin{aligned} var(\varepsilon_i|x_i) &= (1 - x_i\beta)(-x_i\beta)^2 + x_i\beta(1 - x_i\beta)^2 \\ &= x_i\beta(1 - x_i\beta) \end{aligned} \tag{4.9}$$

This proofs that the assumption of constant variance of the residuals $var(\varepsilon_i|x_i) = \sigma_i^2$ is violated in a linear probability model, because equation 4.9 shows that the conditional variance is a function of $x_i$. Thus, estimating categorical outcome variables in a OLS model by default induces heteroskedasticity.

This does not affect the estimated slopes. However, the reported variance of the slope estimates is biased, which results in either higher or lower p-values and therefore an over or under estimation of the results. To account for heteroskedasticity a variance weighted least square regression can be executed in the following way. In a first step the estimates of the regression have to be obtained by OLS. The predicted values $\hat{y}_i$ have to satisfy $0 < \hat{y}_i < 1$. If not, the fitted values have to be brought to match the outlined interval. From the fitted values the estimator of $\sigma_i^2$ has to be obtained, noted as follows

$$\hat{\sigma}_i^2 = \hat{y}_i(1 - \hat{y}_i) \tag{4.10}$$

The inverse of the variance-covariance matrix $\frac{1}{\hat{\sigma}_i^2}$ can then be used as weights in the variance weighted least square regression. In this way, cases with lower error variance get assigned a higher weight in the regression, whereas cases with higher error variance get a smaller weight. The estimated linear model of the probability of being employed whilst claiming pension benefits for individual $i$ is noted as:

$$\frac{y_i}{\hat{\sigma}_i^2} = \frac{\beta_0}{\hat{\sigma}_i^2} + \frac{x_i\beta}{\hat{\sigma}_i^2} + \frac{\varepsilon_i}{\hat{\sigma}_i^2} \tag{4.11}$$

### 4.2.2 Proportional Sub-hazard Models

In the second analysis, I study the length of time until retirees start their first post-retirement job (PRJ), and the factors which influence these transitions. This is done by event history analyses (see Allison, 1984; Blossfeld, Golsch, and Rohwer, 2007). There are competing PRJ, because people can choose

between different alternatives, but only enter one trajectory, and the entry in different trajectories is not independent of each other. Because of this I have to include competing events in my study (see Cleves, Gould, Gutierrez, and Marchenko, 2010; Fine and Gray, 1999; Klein and Andersen, 2005). To test my hypotheses outlined in Section 3.2.2, the events of interest are two specific employment trajectories. I categorize them according to changes in the work environment compared to the last job prior to retirement (a detailed description of the empirical strategy is given in Chap 7): post-retirement jobs in a different working environment (PRJ-DE) and post-retirement jobs in the same working environment (PRJ-SE).

Consider the event of interest the first PRJ-DE after being retired. In this analysis competing risks refer to the chance that instead of PRJ-DE, I observe a different event, for instance, PRJ-SE. This setup differs from the common right-censoring in survival analyses. Censored cases are still considered at risk to experience the event of interest, PRJ-DE, but it is unknown when the event will happen. On the other side, the competing event, PRJ-SE, is permanent and therefore impedes the event of interest, PRJ-DE, from happening (Cleves, Gould, Gutierrez, and Marchenko, 2010).

In a competing risk framework the failure function, called cumulative incidence function (CIF), provides the better estimate in comparison to the survivor function (Kaplan Meier). With competing events, the type of event which will occur is unknown until it occurs.

The question of interest is "What is the probability that a person starts a PRJ-DE within $t = T$"? $T$ denotes the time until the start of the first $PRJ$ and $K$ refers to the possible job trajectories an individual may enter, with

$k = 1, \ldots, K$. Every individual can be displayed with a pair $(T,k)$. The CIF indicates the probability to fail until a point at time $t$ from cause $k$.

$$P(T \leq t, K = k) \quad with\, k = 0, \ldots, K \tag{4.12}$$

The CIF can be computed by estimating a proportional hazard model for each $k$, but it is hard to interpret the estimates of the fitted model on cumulative incidence, because the covariates can influence the hazard of the possible events differently. That is why I do not use the standard proportional hazard model, but estimate the influence of the covariates on the sub-hazard of the event of interest.

The sub-hazard defines the failure of the events of interest, and at the same time keeps people who experience competing events at risk. In that way, they can be counted as not having any chance of failing (Cleves, Gould, Gutierrez, and Marchenko, 2010). Fine and Gray (1999) define the sub-hazard as

$$\overline{h}_k(t|\boldsymbol{X}) = \lim_{\Delta_t \to 0} \frac{P\{t < T \leq t + \Delta_t, K = k \mid T > t \ \vee \ (T \leq t \ \wedge \ K \neq k), \boldsymbol{X}\}}{\Delta_t} \quad with\, k = 1, \ldots, K \tag{4.13}$$

One advantage of modeling the sub-hazard, is that the CIF for each cause $k$ can be calculated as follows

$$CIF_k(t|\boldsymbol{X}) = 1 - exp\{-\overline{H}_k(t), \boldsymbol{X}\} \tag{4.14}$$

$$= 1 - exp\{-\int_0^t \overline{h}_k(s)ds, \boldsymbol{X}\} \quad with\, k = 1, \ldots, K \tag{4.15}$$

To produce cumulative incidence functions for the events of interest PRJ-SE and PRJ-DE I estimate a competing risk regression suggested by Fine and Gray (1999) for each of the events of interest.

$$\overline{h}_k(t|\boldsymbol{X}) = \bar{h}_{k,0}(t)\, exp(\boldsymbol{X}^T\boldsymbol{\beta}) \quad with\, k = 1, \ldots, K \tag{4.16}$$

This Section has outlined the general methodological approach used in the analyses in Chapter 6 and Chapter 7. The empirical specifications of the outlined methods to address the questions under study is described in the respective empirical chapters. Because processes on the micro-level are influenced by processes on the macro-level (for a detailed discussion of the bridge assumptions I made refer to Section 3.1.2), the next chapter gives an overview on macro conditions for older workers in Society differentiated by demographic groups on the labor market. These are then included in the estimation on the individual level outlined in Chapter 6 and Chapter 7.

# Chapter 5

# Pre-Retirement Employment of Older Workers

## 5.1 Macro Conditions for Post-Retirement Employment

The micro-macro model of post-retirement employment shows how different exogenous factors influence the processes on the micro level (see Chapter 3 for a detailed discussion of the theoretical framework I use in my dissertation). Whereas the main empirical part of my study is to produce new evidence on the micro-level, the events on the micro-level are influenced by conditions on the macro-level, defined in bridge assumptions. In the case of post-retirement employment this is primarily the set-up of institutional systems, such as the pension system and the labor market situation for older people. As the pension system has already been discussed in Chapter 2, I now focus on describing the labor market conditions on the macro-level for older people.

The situation prior to retirement influences the transition and the life beyond retirement. It is important when studying retirement topics to include the time prior to retirement Beehr (1986), because the pre-retirement situation affects individuals on the micro-level. As discussed in Section 3.1.2 I consider the situation on the labor market prior to retirement as bridge assumption in the micro-macro model of post-retirement employment, which influence individuals' decisions to engage in post-retirement employment. To reflect the heterogeneity among older workers, and because I assume that different demographic groups are influenced differently by the proposed bridge assumptions, I focus on the comparison between men and women, and immigrants and natives.

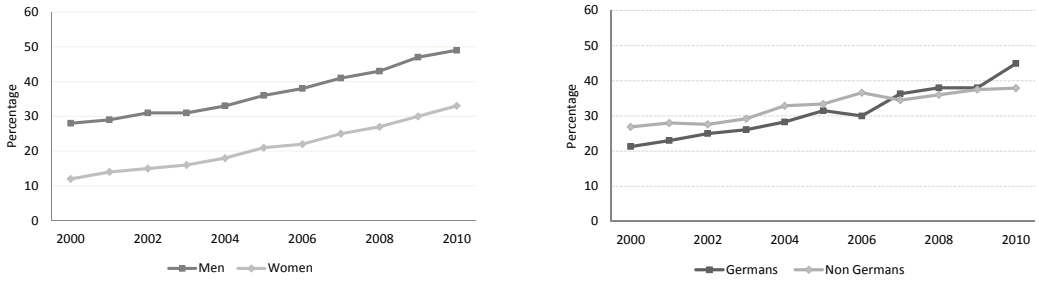
Changes in the labor market have increased uncertainty for specific demographic groups. Public policy discusses mainly two groups which are most affected by uncertainty in older age. Firstly women, because they are

more likely to experience interrupted employment histories. They often work part-time or in atypical employment, and suffer from penalties due to family formation (e.g., Aisenbrey, Evertsson, and Grunow, 2009; Beblo, Bender, and Wolf, 2009; Dobrič, 2000; Gangl and Ziefle, 2009; Hank, 2004).

Secondly, immigrants face problems on the labor market (e.g. Deutsches Zentrum für Altersfragen, 2006; Granato, 2009; Kalter, 2005; Kogan, 2004). They often work in less qualified jobs (e.g. Brück-Klingberg, Burkert, Damelang, Deeke, Haas, Schweigard, Seibert, and Wapler, 2009; Hochfellner and Wapler, 2010). This particularly applies to older immigrants since they on average hold a lower level of qualification (e.g. Baykara-Krumme and Hoff, 2006; Burkert, Hochfellner, and Wurdack, 2012).

In the past decade, labor market participation of older individuals, which is displayed in Figure 5.1, has increased steadily but is still unsatisfying. In

**Figure 5.1:** Employment shares, age 60 to 64, 2000 to 2010, by nationality and gender




*Source: Statistisches Bundesamt (2011)*

2010 only half of the men and about one third of the women aged 60 through 64 were employed. Employment shares are higher for Germans compared to non Germans. However, this relationship has arisen recently. Until 2007, employment shares of older people were higher among non Germans compared

to Germans.

It is necessary to learn about the labor market participation of older individuals when studying driving forces of staying in the labor force beyond retirement (see Beehr, 1986; Cahill, Giandrea, and Quinn, 2006; Heribert, 2006). Therefore, descriptive statistics on labor market performance and characteristics determining the position of older workers within the labor market are calculated. The outlined statistics are computed for the lifetime period between the ages 45 and 64. In this period of age, people are usually rooted in the labor market and already working in their career jobs. For some of the statistics this age group is divided further, to account for the fact that people who are only years away from being retired might behave differently in the labor market. All statistics are presented by ethnicity and gender to get an impression to what extent different demographic groups in the labor market vary across the presented labor market indicators.

In a first step, the statistics are generated for the year 2007. This year was chosen, because the BASiD data have been sampled in 2007, and therefore it is possible to extrapolate the sample to the German population. In the next step, the focus lies in comparing labor market integration of the different subgroups in a longitudinal perspective. This contains analyses of labor market participation rates and transitions out of unemployment into work.

## 5.2 Older Workers on the Labor Market

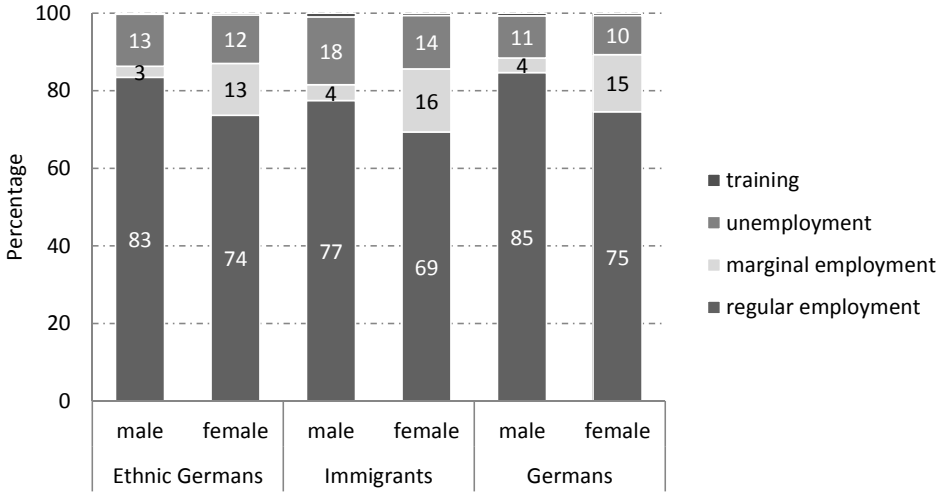
In comparison to other European countries such as Denmark, the United Kingdom, or the Netherlands, Germany has been relegated to one of the lowest positions in the ranking of labor participation rates of older workers

(Burkert and Sproß, 2007). To describe the detailed labor market situation for older people, a multitude of other statistics can be generated additionally to employment shares. The calculations for the following statistics are based on BASiD. In total, the analysis sample consists of 133,367 persons, between the ages 45 and 64. Almost two thirds of the observed people are Germans, the other third are immigrants, from which five percent are ethnic Germans. The gender ratio in this sample is balanced. The presented statistics for the year 2007 are weighted to match the German population.

Figure 5.2 illustrates the labor force state of older people on the labor market in 2007. I consider this statistic as an indicator to see how labor market attachment prior to retirement differs according demographic groups on the society level. The descriptive show that the majority of the older people in the analysis sample is employed in a regular job liable to social security. It may be seen as an indicator for a satisfactory labor market integration of the considered subgroups. In addition, these people are more likely to search for continuity in retirement (see Atchley, 1989, 1992).

Although employment shares are quite high, the unemployment rate is above the German average rate of nine percent in 2007. Unemployment among Ethnic Germans is about two percentage points higher than for Germans. This is true for both men and women. Male immigrants differ by seven percentage points, female immigrants by four percentage points from their respective German comparison group. This graph also shows that women work to a higher extent in marginal employment than men. This is true for Germans, ethnic Germans and immigrants. Only a marginal part of older people are registered in training programs. In general, older women and immigrants show a lower degree of labor market attachment.

**Figure 5.2:** Labor force state of older workers on June 30, 2007, by ethnicity and gender




*Source: Burkert, Hochfellner, and Wurdack (2012)*

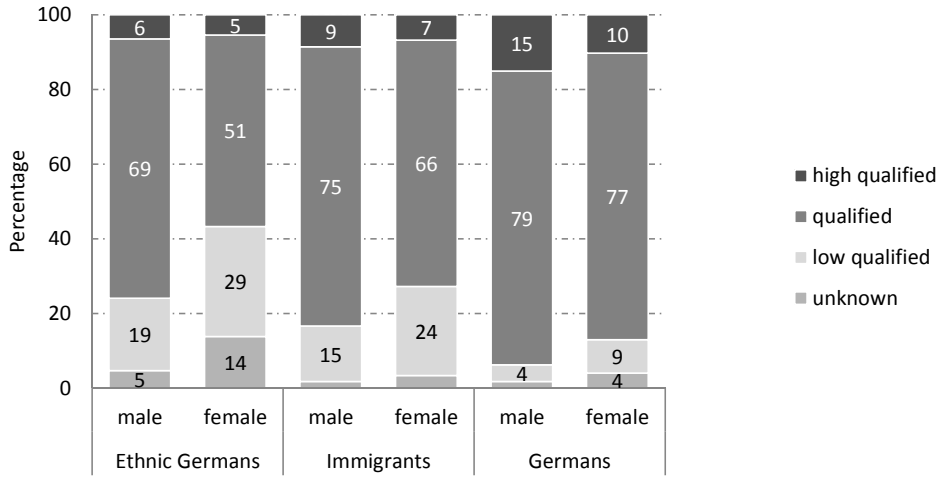
### 5.2.1 Differences in Skill Levels

The situation of older people on the labor market depends on their qualification. When hiring workers, the employer has to decide if the applicant is equipped with the skills needed for the vacant position. He makes his decision indirectly through information such as the qualification of a person. The employer uses the educational degree as a signal to estimate the productivity of a worker (Spence, 1973). Higher education increases the likelihood of finding a job within shorter search periods. This should influence the transition times into post-retirement jobs for retirees who decide to take up a job after being retired.

Figure 5.3 displays the highest educational degree obtained by the investigated subgroups.[12] Most of the older people can be considered as qualified

[12]There is no official plausibility proof if the education information is reported to social security correctly by the employer, which might result in miss-classifications (see also Section 6.1 and Section 7.2). These are corrected by applying the cleansing procedures

**Figure 5.3:** Qualification of older workers on June 30, 2007, by ethnicity and gender




*Source: Burkert, Hochfellner, and Wurdack (2012)*

workers because they completed an educational training. Among immigrants, approximately one out of four women (24 percent) and about one sixth of the men (15 percent) do not hold a vocational degree. The same pattern is found among ethnic Germans.

This situation does not apply to Germans in the same manner. Only nine percent of the women and four percent of the men do not hold a vocational certificate. However, the inference that a considerable part of immigrants and ethnic Germans never got a vocational degree cannot be made from this statistic. An explanation for the high share of people without a vocational degree could be that immigrants and ethnic Germans have obtained their degrees in their home countries, but upon entry to Germany the degrees have not been accredited. It often applies to people with foreign university degrees

proposed by Fitzenberger, Osikominu, and Völter (2006).

(Englmann and Müller, 2007).

In particular, highly trained professionals have difficulty getting their educational and professional qualifications accredited in Germany. Figure 5.3 is in line with this suggestion. The data shows a large differential between highly-skilled Germans, immigrants, and ethnic Germans. In comparison to 15 percent of the older male Germans having obtained a university degree, it is only about six percent of male ethnic Germans and nine percent of male immigrants. The differences are about the same for women, albeit on a lower level compared to men.

A higher qualification improves employment opportunities and has positive effects on the employment relationship, as well as the transition to retirement (see Brussig, 2009; Clemens, Hagen, and Himmelreicher, 2007; Frosch, 2007). The on average lower qualification of older immigrants and ethnic Germans, especially of female ethnic Germans, can be seen as an indicator that they are in fact a subgroup in the labor market who will have difficulty when searching for a job (see Adams and Rau, 2004; Baykara-Krumme and Hoff, 2006; Kalter, 2005).

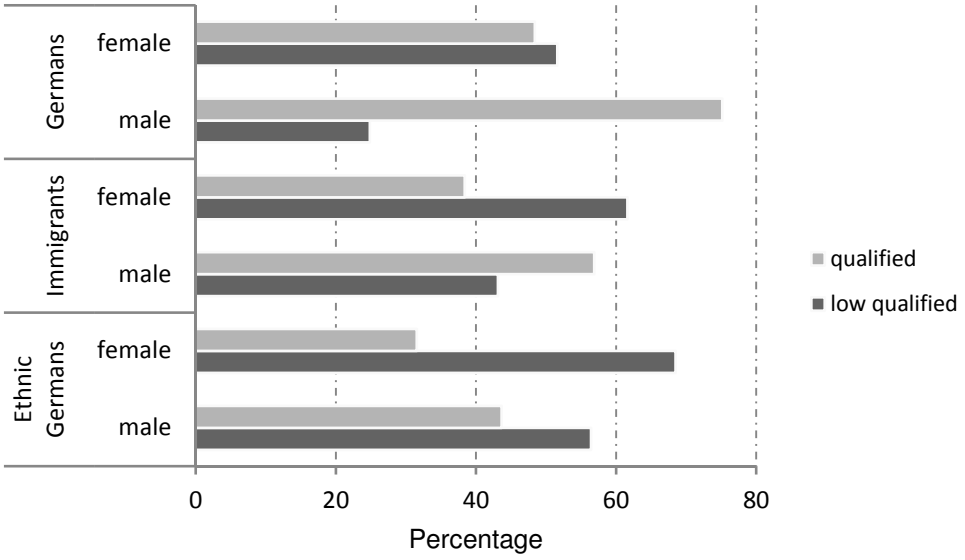
### 5.2.2 Differences in Job Characteristics

The position within the labor market plays a crucial role concerning the quality of life in retirement. People working in jobs which demand higher skill levels are highly valued in society (Seebaß and Siegert, 2011) and are financially more secure. Low-skilled employment comprises jobs which pay less and can be found in the outsider market (see Breen, 1997). Skilled employment is mostly held by white collar workers, whereas blue collar workers primarily are employed in low-skilled jobs. Hence, older people working in unskilled

professions are at a higher risk of being exposed to old age poverty. They might be more likely to engage in post-retirement employment because of economic preferences.

The way in which Germans, immigrants and ethnic Germans differ in their occupational status is outlined in Figure 5.4. Older ethnic Germans as well as

**Figure 5.4:** Qualification of employment of older workers on June 30, 2007, by ethnicity and gender




*Source: Burkert, Hochfellner, and Wurdack (2012)*

older immigrants pursue low-skilled employment at a higher rate than older Germans. This is true for both males and females. The highest percentage of workers in skilled employment is found among male Germans, followed by male immigrants, and female Germans. Three quarters of German men are employed in skilled jobs, as opposed to only half of the ethnic Germans and immigrants. Women are employed at a higher rate in low-skilled jobs among ethnic Germans and immigrants, whereas the quality of employment German women work in is almost balanced. The number of women engaged in skilled

employment (48 percent) is similar to those engaged in low-skill employment (52 percent).

The results are consistent with the outlined differences in obtained educational degrees and support the argument that lower educational degrees result in lower skilled jobs.

## 5.3 Labor Force Participation Trends

On average, immigrants are less attached to the labor market than people without immigration history (Kalter, 2005). The low level of education as well as the employment in low-skilled occupations influences immigrants' entire employment histories (Heribert, 2006). Also women are less integrated, which is caused by interrupted employment biographies due to family formation (Simonson, Gordo, and Titova, 2011). In the following section, labor market participation rates of Germans, immigrants, and ethnic Germans of birth cohorts 1940 to 1949 are analyzed to draw conclusions on their labor market integration throughout their life course. By executing longitudinal analyses it will show how employment histories of the cohorts at retirement age differ by demographic groups. The statistics of the aggregate will show who is mostly affected by interrupted un-continuous employment histories on the macro-level.

The cohort 1940 to 1949 allows for an analyses starting with the first employment held in Germany through retirement. For individuals aged 20 to 65, their potential employment period in Germany is calculated.[13] The periods of potential employment are compared with the actual employment

[13]The accumulated period of time a person is able to work. Meaning the person has already left the education system but has not retired yet, is not doing civil or military service, and is not incapable of working.

state on June 30 every year. Employment is defined as a job that is covered by social security. It is neither determined by working hours nor the type of occupation. The calculations by ethnicity are presented separately for men in the left and women in the right panel in Figure 5.5.

**Figure 5.5:** Labor force participation over the life cycle, by ethnicity and gender


*Source: Burkert, Hochfellner, and Wurdack (2012)*

The labor force participation rate of male Germans compared to the labor force participation rate of male Ethnic Germans and male immigrants is on average the highest from 1980 to 1989. Since 1965 through the beginning of the 1980s it has developed positively. A sharp fall is reported in 1990. It can be explained by the German reunification. When calculating the same statistic separately for East and West Germany the decrease is much higher in East Germany. Another explanation goes back to social security. After the reunification East Germany had to be integrated into the German social security system. This process was time consuming and therefore resulted in belated notifications, which can be seen in the steep 1990's drop.

In the period from 1992 to 2006, the labor force participation rate has decreased. A yearly decline of up to five percentage points can be noted. In

this period of time the plotted curves proceed parallel, albeit on different levels. Regarding the age of the persons in the observed cohorts it implies: the highest participation of the male German cohorts 1940-1949 was at an individuals' age between 30-39 years. After this age labor force participation begins to decrease again.

Male immigrants show consistently the lowest labor force participation rates. The only exceptions are the 1970s. Up to 1973 labor force participation increases and stays consistent at higher order until the beginning of the 1980s. This development can be explained by the recruitment of immigrant workers starting in 1955 through 1973. Male immigrants show the highest labor force participation rates at younger ages. Beginning in 1993, a strong, continuous decrease of employment is noted. After 2003 only one third of the immigrant population is employed.

The labor force participation rate of male ethnic Germans contrasts strongly with the patterns of the other ethnic groups. There are often strong fluctuations in subsequent years. One explanation for this can be several disruptions of the employment history, for example frequent loss of jobs and following unemployment periods (see Hochfellner and Wapler, 2010). The labor force participation rate increases in 1969. From the mid 1990s there is a continual decrease in the labor force participation rate of male ethnic Germans, which ends in 2007.

In addition, Figure 5.5 shows gender differences. German men have on average higher labor force participation rates than German women and hence are better integrated. The gender differences in labor market participation progresses similarly for immigrants. For ethnic Germans there are fewer gender

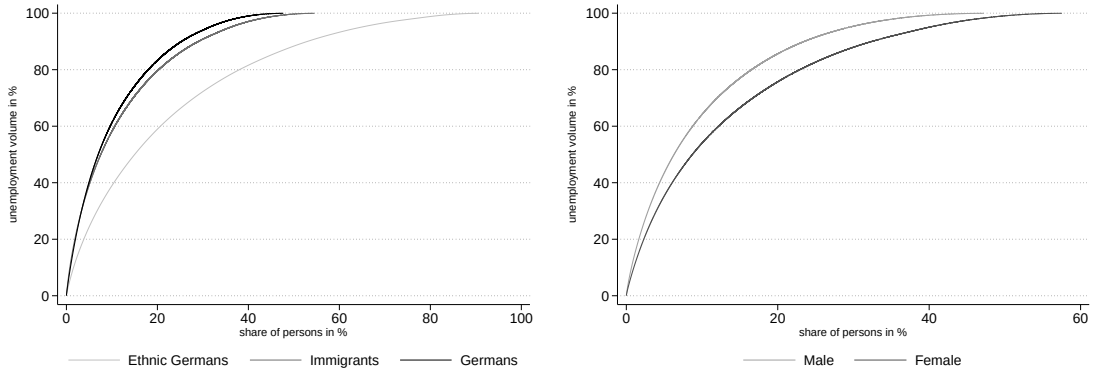
differences. This is due to the fact that a high labor force participation rate of women was common in the former Soviet Union (Behrensen and Westphal, 2009). The gender gap decreases continuously and is nearly equalized in the last ten years of the employment history.

## 5.4 Unemployment and the Transition to Work

Besides the labor market participation rate, the share of unemployment is a relevant indicator to describe the integration into the labor market. For instance, the unemployment rate of immigrants is almost twice as high when compared to Germans. Figure 5.6 shows how strongly people in the age between 45 and 64 have been affected by unemployment until the end of 2007. This illustrates to what extent the unemployment volume is distributed within the observed subgroups, whereas Figure 5.2 only shows the pure unemployment rate of the observed subgroups.

For example, it may always be the same kind of people affected by unemployment, whereas the majority is hardly or not at all affected by unemployment. Another possibility is, that all people are equally affected by unemployment (Möller and Schmillen, 2008). To get an idea about the share of people who constitute the unemployment volume in the outlined sub-groups two indicators are computed. The unemployment volume, which is the sum of days the considered sub-group is unemployed, and the share of people who are unemployed. The relationship of these indicators is plotted in Figure 5.6. This statistic by aggregated demographic subgroups can be considered as an indicator to see in what extent different demographic groups are affect differently by the situation on the labor market in society.

**Figure 5.6:** Unemployment volume of older workers, by ethnicity and gender




*Source: Burkert, Hochfellner, and Wurdack (2012)*

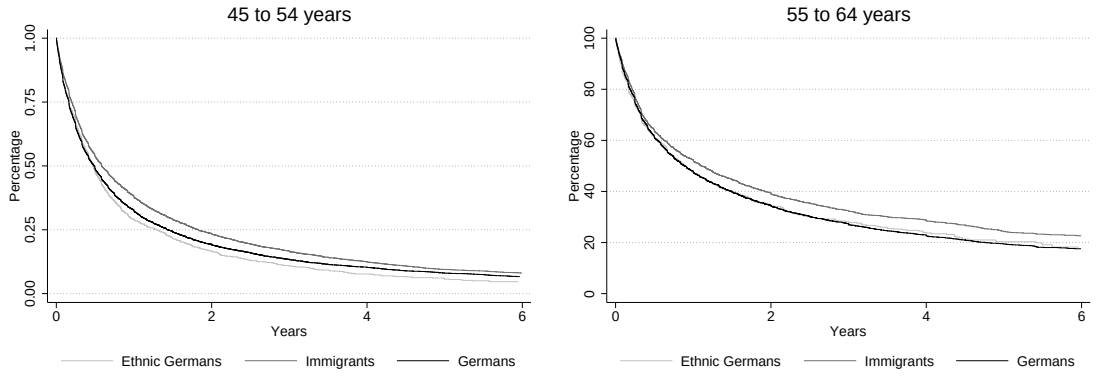
It turns out that older Germans, immigrants and ethnic Germans are affected differently by unemployment. Among Germans, almost 60 percent have never experienced unemployment, whereas the share of immigrants who have never experienced unemployment is approximately 15 percentage points lower. Almost all ethnic Germans (90 percent) have experienced unemployment in their life course. Half of the unemployment volume of Germans is attributed to only eight percent of their population. Ten percent of the immigrant population causes half of the total unemployment volume in this subgroup. Among ethnic Germans the situation is different. Half of the unemployment volume is distributed within a much larger group of people (18 percent). Ethnic Germans are more equally affected by unemployment when compared to Germans and immigrants.

When comparing men and women, it becomes clear that women are affected by a higher extent of unemployment. About 60 percent of men have never experienced unemployment compared to approximately 40 percent of women. Half of the total unemployment volume among men is comprised of less than ten percent of males, wheres the share is higher for the female population.

Previous research suggests that immigrant and ethnic German women and men show a higher risk of being unemployed more frequently and for longer periods than German men and women (e.g., Hochfellner and Wapler, 2010; Kogan, 2004; Uhlendorff and Zimmermann, 2006).

In addition, literature shows that people at higher ages remain unemployed longer (e.g., Frosch, 2007). This is why in the following analysis individuals are divided by age groups as well. People between the ages of 45 and 55 and the ages of 55 and 65 are examined separately. Unemployment periods are censored if they are longer than six years. The Kaplan Meier estimates account for repeated events. It is taken into account that people can experience unemployment a number of times. The estimates include individuals of all relevant age groups which were at least once unemployed, beginning from the year 2000 to the end of 2007. The end of unemployment is defined by the transition into a job which is not subsidized by the German Employment Agency. Figure 5.7 shows transitions out of unemployment into work by ethnicity for two different age groups.

**Figure 5.7:** Transition in work of older workers, 2000-2007, by ethnicity and age




*Source: BASiD, own calculations*

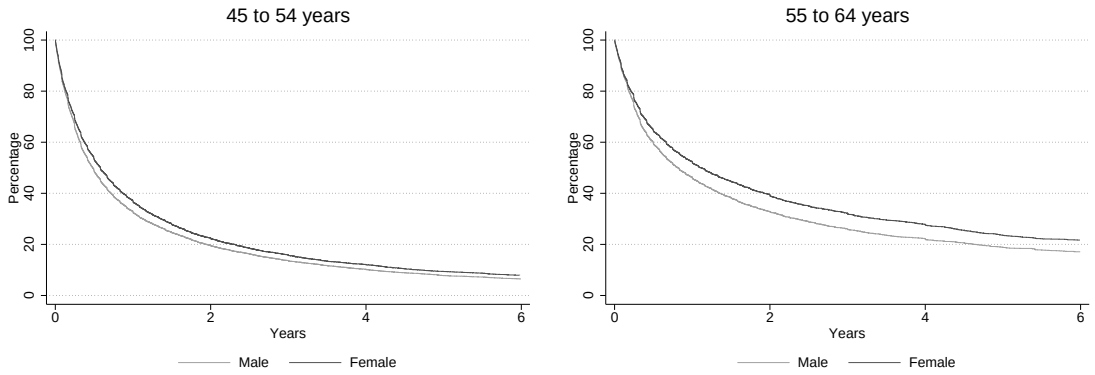
The length of unemployment differs according to ethnicity. Immigrants need more time to transition into jobs when unemployed. The mean duration within a person finds a new job is less than one year for ethnic Germans and Germans, whereas on average immigrants are unemployed six months longer. Despite the high unemployment rate among ethnic Germans, their job search periods are comparably short and more equally distributed. This leads to the assumption that ethnic Germans are not able to find long-lasting employment relationships.

Additionally, it can be shown that transitions out of unemployment into work varies by age. When comparing the younger people in the left panel, in which after two years of unemployment less than 25 percent still have not found a job, this percentage is much higher in the older age group in the right panel. Depending on ethnicity, between 30 and 40 percent of older workers are still unemployed after two years. After six years of unemployment about twice the people in the older age group have not transitioned into a job compared to the younger age group. The average time in unemployment is higher for older people.

The length of unemployment also differs according to gender. Figure 5.8 shows lengths of unemployment by gender for the younger age group in the left panel and the older age group in the right panel.

Females need more time to transition into jobs when unemployed than males. The gender-specific time spent in unemployment varies by age. The gender differences are more pronounced for the older group shown in the right panel. After two years of unemployment about three quarters of the younger men and women have found a job. In the older age group only about 60 percent of

**Figure 5.8:** Transition in work of older workers, 2000-2007, by gender and age




*Source: BASiD, own calculations*

males and females who have found work after two years. After six years of unemployment about twice the women and men in the older age group have not found a job compared to their counterparts in the younger age group.

## 5.5 Summary

The descriptives show that the situation on the labor market in older age and throughout the life course is not homogeneous. Indications of a problematic situation of older employed persons can be found in the data, since a decreasing job market participation rate over time can be found for all groups. There are sub-groups which are integrated less, especially older immigrants. Early withdrawal from the labor market and employment careers, which have not been fully spent in Germany, interruptions of employment and lower incomes (Konietzka and Kreyenfeld, 2001) are a risk factor for old-age poverty. Also, women seem to be less integrated in comparison to men.

The lower labor market attachments of immigrants and women directly correspond to the amount of pension benefits they receive when they retire (Frommert, Heien, and Loose, 2013; Mika, Rehfeld, and Stegmann, 2009; Simonson, Gordo, and Titova, 2011). The on average lower benefits result in a higher likelihood for these subgroups to live on the poverty threshold when they are retired. These conditions on the macro-level influences individuals' retirement decisions.

The results strengthen the bridge assumption of the theoretical model, discussed in Chapter 3, that different demographic groups are exposed to a different situation on the labor market prior to retirement. In this case it can be assumed that the weaker situation on the labor market of women and immigrants on the macro-level affects their preference to engage in post-retirement on the micro-level. Because they are exposed to a higher extent to old age poverty, women and immigrants might be more likely to take up post-retirement jobs due to economic motives.

In addition, the descriptives in this Chapter show that the labor state prior to retirement varies across demographic groups. German males can be considered as working in continuous work relationships, a higher percentage of skilled persons and to a higher extent in skilled profession compared to male or female immigrants, and female. This groups, for instance might be more likely to search for continuity and according the principle of "active aging", take-up post-retirement job because of psycho-social preferences.

In sum, this Chapter shows that the bridge assumptions formulated in Chapter 3 can be seen in the data. Overall, the presented descriptives are in line with the results of previous studies on the situation of older people in

the labor market (e.g., Allmendinger, 1994; Arlt, Dietz, and Walwei, 2009; Bundesagentur für Arbeit, 2012; Bönke, Schröder, and Schulte, 2010; Brussig, 2009, 2010; Bundestag, 2010; Burkert and Sproß, 2007; Dietz and Walwei, 2011; Engelhardt, 2012; Heribert, 2006). The computed statistics referring to the labor market situation prior to retirement, and the outlined demographic groups will be taken into account to reflect bridge assumptions in the empirical estimations of individual post-retirement outcomes in Chapter 6 and Chapter 7. Previous literature also suggests regional differences in labor market participation (see Geyer and Steiner, 2010; Steiner and Geyer, 2010; Statistisches Bundesamt, 2010). In particular, women in East Germany show different employment patterns in comparison to West German women. In the multivariate analyses of employment behavior beyond retirement controls on the regional level are included to account for differences in East and West Germany.

# Chapter 6

# Post-Retirement Employment to Gain Additional Income

## 6.1 Design of the First Stage Micro-level Study

The central part within the theoretical micro-macro model of post-retirement employment outlined in Chapter 3, is the individual level. Knowledge of individual behavior is used in sociology to describe phenomena, developments or characteristics of societies on the macro-level (see Coleman, 1986, 1990; Raub, Buskens, and van Assen, 2011; Schelling, 1978). So, far this dissertation discussed the important of empirical analyses of individual behavior to describe society, and the assumptions the theoretical model requires to make inference possible.

In my dissertation I want to describe that life course trajectories on the macro-level change over time (see Amrhein, 2004; Geyer and Steiner, 2010), and that post-retirement employment is one of the existing trajectories within the erosion of the standard three-part life course model according Kohli (1985), which can be found in post-modern societies. In addition, I want to find evidence regarding the attributes promoting post-retirement employment in society. In particular, I am interested to find out if economic or psycho-social preferences dominate and how different agents can influence the take-up of post-retirement jobs in society. I study this topic by examining push-and pull factors of individual behavior regarding post-retirement employment (see Shultz, Morton, and Weckerle, 1998; von Bonsdorff, Shultz, Leskinen, and Tansky, 2009; Wang and Shultz, 2010). The bridge assumptions connecting the macro and micro level have been discussed in Chapter 3 and examined in Chapter 5.

Summing up, society influences individual preferences and behavior through institutions (see Blossfeld, Buchholz, and Hofäcker, 2006; Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Engelhardt, 2012; Rinklake and Buchhholz, 2011), such as the pension system and conditions on the labor market. Based on these bridge assumption, the analyses on the micro-level is done in two steps. Retirees have to make two decisions: First, they have to decide to engage in post-retirement employment and find a job. During job search they have to decide in the second stage if they want to stay in the same work environment or switch work environments. The empirical estimation results can be transferred to the macro level, because they describe averages and distributions of the micro-level (see Lindenberg, 1990; Raub, Buskens, and van Assen, 2011; Schelling, 1978).

The empirical analysis presented in this chapter focuses on the first decision an individual has to make when it comes to continue working in retirement. As shown in the micro-macro model in Section 3.1.3 the decision in the first stage on the micro-level a retiree has to make is if she engages in post-retirement employment or not. I distinguish between individuals with economic preferences and psycho-social preferences to reflect the current political and public discourse. In addition there are exogenous factors (see Section 3.2 for a detailed discussion) influencing the actual outcome of individual behavior.

The analysis presented in the following sections investigates whether post-retirement employment is related to the necessity of additional income in retirement, which I link to economic preferences, or if it is influenced by factors which allow the inference that individuals continue work in retirement because of psycho-social preferences. The analysis focuses on demographic groups in the labor market who are exposed to old-age poverty to a higher

extent, namely women and immigrants (see Mika and Tucci, 2006; Frommert, Heien, and Loose, 2013). Their conditions on the macro-level differ (Kalter, 2005; Simonson, Gordo, and Titova, 2011; Simonson, Kelle, Gordo, Grabka, Rasner, and Westermeier, 2012), as shown in Chapter 5. This supports the argument of heterogeneous macro-conditions, that is that bridge assumptions affect different demographic groups differently in the labor market, when deciding to engage in post-retirement employment.

In a first step, descriptive statistics provide an overview of how retirees who work beyond retirement differ from retirees who do not. In the second step, the likelihood of being employed, whilst claiming public pension benefits, is estimated by means of a binary probability model. After discussing the results I provide robustness checks for the estimation results. The summary aggregates the result in the micro-level to the macro-level and discusses implications for society.

Three hypotheses addressing the engagement in post-retirement employment, as discussed in Chapter 3, are tested in the first stage on the micro-level. The first one refers to economic preferences (see Bäcker, 2011; Bönke, Schröder, and Schulte, 2010), the second one tests the difference across ethnic labor market subgroups (see Baykara-Krumme and Hoff, 2006; Kalter, 2005; Mika and Tucci, 2006), and the third hypothesis concentrates on working beyond retirement as continued habit (see Atchley, 1989, 1992) and “active aging" (see Haider and Loughran, 2001; Graefe and Lessenich, 2012; Nowossadeck and Vogel, 2013), which I refer to as psycho-social motives. For a detailed discussion of literature and previous studies which I consider the baseline for my hypotheses refer to Section 2.4 and Section 3.2.

- Employment in retirement serves to gain additional earnings, in particular for retirees who are more likely to be affected by old-age poverty (I).
- People with immigration history participate more often in post-retirement employment than Germans (II).
- Experiences during the employment history, particularly former personal working patterns, influence post-retirement careers (III).

Exogenous push-and-pull factors influencing individuals' outcomes are measured by including individual characteristics, labor market performance, retirement characteristics and firm information. The detailed discussion of literature and previous studies in Chapter 2 shows why these attributes play an important role in predicting individual outcomes. It is important to include these characteristics to address the different agents in the micro-macro model, as well as the bridge assumptions. Firms and institutional settings, for instance the pension system, can direct individual outcomes. Conditions on the labor market might put restrains on some individuals, and at the same highly support others to find employment beyond retirement. In the theoretical concept the impact of the pull-factors, the individual cannot manipulate, are displayed by the exogenous arrows in Figure 3.3 in Chapter 3. Push-and-pull factors included in the analyses are described in the following.

As personal characteristics influencing post-retirement employment, qualification, ethnicity, and gender are taken into account. Qualification, as a measure of economic performance (see Becker, 1993), determines individuals' assignments to social classes. In addition, it serves as an indicator of social status (see Whitty, 2001). A higher qualification and life-long learning throughout the working career guarantee longer earning histories and higher

pension entitlements. Furthermore, this leads to more flexibility concerning the individual arrangement of leaving the labor force and enter retirement (Clemens and Himmelreicher, 2008). Qualification is measured by using information about peoples' highest educational degree obtained, recorded in the notifications to social security.[14]

Including information on education in the analyses may be considered as measure to what extent the German education system, as one system within the institutional settings, drives post-retirement employment. This matter of fact refers to the bridge assumption formulated on the influence of institutional settings in Chapter 3. However, regarding the take-up of post-retirement employment I do not expect a strong relationship. Older workers higher labor market experience should outweigh the effect of the education system. In the second stage on the micro-level estimated in Chapter 7, however, education might be more influential regarding transition times or the type of jobs retirees take-up.

Employment shares, which measure lengths of unemployment and employment, related to the past ten biography years before retirement entry, are also included in the estimation (see Brussig, 2009; Fasang, 2012). Furthermore, days of sick leave are accumulated over the individuals' complete working histories (see Gärtner, 2010). The last job held prior to retirement is considered to be one of the main influencing factors on the probability of being employed in retirement (see Radl, 2007; Schellenberg, Turcotte, and Ram, 2005; Smeaton and McKay, 2003). Thus, further controls in the model are

[14]There is no official proof if the education information is reported correctly to social security by the employer, which might result in miss-classifications (see also Section 7.2 and Section 5.2.1. These are corrected by applying cleansing procedures proposed by Fitzenberger, Osikominu, and Völter (2006).

the lengths of time worked and the qualification of the last job before retirement. In addition, industry dummies are included in the model, to control for the workload people are exposed to.[15] Information about the employing establishment at the last job prior to retirement such as its size and the share of employees above the age of 50 years, help to characterize the job prior to retirement at the establishment level (see Adler and Hilber, 2009; Schmidt, Tisch, and Engelhardt, 2012; Bellmann, Gewiese, and Leber, 2006; Bellmann, Leber, and Stegmaier, 2007).

This enables me to account for pre-retirement events in peoples' life courses. As discussed in Chapter 3 life course theory suggests path dependency (Elder, 1995; Wang, Zhan, Liu, and Shultz, 2008), thus events from the past do influence future events. By including employment an unemployment shares I can also control for the continuance of employment histories. According to Kohli (1989) life course trajectories are becoming more flexible, which should be reflected in the measures calculated over the employment history. In addition, the included characteristics of the job prior to retirement are based on the bridge assumption that conditions on the labor market prior to retirement influence individual behavior (see in Chapter 3 for a detailed discussion). The establishment information helps to get evidence on the role firms play as an additional actor on the micro-level.

Information addressing the entry into retirement is also included in the model. The first indicator measures the financial situation in retirement. Earning points are used to construct this indicator. Pension payments dif-

[15] I first tried to classify occupations regarding their workload. The estimation results showed that the developed classification is not a valid measurement and thus does not capture differences in workload. This is why I am using the industry as proxy to account for the workload of different positions.

fer in East and West Germany (Deutsche Rentenversicherung Bund, 2012). Hence, if using the amount of pension benefits received, regional differences are not accounted for and results can be biased. Accumulated earning points display the relative position on the earnings distribution and therefore do not include regional variance. In addition, the age at retirement as an important social and biographical point in individuals' lives (Jansen, 2013; Radl, 2007) is included. It is also possible to account for early entry in retirement by adding age dummies (see Alexsandrowicz, Fasang, Schömann, and Staudinger, 2010). Changes in pension law affect different cohorts in a different way. Including the information of retirement entry cohorts, in addition to retirement age, is used to classify the retirees according to the pension law they are eligible for. Adding information from peoples' pension accounts, controls again for institutional settings, which again refers to the bridge assumption formulated on the influence of institutional settings in Chapter 3.

## 6.2 Empirical Specification

The data used for the empirical estimation is BASiD, and is described in detail in Chapter 4. The analysis sample to study outcomes of the first decision on the micro-level consists of people claiming old-age pension benefits on December 31, 2007. This means the examined retirees vary in age. They may either have retired at the normal retirement age of 65, earlier, or later than it.[16] Individuals insured by the miners' pension insurance are excluded from the analyses, because they are insured at higher order and therefore are not comparable to the average German retiree (Hochfellner, Müller, and Wurdack, 2011). In addition, the sample only includes retirees between the ages 60 and

[16]All early retirees in the sample receive deducted pension benefits.

69 and excludes civil servants and freelancers. After data cleansing, complete working histories of 25,304 retirees starting in 1951 to 2009 are included in the analyses. The sample consists of 19,756 Germans, 4,496 immigrants, and 913 ethnic Germans. The gender ratio is almost balanced for Germans and immigrants. Among ethnic Germans there are more women in the sample than men.

In order to make further statements on the formulated hypotheses, a logit model of the probability of being employed beyond retirement is estimated. Retirees are considered to be employed beyond retirement if there is an employment notification after the official retirement date stored in the data. This employment relationship has to be at least 90 days long. Otherwise retirees are classified as not employed. Following this definition, about 20 percent of the retirees in the sample are employed at least once beyond retirement. To gain evidence to what extent ethnic Germans and immigrants differ from Germans the model is fully interacted by ethnicity. In order to check for robustness according gender differences, separate models for men and women are estimated in a further step. Thus, the probability of being employed beyond retirement of individual $i$, is noted as follows:

$$\begin{aligned}\ln \frac{P(empl)_i}{(1-P(empl))_i} =& \beta_0 + \boldsymbol{\beta}_I \boldsymbol{IND}_i + \boldsymbol{\beta}_{EP} \boldsymbol{EMP}_i + \boldsymbol{\beta}_R \boldsymbol{RET}_i + \boldsymbol{\beta}_E \boldsymbol{E}_i + \\ & \boldsymbol{\beta}_{EI} \boldsymbol{E} \times \boldsymbol{IND}_i + \boldsymbol{\beta}_{EEP} \boldsymbol{E} \times \boldsymbol{EMP}_i + \boldsymbol{\beta}_{ER} \boldsymbol{E} \times \boldsymbol{RET}_i + \varepsilon_i \end{aligned} \tag{6.1}$$

where $\boldsymbol{E}$ is a vector for the three ethnic groups I am comparing. The vector $\boldsymbol{IND}$ denotes individual characteristics. Vector $\boldsymbol{EMP}$ contains characteristics regarding the employment history, whereas vector $\boldsymbol{RET}$ includes information on retirement characteristics discussed in Section 4.2.1. This specification allows for analyzing whether the displayed vectors contribute to occupational

activity in retirement and to what extent immigrants and ethnic Germans differ from Germans. For an intuitive interpretation, the derived average marginal effects rather than the estimated coefficients are presented in the estimation tables.

It has to be kept in mind that there is an academic discussion on the interpretation of marginal effects of interaction terms (see Ai and Norton, 2003; Puhani, 2012). To cross-validate the marginal effects, the model is also estimated as linear probability model. In general, a logit model should be preferred when analyzing categorical outcomes, because the logistic distribution restricts probabilities to the range between zero and one. Linear models do not impose this restriction and therefore usually do not provide the best model fit when estimating categorical outcomes. However, the predicted probabilities when estimating a linear model of the probability of being employed in retirement turned out to be in the interval between zero and one. This allows me to use a linear model as alternative estimation strategy for robustness checks. To account for heteroskedasticity a variance-weighted least square regression is executed using the inverse of the variance-covariance matrix of the residuals, estimated by OLS, as weights (see Wooldridge, 2003) in the regressions. The proof for this proposition is provided in Section 4.2.1

## 6.3 Discussion of Results

### 6.3.1 Descriptives

About 20 percent ($n$ = 5,041) of the overall retirees in the sample ($n$ = 25,304) are employed beyond retirement. One out of four ethnic Germans and Germans are employed beyond retirement, whereas immigrants make up only 17

percent of the working retirees. At first glance, this proportion seems to be quite high compared to the employment shares of retirees obtained from the German Mikrozensus. The reason for the differences can be explained by the calculation basis. In the BASiD sample, the percentage of post-retirement employment is computed by comparing employed retirees to all retirees in the sample, not to the working population.

The majority of employment relationships can be classified as marginal employment. About 62 percent of the employed retirees do not change the company that employs them in their post-retirement job. Table 6.1 shows selected sample characteristics. The considered retirees belong to cohorts

**Table 6.1:** Individuals receiving old-age pensions, 2007, by ethnicity

| | Germans | immigrants | ethnic Germans |
|---|---|---|---|
| No. of retirees | 19,756 | 4,496 | 913 |
| No. of retirees (weighted) | 3,331,611 | 385,412 | 121,501 |
| Average age at entry in retirement | 61.85 | 62.42 | 62.09 |
| Average acc. earning points | 35.62 | 27.06 | 28.49 |
| Average share of employment within 10 years before retirement (percent) | 59.50 | 46.8 | 52.6 |
| Average sickness months in the employment history | 2.44 | 3.28 | 2.23 |
| Males (percent) | 48 | 58 | 40 |
| Females (percent) | 52 | 42 | 60 |
| Education unknown (percent) | 4 | 4 | 23 |
| Without vocational training (percent) | 12 | 43 | 25 |
| With vocational training (percent) | 74 | 45 | 43 |
| University (percent) | 10 | 10 | 9 |
| Employed beyond retirement (percent) | 24 | 17 | 24 |

*Notes:* The displayed percentages are calculated using population weights. The outlined averages include retirement inflows between 2000 and 2007. Sick times are notified to social security after being on sick leave for six weeks, because health insurance then pays the salary. The increased share of immigrants in our sample is due to the disproportional sampling. If weighted to the population in 2007 the share of immigrants is about 10 percent.

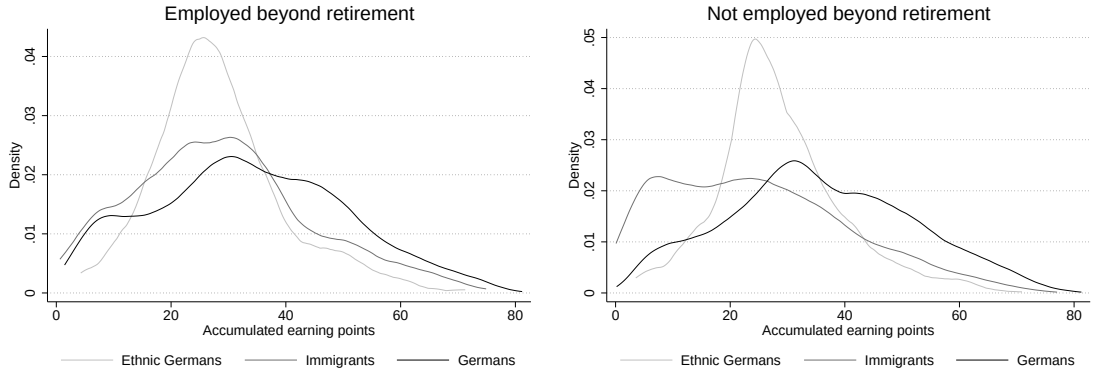
from 1940 to 1947 and are between the age of 60 and 67 in the observed year 2007.[17]

[17]Due to disclosure control retirees above the age of 67 in 2007 are not included in BASiD.

It is noticeable that there is almost no difference in the mean age of retirement between Germans, ethnic Germans and immigrants. It is below the normal retirement age for each ethnicity. However, there are disparities in the accumulated earning points and the labor attachment within ten years before transitioning to retirement. In both cases Germans perform best, whereas immigrants show the worst performance.

The distribution of accumulated earning points by ethnicity is shown in Figure 6.1. The left panel outlines the distribution of earning points for retirees who are employed, the right panel the distribution of earning points for retirees who are not working. The graphs show considerable ethnic differences. This pattern is in line with the study on retirees in Germany by Mika and Tucci (2006). It is apparent that the distributions of earning points for

**Figure 6.1:** Accumulated earning points in 2007, by post-retirement employment state




*Source: BASiD, own calculations*

the observed sub-groups are similar among ethnic Germans. Most of them accumulate about 25 earning points, whereas the distributions for immigrants vary clearly. Among those who are not employed in retirement, the majority of immigrants accumulate fewer earning points than immigrants who are

employed. Germans show the widest range in the distribution of earning points, which is similar for retirees with or without post-retirement jobs.

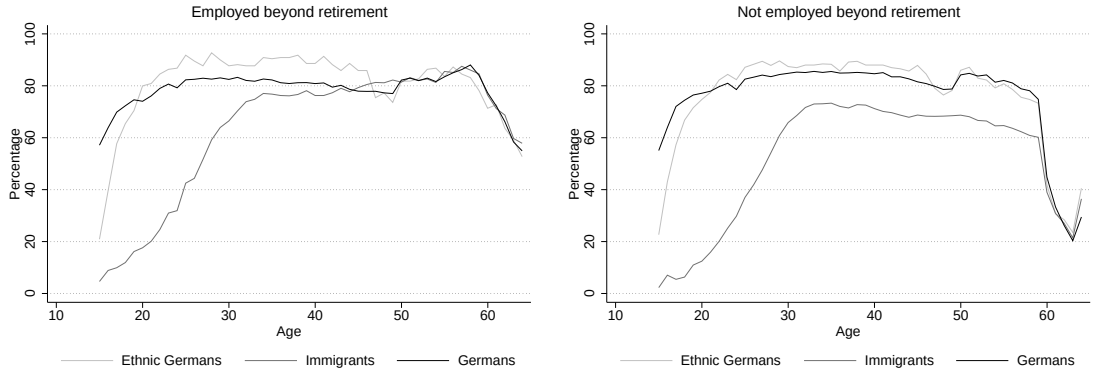
Focusing on employed retirees, Germans attain on average the highest amount of earning points (33.7 percent) in comparison to immigrants (30.6 percent) and ethnic Germans (28.0 percent). Among non-employed retirees, Germans accumulate the highest amount of earning points (36.2 percent), whereas immigrants (26.4 percent) and ethnic Germans (28,6 percent) follow far behind.

The descriptive results are ambiguous. On average, German retirees with a lower mean of earning points are employed at a lower rate than immigrants. Among immigrants, on average, retirees with higher personal earning points are employed more often. Turning to ethnic Germans, no disparities can be determined between employed and non-employed retirees.

Another central aspect for the multivariate analyses is the impact of the individuals' working histories. To get an impression when individuals enter and leave the workforce, employment shares by age and observed subgroup are computed every year on June 30. The corresponding statistic is illustrated in Figure 6.2.

Immigrants differ considerably from Germans and ethnic Germans in terms of employment. Their employment shares are constantly lower compared to Germans and ethnic Germans. The graph shows that immigrants have difficulties finding a job, especially in younger ages. An explanation for the lower employment shares of immigrants in younger ages is that immigrants are more likely to be unemployed or to get training after they immigrate. The

**Figure 6.2:** Employment share over the life-cycle, by post-retirement employment state




*Source: BASiD, own calculations*

majority of them is in employment starting at the age of 30.

Mika and Tucci (2006) show considerable differences regarding the amount of received pension benefits by ethnicity. Shorter contribution periods of immigrants, for instance because of the higher age when starting to contribute to the German pension insurance, are responsible for that. On average, immigrants start contributing 12 years later in comparison to Germans. ethnic Germans show higher rates of employment in early ages, because occupational activity in their home country is taken into account for their pension eligibility.

Comparing employment histories of retirees with and without jobs, a common pattern for ethnic Germans arises. In both cases, employment shares show the same trend, despite little variability at a very high level. The opposite can be found looking at Germans and immigrants. Non-employed German retirees show higher employment shares compared to employed retirees. In contrast, immigrants show the complete opposite to be true. Overall, Figure 6.1 and Figure 6.2 indicate that the group of employed retirees accumulate lower earning points and vice versa.

### 6.3.2 Multivariate

The outlined differences of employment behavior in retirement in Chapter 6.3.1 can also be found in the estimation results in Table 6.2. The estimation results for the gender specific models are presented in Table 6.3 and Table 6.4 respectively.

**Table 6.2:** Average marginal effects (fully interacted with nationality)

| Dependent variable: Employed beyond retirement | | | |
|---|---|---|---|
| Explanatory variable | Germans | immigrants | ethnic Germans |
| Empl. share within 10 years before retirement (ref.: 76 – 100 percent) | | | |
| ≤ 25 percent | -0.040*** | -0.017 | -0.042 |
| | *0.013* | *0.034* | *0.062* |
| 26 – 50 percent | 0.011 | 0.029 | 0.008 |
| | *0.011* | *0.028* | *0.048* |
| 51 – 75 percent | 0.034*** | 0.001 | 0.029 |
| | *0.009* | *0.024* | *0.043* |
| Unemployment in employment history (ref.: never unemployed) | | | |
| ≤ 2 years | 0.035*** | -0.013 | -0.001 |
| | *0.007* | *0.017* | *0.039* |
| > 2 years | 0.030*** | 0.013 | 0.025 |
| | *0.008* | *0.021* | *0.043* |
| Gap between last job and entry to retirement (ref.: no gap) | | | |
| < 1 year | -0.191*** | 0.040 | -0.066 |
| | *0.011* | *0.029* | *0.064* |
| 1 to < 2 years | -0.238*** | -0.058 | -0.067 |
| | *0.011* | *0.037* | *0.060* |
| 2 to < 3 years | -0.293*** | 0.036 | -0.045 |
| | *0.011* | *0.030* | *0.060* |
| 3 to < 6 years | -0.365*** | 0.049* | 0.097 |
| | *0.012* | *0.029* | *0.051* |
| 6 to < 10 years | -0.316*** | 0.057* | -0.084* |
| | *0.017* | *0.038* | *0.097* |
| ≥ 10 years | -0.363*** | 0.140 | -0.143 |
| | *0.042* | *0.142* | *0.155* |
| Job prior to retirement (ref.: employed liable to social security) | | | |
| Marginal part-time | 0.196*** | -0.030 | 0.035 |
| | *0.007* | *0.019* | *0.037* |
| Partial retirement | -0.147*** | -0.015 | 0.068 |
| | *0.009* | *0.025* | *0.047* |
| Industry of job prior to retirement (ref.: agriculture) | | | |
| Mining/manufacturing | 0.029*** | 0.043 | -0.002 |
| | *0.011* | *0.033* | *0.069* |
| Energy/water supply | 0.015 | 0.020 | 0.087 |
| | *0.029* | *0.114* | *0.145* |

Table 6.2 – continues...

Table 6.2 – continued

| Explanatory variable | Germans | immigrants | ethnic Germans |
|---|---|---|---|
| Construction | 0.063*** | -0.005 | -0.045 |
| | *0.015* | *0.044* | *0.100* |
| Trade | 0.064*** | 0.040 | 0.000 |
| | *0.011* | *0.032* | *0.070* |
| Transportation | 0.074*** | 0.046 | 0.115 |
| | *0.014* | *0.042* | *0.086* |
| Finance | -0.014 | 0.021 | 0.203* |
| | *0.020* | *0.066* | *0.120* |
| Economic services | 0.033*** | 0.105*** | 0.026 |
| | *0.012* | *0.032* | *0.065* |
| Administration | -0.016 | 0.079** | 0.050 |
| | *0.011* | *0.033* | *0.069* |
| Public administration | 0.022 | 0.039* | 0.084 |
| | *0.012* | *0.037* | *0.072* |
| Age at entry in retirement (ref.: 65 years) | | | |
| 60 years | 0.028*** | -0.059*** | 0.021 |
| | *0.009* | *0.019* | *0.039* |
| 61 years | 0.041*** | -0.054** | -0.095* |
| | *0.010* | *0.023* | *0.051* |
| 62 years | 0.050*** | -0.055** | -0.027 |
| | *0.011* | *0.027* | *0.056* |
| 63 years | 0.028*** | -0.041* | -0.040 |
| | *0.010* | *0.023* | *0.047* |
| 64 years | 0.036*** | -0.023 | -0.099* |
| | *0.013* | *0.029* | *0.056* |
| 66 years | 0.046** | -0.093* | -0.016 |
| | *0.020* | *0.053* | *0.066* |
| 67 years | -0.023 | 0.160 | -0.196 |
| | *0.089* | *0.114* | *0.151* |
| Individual characteristics | | | |
| Cum. earning points | -0.044*** | 0.062*** | -0.014 |
| | *0.005* | *0.012* | *0.040* |
| Female | -0.079*** | 0.052*** | 0.011 |
| | *0.007* | *0.016* | *0.034* |
| Ethnicity | ref. | -0.265*** | 0.061 |
| | | *0.069* | *0.173* |
| Other controls | | | |
| Cum. sick time | -0.000 | 0.001 | 0.002 |
| | *0.000* | *0.001* | *0.003* |
| Cum sick time$^2$ | 0.000 | -0.000 | -0.000 |
| | *0.000* | *0.000* | *0.000* |
| Experience | 0.000 | -0.001 | -0.006 |
| | *0.001* | *0.003* | *0.004* |
| Experience$^2$ | 0.000 | 0.000 | 0.000 |
| | *0.000* | *0.000* | *0.000* |
| Qualified job prior to retirement | 0.010 | -0.021 | 0.036 |
| | *0.006* | *0.083* | *0.035* |
| No. of observations | | 25,139 | |
| McFaddens adj. $R^2$ | | 0.250 | |

Table 6.2 – continues...

Table 6.2 – continued

| Explanatory variable | Germans | immigrants | ethnic Germans |
|---|---|---|---|
| LL | | -9993.503 | |
| Model fit (Wald) | | $x^2(131)$=5589.10*** | |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10 percent level. All models include education dummies and the firm size of the employing establishment prior to retirement.

Hypothesis I, that post-retirement employment is related to gain additional income can be confirmed by the estimation results. However, the estimates only partly support hypothesis II, that employment beyond retirement varies by immigration history.

A person's financial situation influences occupational activity beyond retirement. The amount of accumulated personal earning points in the period of employment has a negative effect on occupational activity in retirement for Germans. People who can accumulate more personal earning points during working life show a reduced probability of labor force participation in retirement. Ethnic Germans do not differ from Germans significantly, whereas immigrants differ significantly. An increase in personal earning points is accompanied by a higher probability of holding post-retirement employment relationships among immigrants. That immigrants with poorer financial resources are less likely to engage in post-retirement compared to Germans, might be connected to a higher cohesion and financial support within the family.

When examining educational attainments, estimation results differ from the assumptions made. There is no significant effect for the relationship of education and work beyond retirement for all of the considered groups. Literature, in particular the "active aging" studies, suggest that highly qualified

people continue to work because of psycho-social preferences (see Grabka, 2013; Deller and Maxin, 2009; Nowossadeck and Vogel, 2013; Scherger, Nazroo, and Higgs, 2011; Scherger, Hagemann, Hokema, and Lux, 2012). I can not see any evidence in my study for an influence of education on engagement in post-retirement employment. However, I assume that I will see educational impacts in the second stage of the micro-level analysis in Chapter 7, when the outcome addresses different types of post-retirement employment.

People whose occupational careers are characterized by employment interruptions show higher probabilities to work beyond retirement, although interruption of employment resulting from longer duration of sick leave is not considered as significant predictor for being employed beyond retirement. This result is in line with the assumed path dependency of life course theory (see Elder, 1995; Wang, Zhan, Liu, and Shultz, 2008). In particular, unemployment experience during life course increases the likelihood to work beyond retirement. It is higher for retirees who have been unemployed more than two years in comparison to retirees who have not experienced unemployment. Individuals with unstable careers show a higher probability to be engaged in post-retirement employment. However, with increasing unemployment duration, the size of this effect decreases, in particular for women. There are no significant differences between ethnic Germans and immigrants compared to Germans regarding the influence of unemployment experience. The influence of prior life history events affects all demographic group in the same way. That shows that the instabilities on the labor market, considered as bridge assumptions in the micro macro model do not affect people differently.

Descriptive analyses have revealed that labor market participation is much lower for non-employed than for employed retirees. In contrast, multivariate

analyses show that ethnic Germans and immigrants do not differ significantly from Germans in respect to the influence of labor market participation through the life course on post-retirement employment. The estimates suggest an impact for two groups who differ in labor market attachment. Individuals who have been employed up to one quarter of the last ten years prior to retirement are less likely to be employed in retirement, whereas individuals who are employed between 5 and 7.5 years within the past ten years prior to retirement are more likely to be employed in retirement in comparison to people who are employed permanently. This result shows that labor market attachment is a predictor of finding a job. A weaker labor market attachment can be seen as a constraint which pulls individuals from the labor market, whereas higher labor force attachments pull individuals on the labor market, because job search will be much easier (see Adams and Rau, 2004). This relationship should also show up in the second stage estimation when studying transition times into post-retirement employment trajectories.

In respect to the age at retirement entry, immigrants differ significantly from Germans. Among Germans, the likelihood of holding post-retirement employment is higher for people who have retired early in life compared to people that have retired at the normal retirement age of 65. In this respect, immigrants differ significantly from Germans. The likelihood of pursuing post-retirement employment is lower for immigrants who retire early in comparison to Germans.

The influence of gender differs significantly between Germans and immigrants. German women show a reduced probability of being employed beyond retirement in comparison to German men. This can be explained by role allocations within the society or the division of household duties:

Whereas men work to provide income for the family, their spouses stay at home. For immigrants, the effect is not that strong. This is also supported by the gender-specific estimates. For women and men engaged in post-retirement employment the influencing variables stay the same for both sexes. When estimating separately for men and women, only the strength of the marginal effects varies. In sum, the estimates show no big gender differences. The bridge assumption for gender specific influences of macro-conditions and thus gender specific outcomes is not reliable. This might not be surprising in the first stage of the individual micro-model, because the empirical model includes controls for employment characteristics (see Section 2.4.6). This way the gender dummy has to be interpreted conditional on having the same employment characteristics as men. Thus, it might be gender specific role allocations explaining the few differences.

There are also facts that support hypothesis III, which assumes psycho-social preferences expressed in a continuing persistent work history after transition from work to retirement. The estimations are in line with findings of recent qualitative studies, which indicate a higher commitment to work for older employees who worked full-time prior to retirement compared to people in partial retirement (e.g., Deller and Maxin, 2009; Dorbritz and Micheel, 2010; Micheel, Roloff, and Wickenheiser, 2011; Roloff, 2010). Retirees who have been marginal part-time workers prior to retirement show a higher probability of holding an occupational activity in retirement, persons that have been in partial retirement show a lower probability in comparison to retirees who were regular full-time employees. At this point there cannot be found any significant variation between immigrants and Germans.

The key feature supporting hypothesis III is the period of time between the last occupancy and retirement. This gap influences the probability of labor force participation in retirement negatively compared to direct transitions to post-retirement employment. The higher the gap, the higher the size of the effect. Whereas shorter gaps (up to one year) only reduce the probability of being employed by 19 percent, longer gaps lasting for three to six years reduce the probability of being employed beyond retirement by 35 percent. This is true for all ethnic subgroups. This result suggest that continuity is in deed important considering post-retirement employment.

Additionally, it seems that specific sectors people worked in before retiring have an effect on occupational activity in retirement. Mining, manufacturing, finance, and economic and public services have a positive effect on the probability of being employed beyond retirement compared to agriculture and foresting. This reflects the ability to work in specific industries. People who worked in industries with a higher physical demand prior to retirement are less likely to engage in post-retirement, which might just be because they cannot cope with the required workload any more.

**Table 6.3:** Average marginal effects (fully interacted with nationality), female model

| Dependent variable: Employed beyond retirement | | | |
|---|---|---|---|
| Explanatory variable | Germans | immigrants | ethnic Germans |
| Empl. share within 10 years before retirement (ref.: 76 – 100 percent) | | | |
| ≤ 25 percent | -0.036** | -0.061 | -0.008 |
| | *0.015* | *0.043* | *0.068* |
| 26 – 50 percent | 0.011 | -0.002 | -0.021 |
| | *0.013* | *0.037* | *0.051* |
| 51 – 75 percent | 0.032*** | -0.039 | -0.029 |
| | *0.011* | *0.030* | *0.049* |
| Unemployment in employment history (ref.: never unemployed) | | | |
| ≤ 2 years | 0.028*** | 0.009 | -0.023 |
| | *0.008* | *0.020* | *0.041* |
| > 2 years | 0.036*** | 0.031 | 0.024 |
| | *0.010* | *0.025* | *0.045* |
| Gap between last job and entry to retirement (ref.: no gap) | | | |
| < 1 year | -0.209*** | 0.023 | -0.028 |
| | *0.014* | *0.038* | *0.072* |
| 1 to < 2 years | -0.271*** | -0.081 | -0.024 |
| | *0.015* | *0.055* | *0.083* |
| 2 to < 3 years | -0.299*** | 0.066* | 0.041 |
| | *0.014* | *0.039* | *0.067* |
| 3 to < 6 years | -0.370*** | 0.065 | 0.154*** |
| | *0.015* | *0.040* | *0.055* |
| 6 to < 10 years | -0.315*** | 0.115** | -0.028 |
| | *0.020* | *0.046* | *0.122* |
| ≥ 10 years | -0.351*** | 1.615*** | -0.024* |
| | *0.056* | *0.087* | *0.173* |
| Job prior to retirement (ref.: employed liable to social security) | | | |
| Marginal part-time | 0.180*** | -0.017 | 0.032 |
| | *0.008* | *0.024* | *0.042* |
| Partial retirement | -0.148*** | 0.019 | -0.001 |
| | *0.013* | *0.032* | *0.079* |
| Industry of job prior to retirement (ref.: agriculture) | | | |
| Mining/manufacturing | 0.044*** | 0.104** | -0.010 |
| | *0.014* | *0.042* | *0.081* |
| Energy/water supply | 0.073* | - | - |
| | *0.044* | | - |
| Construction | 0.079*** | -0.058 | - |
| | *0.021* | *0.112* | |
| Trade | 0.074*** | 0.089** | 0.045 |
| | *0.013* | *0.041* | *0.076* |
| Transportation | 0.090*** | 0.049 | 0.102 |
| | *0.020* | *0.066* | *0.100* |
| Finance | 0.019 | 0.096 | 0.202* |
| | *0.024* | *0.065* | *0.143* |
| Economic services | 0.051*** | 0.149*** | 0.071 |
| | *0.014* | *0.041* | *0.071* |
| Administration | -0.007 | 0.122*** | 0.096 |

Table 6.3 – continues...

Table 6.3 – continued

| Explanatory variable | Germans | immigrants | ethnic Germans |
|---|---|---|---|
| | *0.013* | *0.041* | *0.080* |
| Public administration | 0.032** | 0.039 | 0.090 |
| | *0.015* | *0.043* | *0.075* |
| Age at entry in retirement (ref.: 65 years) | | | |
| 60 years | 0.004 | -0.061** | 0.049 |
| | *0.011* | *0.024* | *0.046* |
| 61 years | 0.020 | -0.049* | -0.036 |
| | *0.013* | *0.029* | *0.058* |
| 62 years | 0.027* | -0.045 | 0.023 |
| | *0.014* | *0.034* | *0.060* |
| 63 years | 0.033** | -0.068** | -0.015 |
| | *0.014* | *0.033* | *0.062* |
| 64 years | 0.033 | -0.035 | -0.073 |
| | *0.020* | *0.041* | *0.060* |
| 66 years | 0.027 | -0.136 | 0.006 |
| | *0.023* | *0.083* | *0.064* |
| 67 years | -0.018 | 0.163 | -0.116 |
| | *0.080* | *0.103* | *0.151* |
| Individual characteristics | | | |
| Cum. earning points | -0.036*** | 0.057*** | -0.021 |
| | *0.006* | *0.014* | *0.040* |
| Ethnicity | ref. | -0.206** | 0.075 |
| | | *0.083* | *0.172* |
| Other controls | | | |
| Cum. sick time | 0.000 | 0.000 | 0.000 |
| | *0.000* | *0.001* | *0.003* |
| Cum sick time$^2$ | -0.000 | -0.000 | -0.000 |
| | *-0.000* | *0.000* | *0.000* |
| Experience | 0.000 | -0.002 | -0.004 |
| | *0.001* | *0.004* | *0.004* |
| Experience$^2$ | -0.000 | 0.000 | 0.000 |
| | *0.000* | *0.000* | *0.000* |
| Qualified job prior to retirement | 0.022** | -0.052 | -0.007 |
| | *0.008* | *0.022* | *0.042* |
| No. of observations | | 15,228 | |
| McFaddens adj. $R^2$ | | 0.286 | |
| LL | | -5600.1707 | |
| Model fit (Wald) | | $x^2(131)$=5766.68*** | |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10 percent level. All models include education dummies to and the firm size of the employing establishment prior to retirement.

**Table 6.4:** Average marginal effects (fully interacted with nationality), male model

| Dependent variable: Employed beyond retirement<br>Explanatory variable | Germans | immigrants | ethnic Germans |
|---|---|---|---|
| Empl. share within 10 years before retirement (ref.: 76 – 100 percent) | | | |
| ≤ 25 percent | -0.038 | 0.033 | -0.266 |
| | *0.026* | *0.058* | *0.239* |
| 26 – 50 percent | 0.008 | 0.078 | 0.127 |
| | *0.021* | *0.048* | *0.154* |
| 51 – 75 percent | 0.027 | 0.062 | 0.247** |
| | *0.017* | *0.042* | *0.117* |
| Unemployment in employment history (ref.: never unemployed) | | | |
| ≤ 2 years | 0.038*** | -0.046 | 0.058 |
| | *0.011* | *0.030* | *0.093* |
| > 2 years | 0.015 | -0.007 | 0.012 |
| | *0.015* | *0.036* | *0.108* |
| Gap between last job and entry to retirement (ref.: no gap) | | | |
| < 1 year | -0.153*** | 0.051 | -0.210 |
| | *0.018* | *0.029* | *0.137* |
| 1 to < 2 years | -0.189*** | -0.073 | -0.257* |
| | *-0.016* | *0.037* | *0.141* |
| 2 to < 3 years | -0.260*** | -0.039 | -0.282** |
| | *-0.019* | *0.030* | *0.122* |
| 3 to < 6 years | -0.318*** | -0.010 | -0.086 |
| | *-0.020* | *0.029* | *0.149* |
| 6 to < 10 years | -0.309*** | -0.054 | -0.135* |
| | *0.033* | *0.038* | *0.318* |
| ≥ 10 years | -0.400*** | -0.001 | 1.724*** |
| | *0.066* | *0.142* | *0.439* |
| Job prior to retirement (ref.: employed liable to social security) | | | |
| Marginal part-time | 0.220*** | -0.042 | 0.140 |
| | *0.013* | *0.035* | *0.086* |
| Partial retirement | -0.140*** | -0.055 | 0.108 |
| | *-0.014* | *0.038* | *0.081* |
| Industry of job prior to retirement (ref.: agriculture) | | | |
| Mining/manufacturing | 0.007 | -0.032 | -0.032 |
| | *0.018* | *0.054* | *0.133* |
| Energy/water supply | -0.033 | 0.147 | -0.049 |
| | *0.041* | *0.125* | *0.200* |
| Construction | 0.038* | -0.035 | -0.064 |
| | *0.021* | *0.060* | *0.159* |
| Trade | 0.048** | -0.032 | -0.174 |
| | *0.019* | *0.055* | *0.146* |
| Transportation | 0.050** | 0.014 | 0.118 |
| | *0.021* | *0.062* | *0.164* |
| Finance | -0.078** | -0.157 | 0.096 |
| | *0.039* | *0.171* | *0.199* |
| Economic services | 0.004 | 0.058 | -0.151 |
| | *0.020* | *0.053* | *0.153* |
| Administration | -0.033* | 0.036 | -0.091 |

Table 6.4 – continues...

Table 6.4 – continued

| Explanatory variable | Germans | immigrants | ethnic Germans |
|---|---|---|---|
| | *0.019* | *0.058* | *0.132* |
| Public administration | 0.001 | 0.077 | 0.042 |
| | *0.024* | *0.071* | *0.177* |
| Age at entry in retirement (ref.: 65 years) | | | |
| 60 years | 0.044*** | -0.037 | 0.120 |
| | *0.009* | *0.032* | *0.090* |
| 61 years | 0.043*** | -0.053 | -0.201 |
| | *0.010* | *0.040* | *0.133* |
| 62 years | 0.055*** | -0.054 | -0.236 |
| | *0.011* | *0.045* | *0.230* |
| 63 years | 0.022 | -0.008 | -0.038 |
| | *0.010* | *0.034* | *0.083* |
| 64 years | 0.043** | -0.007 | -0.156 |
| | *0.013* | *0.043* | *0.101* |
| 66 years | 0.077** | -0.068 | 0.056 |
| | *0.020* | *0.077* | *0.205* |
| Individual characteristics | | | |
| Cum. earning points | -0.051*** | 0.070*** | 0.045 |
| | *0.012* | *0.022* | *0.116* |
| Ethnicity | ref. | -0.282** | -0.233 |
| | | *0.118* | *0.474* |
| Other controls | | | |
| Cum. sick time | -0.000 | 0.001 | -0.002 |
| | *0.001* | *0.002* | *0.006* |
| Cum sick time$^2$ | 0.000 | -0.000 | -0.000 |
| | *0.000* | *0.000* | *0.000* |
| Experience | -0.001 | 0.000 | -0.004 |
| | *0.001* | *0.004* | *0.012* |
| Experience$^2$ | 0.000 | -0.000 | -0.000 |
| | *0.000* | *0.000* | *0.000* |
| Qualified job prior to retirement | -0.005 | 0.020 | 0.113 |
| | *0.011* | *0.027* | *0.065* |
| No. of observations | 9,893 | | |
| McFaddens adj. $R^2$ | 0.215 | | |
| LL | -4286.9329 | | |
| Model fit (Wald) | $x^2(125)$=3165.16*** | | |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10 percent level. All models include education dummies to and the firm size of the employing establishment prior to retirement.

### 6.3.3 Robustness Check

Table 6.5 provides the estimates for the robustness check executed for the main model in Section 6.3.2. The estimates are retrieved by a linear probability model. Estimating categorical outcome variables in a linear model by definition induces heteroskedasticity, because the estimated errors, which equal the variance-covariance matrix of the residuals, are never of constant variance across the independent variables. The proof for this proposition is given in Section 4.2.1. This does not affect the estimated slopes. However. the reported variance of the slope estimates are biased, which results in either higher or lower p-values and therefore an over or under estimation of the results. To account for heteroskedasticity a variance weighted least square regression is executed using the inverse of the estimated variance-covariance matrix of the residuals as weights. In this way, cases with lower error variance get assigned a higher weight in the regression, whereas cases with higher error variance get a smaller weight (see Wooldridge, 2003).

The linear estimations are in line with the main logit-model. The results show the same trends as the binary probability model. The significance of the predictors equals the logit estimation. The coefficients show the same direction and vary sometimes in strength. In these cases the size of the effect is stronger in the linear model. I consider this as a reliable indicator for the robustness of the multivariate results.

**Table 6.5:** Coefficients, weighted (fully interacted with nationality)

| Dependent variable: Employed beyond retirement<br>Explanatory variable | Germans | immigrants | ethnic Germans |
|---|---|---|---|
| Empl. share within 10 years before retirement (ref.: 76 – 100 percent) | | | |
| ≤ 25 percent | -0.028** | -0.010 | -0.029 |
| | *0.015* | *0.036* | *0.067* |
| 26 – 50 percent | 0.034*** | 0.034 | 0.007 |
| | *0.012* | *0.030* | *0.054* |
| 51 – 75 percent | 0.064*** | 0.015 | 0.049 |
| | *0.011* | *0.027* | *0.047* |
| Unemployment in employment history (ref.: never unemployed) | | | |
| ≤ 2 years | 0.054*** | -0.031* | -0.030 |
| | *0.007* | *0.016* | *0.037* |
| > 2 years | 0.050*** | -0.011 | -0.011 |
| | *0.008* | *0.018* | *0.038* |
| Gap between last job and entry to retirement (ref.: no gap) | | | |
| < 1 year | -0.296*** | 0.077** | -0.054 |
| | *0.012* | *0.032* | *0.060* |
| 1 to < 2 years | -0.352*** | -0.019 | -0.051 |
| | *0.011* | *0.030* | *0.056* |
| 2 to < 3 years | -0.406*** | 0.048 | -0.036 |
| | *0.011* | *0.031* | *0.054* |
| 3 to < 6 years | -0.440*** | 0.051* | 0.080 |
| | *0.011* | *0.029* | *0.052* |
| 6 to < 10 years | -0.372*** | 0.063* | 0.016 |
| | *0.015* | *0.036* | *0.069* |
| ≥ 10 years | -0.394*** | 0.107 | -0.014 |
| | *0.037* | *0.077* | *0.126* |
| Job prior to retirement (ref.: employed liable to social security) | | | |
| Marginal part-time | 0.294*** | -0.045* | 0.029 |
| | *0.009* | *0.023* | *0.042* |
| Partial retirement | -0.225*** | 0.003 | 0.095* |
| | *0.010* | *0.024* | *0.052* |
| Industry of job prior to retirement (ref.: agriculture) | | | |
| Mining/manufacturing | 0.027** | 0.054* | -0.017 |
| | *0.011* | *0.028* | *0.066* |
| Energy/water supply | 0.013 | 0.030 | 0.083 |
| | *0.028* | *0.090* | *0.184* |
| Construction | 0.062*** | 0.001 | -0.058 |
| | *0.018* | *0.037* | *0.091* |
| Trade | 0.067*** | 0.034 | -0.025 |
| | *0.011* | *0.029* | *0.070* |
| Transportation | 0.078*** | 0.045 | 0.121 |
| | *0.011* | *0.040* | *0.093* |
| Finance | -0.013 | 0.057 | 0.215 |
| | *0.020* | *0.050* | *0.141* |
| Economic services | 0.032** | 0.108*** | 0.001 |
| | *0.012* | *0.031* | *0.063* |
| Administration | -0.021** | 0.083** | 0.020 |
| | *0.011* | *0.030* | *0.064* |

Table 6.5 – continues...

Table 6.5 – continued

| Explanatory variable | Germans | immigrants | ethnic Germans |
|---|---|---|---|
| Public administration | 0.021 | 0.048 | 0.070 |
| | *0.011* | *0.035* | *0.070* |
| Age at entry in retirement (ref.: 65 years) | | | |
| 60 years | 0.031*** | -0.049*** | 0.020 |
| | *0.009* | *0.018* | *0.038* |
| 61 years | 0.041*** | -0.047** | -0.100** |
| | *0.010* | *0.023* | *0.047* |
| 62 years | 0.053*** | -0.049* | -0.031 |
| | *0.012* | *0.027* | *0.060* |
| 63 years | 0.029*** | -0.038* | -0.045 |
| | *0.011* | *0.022* | *0.047* |
| 64 years | 0.044*** | -0.022 | -0.104* |
| | *0.014* | *0.029* | *0.060* |
| 66 years | 0.045* | -0.070 | -0.019 |
| | *0.024* | *0.044* | *0.077* |
| 67 years | 0.016 | 0.104 | -0.107 |
| | *0.143* | *0.190* | *0.180* |
| Individual characteristics | | | |
| Cum. earning points | -0.044*** | 0.049*** | -0.002 |
| | *0.005* | *0.010* | *0.036* |
| Female | -0.081*** | 0.051*** | 0.025 |
| | *0.007* | *0.014* | *0.032* |
| Ethnicity | ref. | -0.237*** | 0.036 |
| | | *0.057* | *0.172* |
| Other controls | | | |
| Cum. sick time | 0.000 | 0.000 | 0.000 |
| | *0.000* | *0.001* | *0.002* |
| Cum sick time$^2$ | -0.000 | -0.000 | -0.000 |
| | *0.000* | *0.000* | *0.000* |
| Experience | 0.000 | -0.000 | -0.005 |
| | *0.001* | *0.003* | *0.004* |
| Experience$^2$ | -0.000 | -0.000 | 0.000 |
| | *0.000* | *0.000* | *0.000* |
| Qualified job prior to retirement | 0.006 | -0.013 | 0.038 |
| | *0.006* | *0.015* | *0.034* |
| *_cons* | 0.501*** | | |
| | *0.028* | | |
| No. of observations | 25,139 | | |
| Model fit (Wald) | $x^2(131)$=9886.94*** | | |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10 percent level. All models include education dummies to and the firm size of the employing establishment prior to retirement.

## 6.4 Summary

The findings of this study reveal that a considerable percentage (20 percent) of old-age retirees between 60 and 67 years of age are employed beyond retirement. I can find evidence for economic and psycho-social preferences to engage in post-retirement employment. The bridge assumption that different demographic groups are affected differently by the macro-conditions can be confirmed only partly. The estimation results do not vary much between for men and women, however there is variation in respect to ethnicity. The empirical model also shows that conditions on the macro-level, such as institutional settings, impact individual outcomes.

The individual outcomes of the analyzed rational choice model on the micro-level, which includes the two preferences I am assuming as push factors to engage in post-retirement employment can be summarized as follows. The probability of being engaged in post-retirement employment decreases with increasing pension income. Retirees who have experienced longer periods of unemployment are more likely to be employed in retirement. These results speak to economic preferences to engage in post retirement employment. Although, there is evidence for economic preferences on the individual level, the estimation results do not necessarily support the old-age poverty discussion. Overall, the results speak more to what I call a “catch-up" effect (see Kahneman and Tversky, 1979) than preventing old-age poverty by working beyond retirement. Besides economic preferences, the results also suggest that retirees with higher labor market attachment (with few career interruptions) are more likely to work. Considering this, it seems more likely that individuals engage in post-retirement employment to make up income losses due to shorter employment interruptions, not because they are at the risk of old age poverty.

The attributes, which are connected to old-age poverty (see Bäcker, 2011), like low qualification, high unemployment, unstable careers, unskilled occupations all have a negative influence on the likelihood to engage in post-retirement employment. One explanation for this result can be that retires exposed to old-age poverty get pushed out of the labor market and do not find jobs. Furthermore, there is evidence for continuing working histories in retirement, which I refer to as psycho-social preferences. The probability of employment is highest for people with direct transitions from work to retirement and individuals who are employed to a higher extent prior to retirement.

The theoretical model stated that macro-conditions influence individual outcomes. Because of this, variables to describe institutional settings are included as control in the estimation of the model. The education background serves as indicator to gain insights of the relationship of the education system and post-retirement employment. The estimates do not suggest a relationship, which is comprehensible in case of a “yes" or “no" decision. At the age of retirement, education might be more relevant for the decision on the type of post-retirement job. In turn, the estimates show that the institutional settings of the pension system influence individual outcomes. This can be said by interpreting the included variables referring to the pension accounts. For instance, the likelihood of post-retirement employment varies with age. This is in line with restrictions in the pension system. When being retired before the normal retirement age of 65, there are earning thresholds if people want to work in retirement. To test the assumption that firms can be additional actors in the micro-macro model, firm dummies are included in the model as controls. They are not significant.

Addressing the theoretical assumption that macro conditions affect different demographic groups differently, the model only shows differences between Germans and Immigrants. Ethnic differences exist partly. Immigrants who face a worse financial situation in retirement show a reduced probability of being employed during retirement. This can possibly be explained by a higher family cohesion of immigrants or return migration. Ethnic Germans do not vary much from Germans, which can be explained by their eligibility resulting from the foreign pension law. Nearly all variables addressing the working histories of ethnic Germans are not significantly different from Germans. The fact, that only immigrants differ from Germans, confirms that the institutional setting of the German pension system influences the variations in individual outcomes regarding to ethnicity. Ethnic Germans and Germans are treated in the same way in German pension law. Immigrants do not have the same premises and therefore are exposed to different institutional conditions, which then results in different outcomes.

The predicted marginal effects allow to transfer the result obtained on the micro-level to the macro-level. By examining how the average retiree behaves, implications for society can be derived. Although there is a high percentage of retirees working in retirement, which indicates that employment biographies are in fact changing toward more flexibility (see Amrhein, 2004; Guillemard, 1991; Kohli, 1989, 2000), it might be to early to consider socialization of retirement as macro-outcome, although the results show strong tendencies, that retirement changes from leisure time to a combination of leisure and work. Post-retirement employment leads to extended employment histories in society. On the one hand this is discussed as result of the “active aging" concept (see Grabka, 2013; Graefe and Lessenich, 2012; Maxin and Deller, 2010; Nowossadeck and Vogel, 2013; Räder, 2013; Scherger, Nazroo, and Higgs,

2011), which my results confirm. On the other hand there is a huge discussion about old-age poverty as macro phenomenon (Bäcker, 2011; Börsch-Supan, Gasche, and Lamla, 2013; Köppe, 2010; Kumpmann, Gühne, and Buscher, 2010; Mika and Tucci, 2006; Seils, 2013). The results of this empirical study confirm economic preferences, but also suggest that people exposed to old-age poverty are less likely to engage in post-retirement. Addressing society this will affect assistance payments. If people who need additional money do not engage in post-retirement society has to cover the costs.

Thus, the implication of this first study on the micro-level which is most important for the German government is that preferences are not mutually exclusive. This indicates that the political debate on post-retirement employment has to shift from discussing the reason for post-retirement employment and the “one size fits all" policy approach, towards a debate on the heterogeneity of the workforce beyond retirement. Chapter 8 discusses how public policy can support heterogeneity in preferences efficiently by a mix of different policy strategies (see Kerschbaumer, 2013; Lessenich, 2012a; Naegele, 2013). To find out how people can be supported in a better way, it is not only important to know the influencing factors of engagement in post-retirement employment, but also to describe the job-search and type of post-retirement jobs retirees hold.

This refers to the second decision a person has to make after she decided to engage in post-retirement employment: when to start and what kind of job she wants to work in. This will be studied in the next Chapter 7, which focuses on transition times to post-retirement jobs in more detail. In addition, a differentiation between different post-retirement outcomes is made. To find out if there are also people who want to work but don’t find a job, job

search will be classified as an additional outcome next to the different job trajectories. Whereas the first stage includes all retirees, the second decision is only done by these who stay in the labor force.

# Chapter 7

# Post-Retirement Employment Trajectories

## 7.1 Design of the Second Stage Micro-level Study

The second empirical chapter of my study addresses the second micro-level stage within the post-retirement employment micro-macro model according to Coleman (1986). Whereas the theoretical implications are discussed in Chapter 3, this Chapter is the follow-up to the first empirical part, which is outlined in the previous Chapter 6. The focus of the previous chapter was on explaining preferences to engage in post-retirement employment. The main part of the second empirical study will focus on push-and-pull factors (see Shultz, Morton, and Weckerle, 1998) influencing transition times into different post-retirement job trajectories to round off the concept of post-retirement employment on the micro-level.

On the micro-level, retirees do not only have to decide to take up a post-retirement job. A second decision which is conditional on being in the labor force refers to the type of post-retirement job people work in (the theoretical model on the micro-level is discussed in detail in Section 3.1.3). Studying the process until retirees find a job, provides politics with new insight in what way they can either people direct to specific outcomes or support them to obtain their desired outcomes. This can be done by changing macro-conditions and pull-factors through policy regulations. One example is the “Kombi-Rente", which is currently discussed in politics, which is a reform of the pension system designed to support people to extend their working lives.

Thus, for the development of efficient public policy reforms and to set incentives for workers to extend their careers it is not only important to know the motives and factors influencing post-retirement employment decisions,

which are discussed in the previous Chapter 7. Furthermore, it requires the understanding of labor force patterns among older workers (see Kerschbaumer, 2013; Naegele, 2013; Räder, 2013). Individuals who decide to stay in the labor force beyond retirement, choose in the second stage on the micro-level, after deciding to engage in post-retirement employment, between different post-retirement job trajectories (PRJ) to work in (see von Bonsdorff, Shultz, Leskinen, and Tansky, 2009; Wang, Adams, Beehr, and Shultz, 2009).

For instance, retirees can stay in or switch employment environments of their pre-retirement jobs (see Wang, Zhan, Liu, and Shultz, 2008). Retirees also differ according to the length of time transitioning in post-retirement jobs (see Ruhm, 1990; Maestas, 2010). Some people might stay on their pre-retirement jobs right away, whereas others might need more time to find post-retirement jobs. In addition, there is always the possibility that retirees are searching for a job but are not successful in finding one (see Adams and Rau, 2004).

The analysis of this chapter contributes new insights on predictors of different types of PRJ retirees work in, as discussed in theoretical considerations in Chapter 3. Thus, the second empirical part concentrates on the role employers play in the post-retirement employment micro-macro model, instead of focusing on explaining impacts of institutional settings. Detailed information on the employing establishment allows me to distinguish if people change establishments for their post-retirement job, as well as to include plenty of establishment characteristics.

PRJ which are held with the same employer and in the same occupation as the pre-retirement job can be seen as continuation of the employment career,

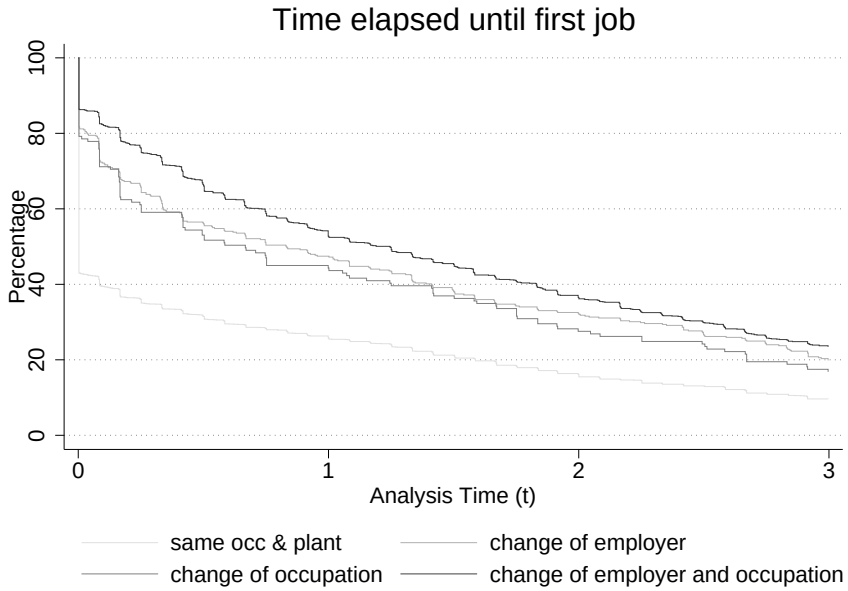
because employees are staying within the same working environment (see von Bonsdorff, Shultz, Leskinen, and Tansky, 2009; Wang, Zhan, Liu, and Shultz, 2008). But it is also possible to start working in a complete different working environment, which in my study implies a change of employer and a change in occupation. Possible variations would be a change of employer without changing occupation, or a change of occupation within the same establishment. Another trajectory I include in the analyze is job search (see Adams and Rau, 2004), to capture retirees who are in the labor force but not in the labor market. All possible trajectories are defined as competing risks in the analysis (see Allison, 1984; Blossfeld, Golsch, and Rohwer, 2007).

The presented analyses account for different ethnic populations and gender, again to include the bridge assumption that macro-conditions affect certain demographic groups differently. To consider other influential macro-conditions, as discussed in Section 3.1.2 and already implemented in the first empirical study in Chapter 6, I include independent variables referring to the pension and education system. For studies in job-search it is important to include regional controls. Because of varying macro-conditions on the labor market between regions, employment growth within regions and thus the time until people find a job might vary (see Dauth, 2013). As the second stage study explicitly examines transition times into employment I use regional unemployment rates to measure the impact of labor market conditions on post-retirement employment.

Summing up, in this chapter, I study the lengths of time until retirees start their first PRJ, and the push-and-pull factors which influence these transitions. Kaplan Meier estimates provide first descriptive evidence that the time until individuals enter their first PRJ differs by PRJ. Figure 7.1

shows transitions into the different job trajectories, when failure is defined as entering any kind of post-retirement job, without accounting for competing risks (see Allison, 1984; Blossfeld, Golsch, and Rohwer, 2007).

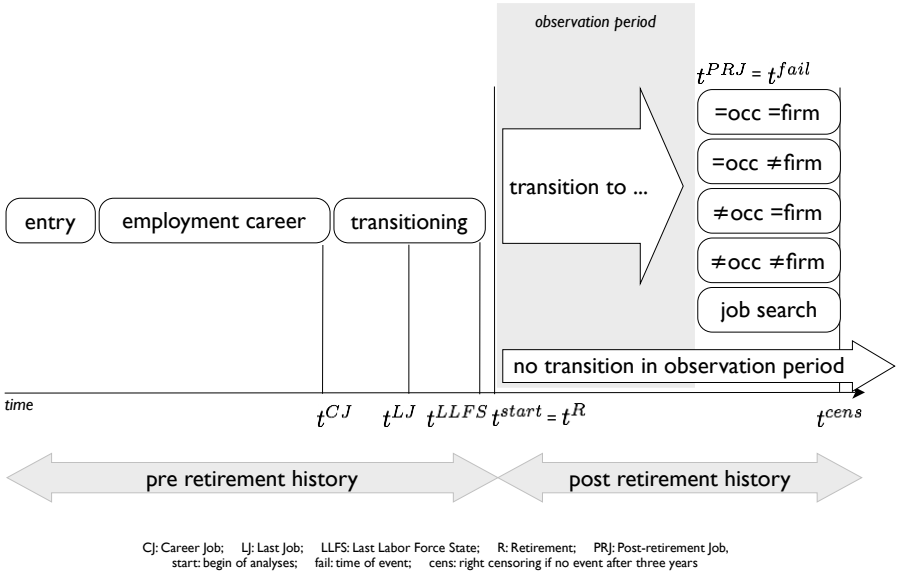
**Figure 7.1:** Post-retirement job trajectories




*Source: BASiD, own calculations*

However, I define competing PRJ, because people can choose between different alternatives, but only enter one trajectory. I consider entry into the different PRJ not independent from each other (see Cleves, Gould, Gutierrez, and Marchenko, 2010; Fine and Gray, 1999; Klein and Andersen, 2005). My events of interest are two specific employment trajectories. I categorize them according to changes in the work environment compared to the last job prior to retirement. Post-retirement jobs in the same work environment (PRJ-SE) are defined as staying with the same employer and holding the same occupation once being retired ($n$ = 2,051). Post-retirement jobs in a different work environment (PRJ-DE) are associated with a change of employer and

occupation ($n$ = 1,093). Competing trajectories are defined as PRJ where only the employer ($n$ = 409) or the occupation ($n$ = 149) changes, as well as registration as job seeker ($n$ = 992). I advance the definition of differentiating jobs according the occupation of Wang, Zhan, Liu, and Shultz (2008) and von Bonsdorff, Shultz, Leskinen, and Tansky (2009) by adding the change of employer. The framework of the survival analysis is pointed out in Figure 7.2.




I observe individuals after they start claiming pension benefits at $t^{start}$, which sets them at risk for failure on their entry to retirement $t^{R}$. Individuals fail as soon as they experience one of the employment trajectories defined above at $t^{PRJ}$. I censor analysis time after three years at $t^{cens}$, to make sure that every cohort can be followed for exactly three years in the sample.

The theoretical discussion in Chapter 3 leads to various hypotheses on how different push-and-pull factor influence transition times into different PRJ

(Shultz, Morton, and Weckerle, 1998). The hypotheses tested include the most important push-and-pull factors considered by previous studies on retirement transitions (e.g., Beehr, 1986; Cahill, Giandrea, and Quinn, 2006; Davis, 2003; Dorbritz and Micheel, 2010; Feldman, 1994; Maestas, 2010; Micheel, Roloff, and Wickenheiser, 2010; Ruhm, 1990; Smeaton and McKay, 2003; Taylor, 2010; Wang, Zhan, Liu, and Shultz, 2008), which are discussed in detail in Chapter 2: financial situation, labor market attachment, health, and establishment characteristics. The hypotheses addressed in the second stage of the micro-level (see Section 3.2.2 for a detailed discussion of all hypotheses relevant for the second stage on the micro-level) are formulated as follows.

The financial situation is used again to include a measurement for economic preferences (see Burtless and Moffitt, 1985; Fields and Mitchell, 1984; Ruhm, 1990), however I do not expect that the effects are as strong as in the first stage, when people decide to engage in post-retirement employment or not. In this scenario I might find differences for people who are exposed to old age poverty versus people who only want to make up income losses, which could not be separated in the first empirical part of this study. Individuals who are working due to economic preferences but not because exposed to old-age poverty, might be more flexible, whereas people who need the job might prefer to continue their pre-retirement job due to security reasons. I also expect transition times to be shorter for people exposed to old-age poverty. Following hypotheses regarding the influence of the financial situation on the transition in PRJ are tested:

- The likelihood to transition to a PRJ-SE is higher for individuals living on the poverty threshold (I).

- Individuals who are financially better off are more likely to change their

employment environment in retirement, and therefore are more likely taking a PRJ-DE (II).

Labor market attachment, as implemented in the first empirical part in Chapter 6 is used as a proxy to see if characteristics of individual employment histories (interrupted vs. stable biographies) influence the transition into certain PRJ. Life course theory states that biographies have changed over time (see Guillemard, 1991; Kohli, 1985, 2000). Individuals are not continuously employed anymore, destabilization of employment histories is common for specific groups on the labor market (see Blossfeld, Buchholz, and Hofäcker, 2006; Breen, 1997; Geyer and Steiner, 2010; Giesecke and Heisig, 2010; Struck, Grotheer, Schröder, and Kohler, 2007). Interruptions in employment over the life course do not only affect the engagement in post-retirement employment. Labor market attachment is also a factor predicting the transition in PRJ-DE or PRJ-SE. The higher the labor market attachment the faster retirees might find a job, because they are familiar with procedures on the labor market (Adams and Rau, 2004). For instance, retirees with continuous biographies might be more likely to seek continuity in their pre-retirement job, whereas retirees who already experienced interruptions are more comfortable with switching fields in retirement also. Following hypotheses regarding the influence of labor market attachment on the transition in PRJ are tested:

- Individuals who are employed prior to retirement are more likely to stay in their PRJ-SE, whereas individuals who are not employed show a higher probability of switching environments (III).
- The likelihood of entering a PRJ-SE is higher for retirees with shorter gaps between their last job and their entry to retirement (IV).
- The likelihood of entering a PRJ-DE increases with unemployment experience (V).

Health is considered as pull factor influencing outcomes on the micro-level (Gärtner, 2010; Sendler, 2011). As this second study is conditional on being in the labor force I only expect a weak relationship of health and PRJ outcomes. At this stage I expect the sample of retirees being the healthier ones. Therefore only one hypotheses regarding the influence of health on the transition in PRJ is tested:

- For individuals with poor health the likelihood of holding a PRJ-SE is higher than the likelihood of changing to a PRJ-DE (VI).

Establishment characteristics provide evidence in what way additional actors influence outcomes on the micro-level (Smeaton and McKay, 2003). In particular firm policies might favor a certain group of retirees (see Wübbeke, 2005a). Firms might only employ and train a limited amount of older people, and in this case the high qualified might be more attractive to firms (see Hutchens, 2007).

- This probability of entering PRJ-SE is higher for individuals employed at smaller establishments before retirement. Individuals employed in larger firms show a higher likelihood to enter PRJ-DE (VII).

- If the share of older workers in the establishment prior to retirement is higher, it is more likely that retirees transition to a PRJ-DE (VIII).

To include push-and-pull factors influencing the likelihood of entering PRJ throughout the life course, employment characteristics are measured at different stages in life. Including these longitudinal characteristics is important according to life course theory to account for path dependency of events Elder (1995); Kohli (1985). The model includes information at the time the individual was on her career job $t^{CJ}$, which is defined as longest job within an establishment according to Ruhm (1990). However the career job is

not necessarily the job prior to retirement. This is why I generate variables containing information at the time of the last job prior to retirement $t^{LJ}$. These pre-retirement variables are used to control for then macro-conditions on the labor market, discussed in Chapter 6, which influence the engagement in post-retirement employment. In addition, I include variables at the time of the last labor force state the individual has been observed before transitioning into retirement $t^{LLFS}$. This can be identical to the last job prior to retirement. If a person experiences unemployment before being retired, the last observation differs from the last job prior to retirement. Additional variables, which contain information on the complete employment history prior to retirement and the biography in retirement until finding a PRJ are computed.

## 7.2 Empirical Specification

The analysis sample is restricted to cohorts which are at the normal retirement age of 65 in 2007 (see Chapter 4) for a detail description of the used BASiD data). As the main focus concentrates on studying different employment trajectories beyond the actual retirement transition I further restrict the sample to individuals who received regular old-age pension benefits in 2007. With these two restrictions I make sure that I do not include persons who can only be early retirees at the point when the data was sampled. However, if a person retired at the age of 63 in 2004, she is in the sample because in 2007 she is a regular retiree at the age of 66. In addition, I drop individuals insured by the miners' pension insurance. They are insured at a higher order and therefore are not comparable to the average retiree. This leaves me with a sample of 15,504 retirees of cohorts 1940 to 1942 for which the BASiD data holds longitudinal information available from the beginning of 1951 to the end of 2009. Because the second decision on the type of bridge job is only done by

retirees still in the labor force, I only keep the 4,694 individuals who are still part of the labor force in retirement. These are individuals who are either employed for at least 30 days during the first three years in their retirement, or registered job seekers.

I generate two indicators to measure the impact of the financial situation, referring to economic preferences. The first one contains the benefits received per month, where (***BEN***) is a vector of four income groups, which can vary over time.[18] The second one is the wage received at the end of the career job ($\boldsymbol{w^{CJ}}$) measured in log-points.

The measure for labor market attachment describing a pull factor influencing individual outcomes on the micro-level is derived from the following variables: the days being unemployed relative to the days being in the labor force over the life course (***shui***), the last labor force state prior to retirement (***LLFS***), a vector of five states individuals can hold prior to retirement, and the gap in days between the last job prior to retirement and entry into retirement (***gap***). The health indicator equals the sum of sickness days relative to the days being in the labor force (***shsi***). Finally establishment characteristics, to measure the impact of an additional actor, such as a vector of four plant size dummies (***PSZE***) and the share of workers age 50 and over within the plant (***shw50***) are generated for the establishment of the last job prior to retirement.

Other independent variables controlled for in the vector $\boldsymbol{X}$ are demographics like gender, education[19], nationality, birth cohort, and additional

[18]Thus, this measure includes no income from other sources. For the cohorts in my sample the existence of other pension income for example private or employer based pension plans is neglectable, because both of them are no major sources of income in older age (Schulze and Jochem, 2007).

[19]The education variable was corrected by applying the cleansing procedures proposed

characteristics of the individuals' career job, such as the duration, occupation, position, and working time. Further plant characteristics of the job prior to retirement are industry, information on their employee structure, and a variable which indicates if the establishment has been closed. I also control for regional differences and the economic situation on the macro-level by including regional unemployment rates.

The sample is split by age and at the end of each year to account for varying covariates of age and unemployment rates in vector $\boldsymbol{Y_t}$. This yields to the model I estimate for each of the events of interest $k = PRJ-SE\ and\ PRJ-DE$ to estimate the sub-hazard according to Fine and Gray (1999) (refer to Section 4.2.2 for a detailed discussion on competing risks regressions).

$$\begin{aligned}\log \overline{h}_k(t) = \log \overline{h}_{k,0}(t)\ \{&\boldsymbol{\beta}_{B,t}\boldsymbol{BEN}_t + \beta_C \log w^{CJ} + \boldsymbol{\beta}_L\boldsymbol{LLFS} + \beta_G gap \\ &+ \beta_U shui + \beta_S shsi + \boldsymbol{\beta}_P\boldsymbol{PSZE} + \beta_W shw50 \\ &+ \boldsymbol{\beta_X X} + \boldsymbol{\beta_{Y,t}Y_t} + \varepsilon\}\end{aligned} \tag{7.1}$$

## 7.3 Discussion of Results

### 7.3.1 Descriptives

Selected descriptives are displayed in Table 7.1. Statistics are provided for the analysis sample which includes retirees who stay in the labor force. To compare them with retirees who are not employed beyond retirement I also provide descriptives for people who withdraw completely from the labor market. The retirees are equally distributed across the three cohorts, gender, and education. About 25 percent of the retirees in the sample are employed

by Fitzenberger, Osikominu, and Völter (2006), because there are no quality checks for this variable during the social security notification procedure (see also Section 6.1 and Section 5.2.1).

beyond retirement. This share is higher than official employment shares, due to the age-span I observe. The oldest retirees in the sample are 69 years old.

The median retirement age varies between individuals who are in the labor force and individuals who are not. Individuals who work beyond retirement tend to retire earlier. The financial income is lowest for retirees searching a job. Individuals pursuing PRJ tend to be more attached to the labor market. They show less unemployment experience and switch jobs less often in comparison to job seekers and retirees not pursuing PRJ. The majority of retirees entering PRJ are employed full-time prior to retirement, the majority of job seekers are unemployed to a higher extent. Most of the post-retirement workers choose to work in the same environment. However one third of them change the environment.

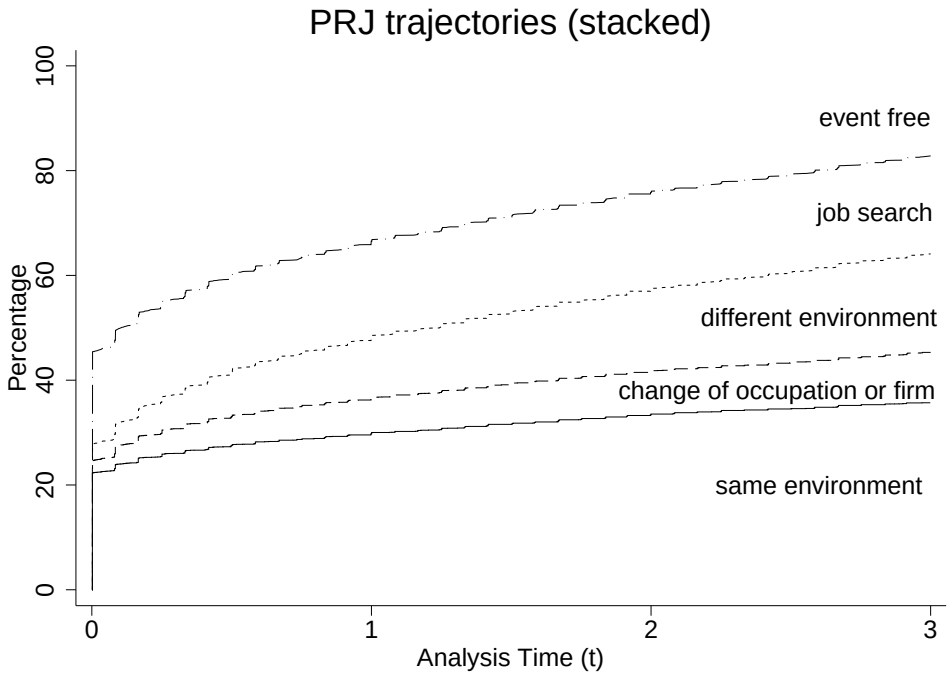
Job seekers differ according to the establishment characteristics of their job prior to retirement from they other retirees in the sample. They tend to work in smaller establishments characterized by a high share of part time workers before they retire. Retirees on post-retirement jobs tend to work in smaller establishments prior to retirement as well, characterized by a high share of older workers.

Before I focus on the events of interest PRJ-SE and PRJ-DE, I briefly provide an overview of all post-retirement transitions observed in the analysis sample in Figure 7.3. Almost 30 percent of the retirees in the labor force have experienced the transition in employment shortly after being retired. The majority of retirees stays within the same work environment, a certain amount changes to a different work environment. This is in line with Hébert and Luong (2008).

**Table 7.1:** Sample characteristics

| Cohort | no job | job | job seeker |
|---|---|---|---|
| No. of individuals | 10,810 | 3,702 | 992 |
| No. of establishments | 8,647 | 3,263 | 701 |
| | | | |
| Share of ... | | in percent | |
| Cohort 1940 | 32 | 35 | 31 |
| Cohort 1941 | 34 | 33 | 36 |
| Cohort 1942 | 34 | 32 | 33 |
| Female | 61 | 58 | 50 |
| Male | 39 | 42 | 50 |
| Low skilled | 26 | 20 | 25 |
| Skilled | 60 | 66 | 63 |
| High skilled | 10 | 8 | 10 |
| Unknown | 4 | 6 | 2 |
| | | | |
| Labor force state before retirement | | in percent | |
| Full time | 28 | 36 | 5 |
| Part time | 7 | 36 | 4 |
| Partially retired | 9 | 4 | 0 |
| Disability retirement | 17 | 3 | 2 |
| Unemployed | 31 | 17 | 88 |
| Training | 8 | 4 | 1 |
| | | | |
| Type of post-retirement job | | in percent | |
| Same firm/occupation | - | 55 | - |
| Different firm/occupation | - | 30 | - |
| Occupation differs | - | 4 | - |
| Firm differs | - | 11 | - |
| Job seeker | - | - | 100 |
| | | | |
| Individual characteristics | | mean | |
| Retirement age | 62 | 63 | 61 |
| Pension receipt in Euro | 799 | 811 | 818 |
| # of unemployment periods | 1.3 | 1.6 | 2.8 |
| # of unemployment years | 1.9 | 1.6 | 5.4 |
| # of sick years | 0.4 | 0.3 | 0.4 |
| # of jobs | 11.5 | 12.1 | 17.0 |
| | | | |
| Firm prior to retirement | | mean | |
| # of employees | 443 | 206 | 283 |
| Share of workers 50+ | 0.29 | 0.37 | 0.30 |
| Share of part-time workers | 0.25 | 0.22 | 0.67 |

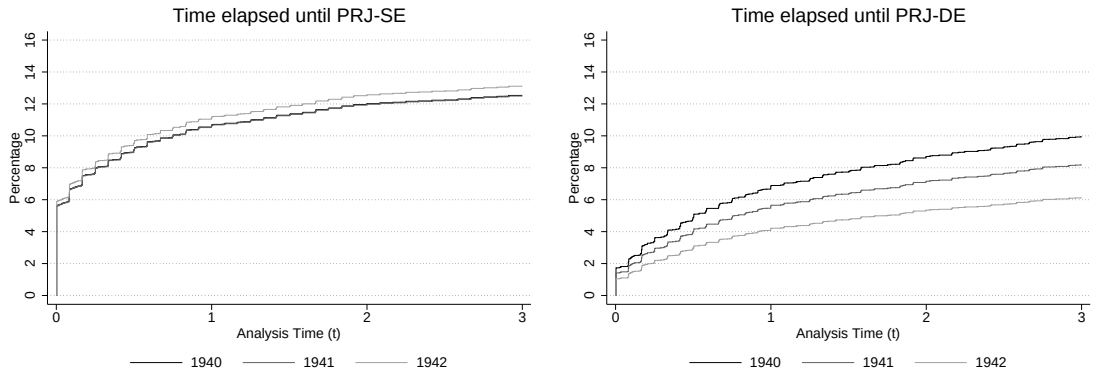
**Figure 7.3:** Cumulative Incidence of post-retirement labor market outcomes




*Source: BASiD, own calculations*

From the estimated model I can derive the CIF for both of the events of interest (see Section 4.2.2 for a detailed outline of how to calculate CIFs). Figure 7.4 displays the probability of cumulative incidence of PRJ-SE on the left panel and PRJ-DE on the right panel for retirees of different cohorts. The probability that individuals born in 1940 have entered a PRJ-SE after one year in retirement is about eleven percent. Individuals of cohort 1941 do not differ. The probability increases somehow for the youngest cohort 1942. In addition, after one year almost all transitions to PRJ-SE are executed. The probability of cumulative incidence of PRJ-SE only increases marginally within the following two years. About half of the retirees transitioning in PRJ-SE enter their job shortly after retirement. However, this looks different

**Figure 7.4:** Cumulative incidence functions of post-retirement job trajectories, by cohort

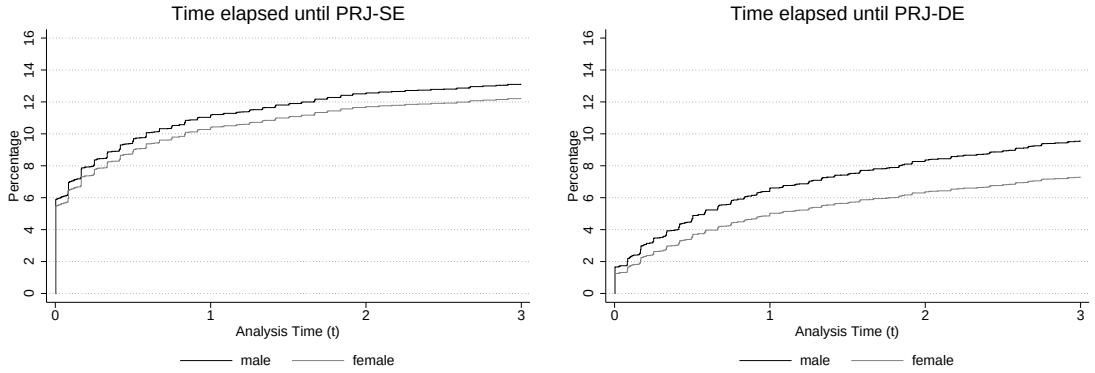



*Source: BASiD, own calculations*

in the right panel. The likelihood of cumulative incidence of PRJ-DE directly after retirement is only two percent. It increases to about ten percent three years after retirement for the oldest cohort. The CIF increases over time for all cohorts. The probabilities of transitioning in PRJ-DE varies significantly across cohorts. After one year the likelihood of cumulative incidence of PRJ-DE is highest for cohort 1940, with approximately seven percent. Individuals born in 1941 show a probability of six percent, the youngest cohort shows the lowest probability of about four percent.

Figure 7.5 displays the probability of cumulative incidence of PRJ-SE on the left panel and PRJ-DE on the right panel for women and men respectively. The probability that women have entered a PRJ-SE one year after being retired is about ten percent. Men differ slightly, but not significantly from women. As described above, after one year of retirement nearly all transitions to PRJ-SE are made. The probability of cumulative incidence of PRJ-SE does only increase marginally within the following two years for both males and females. The probability of cumulative incidence of PRJ-DE increases with time being in retirement for both men and women. Probabilities of transi-

**Figure 7.5:** Cumulative incidence functions of post-retirement job trajectories, by gender

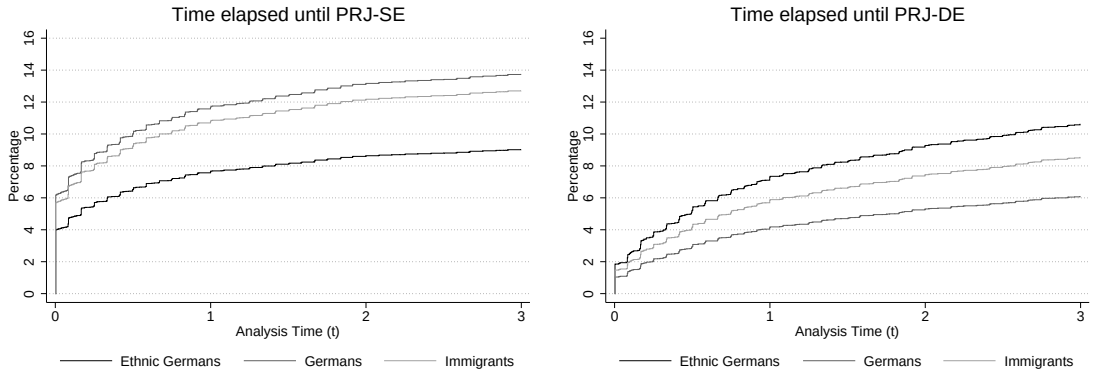



*Source: BASiD, own calculations*

tioning in PRJ-DE vary significantly by gender. After one year in retirement, the probability of cumulative incidence of PRJ-DE is higher for men, with approximately seven percent. Women show a probability of five percent.

Figure 7.6 displays the probability of cumulative incidence of PRJ-SE on the left panel and PRJ-DE on the right panel for Germans, immigrant and ethnic Germans. Ethnic Germans clearly differ from immigrants and

**Figure 7.6:** Cumulative incidence functions of post-retirement job trajectories, by ethnicity




*Source: BASiD, own calculations*

Germans. The probability of entering PRJ-SE directly after retirement is two percentage points lower for ethnic Germans in comparison to immigrants and Germans, who show a similar pattern of transitioning in PRJ-SE. Instead, ethnic Germans show a higher probability of cumulative incidence of PRJ-DE. Three years after retirement about 10 percent of ethnic Germans have started to work in a PRJ-DE, whereas it is only eight percent for immigrant and six percent among Germans.

### 7.3.2 Multivariate

To analyze how different factors influence the cumulative incidence I now focus on the estimated sub-hazard ratios for the variables of interest. Higher values of the covariates imply a constant relative increase of the sub-hazard which equals a higher predicted cumulative incidence for the event of interest at every point in time. The estimates are obtained from a full model, as well as from models estimated separately for men and women. As a robustness check I estimated separate models for each cohort. All models are conditioned on being in the labor force. Thus, retirees who never experience either one of the PRJ trajectories or job search are not included.

The interpretation of the results focuses on the full and gender specific models. The exponentiated coefficients on the sub-hazard of experiencing PRJ-SE are displayed in Table 7.2. The estimates for transitioning in PRJ-DE are displayed in Table 7.3. In addition, the estimates for the cohort models are provided in Table 7.4 and Table 7.5. The presented tables only include estimates for the coefficients of interest, described in Section 7.2. Tables containing a full set of estimates can be found in the appendices in Chapter 8.4.

### Financial Situation

The sub-hazard on PRJ-SE of individuals with the lowest pension benefits is about 17 percent points lower than the sub-hazard of individuals whose pension payments are in the middle range of the distribution. Hence, the cumulative incidence of entering a PRJ-SE for individuals living on the poverty threshold is lower than for individuals living above the poverty threshold. However, this coefficient is only significant at the ten percent level and vanishes in the models estimated separately for males and females. The wage of the career job seems to provide a more significant estimate. An increase of the wage in the career job of one percent decreases the sub-hazard of entering PRJ-SE by about 5 percent. Thus, individuals who earn less show a higher cumulative incidence of entering PRJ-SE. This effect is not significant for females when estimating separate models by gender.

Turning to the sub-hazard for entering PRJ-DE I find that both individuals with higher and lower incomes show a reduced sub-hazard compared to retirees on a middle income level. The predicted cumulative incidence of transitioning to PRJ-DE is highest for retirees on a middle income level. However, this seems to be only true for women, because the coefficients for pension income are only significant for the full model and the female model. The wage of the career job is a better predictor for entering PRJ-DE. An increase of one percent significantly increases the sub-hazard of PRJ-DE by approximately 30 percent in all models. Thus, higher wages increase the probability of switching work environments beyond retirement.

Summing up, I have to reject both my hypotheses I and II regarding the influence of the pension income on PRJ-SE and PRJ-DE. Whereas the

decision of entering the labor force in retirement is driven by the amount of benefit receipt as shown in the first empirical chapter, I cannot confirm this for transitions in PRJ. However, I find that the wage of the career job predicts the cumulative incidence in the way that I suggested the pension income would do: The cumulative incidence of entering PRJ-SE decreases with increasing income, whereas it is the other way round for the cumulative incidence of PRJ-DE.

Turning back to the economic preferences in the micro-macro model of post-retirement employment, I find evidence, that the pension income is a predictor to engage in post-retirement (see Chapter 6, but for the decision on the type of job the amount of pension benefit received does not matter much. The wage at the job prior to retirement seems to be much more influential in the decision of the retiree to switch working environments or stay in the same field. An explanation that retirees who earn higher wages prior to retirement show a higher likelihood of switching work environments might be that these people get more job offers. Higher wages usually are connected to a higher productivity, or a more valuable worker, which makes it easier to switch work environment assuming that more productive individuals can adjust to new workplaces easier. On the other side, people who earn less in their job prior to retirement stay in their working environment, because they might not meet the requirements of the labor market in the same way.

**Labor Market Attachment**

Compared to being full-time employed prior to retirement the sub-hazard for entering PRJ-SE is about 70 percent higher for retirees who work part-time prior to retirement and about 80 percent lower for retirees who were unemployed prior to retirement. This effect is highly significant and nearly the

same for women and men. It turns the other way round for the probability of entry in PRJ-DE on a highly significant level for both women and men. The gap between the last job prior to retirement and retirement, however, is significantly influences the sub-hazard of entry in PRJ-SE. It decreases nearly by 1 percent for every day the gap gets longer.

Unemployment experience is a better predictor for the likelihood of transitioning in a PRJ-DE, however not in the way we thought it would be. Increasing unemployment experience accumulated over the employment history is associated with a decrease of the sub-hazard and therefore a lower cumulative incidence of PRJ-DE. This relationship is not significant for the probability of transitioning in PRJ-SE.

Regarding the influence of labor market attachment on the cumulative incidence of PRJ-SE and PRJ-DE I can confirm my hypotheses III and IV, but have to reject hypothesis V. In general, the probability of cumulative incidence for PRJ-SE is higher for retirees with higher labor market attachment, whereas retirees with lower labor market attachments show a higher likelihood of cumulative incidence of PRJ-DE.

Turning back to the push-and-pull factors of the micro-macro model of post-retirement employment, the employment state prior to retirement does not only influence individuals to engage in post-retirement employment, but depending on the state prior to retirement the likelihood of staying in the same working environment or switching fields changes. The result that people who are employed prior to retirement are more likely to stay, is in line with the psycho-social theories discussed in Section 3.1.3. Staying in the same field expresses the search for continuity on the micro-level, as well as the fact that the gap between the last job prior to retirement and retirement is

smaller for retirees entering PRJ-SE. On the other side it seems like being unemployment impacts the transition in PRJ-DE. This is in line with life course theory Elder (1995); Kohli (1985), suggesting path dependency of events. Unemployment experience measures, either in the long-run or the short-run prior to retirement, both predict a higher likelihood of switching working environments in retirement.

**State of Health**

When interpreting the estimates of the health indicator in the context of the micro-macro model, it has to be kept in mind that my results are conditional on being in the labor force. Assuming that most retirees who are in the labor force are at good health, I observe fewer retirees with poor health. Nevertheless, the health condition of the retirees does not influence the sub-hazard of entering PRJ-DE. Turning to PRJ-SE, I find that the sub-hazard increases with the extent of being sick, accumulated over the employment history. Retirees who have been on sick leave more frequently are more likely to experience PRJ-SE. However, this effect is only significant in the full and the female model.

The findings lead to partly reject hypotheses VI. The cumulative incidence for entering PRJ-SE is higher for retirees with poor health, but there is no significant influence of health on changing work environments. An explanation for this might be that it is more likely to stay within the same work environment for these retirees, because they are familiar with the workplace and know that they can manage their job within their constraints, whereas if they change environments they might not be able to adjust to the new demands.

### Impact of Firms

Concerning the influencing factors on the establishment level I do not find any evidence regarding the existing age structure in the establishments. I have to reconsider our assumption, that a high number of older individuals in the establishments prevents employers from hiring more older workers. The covariate is not significant in any of the estimated models. However the size of the establishments retirees worked in before retirement influences the cumulative incidence of PRJ-DE and PRJ-SE. The sub-hazard of entering PRJ-SE is approximately eleven percent higher for retirees employed in smaller establishments and 28 percent lower for retirees employed in large establishments. The sub-hazard of transitioning in PRJ-DE is about 50 percent higher for retirees who worked in large establishments.

Summing up, I can only confirm hypothesis VII. This result is in line with the early retirement schemes provided by the German government, of which mainly only large firms made use. Smaller firms might be more in need of their older workers to maintain firm specific human capital and older workers in smaller firms may perceive the working environment as much more social. All these factors may lead to the intention to stay with the same employer. This can also be considered a psycho-social effect. Individual in working in smaller establishment might be more involved in social networks at the workplace. The higher likelihood of staying in the same environment may then be explained by the fact that retirees want to maintain their social contacts.

On the macro-level public policy can learn from these results that employers are considered a second agent influencing PRJ, although they are of minor importance in the decision to take up a post-retirement job (see Chapter 6).

It seems that retirees in large firms are not continuing their job within the firm when they are retired. To change this, public policy can for instance provide tax subsidies for large firms in case they offer more possibilities to extent employment opportunities for older people.

**Table 7.2:** Exponentiated coefficients (failure: PRJ-SE; competing risk: PRJ-DE, change in employer or occupation, job search)

| | Total | Men | Women |
|---|---|---|---|
| *BEN* $\leq$ 399 | 0.832* | 0.827 | 0.838 |
| | *0.081* | *0.100* | *0.139* |
| *BEN* 400–699 | 1.061 | 1.120 | 0.944 |
| | *0.075* | *0.094* | *0.134* |
| *BEN* 1000–1299 | 1.026 | 1.101 | 1.001 |
| | *0.079* | *0.163* | *0.086* |
| *BEN* $\geq$ 1300 | 0.983 | 0.816 | 0.975 |
| | *0.088* | *0.211* | *0.100* |
| $\log w^{CJ}$ | 0.949** | 0.835*** | 1.035 |
| | *0.025* | *0.030* | *0.038* |
| *LLFS* part-time | 1.675*** | 1.577*** | 1.740*** |
| | *0.099* | *0.133* | *0.138* |
| *LLFS* partial retirement | 1.088 | 0.872 | 1.241 |
| | *0.325* | *0.590* | *0.440* |
| *LLFS* disability retirement | 0.521* | 0.581 | 0.509* |
| | *0.184* | *0.325* | *0.234* |
| *LLFS* unemployed | 0.205*** | 0.190*** | 0.215*** |
| | *0.039* | *0.056* | *0.051* |
| *LLFS* training | 0.960 | 1.164 | 0.950 |
| | *0.240* | *0.397* | *0.280* |
| *gap* in days | 0.998*** | 0.999*** | 0.998*** |
| | *0.000* | *0.000* | *0.000* |
| *shui* | 2.592 | 5.224** | 1.042 |
| | *-1.528* | *-3.439* | *-1.103* |
| *shsi* | 23.38** | 10.56 | 18.36* |
| | *-36.56* | *-29.70* | *-32.03* |
| *PSZE* 10 – 49 | 1.114* | 1.094 | 1.189** |
| | *0.072* | *0.103* | *0.099* |
| *PSZE* 50 – 249 | 0.917 | 0.889 | 1.003 |
| | *0.069* | *0.092* | *0.101* |
| *PSZE* $\geq$ 250 | 0.728*** | 0.541*** | 0.939 |
| | *0.066* | *0.075* | *0.107* |
| *PSZE* unknown | 0.381*** | 0.545 | 0.406 |
| | *0.142* | *0.290* | *0.245* |
| *shw*50 | 1.012 | 0.917 | 1.077 |
| | *0.122* | *0.157* | *0.178* |
| cohort 1941 | 0.997 | 0.971 | 1.005 |
| | *0.056* | *0.078* | *0.075* |
| cohort 1942 | 1.050 | 1.031 | 1.042 |
| | *0.060* | *0.086* | *0.083* |
| female | 1.079 | | |
| | *0.074* | | |
| # of observations | 12,011 | 7,426 | 4,585 |
| # of events | 2,041 | 1,279 | 762 |
| # of competing risks | 2,169 | 1,111 | 1,058 |
| AIC | 28637.2 | 16334.9 | 9662.3 |
| BIC | 29147.4 | 16804.9 | 10099.5 |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10 percent level. All models include age dummies, potential experience, actual length of employment career and no. of jobs and unemployment episodes, ethnic background dummies, three dummies indicating the education level, an east/west dummy and the unemployment rate. Further career job controls are twelve occupation dummies and tenure; employer controls are calculated for the last job prior to retirement and additionally include 10 industry dummies, a dummy indicating closure, as well as the share of female, part-time and high-skilled workers.

**Table 7.3:** Exponentiated coefficients (failure: PRJ-DE; competing risk: PRJ-SE, change in employer or occupation, job search)

| | Total | Men | Women |
|---|---|---|---|
| *BEN* ≤ 399 | 0.489*** | 0.692 | 0.174*** |
| | *0.099* | *0.174* | *0.079* |
| *BEN* 400–699 | 0.719** | 0.890 | 0.325*** |
| | *0.105* | *0.156* | *0.108* |
| *BEN* 1000–1299 | 0.988 | 1.049 | 0.923 |
| | *0.137* | *0.256* | *0.162* |
| *BEN* ≥ 1300 | 0.646*** | 0.570 | 0.583** |
| | *0.106* | *0.254* | *0.124* |
| $\log w^{CJ}$ | 1.298*** | 1.365*** | 1.322*** |
| | *0.077* | *0.110* | *0.112* |
| *LLFS* part-time | 0.248*** | 0.212*** | 0.226*** |
| | *0.050* | *0.053* | *0.090* |
| *LLFS* partial retirement | 2.595*** | 1.026 | 4.663*** |
| | *0.501* | *0.520* | *-1.092* |
| *LLFS* disability retirement | 2.561*** | 0.809 | 5.639*** |
| | *0.542* | *0.271* | *-1.600* |
| *LLFS* unemployed | 2.260*** | 1.520** | 3.492*** |
| | *0.316* | *0.319* | *0.725* |
| *LLFS* training | 1.509 | 0.948 | 2.536*** |
| | *0.413* | *0.375* | *0.859* |
| *gap* in days | 1.000 | 1.000 | 1.000 |
| | *0.000* | *0.000* | *0.000* |
| *shui* | 0.033*** | 0.050** | 0.033*** |
| | *0.030* | *0.076* | *0.042* |
| *shsi* | 30.90 | 1776.9* | 0.171 |
| | *-93.73* | *-7618.8* | *0.715* |
| *PSZE* 10 – 49 | 0.944 | 1.298 | 0.807 |
| | *0.136* | *0.297* | *0.159* |
| *PSZE* 50 – 249 | 1.191 | 1.617** | 0.975 |
| | *0.173* | *0.365* | *0.196* |
| *PSZE* ≥ 250 | 1.550*** | 1.834** | 1.494* |
| | *0.249* | *0.473* | *0.318* |
| *PSZE* unknown | 1.273 | 1,405 | 1.109 |
| | *0.612* | *-1.098* | *0.658* |
| *shw*50 | 0.952 | 0.915 | 0.977 |
| | *0.252* | *0.356* | *0.396* |
| cohort 1941 | 0.815** | 0.938 | 0.712** |
| | *0.084* | *0.152* | *0.100* |
| cohort 1942 | 0.603*** | 0.652** | 0.574*** |
| | *0.076* | *0.123* | *0.099* |
| female | 1.327* | | |
| | *0.193* | | |
| # of observations | 12,011 | 7,426 | 4,585 |
| # of events | 832 | 411 | 421 |
| # of competing risks | 3378 | 1,979 | 1,399 |
| AIC | 13210.1 | 5791.7 | 5463.3 |
| BIC | 13720.3 | 6261.7 | 5900.6 |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10 percent level. All models include age dummies, potential experience, actual length of employment career and no. of jobs and unemployment episodes, ethnic background dummies, three dummies indicating the education level, an east/west dummy and the unemployment rate. Further career job controls are twelve occupation dummies and tenure; employer controls are calculated for the last job prior to retirement and additionally include 10 industry dummies, a dummy indicating closure, as well as the share of female, part-time and high-skilled workers.

### 7.3.3 Robustness Check

This section provides the estimation results when estimating the model separately by cohort. The results are in line with the overall model. Cohort differences are not significant regarding transitions in PRJ-SE, which I expected, because the different cohorts only vary by one year. To observe changes of behavior across cohorts a wider range of cohorts has to be observed, which is not possible in the BASiD data. However, I find differences in cohorts regarding transitions in PRJ-DE. It could be that extending employment biographies by changing employment types proceeds much faster in society than extending employment biographies through working longer on the same job. Maybe younger cohorts are more flexible and thus transition in PRJ-DE is significantly different across cohorts. The age of the retirees is included in the model, which means that the observed significance is not due to an actual age effect. If age is not included in the regression all cohort dummies are significant. By including the entry year to retirement I also control for policy changes which can affect different cohorts differently.

**Table 7.4:** Exponentiated coefficients (failure: PRJ-SE; competing risk: PRJ-DE, change in employer or occupation, job search)

| | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| *BEN* $\leq$ 399 | 0.832* | 0.781 | 0.792 | 0.904 |
| | *0.081* | *0.118* | *0.122* | *0.149* |
| *BEN* 400–699 | 1.061 | 1.094 | 1.098 | 0.908 |
| | *0.075* | *0.128* | *0.136* | *0.106* |
| *BEN* 1000–1299 | 1.026 | 1.046 | 0.913 | 1.173 |
| | *0.079* | *0.146* | *0.118* | *0.134* |
| *BEN* $\geq$ 1300 | 0.983 | 0.909 | 0.927 | 0.947 |
| | *0.088* | *0.145* | *0.137* | *0.148* |
| $\log w^{CJ}$ | 0.949** | 0.937 | 0.967 | 0.918** |
| | *0.025* | *0.038* | *0.043* | *0.035* |
| *LLFS* part-time | 1.675*** | 1.645*** | 1.702*** | 1.614*** |
| | *0.099* | *0.160* | *0.180* | *0.140* |
| *LLFS* partial retirement | 1.088 | 0.788 | 1.559 | 1.062 |
| | *0.325* | *0.412* | *0.750* | *0.598* |
| *LLFS* disability retirement | 0.521* | 0.250** | 1.439 | 0.449 |
| | *0.184* | *0.166* | *0.542* | *0.306* |
| *LLFS* unemployed | 0.205*** | 0.116*** | 0.180*** | 0.355*** |
| | *0.039* | *0.035* | *0.065* | *0.111* |
| *LLFS* training | 0.960 | 1.561 | 1.295 | 0.406 |
| | *0.240* | *0.520* | *0.529* | *0.225* |
| *gap* in days | 0.998*** | 0.999*** | 0.998*** | 0.998*** |
| | *0.000* | *0.000* | *0.000* | *0.000* |
| *shui* | 2.592 | 3.884 | 2.138 | 5.054** |
| | *-1.528* | *-3.956* | *-2.210* | *-4.132* |
| *shsi* | 23.38** | 60.84 | 13.30 | 17.98 |
| | *-36.56* | *-166.7* | *-38.86* | *-46.22* |
| *PSZE* 10 – 49 | 1.114* | 1.287** | 1.086 | 0.972 |
| | *0.072* | *0.155* | *0.111* | *0.091* |
| *PSZE* 50 – 249 | 0.917 | 0.888 | 0.958 | 0.903 |
| | *0.069* | *0.118* | *0.123* | *0.100* |
| *PSZE* $\geq$ 250 | 0.728*** | 0.803 | 0.696** | 0.609*** |
| | *0.066* | *0.113* | *0.112* | *0.088* |
| *PSZE* unknown | 0.381*** | 1.065 | 0.039*** | 0.322** |
| | *0.142* | *0.634* | *0.044* | *0.153* |
| *shw*50 | 1.012 | 1.140 | 0.932 | 1.061 |
| | *0.122* | *0.235* | *0.188* | *0.192* |
| female | 1.079 | 1.119 | 0.969 | 1.047 |
| | *0.074* | *0.140* | *0.112* | *0.111* |
| cohort 1941 | 0.997 | | | |
| | *0.056* | | | |
| cohort 1942 | 1.050 | | | |
| | *0.060* | | | |
| # of observations | 12,011 | 4,731 | 3,957 | 3,323 |
| # of events | 2,041 | 703 | 665 | 673 |
| # of competing risks | 2,169 | 743 | 747 | 679 |
| AIC | 28637,2 | 8124,7 | 8344,5 | 8373,4 |
| BIC | 29147,4 | 8557,7 | 8759,2 | 8770,5 |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10 percent level. All models include age dummies, potential experience, actual length of employment career and no. of jobs and unemployment episodes, ethnic background dummies, three dummies indicating the education level, an east/west dummy and the unemployment rate. Further career job controls are twelve occupation dummies and tenure; employer controls are calculated for the last job prior to retirement and additionally include 10 industry dummies, a dummy indicating closure, as well as the share of female, part-time and high-skilled workers.

**Table 7.5:** Exponentiated coefficients (failure: PRJ-DE; competing risk: PRJ-SE, change in employer or occupation, job search)

| | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| *BEN* $\leq$ 399 | 0.489*** | 0.442** | 0.336*** | 0.728 |
| | *0.099* | *0.150* | *0.116* | *0.282* |
| *BEN* 400–699 | 0.719** | 0.701 | 0.590** | 0.911 |
| | *0.105* | *0.162* | *0.156* | *0.269* |
| *BEN* 1000–1299 | 0.988 | 0.835 | 1.168 | 1.013 |
| | *0.137* | *0.207* | *0.296* | *0.244* |
| *BEN* $\geq$ 1300 | 0.646*** | 0.589* | 0.924 | 0.400*** |
| | *0.106* | *0.164* | *0.269* | *0.137* |
| $\log w^{CJ}$ | 1.298*** | 1.289*** | 1.637*** | 1.189 |
| | *0.077* | *0.111* | *0.218* | *0.137* |
| *LLFS* part-time | 0.248*** | 0.278*** | 0.188*** | 0.209*** |
| | *0.050* | *0.096* | *0.068* | *0.074* |
| *LLFS* partial retirement | 2.595*** | 5.390*** | 1.494 | 2.542*** |
| | *0.501* | *-1.724* | *0.573* | *0.777* |
| *LLFS* disability retirement | 2.561*** | 3.154*** | 1.171 | 2.191* |
| | *0.542* | *-1.054* | *0.510* | *-1.001* |
| *LLFS* unemployed | 2.260*** | 2.539*** | 1.410 | 2.612*** |
| | *0.316* | *0.608* | *0.338* | *0.721* |
| *LLFS* training | 1.509 | 0.818 | 1.687 | 1.569 |
| | *0.413* | *0.454* | *0.598* | *0.814* |
| *gap* in days | 1.000 | 1.000 | 1.000* | 1.000 |
| | *0.000* | *0.000* | *0.000* | *0.000* |
| *shui* | 0.033*** | 0.378 | 0.085 | 0.000*** |
| | *0.030* | *0.594* | *0.129* | *0.001* |
| *shsi* | 30.90 | 0.006 | 0.989 | 1.001*** |
| | *-93.73* | *0.032* | *-5.869* | *-4.476* |
| *PSZE* 10 – 49 | 0.944 | 0.782 | 1.073 | 0.793 |
| | *0.136* | *0.182* | *0.288* | *0.242* |
| *PSZE* 50 – 249 | 1.191 | 1.029 | 1.348 | 0.975 |
| | *0.173* | *0.252* | *0.348* | *0.285* |
| *PSZE* $\geq$ 250 | 1.550*** | 1.610* | 1.373 | 1.609 |
| | *0.249* | *0.416* | *0.390* | *0.485* |
| *PSZE* unknown | 1.273 | 0.635 | 0.875 | 2.015 |
| | *0.612* | *0.462* | *0.865* | *-1.711* |
| *shw*50 | 0.952 | 1.301 | 0.365* | 0.858 |
| | *0.252* | *0.552* | *0.193* | *0.417* |
| female | 1.327* | 1.326 | 2.292*** | 1.021 |
| | *0.193* | *0.313* | *0.573* | *0.245* |
| cohort 1941 | 0.815** | | | |
| | *0.084* | | | |
| cohort 1942 | 0.603*** | | | |
| | *0.076* | | | |
| # of observations | 12,011 | 4,731 | 3,957 | 3,323 |
| # of events | 832 | 319 | 266 | 247 |
| # of competing risks | 3378 | 1,127 | 1,146 | 1,105 |
| AIC | 13210.1 | 4434.1 | 3574.8 | 3315.8 |
| BIC | 13720.3 | 4867.1 | 3989.5 | 3712.9 |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10 percent level. All models include age dummies, potential experience, actual length of employment career and no. of jobs and unemployment episodes, ethnic background dummies, three dummies indicating the education level, an east/west dummy and the unemployment rate. Further career job controls are twelve occupation dummies and tenure; employer controls are calculated for the last job prior to retirement and additionally include 10 industry dummies, a dummy indicating closure, as well as the share of female, part-time and high-skilled workers.

## 7.4 Summary

The results complement previous findings on influencing factors of bridge employment and expectations on working longer, discussed in Chapter 2. The determinants influencing withdrawal from the labor market also play a role when returning to the labor market after being retired. Entering the same working environment can be regarded as extending employment careers according to Wang and Shultz (2010) or von Bonsdorff, Shultz, Leskinen, and Tansky (2009), whereas a change in employment tends to resemble unretirement according to Maestas (2007).

Summing up, the findings on push-and pull factors influencing the transition into different PRJ suggest that retirees in Germany transition much faster when working in the same environment. Transition probabilities into a different work environment differ significantly by cohort and gender. The cumulative incidence of entering the same work environment decreases with increasing wages in the career job. Retirees with lower labor market attachment show a higher cumulative incidence of transitioning in different work environments. In addition, I confirm the influence of firm characteristics on entering different job trajectories beyond retirement. Characteristics of macroconditions within regional labor markets also have an impact on transition times into PRJ. The higher the unemployment rate, the less likely retirees transition into PRJ. About 20 percent of the retirees in the analysis sample transitioned into job search three years after being retired and never found a job within the observation period. These people have to be activated by public policy (see Lessenich, 2012b,a)

The results fit into the theoretical micro-macro model according to Coleman (1986) well. They complement the objectives observed for the first stage of the individual decision making on the micro-level. The results are in line with the assumed preferences of individuals to engage in post-retirement employment discussed in Chapter 6. Combining the results of the two stages on the micro-level indicates that individuals following economic preferences can be divided further into a group of people who really need the financial income and individuals who only want to catch up on some income losses. The first ones do this by staying in the same work environment, whereas the second group switches fields. Concerning psycho-social preferences the results suggest that individuals transition faster, when they stay in the same work environment, which matches the results of Chapter 6, that the search of continuity according life course theory exists (see Elder, 1995).

Pull-factors to transition in a certain PRJ, which individuals cannot manipulate such as health are included in the first and second stage estimation on the micro level. In both analyses I cannot find significant evidence that health constraints impact the engagement in PRJ. This is not in line with previous studies (e.g, Beehr, 1986; Davis, 2003; Dorbritz and Micheel, 2010; Feldman, 1994; Taylor, 2010; Wang, Zhan, Liu, and Shultz, 2008). However, the results of both of my empirical chapters are consistent. Consindering that in my sample I do only have the healthier retirees, because only these older people are on the labor market (e.g, Cahill, Giandrea, and Quinn, 2006; Crawford and Tetlow, 2010; Komp, van Tilburg, and van Groenou, 2010), I do not wonder about the results I get. However, the second stage analyses showed that transition in PRJ varies by the occupation people work in before retiring. This can be seen as a proxy for employability of older workers (Micheel, Roloff, and Wickenheiser, 2011). Some people might have to change fields because

they cannot meet the demands of their trained occupation anymore, or due to occupational change cannot find an equivalent job (see Breen, 1997; Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009). This might also explain the longer times of job search for PRJ-DE. The role occupations and employability play in pulling individuals from the labor market has to be studied in more detail in future projects. Another pull-factor is the influence establishments have on individual outputs, acting as an additional agent on the micro-level. Chapter 6 showed that establishments do not have an impact on the decision to engage in post-retirement employment. However, the role of establishments is visible in the second stage. Certain establishment characteristics, such as the firm size are promoting the transition in specific PRJ. This is in line with previous research (see Dorbritz and Micheel, 2010; Micheel, Roloff, and Wickenheiser, 2010; Smeaton and McKay, 2003).

The macro-conditions included in the second stage on the individual-level refer to regional labor market indicators and the individual conditions on the labor market prior to retirement which influence individuals outcomes. The study in this chapter can be considered a dynamic approach, because not only the structures on the a reference day are analyzed. Thus, to control for institutional settings a dummy for every retirement cohort and age is included. Identical to the first empirical part these attributes reflect bridge assumptions in the micro-macro model of post-retirement employment (see Lindenberg, 1990). Macro-conditions on regional labor market influence individual outcomes. The higher the unemployment rate in the district, the less likely retirees end up in PRJ-DE and PRJ-SE. Labor market attachment prior to retirement is not only influencing the first stage on the micro-level but also the second stage. Individuals with weaker labor market attachment are more likely to switch working environments and thus also show longer

times of job search. This is one important setting where I see need of action for politics. By improving macro-condition for individuals with weaker labor market attachment public policy might help to reduce times for job-search (see Adams and Rau, 2004), for instance by improving further adult education.

In addition, the assumption of different outcomes for demographic groups is addressed in the second stage. The CIFs are computed by gender and ethnicity. The computed CIFs support the results of Chapter 6. Male retirees end up to a higher extent in PRJ-DE and PRJ-SE than women in general. Regarding transition times I can find no evidence that women are affected differently by macro-condition than men. The distributions proceed the same way, except on a different level. Overall, there are no important gender differences. However, the results of the second micro-level stage complement the results of the first stage. Macro-conditions affect people with different ethnicity differently. Regarding the transition in different PRJ Ethnic Germans and Germans differ. Ethnic Germans are more likely to change work environments, whereas transitioning into PRJ-SE is more common for Germans.

The transfer to the macro level is done by interpreting the distributions of the sub-hazards. In comparison to the first stage, which outcomes for society concentrated on motivations for post-retirement employment, the second stage provides better evidence for socialization of retirement and the development of PRJ within dissolving life course patterns and emerging patchwork biographies. The CIFs for entering PRJ-DE is significantly different for all observed birth cohorts. Younger cohort show a lower probability to be engaged in PRJ-DE but a higher one for being engaged in PRJ-SE. For older cohorts, this is exactly the opposite way. This means that over time people the shares of PRJ-DE and PRJ-SE in society changes. As PRJ-SE is

the preferred trajectory for younger cohorts and is also connected to shorter transition times, I interpret this as evidence for a socialization of retirement (Kohli, 2000). Younger cohort stay in their fields compared to older cohorts who tend to switch work environment, for which a direct transition is less likely. An explanation for this would be that individuals perceive retirement as leisure and work (see Amrhein, 2004; Micheel, Roloff, and Wickenheiser, 2011; Nowossadeck and Vogel, 2013; Reynolds, Ridley, and Horn, 2005; Scherger, Nazroo, and Higgs, 2011; van Dyk, Lessenich, Denninger, and Richter, 2013). Because of this the younger generation stays with their jobs. At the time the older generation retired, retirement was seen as leisure time only. The withdraw from the labor market first and go back later on to correspond to the socialization of retirement.

Implications for public policy address the push-and-pull factors influencing transition times into different PRJ. By knowing these public policy can develop target-oriented reforms of institutional settings and manipulate pull-factors to support the extension of working lives (see Blank and Buschoff, 2013; Buss and Kuhlmann, 2013; Naegele, 2013). In what ways public policy can manipulate the processes within the micro-macro model of post-retirement employment is discussed in the following Chapter 8.

# Chapter 8

# Discussion of Results and Implications for Public Policy

## 8.1 Conclusion and Outcomes for Society

In my dissertation I study the phenomenon of post-retirement employment in Germany and how it can be explained. Whereas the empirical analyses concentrate on explaining individual behavior on the micro-level, the implemented theoretical micro-macro model according to Coleman (1986) shows that relationships on the micro-level describe post retirement employment as an outcome within the German society.

I study two main research questions addressing post-retirement employment on the individual level in two different stages to explain outcomes for society. First, the probability to engage in post-retirement employment, and then the likelihood of working in different types of post-retirement jobs. In this way, I address the motives behind post-retirement employment, as well as push-and-pull factors driving employment in retirement and how they influence transitions into specific post-retirement job trajectories. My research contributes new insights to the relationship of individuals' and firms' attributes and post-retirement employment, which is important for public policy to be efficient in designing policy reforms. By explaining individual behavior regarding post-retirement employment, I identify attributes which can be used by public policy to support changes within the society.

Detailed knowledge of the labor market situation of the older workforce results in more efficient public policy reforms supporting work beyond retirement (Burkert and Sproß, 2007). Therefore public policy first of all needs to know if post-retirement employment has to be taken seriously when discussing the extension of employment careers of older workers. Statistics show that employment rates of retirees increased in the past years (see Panova, 2013).

The results of this doctoral thesis are in line with the mentioned argument. 20 percent of the observed retirees in my analysis sample are employed beyond retirement. This shows that post-retirement employment is a topic which has to be addressed in public policy, in particular, because studies show that post-retirement employment will increase further in the future (Brussig, 2009).

Currently, the political, academic, and public discourse focuses on the reasons why retired people stay in the labor market. The question which is addressed is if post-retirement employment is forced due to old-age poverty (see Bäcker, 2011; Bönke, Schröder, and Schulte, 2010; Börsch-Supan, Gasche, and Lamla, 2013; Bundestag, 2010; Kumpmann, Gühne, and Buscher, 2010), or if retirees go back in the labor market voluntarily because they want to stay active (see Grabka, 2013; Graefe and Lessenich, 2012; Nowossadeck and Vogel, 2013; Scherger, Nazroo, and Higgs, 2011). The public discussion about the motives of employment beyond retirement is highly emotional. Figure 8.1 combines some headlines of leading newspapers in Europe to provide an impression about the contents of the debate.

My research addresses this controversial discussion by searching for individual preferences to engage in post-retirement employment. In society post-retirement employment is either connected to old-age poverty, which is suggested by the financial necessity argument, or it is connected to the active aging argument, which is the second opinion within the discourse (see Section 3.1.3 for a detailed discussion of individual preferences). I suggest that the political debate on post-retirement employment has to go back to an objective neutral discussion on the motives for post-retirement employment. The debate has to shift from discussing the reasons for post-retirement employment, towards a debate about the heterogeneity of the workforce beyond

**Figure 8.1:** Public policy discussion


*Source: own illustration*

retirement and ways of how to support individuals according their specific needs (see Eichhorst and Sproß, 2005; Leiber, 2009; McNair, 2006). The main result of my dissertation is that preferences for post-retirement employment are not considered as mutually exclusive. My research shows evidence for both arguments: People who have to work beyond retirement and people who want to work engage in post-retirement employment.

On the macro level extending employment careers and labor force participation of older people is one way to deal with the impacts of population aging (Bäcker, Naegele, Bispinck, Hofemann, and Neubauer, 2008; Blank and Buschoff, 2013; Börsch-Supan, 2003). Employment is the best instrument to improve the financial situation of the social security system and individuals' savings (Börsch-Supan, Gasche, and Lamla, 2013). The empirical analyses in my dissertation show that a considerable amount of retirees are engaged in post-retirement employment, but I also assume that these flexible patchwork

biographies cannot be considered as generally accepted in society to date. Therefore, the aggregation of the results of the studies on the micro-level might provide limited inference if patchwork biographies, in particular, post-retirement employment can be considered a macro-phenomenon in society only partly.

Another important macro-condition for the development of post-retirement employment in society refers to the institutionalization of life course trajectories, or to be more precise in the dissolving three part life course model (see Amrhein, 2004; Guillemard, 1991; Kohli, 1985, 1989). These changing macro conditions in society enable the development of patchwork biographies and flexible ways for individual life courses. This leads to the perception of retirement as leisure and working time. Comparing different cohorts my results show that younger cohorts tend to switch working environments in retirement, what I interpret as higher flexibility in the decision making on the type of PRJ. In addition, I can show that macro-conditions affect various demographic groups differently regarding their post-retirement outcome.

Changes on the labor market also influence macro-conditions for individuals on the micro-level (see Lindenberg, 1977; Opp, 2009; Schelling, 1978). Employment histories are becoming more insecure and unstable (see Giesecke and Heisig, 2010; Simonson, Gordo, and Kelle, 2011; Steiner and Geyer, 2010; Struck, 2006; Struck, Grotheer, Schröder, and Kohler, 2007). Especially women and immigrants show interrupted working careers (see Kalter, 2005; Simonson, Gordo, and Titova, 2011). Occupations change, which makes it more difficult for older workers to maintain their jobs (see Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Rinklake and Buchhholz, 2011).

Globalization is increasing inequality in older age in general (see Blossfeld, Buchholz, and Hofäcker, 2006; Mills, 2009). Macro-conditions are important for the analyses on the micro level because they shape individuals preferences and beliefs (see Frings, 2007; Raub, Buskens, and van Assen, 2011). Thus, I included indicators to measure or control for differences in individual macro-conditions in the individual rational choice model on the micro-level. Individual pick the type of post-retirement job with the highest utility (see Blossfeld, Buchholz, and Hofäcker, 2006). The rational choice model I implemented on the micro-level includes also the possibility if firms as additional agent influencing individual outcomes.

In particular, I find evidence for both, economic (see Burtless and Moffitt, 1985; Gruber and Wise, 2004) and psycho-social preferences (see Atchley, 1989, 1992). My research shows that the probability of holding a post-retirement job is linked to economic preferences. It is declining with increasing pension incomes. But the likelihood is also higher for retirees who directly continue their pre-retirement job and show higher labor market attachments. Conditional on being in the labor force, retirees with higher labor market attachment show the highest probabilities of staying in their work environment after retirement. In contrast, retirees who are exposed to old age poverty are more likely to switch their working environments in retirement.

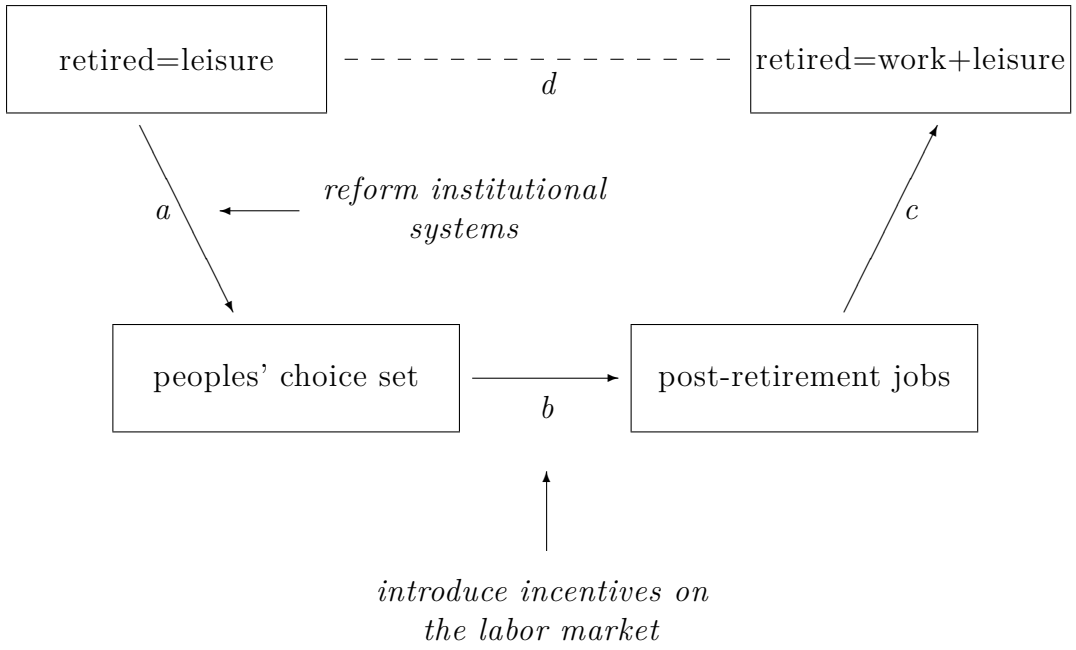
The public and political discussion as well as research on this topic provides evidence that post-retirement employment observed on the micro-level soon will find its way to be described as macro-phenomenon (see Bundestag, 2010). Then, I would consider the aggregation from micro to macro outcomes more reliable. The relationship will be stronger in the future as I would describe it right now. To date, conclusions can be drawn on how public policy can

intervene to support the changes from standardized employment biographies towards patchwork biographies within societies. The analyses on the micro level generate evidence public policy can use to set incentives and change regulations that post-retirement employment is soon to become a general accepted type of employment in society. This will prevent old-age poverty in society, and support the older society to being active.

Public policy can use the results of my study to manipulate the micro-macro relationship by appearing as additional actor in the micro-macro framework. In particular, the heterogeneity of people should be incorporated in policy interventions. A support through a public policy mix of supporting post-retirement employment of individuals at the risk of old age poverty, as well as the support of post-retirement employment in reference to “active aging" of individuals is necessary. Therefore, public policy can intervene at two points in the model, which is illustrated in Figure 8.2.

First of all public policy can change institutional settings. An example would be the execution of pension reforms such as the introduction of the “Riester Reform". Currently, public policy is debating about introducing the “Kombi-Rente". This is considered a pension reform which provides more flexibility in retirement transitions. Changes in pension policy can be considered as curative measures (Börsch-Supan, Gasche, and Lamla, 2013; Naegele, 2013). Curative measures do not prevent an outcome on the macro-level from happening, but support individuals who are exposed to it. In reference to old-age poverty, the additional payment of benefits due to low pension benefit receipt would be considered as curative measure. The “Kombi-Rente" can be seen as curative measure to support people’s psycho-social preference aligned within an actively aging workforce.

**Figure 8.2:** Public policy interventions to support post-retirement employment




*Source: own illustration following Coleman (1986)*

Another possibility for instance, would be to change the education system and make sure that individuals receive the best possible education (see Allmendinger, 1989; Schneider, 2000; Stenberg, de Luna, and Westerlund, 2012). This is considered a preventive measure because it prevents certain outcomes on the macro-level, for instance old-age poverty, from happening. Changes of institutional settings will change bridge assumptions and therefore the conditions on which individuals have to decide, as well as their values and norms (see Raub, Buskens, and van Assen, 2011).

The second position in the model where public policy can influence individuals' outcomes is in arrow *b*. Individual decision making is influenced by push-and-pull factors (Shultz, Morton, and Weckerle, 1998), which have been analyzed in the empirical part in Chapter 6 and Chapter 7. By regulating the labor market and activating individuals public policy can introduce or repeal factors which influence individuals' outcomes (see Buss and Kuhlmann, 2013; Kerschbaumer, 2013; Lessenich, 2012a). For instance, public policy can pay incentives for firms to employ more older workers, or introduce a minimum quota of older people employed in an establishment, or support aged-based workplaces. Public Policy can also provide training and support life long learning to make sure that people meet the requirements of the labor market (see Bellmann and Stegmaier, 2007). All these will influence individuals' outcomes towards post-retirement employment, because restraints are removed.

In principle, the point at which to apply policy interventions should be within the education system, economic policies, integration policies, and labor market policies (Börsch-Supan, Gasche, and Lamla, 2013). The next section outlines alternatives by which public policy can improve labor market participation in retirement, and therefore prevent old-age poverty an support the active aging of society. The outlined alternatives will be discussed in reference to the empirical results of my thesis.

## 8.2 Implications for Public Policy

The most important result of my thesis for public policy is that there is no “one size fits all" approach. My research shows that post retirement employment can be explained by a function of endogenous preferences whose persecution is then constraint by endogenous or exogenous push-and-pull

factors, such as institutional settings (see Blossfeld, Buchholz, and Hofäcker, 2006; Mayer, 2004; Rinklake and Buchhholz, 2011) in society and individual working histories (see Amrhein, 2004; Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Kohli, 2000; Steiner and Geyer, 2010). This means that public policy has to develop target-oriented support through a public policy mix of different measures to account for heterogeneity in society (see Eichhorst and Sproß, 2005; Kerschbaumer, 2013). For instance, the support of post-retirement employment of individuals at the risk of old age poverty, as well as the support of post-retirement employment in reference to "active aging" (Nowossadeck and Vogel, 2013) of individuals is necessary. Both types of individuals are more likely to engage in post-retirement, however, the measure to help them participate in the labor market may not be the same (see Dorbritz and Micheel, 2010). Public policy has to be aligned to the different demographic-groups in the labor market. My thesis shows that there is a demand for an activating target-oriented support of working longer in society.

### 8.2.1 Support Economic Preferences

My results show that a motive to engage in post-retirement employment are economic preferences (see Section 3.1.3 for a detailed discussion). Because of this, public policy needs to offer more job opportunities for individuals who want or need to improve their income in retirement. Public policy needs to activate (see Lessenich, 2012a) low income workers to stay on the labor market as long as possible. I find evidence that the probability of being employed beyond retirement is lower for retirees with higher pension incomes. This is in line with a study by Brussig (2009), who suggests that post-retirement employment is a result of decreasing pension incomes and the necessity of additional earnings. This can be caused by the exposure to old-age poverty.

Post-retirement to gain additional income will be even more important in the future. More and more people will be exposed to old-age poverty, because it is difficult to experience a uninterrupted working career, due to structural changes in the labor market (see, Goebel and Grabka, 2011; Meinhardt, 2011). In particular women or immigrants experience interruptions in their working histories (see Kalter, 2005; Simonson, Gordo, and Titova, 2011), which result in lower incomes in retirement (see Frommert, Heien, and Loose, 2013; Mika and Tucci, 2006). My results suggest that conditional on the financial income in retirement employment beyond retirement is more likely for retirees who experienced little employment interruptions or longer unemployment within ten years prior to retirement. I think of this as an evidence for a “catch-up" effect. Independent of the respective financial situation in retirement, interruptions of the employment career result in lower pension benefits. Post-retirement may therefore be seen not only as motivation to gain additional income because of the exposure to old-age poverty, but also to make up for entitlement losses throughout the career, for instance due to unstable working lives (see Giesecke and Heisig, 2010; Struck, Grotheer, Schröder, and Kohler, 2007) for retirees on a middle income level.

If the government aims at reducing old-age poverty, the best instrument is employment. People are more likely to be employed the higher they are educated, the more employment-friendly the labor market is, and the better the economy is. A possibility to increase income is to increase the volume of labor (see Börsch-Supan, Gasche, and Lamla, 2013). Employed people contribute to social security. Continuous employment leads to higher old-age saving in the pension system, or to higher private savings. This will help to finance the pension system and improve private savings. Private savings are especially important since the introduction of the “Riester-Rente", because

future private savings have been added as third pillar to the pension system (Börsch-Supan and Wilke, 2006). People are less likely to save when they experience unemployment a lot (Börsch-Supan, Gasche, and Lamla, 2013). In particular, individuals who experience long periods of unemployment are affected most with a loss in pension income (see Steiner and Geyer, 2010; Trischler, 2012; Uhlendorff and Zimmermann, 2006). Hence, any policy with the goal to improve labor market participation rates is as well good to avoid old-age poverty (Lain, 2011).

In today's public policy discussions regarding old-age poverty preventive measures are not really discussed. Instead of focusing on not letting old-age poverty arise, public policy focuses on ways of how to deal with old-age poverty. The measures are comprised in a pension package of the federal ministry of labor and social affairs. The single plans within the package are either designed to work within the pension system or outside of it. They either are concentrated on all insured persons or on specific subgroups.

Most of the discussed propositions aim at improving pension benefits. For instance the "Zuschussrente" is planned to pay additional benefits to people who receive low pension benefits. The underlying idea is that people who are continuously employed but in low qualified jobs or low income jobs will receive a really low pension. They are likely to receive the same amount as people who never worked at all. To support these people the government wants to augment their pensions. In the cause of justice under certain conditions (a minimum years of contributions and private savings) affected people will receive a pension which is higher compared to individuals who did not work at all. The only problem here is that low income people are also less likely to have private savings, so it is not clear who will benefit from the "Zuschussrente"

(see Börsch-Supan, Gasche, and Lamla, 2013).

An augmentation of pensions enables the principle of equivalence, which is the typical design of the German pension system. Usually there is a relationship between contribution periods and amount of benefits received. According to the plan of the “Zuschussrente" it is possible that a person, who is employed full-time in a low income job receives the same amount of benefits as a person who did the exact same job, but part-time. However, the first person would have contributed twice as much as person 2. This is not in line with certain beliefs of fairness. This has been one argument why the “Zuschussrente" has not been implemented in this form so far. Policies to augment low pension benefits are critically discussed. For instance they might set the wrong incentives. Person 2 doesn’t have any incentive to work more during his career, and person 1 might reduce working hours, because they will receive the same amount of benefits. Policies outside of the pension system start at the “Grundsicherung". The main goal is to make income allowances more easy, for instance through the introduction of tax exempt amounts. In this way, low income households would also profit from “Riester" savings (Börsch-Supan, Gasche, and Lamla, 2013).

There are plenty of suggestions of how to deal with old-age poverty, for instance changes in institutional settings. To date, prevention is not the main focus of public policy. Curative propositions all have to goal to improve the amounts of benefits. This is costly and leads to problems in other places. It would be better if policy tries to solve the causes instead of dealing with the symptoms. For instance public policy can change institutions in a way that they can filter inequalities in society better (see Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009), as discussed in Chapter 3.

The government should start with improving the conditions in the education system and the labor market (see Allmendinger, 1989; Leiber, 2009; Meinhardt, 2011; Naegele, 2013). This would help to reduce inequalities in later life. In particular people whose economic preferences to engage in post-retirement employment are because they want to make up for income losses due to interruptions in their employment careers. Improving the sector of adult education an training might help to reduce gaps in individuals life courses, which then results automatically in a better financial situation in old-age.

### 8.2.2 Support Psycho-Social Preferences

Another preference my study suggests for taking up post-retirement jobs are psycho social preferences (see Section 3.1.3 for a detailed discussion). Individuals want to stay active in retirement to maintain daily structures and social contacts (see Atchley, 1989, 1992). Retirees with psycho-social preferences are on their search for continuity Elder (1995). This is why public policy does not only have to improve job opportunities for older workers, but also has to support older people to extend their working life.

Expanding working lives can be done at the margins of the employment life. Public policy can shorten times in the education system and extent older workers' employment lives. Also this goes back to education policies and improving institutional settings to filter inequality in society better. The government has to optimize schooling and higher education and generate incentives for training of older people. Longer contribution times through longer working lives do not only benefit individuals searching for continuity but also result in higher benefits and savings for individuals.

In addition, individuals with higher labor market attachment directly

before the transition into retirement show higher probabilities of being employed afterwards. They are more likely to stay on a PRJ-SE, continuing directly after entry into retirement. These retirees show higher wages in their career jobs and are highly skilled. This is evidence for another group of post-retirement workers I consider following psycho-social motives. Retirees who want to continue their careers, and who are pulled into the labor market because of their higher attachment. However, depending on their retirement age, not all of them might be able to find continuity.

Currently early retirees are restricted by pension law on an upper amount of earnings in retirement. Retirees who are claiming pension benefits before the normal retirement age, can earn up to 450€. If they earn more their pension gets deducted. As normal retirement age rises step-wise to the age of 67, future retirees have to stick to these limits until they are 67. This fact most likely does not support the "active aging" policy (see Grabka, 2013; Nowossadeck and Vogel, 2013; Scherger, Nazroo, and Higgs, 2011) and the development of patchwork biographies. In particular retirees working in high qualified jobs are likely to earn more than the additional earnings limit, even if they reduce working hours. Thus, continuing working for them means to receive less pension. The other alternatives would be to stop working at all, to delay retirement, or to start working again when reaching the normal retirement age. However, my study shows that the longer the gap between retirement and start of post-retirement job the less likely people are to engage in post-retirement employment. Thus, this would work counterproductive regarding the aim of improving labor market participation of older people. The flexible way of combining leisure and work might be more attractive for people who want to engage in post-retirement employment because of psycho-social preferences.

The “Kombirente" which should have been introduced recently, would help retirees who want to stay in the labor market to get more flexibility. I observe a higher share of working retirees at younger ages. So far some of these may had to switch work environments, because of the additional earnings limit. With the “Kombirente" retirees are gaining more flexibility in continuing their working life. Thus, I consider the “Kombi-Rente" a successful policy approach, which picks up the arguments of life course theory addressing individualization and flexible life course patterns (see Guillemard, 1991; Kohli, 1985, 1989). By allowing more opportunities to form life course patterns in retirement, public policy supports flexibility in older ages and the socialization of retirement on the macro-level (see Denhart and Jeffress, 1971).

### 8.2.3 Support Activation of Older People

The impact of the “Riester-Reform" will be fully come to extent when the next generations start claiming pension benefits. These retirees are affected by reductions in benefits but cannot compensate this with savings, basically because they haven’t had enough time to save privately (Börsch-Supan, Gasche, and Lamla, 2013). Post-retirement employment will increase even more in the future. Thus, public policy has to support in particular future retirees to extend their employment careers, by developing activation reforms, to make them aware of the situation they have to face when being in retirement.

Elements of a successful governmental activation strategy are not only connected to the restructuring of institutional settings or changing policies. In general, the activation concept suggests that individuals realize that they are responsible for society and therefore have to engage in activities which benefit the society (see Lessenich, 2012b,a). Therefore, making individuals

aware of their position in society is part of the governmental support for individuals to extend their employment biographies. One way of doing this is to improve employability of individuals, defined as safeguarding that every person can make use of her available resources on the labor market. It also comprises demanding the provision of work from people in the society (Lessenich, 2012b). This activation concept can be applied, for instance, to shorten transition times and by strengthening life-long education and training.

The longer transition times into PRJ-DE may be explained by longer searching times for jobs which meet the requirements of the older workforce. The German occupational system is highly certificate related (Englmann and Müller, 2007). Especially older individuals are trained in occupations which are disappearing due to technological change. Thus, if retirees do not have the possibility to stay in their work environment it may be difficult to transition to a PRJ-DE. Individuals who switch work environments have to first find a new job and then adjust to the new workplace. Providing more age-based job opportunities supports continuous and fast inflows to new work environments and thus shortens transition times. This addresses mainly firms as agents influencing post-retirement outcomes. It is important to make firms aware of their social responsibilities. In the long-run firms will benefit from activation policies, because firms will have to deal with a lack of skilled workers in the future. I show that the probability of switching work environments is higher for individuals who are employed in large establishments prior to retirement. Thus, public policy can directly address large firms in providing either benefits for these firms to maintain the older workforce or provide support specific training to employees which are employed in large establishments and help placing them in different work environments. In recent years companies have enhanced their attention to older employees in the course of the upcoming

shortage of skilled labor. However, only a small amount of older employees participate in further education. In addition, some companies are still reluctant in hiring older employees.

The second empirical part of my dissertation examined push-and-pull factors regarding post-retirement outcomes on the micro-level to gain evidence on how public policy can manipulate or deal with these factors to provide the best opportunity for every individual to achieve his preferred outcome. For efficient reforms on the macro model, these push-and-pull factors can be addressed by the government within the activation concept. Thus, the following sections discuss possibilities for public policy to control macro-conditions and influencing factors of post-retirement employment outcomes in society.

### 8.2.4 Control Conditions and Push-and-Pull Factors

Public Policy can direct bridge assumptions and constraints within individual decision making, and thus outcomes on the macro-level. This can be used to encourage retirees to stay in the labor market. The government may control push-and-pull factors and conditions which influence individual behavior in the direction that more people are engaging in post retirement employment. This will result in a decrease in the outcome of old-age poverty and strengthen the concept of “active aging" within the society.

#### Long Term Concepts

Further policy reforms should additionally support strategies and long-term concepts of human capital investment, in particular through changes in the education system (Naegele, 2013). Human capital and a higher education guarantees a better position on the labor market Becker (1993). My results

suggest labor market attachment as a highly reliable predictor of transitioning in different PRJ. The job outcome depends on the degree of labor market attachment. Thus, investments in employability and lifelong learning is the most important instrument of public policy to keep older workers attached to the labor market (see Buchholz, Hofäcker, Mills, Blossfeld, Kurz, and Hofmeister, 2009; Rinklake and Buchhholz, 2011). Although in general older employees in Germany show a lower risk of getting unemployed the probability of finding a job is low once being unemployed (Frosch, 2007). In 2011, unemployment duration of older individuals was on average 17 weeks higher compared to younger ones (Bundesagentur für Arbeit, 2012). To avoid transferring this matter of fact in lower labor market attachments, investments strengthening labor market attachments and employability have to start way in advance before the retirement transition.

Primarily, education is important. People without a educational or vocational degree usually are only employed in marginal low qualified jobs in the outsider market (Breen, 1997). This means they have a higher risk of getting unemployed than well educated people due to their worse standing in the labor market. People who leave the schooling system without degree nowadays are at the risk of living in old-age poverty in the future. The primary instrument to reduce old-age poverty is to support demographic groups in the labor market who show a higher risk top be on low income levels through their employment career, by improving their education, in particular the qualification of children of low income families should be improved (see Börsch-Supan, Gasche, and Lamla, 2013).

Lifelong learning is not only connected to younger ages, it also has a direct link to old-age. If public policy wants to support people working longer, it is

important to develop specific training for older individuals. Older individuals are confronted with the change in technology and the occupational structure in the labor market Blossfeld, Buchholz, and Hofäcker (2006). For instance, there are only few programs which are designed to teach older individuals how to use new technologies. In addition, if older workers have to switch jobs because the job they are trained in has vanished, they need to have skills in job search. Adams and Rau (2004) find that job search of older individuals differs from younger ones. This implies that programs of the Employment Agency to support people in their job search have to be directly suited for the demands of older workers. In an aging society it is important to establish a self-contained old-age education system. This concept is known as educational gerontology. It's aim is to help individuals to manage their aging and to find preventive ways to cope with new risks of aging (Naegele, 2013).

### Employers and Occupations

From a firm's perspective older workers are expensive (Künemund and Kolland, 2007). Studies on employer's practices suggest that firms evaluate the job performance of older employees quite positive. Older workers are for instance appreciated for their expertise, work ethic, or work discipline Bellmann and Stegmaier (2007). However, it seems that the appreciation of older workers only partially finds expression in operational implementations. In firm training for the elderly for example is found only in few firms (Bellmann, Leber, and Stegmaier, 2007). Thus, investing in older people seems still to be perceived as less beneficial for firms. Public policy can change this, for instance by offering incentives to firms to employ older workers and adjust workplaces that they meet the requirements of older people (see Buss and Kuhlmann, 2013; Räder, 2013).

In addition, the task of public policy is to change the image of the “old worker with poor health" towards the “active aging" retiree who is still employable (see Backes and Clemens, 2003; Grabka, 2013; Jansen, 2013). My research shows that health is not a good predictor of post-retirement employment. But this might be induced by selectivity, because in my sample the majority of retirees are of better health. But public policy, for instance can classify weary occupations occupations vs. less weary occupations. My research shows that there are in fact differences in occupations according to their relationship to post-retirement employment. Individuals who worked in the manufacturing sector and in blue collar occupations are less likely to engage in post-retirement employment, as well as individuals working in the public sector. Whereas in the first cast it is likely due to the fact that these kind of occupations are stressful and physically hard to manage, in the second case I assume that lower likelihood of engagement in post-retirement employment is not due the demands of the occupation, but because the public administration still has strict regulations on mandatory retirement. With classified occupations public policy can create incentives for firms with a high share of weary occupations to rearrange workplaces and improve the quality of work by offering flexible employment arrangements.

### 8.2.5 Account for Heterogeneity

The heterogeneity of individuals implies that there are certain sub-groups on the labor market which are more affected by old-age poverty (see Köppe, 2010; Frommert, Heien, and Loose, 2013). To reduce the negative outcome sub-groups have to be treated according to their specific needs. Chapter 4 shows that women and immigrants can be considered a sub-group which differ in their labor market conditions (see Kalter, 2005; Simonson, Gordo, and Titova, 2011). These conditions influence their decision making. Public

policy can change macro-condition for these groups. In consequence, their post-retirement outcomes are not affected differently by macro-conditions, such as institutional settings.

In addition, two other demographic groups could be identified in the empirical analysis. The difference of the East and West German population and low qualified people. My analysis do not focus directly on these groups, but I included controls in the models to account for their differences. The controls introduced in the models are significant, which is why these groups are discussed in this section as well.

**Support Immigrants**

In particular, older immigrants show interrupted employment careers and minor labor market attachment, as shown in this dissertation. My study also shows that this results in different post-retirement employment behavior of immigrants in comparison to natives and differences in preferred PRJ of ethnic Germans compared to Germans. The possibilities public policy has for giving immigrants new career perspectives to improve their situation on the labor market are situated in the education system. The key factors for integration into the German labor market are human capital and the development of professional skills (Seibert and Solga, 2005). With job-search training that targets at immigrants, public policy can support immigrants on the labor market (see Deeke, Cramer, Gilberg, and Hess, 2009). This is not only true for older immigrants. In fact, keeping immigrants in education and training programs should start in younger ages.

A more important part concerning professional skills, is the knowledge of the German language (Dustmann, 1994; Esser, 2006; Kalter, 2005). In

this context it is obvious that the acquisition of the German language should be supported in many ways. On the one hand a better command of the German language increases the probability to get employed (Shields and Price, 2002), and on the other hand it improves income opportunities (Aldashev, Gernandt, and Thomsen, 2009; Dustmann, 1994; Dustmann and Fabbri, 2003). The goal is to reduce the gap in education between people with and without immigration history, to reduce interruptions in employment histories.

### Support Women

Women as more exposed to old age-poverty, because they have to interrupt their employment career for taking care of children, and in consequence suffer from economic losses afterwards (see Aisenbrey, Evertsson, and Grunow, 2009; Beblo, Bender, and Wolf, 2009; Frommert, Heien, and Loose, 2013). The workforce participation of women clearly differs from the workforce participation of men (see Simonson, Gordo, and Titova, 2011). This is not only true in younger age, but continues also in older age, as is descriptively shown in Chapter 5 of my dissertation. The broken nature of womens' work histories influences their total time in the work force (Shacklock, Brunetto, and Nelson, 2009), and thus leads to fewer earning points. But they not only have to accept fewer earning points. Less time in the labor force is equal to less accumulation of human capital and lower experience. In fact older women might be affected by age and sex discrimination.

To resolve this problem one goal of public policy should be to increase the labor market participation of women, in particularly of mothers. Public policy is in favor to introduce a women quota to make sure establishments don't discriminate women.

Another way would be to invest in day care and support women in managing family and job (Börsch-Supan, Gasche, and Lamla, 2013). The German policy is considered as family oriented in the sense of an understanding of the family as supporting women to stay at home and raise a family. One possibility of increasing labor market participation of mothers is too reduce the incentives to follow this traditional family concept. This is currently changing. Most women want to go back to work after the birth of a child. But it is hard to get back to the same job, especially if it is a job which cannot be done part-time. It is important to strengthen the compatibility of working and family life and by this set more incentives to get women back on the labor market. This way the risk of interrupted employment careers of women can be reduced.

**Support Low-Qualified Workers**

The second stage of my study showed that poor education reduces the likelihood to engage in PRJ-SE and PRJ-DE. However, poor qualified people are at a higher risk of old-age poverty, and might need a post-retirement job to gain additional income (Bäcker, 2011; Seils, 2013). Public policy needs to help them to maintain on the labor market. As my results show that they are more likely to switch work environment with higher transition times, specific job search training might help these people to transition faster and increase job finding rates of older low-qualified people. Therefore education of low qualified people is important. Chapter 5 shows that low-qualified people are at higher risk of becoming unemployed. They work to a higher percentage in low-qualified employment. People who graduate from high school without degree are primarily at risk of old-age poverty in later life (Börsch-Supan, Gasche, and Lamla, 2013). Improving their education will help them to not end up in old-age poverty.

This was tried by the German government under the title “Bildungsgutscheine". Families who receive supporting benefits of the state (Hartz 4) are able to receive vouchers which they can use to get additional educational training for their kids. The policy was not really successful. The acceptance of these vouchers is low in society. The percentage of families who applied for the “Bildungsgutscheine" has been low. One reason for this is that the bureaucracy is too high and also the ways these vouchers can be used are not flexible enough. Probably a better solution would be to finance in-school support for children of low income families, for instance support them with guides who help them mastering the regular school every day life. In the long run this will automatically translate into lower poverty rates in old-age, because it helps to get these people in better paid jobs and therefore improves their pension payments.

**Support Regional Equity**

Simulation studies show that there is a high difference in pension benefits received in East and West Germany. Steiner and Geyer (2010) refer to the threat that 32 percent of east German men (cohort 1952–1971) will receive pension benefits which will be below 600€ - thus equals the basic subsistence of elderly today. In the fist stage model of the individual decision I captured this by not including the actual pension income, but earning points, which is considered a relative measure and is not biased due to regional differences. In the second stage I used monetary pension incomes as measure for economic preferences. To account for east west differences, regional unemployment rates are included. The results show that in East Germany where unemployed rates are higher individuals are less likely to work in post-retirement jobs, either in the same environment or in a different one. However, because East Germans pension payments are lower than West Germans pension

payments, they might want to prefer staying on the labor market for economic reasons. As the economy is doing worse and the unemployment rate is high the job search is much more challenging. The government should provide in particular training for older people in East Germany. In the long run the pension payments have to be adjusted on West German height to ensure a better financial security in retirement in the eastern part or Germany.

## 8.3 Outlook

Summing up, one of the most promising options is to raise the limit of additional earnings for early retirees and thus set incentives for older workers to stay in the labor market. As a result, firms will also profit because they are facing the lack of skilled workers. They can fill vacancies with older workers. An improvement of the additional earning limits also leads to more flexibility considering employment trajectories older workers can choose, and regarding the ways people can transition into retirement and then withdraw from the labor market completely in much higher ages. This will also help to finance the social security system. In future, when people have to work until 67 years of age, this will even get more important. The effective retirement age is much lower than the normal retirement age today. If this stays the same retirees are affected by the additional earning limits for a longer period of time. To shorten this time the upper threshold should be not tight to the normal retirement age but instead to a certain amount of years for example.

One problem is the insecurity among early retirees and what they are allowed to earn and what happens if they earn more. The regulations within the German pension system. Thus, may retirees do not work, although they

want to because they are afraid that they have to pay back their benefits received. To actively promote post-retirement employment public policy should spent more time on clarifying the contents of the policies, and make sure that everybody understands it. So they will automatically be much more effective. This will help the individual in her decision-making. It will shed light onto information which is not accessible for individuals, or where the effort is to high to get to this information. It will strengthen individuals consciousness in decision-making. In particular, in case of the concept of patchwork biographies where a person has to decide between differents options of post-retirement employment trajectories she can work in.

## 8.4 Further Research Needs

The first follow-up question to the dissertation results refers to old-age poverty. I find evidence that people who are at the risk of old age poverty or want to catch-up income losses are more likely to increase retirement income. At this stage I cannot draw causal inference, which would be great for public policy to have. To provide more insights to the policy debate this topic has to be examined further, in particular, causal inference has to be provided. For instance, a propensity score matching enables to generate a counterfactual group of individuals who are showing a high risk of old age poverty in various personal and career related attributes but are actually not subject to old age poverty. This group may then be compared to individuals with the same characteristics who are exposed to old-age poverty regarding their employment behavior beyond retirement. In a similar vein, as an alternative to more savings, individuals may work longer in order to fill the pension gap. There is very little evidence in Germany about this trade-off.

Smeaton and McKay (2003) and Kim and Feldmann (2000) recommend for comparative studies that examine how different institutional settings either support or prevent employees from working longer. Age-based workplaces lead to a more productive older workforce. Hence, different organizational and cultural environments have to be studied in more detail. It is important to address differences in work ability in order to identify sub-groups of individuals at-risk for having lower levels of work ability. By identifying individuals at-risk for low levels of work ability, we will know which sub-groups to target for potential interventions to increase work ability and prevent work ability declines. Related to this, an examination of the stability of workability over time is needed.

Technological advances have become integrated into various aspects of daily life and work places. With rapid changes in technology use in the workplace paired with an aging workforce, it is increasingly important that research identify mechanisms that promote technology use to prevent workforce exits by aging workers who are unable to cope with ever-changing technological advances. Technology in the workplace can be, but does not have to be an obstacle for older employees to work longer. Existing and future technologies provide an important avenue by which adults may improve and maintain their personal and work lives as they age. Thus, it is important to examine individual and firm responses to technology use in the workplace and its impact on working longer. An objective may be to study firm responses regarding training of older employees after introducing new technologies in the workplace. These results can be used to provide workplaces for older people which suits their abilities best.

Also employer practices have to be studied to a greater extent. My dis-

sertation provides evidence that the employer influences post-retirement employment, for instance, by following firm specific strategies when hiring or laying off workers. My results suggest that firm characteristics have to be examined in much more detail according to their impact on older workers employment patterns. Firms have the potential to discriminate against older workers or to maintain their productivity. For instance, firm can provide further training. Previous research mainly studies who is receiving employer provided training. If we can understand the mechanisms behind assigning workers and training, public policy might interfere by placing subsidies to support that firms provide training to individuals who really need it.

Another interesting research follow up to my dissertation lies in the theoretical perspective. The applied micro-macro model shows that changes on the macro-level can be explained by studying outcomes on the micro-level. This can be applied not only to post-retirement employment trajectories, but to life course transitions in general. By studying a theoretical model of life course transitions on the micro-level, applying a game theoretical model with multiple actors, the change in life course trajectories in society can be empirically tested. V Life course studies (Kohli, 1989, e.g.,) suggest that individual biographies have changes from a standard three part model to flexible patchwork biographies. Whereas there is lots of either theoretical or empirical explanation, I am not aware of a paper which estimates a developed theoretical model to explain the appearance of patchwork biographies. By analyzing individual employment trajectory sequences, it is possible to identify labor market career pathways for individuals, which then may be clustered to find similarities and differences between cohorts. The Comparison of sequences in life course patterns across cohorts, and the analyses of push-and pull factors which form theses transitions, will show if a development from

standard biographies to patchwork biographies can be explained within a theoretical micro-macro model.

# Appendices

## Full Estimation Results of the Competing Risks Regressions

The tables in this section display the full estimation results for all estimated competing risk models in Chapter 7.

**Table 8.1:** Exponentiated coefficients (failure: PRJ-SE; cr: PRJ-DE, change in employer or occupation, job search), full estimation results

| Dependent variable: PRJ-SE<br>Explanatory variable | Total | Men | Women |
|---|---|---|---|
| Financial Situation | | | |
| *BEN* $\leq$ 399 | 0.832* | 0.827 | 0.838 |
| | *0.081* | *0.100* | *0.139* |
| *BEN* 400–699 | 1.061 | 1.120 | 0.944 |
| | *0.075* | *0.094* | *0.134* |
| *BEN* 1000–1299 | 1.026 | 1.101 | 1.001 |
| | *0.079* | *0.163* | *0.086* |
| *BEN* $\geq$ 1300 | 0.983 | 0.816 | 0.975 |
| | *0.088* | *0.211* | *0.100* |
| $\log w^{CJ}$ | 0.949** | 0.835*** | 1.035 |
| | *0.025* | *0.030* | *0.038* |
| Labor market attachment | | | |
| *LLFS* part-time | 1.675*** | 1.577*** | 1.740*** |
| | *0.099* | *0.133* | *0.138* |
| *LLFS* partial retirement | 1.088 | 0.872 | 1.241 |
| | *0.325* | *0.590* | *0.440* |
| *LLFS* disability retirement | 0.521* | 0.581 | 0.509* |
| | *0.184* | *0.325* | *0.234* |
| *LLFS* unemployed | 0.205*** | 0.190*** | 0.215*** |
| | *0.039* | *0.056* | *0.051* |

Table 8.1 – continues...

Table 8.1 – continued

| Explanatory variable | Total | Men | Women |
|---|---|---|---|
| *LLFS* training | 0.960 | 1.164 | 0.950 |
| | *0.240* | *0.397* | *0.280* |
| *gap* in days | 0.998*** | 0.999*** | 0.998*** |
| | *0.000* | *0.000* | *0.000* |
| *shui* | 2.592 | 5.224** | 1.042 |
| | *-1.528* | *-3.439* | *-1.103* |
| no. of unemployment times | 1.015 | 1.009 | 1.013 |
| | *0.013* | *0.016* | *0.017* |
| no. of jobs | 0.998 | 0.999 | 0.999 |
| | *0.004* | *0.004* | *0.007* |
| duration of employment history | 1.000 | 1.000 | 1.000 |
| | *0.000* | *0.000* | *0.000* |
| potential experience | 0.652 | 0.593 | 0.689 |
| | *0.013* | *0.017* | *0.019* |
| Health | | | |
| *shsi* | 23.38** | 10.56 | 18.36* |
| | *-36.56* | *-29.70* | *-32.03* |
| Establishment characteristics | | | |
| *PSZE* 10 – 49 | 1.114* | 1.094 | 1.189** |
| | *0.072* | *0.103* | *0.099* |
| *PSZE* 50 – 249 | 0.917 | 0.889 | 1.003 |
| | *0.069* | *0.092* | *0.101* |
| *PSZE* $\geq$ 250 | 0.728*** | 0.541*** | 0.939 |
| | *0.066* | *0.075* | *0.107* |
| *PSZE* unknown | 0.381*** | 0.545 | 0.406 |
| | *0.142* | *0.290* | *0.245* |
| *shw*50 | 1.012 | 0.917 | 1.077 |
| | *0.122* | *0.157* | *0.178* |
| share of high skilled | 0.675* | 0.590 | 0.701 |
| | *0.143* | *0.194* | *0.182* |
| share of females | 1.118 | 1.513*** | 0.862 |
| | *0.118* | *0.241* | *0.120* |
| share of part-time | 1.162*** | 1.114 | 1.207*** |
| | *0.058* | *0.077* | *0.080* |
| plant closure | 0.729** | 0.790 | 0.626** |
| | *0.102* | *0.152* | *0.125* |
| mining/manufacturing | 0.800 | 1.415 | 0.652*** |
| | *0.117* | *0.437* | *0.101* |
| energy/water supply | 0.864 | 0.643 | 1.004 |
| | *0.318* | *0.687* | *0.346* |
| construction | 0.903 | 1.054 | 0.878 |
| | *0.147* | *0.388* | *0.146* |
| trade | 0.752** | 0.979 | 0.747* |
| | *0.108* | *0.304* | *0.115* |
| transportation | 0.817 | 1.193 | 0.710** |
| | *0.130* | *0.414* | *0.121* |
| finance | 0.805 | 1.007 | 0.913 |
| | *0.169* | *0.354* | *0.320* |
| economic services | 0.694** | 1.033 | 0.597*** |

Table 8.1 – continues...

Table 8.1 – continued

| Explanatory variable | Total | Men | Women |
|---|---|---|---|
| | *0.103* | *0.329* | *0.093* |
| public administration | 0.614*** | 0.759 | 0.650** |
| | *0.094* | *0.241* | *0.112* |
| administration | 0.666*** | 0.851 | 0.680** |
| | *0.105* | *0.277* | *0.115* |
| Individual characteristics | | | |
| cohort 1941 | 0.997 | 0.971 | 1.005 |
| | *0.056* | *0.078* | *0.075* |
| cohort 1942 | 1.050 | 1.031 | 1.042 |
| | *0.060* | *0.086* | *0.083* |
| female | 1.079 | | |
| | *0.074* | | |
| immigrants | 1.563 | 1.162 | 1.825** |
| | *0.244* | *0.258* | *0.441* |
| germans | 1.437** | 1.217 | 1.640** |
| | *0.211* | *0.245* | *0.379* |
| age = 61 | 1.844*** | 2.139*** | 1.668*** |
| | *0.175* | *0.309* | *0.204* |
| age = 62 | 3.239*** | 5.285*** | 2.146*** |
| | *0.380* | *0.791* | *0.382* |
| age = 63 | 4.110*** | 9.498*** | 2.466*** |
| | *0.480* | *-1.711* | *0.352* |
| age = 64 | 9.228*** | 16.71*** | 5.716*** |
| | *-1.411* | *-4.400* | *-1.075* |
| age = 65 | 10.53*** | 21.30*** | 6.902*** |
| | *-1.364* | *-4.045* | *-1.151* |
| age = 66 | 63.33*** | 132.0*** | 44.32*** |
| | *-11.60* | *-32.24* | *-13.11* |
| age = 67 | 272.3*** | 597.5*** | 271.6*** |
| | *-63.79* | *-178.1* | *-118.1* |
| age = 68 | 880.1*** | 1450.7*** | 1561.6*** |
| | *-224.3* | *-478.40* | *757.3* |
| age = 69 | 6502.5*** | 11335.7*** | 17069.0*** |
| | *-3600* | *-6444* | *-15000* |
| low skilled | 3.365*** | 4.356*** | 3.087*** |
| | *0.283* | *0.495* | *0.411* |
| high skilled | 0.086*** | 0.045*** | 0.119*** |
| | *0.013* | *0.011* | *0.023* |
| unknown skill level | 1.772*** | 2.040*** | 1.350*** |
| | *0.229* | *0.340* | *0.291* |
| Career job characteristics | | | |
| simple manual | 1.533* | 1.194 | 1.581* |
| | *0.336* | *0.355* | *0.436* |
| qualified manual | 1.478* | 1.413 | 1.535 |
| | *0.335* | *0.420* | *0.419* |
| technical | 1.138 | 0.480 | 1.272 |
| | *0.291* | *0.258* | *0.370* |
| engineering | 1.575* | 3.305* | 1.586 |
| | *0.432* | *-2.358* | *0.475* |

Table 8.1 – continues...

Table 8.1 – continued

| Explanatory variable | Total | Men | Women |
|---|---|---|---|
| simple service | 1.433* | 1.371 | 1.359 |
| | *0.310* | *0.389* | *0.371* |
| qualified service | 1.115 | 1.058 | 0.838 |
| | *0.282* | *0.344* | *0.383* |
| semi professional | 0.585* | 0.577 | 0.530 |
| | *0.185* | *0.220* | *0.277* |
| professional | 1.390 | 0.868 | 1.423 |
| | *0.424* | *0.425* | *0.520* |
| simple clerks | 1.435 | 1.203 | 1.369 |
| | *0.327* | *0.361* | *0.448* |
| qualified clerks | 1.276 | 1.162 | 1.266 |
| | *0.285* | *0.348* | *0.358* |
| manager | 0.892 | 0.513 | 1.064 |
| | *0.242* | *0.216* | *0.344* |
| other | 0.718 | 0.341 | 2.939*** |
| | *0.456* | *0.289* | *0.970* |
| unknown | 1.450* | 1.161 | 1.621* |
| | *0.316* | *0.343* | *0.435* |
| tenure | 1.026*** | 1.025** | 1.020* |
| | *0.008* | *0.012* | *0.011* |
| Regional characteristics | | | |
| east | 2.819*** | 7.544*** | 1.467 |
| | *0.802* | *-3.050* | *0.531* |
| unemployment rate | 0.909*** | 0.832*** | 0.967 |
| | *0.025* | *0.032* | *0.035* |
| No. of observations | 12,011 | 7,426 | 4,548 |
| AIC | 28637.2 | 16334.9 | 9662.3 |
| BIC | 29147.4 | 16804.9 | 10099.5 |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10% level. Reference categories for dummy variables are: *BEN* 700–999, *LLFS* full-time, *PSZE* 1 – 9, no plant closure, agriculture, cohort 1940, males, ethnic germans, age = 60, skilled, agricultural, west

**Table 8.2:** Exponentiated coefficients (failure: PRJ-DE; cr: PRJ-SE, change in employer or occupation, job search), full estimation results

| Dependent variable: PRJ-DE<br>Explanatory variable | Total | Men | Women |
|---|---|---|---|
| Financial Situation | | | |
| *BEN* $\leq$ 399 | 0.489*** | 0.692 | 0.174*** |
| | *0.099* | *0.174* | *0.079* |
| *BEN* 400–699 | 0.719** | 0.890 | 0.325*** |
| | *0.105* | *0.156* | *0.108* |
| *BEN* 1000–1299 | 0.988 | 1.049 | 0.923 |
| | *0.137* | *0.256* | *0.162* |
| *BEN* $\geq$ 1300 | 0.646*** | 0.570 | 0.583** |
| | *0.106* | *0.254* | *0.124* |

Table 8.2 – continues...

Table 8.2 – continued

| Explanatory variable | Total | Men | Women |
|---|---|---|---|
| $\log w^{CJ}$ | 1.298*** | 1.365*** | 1.322*** |
| | *0.077* | *0.110* | *0.112* |
| Labor market attachment | | | |
| *LLFS* part-time | 0.248*** | 0.212*** | 0.226*** |
| | *0.050* | *0.053* | *0.090* |
| *LLFS* partial retirement | 2.595*** | 1.026 | 4.663*** |
| | *0.501* | *0.520* | *-1.092* |
| *LLFS* disability retirement | 2.561*** | 0.809 | 5.639*** |
| | *0.542* | *0.271* | *-1.600* |
| *LLFS* unemployed | 2.260*** | 1.520** | 3.492*** |
| | *0.316* | *0.319* | *0.725* |
| *LLFS* training | 1.509 | 0.948 | 2.536*** |
| | *0.413* | *0.375* | *0.859* |
| *gap* in days | 1.000 | 1.000 | 1.000 |
| | *0.000* | *0.000* | *0.000* |
| *shui* | 0.033*** | 0.050** | 0.033*** |
| | *0.030* | *0.076* | *0.042* |
| no. of unemployment times | 0.995 | 1000 | 1009 |
| | *0.026* | *0.024* | *0.039* |
| no. of jobs | 1000 | 1.009*** | 0.991 |
| | *0.006* | *0.002* | *0.007* |
| duration of employment history | 1.001** | 1.001*** | 1001 |
| | *0.000* | *0.001* | *0.000* |
| potential experience | 0.688*** | 0.731*** | 0.601*** |
| | *0.021* | *0.031* | *0.027* |
| Health | | | |
| *shsi* | 30.90 | 1776.9* | 0.171 |
| | *-93.73* | *-7618.8* | *0.715* |
| Establishment characteristics | | | |
| *PSZE* 10 – 49 | 0.944 | 1.298 | 0.807 |
| | *0.136* | *0.297* | *0.159* |
| *PSZE* 50 – 249 | 1.191 | 1.617** | 0.975 |
| | *0.173* | *0.365* | *0.196* |
| *PSZE* $\geq$ 250 | 1.550*** | 1.834** | 1.494* |
| | *0.249* | *0.473* | *0.318* |
| *PSZE* unknown | 1.273 | 1,405 | 1.109 |
| | *0.612* | *-1.098* | *0.658* |
| *shw*50 | 0.952 | 0.915 | 0.977 |
| | *0.252* | *0.356* | *0.396* |
| share of high skilled | 0.621 | 0.68 | 0.331* |
| | *0.262* | *0.447* | *0.207* |
| share of females | 1.745** | 1095 | 3.205*** |
| | *0.414* | *0.358* | *-1.117* |
| share of of part-time | 0.570*** | 0.632** | 0.449*** |
| | *0.084* | *0.115* | *0.116* |
| plant closure | 1363 | 1067 | 1.622* |
| | *0.258* | *0.357* | *0.415* |
| mining/manufacturing | 1281 | 0.739 | 1419 |
| | *0.484* | *0.483* | *0.648* |

Table 8.2 – continues...

Table 8.2 – continued

| Explanatory variable | Total | Men | Women |
|---|---|---|---|
| energy/water supply | 2.569* | 2051 | 2097 |
| | *-1.372* | *-2.023* | *-1.428* |
| construction | 1339 | 1431 | 1297 |
| | *0.530* | *-1.038* | *0.626* |
| trade | 1130 | 0.874 | 1038 |
| | *0.435* | *0.564* | *0.503* |
| transportation | 0.853 | 0.833 | 0.88 |
| | *0.355* | *0.586* | *0.452* |
| finance | 0.956 | 0.71 | 1507 |
| | *0.482* | *0.528* | *-1.270* |
| economic services | 0.925 | 0.68 | 1120 |
| | *0.374* | *0.462* | *0.562* |
| public administration | 1413 | 1051 | 1516 |
| | *0.553* | *0.700* | *0.728* |
| administration | 1898 | 1707 | 2018 |
| | *0.764* | *-1.139* | *-1.050* |
| Individual characteristics | | | |
| cohort 1941 | 0.815** | 0.938 | 0.712** |
| | *0.084* | *0.152* | *0.100* |
| cohort 1942 | 0.603*** | 0.652** | 0.574*** |
| | *0.076* | *0.123* | *0.099* |
| female | 1.327* | | |
| | *0.193* | | |
| immigrants | 0.560** | 0.386*** | 0.847 |
| | *0.131* | *0.121* | *0.287* |
| germans | 0.795 | 0.490*** | 1205 |
| | *0.167* | *0.134* | *0.383* |
| age = 61 | 3.555*** | 4.761*** | 2.676*** |
| | *0.658* | *-1.267* | *0.702* |
| age = 62 | 8.373*** | 9.387*** | 8.831*** |
| | *-1.789* | *-2.957* | *-2.644* |
| age = 63 | 17.14*** | 23.47*** | 20.09*** |
| | *-3.891* | *-8.251* | *-6.046* |
| age = 64 | 30.33*** | 54.26*** | 38.03*** |
| | *-8.107* | *-21.99* | *-13.46* |
| age = 65 | 24.75*** | 32.70*** | 40.53*** |
| | *-6.567* | *-12.56* | *-14.91* |
| age = 66 | 178.0*** | 182.7*** | 380.8*** |
| | *-52.85* | *-81.61* | *-145.8* |
| age = 67 | 451.6*** | 242.8*** | 2068.3*** |
| | *-158.5* | *-122.5* | *-956.7* |
| age = 68 | 857.6*** | 741.5*** | 3889.2*** |
| | *-358.5* | *-411.0* | *-2223* |
| age = 69 | 8019.2*** | 10269.0*** | 29694.8*** |
| | *-4823* | *-7502* | *-24802* |
| low skilled | 2.697*** | 2.960*** | 1.899** |
| | *0.429* | *0.603* | *0.548* |
| high skilled | 0.0925*** | 0.0931*** | 0.0520*** |
| | *0.026* | *0.043* | *0.018* |

Table 8.2 – continues...

Table 8.2 – continued

| Explanatory variable | Total | Men | Women |
|---|---|---|---|
| unknown skill level | 0.275* | 0.237** | 5.119** |
| | *0.199* | *0.141* | *-3.965* |
| Career job characteristics | | | |
| simple manual | 0.897 | 1303 | 0.789 |
| | *0.307* | *0.858* | *0.339* |
| qualified manual | 1188 | 2450 | 0.892 |
| | *0.407* | *-1641* | *0.374* |
| technical | 0.773 | 0.842 | 0.574 |
| | *0.306* | *0.698* | *0.274* |
| engineering | 0.587 | 4.873** | 0.346* |
| | *0.290* | *-3668* | *0.199* |
| simple service | 0.581 | 0.851 | 0.446* |
| | *0.204* | *0.548* | *0.208* |
| qualified service | 0.288** | 0.415 | 0.0977** |
| | *0.147* | *0.330* | *0.104* |
| semi professional | 0.942 | 1459 | 0.911 |
| | *0.381* | *0.997* | *0.534* |
| professional | 0.403 | 0.604 | 0.28 |
| | *0.271* | *0.687* | *0.250* |
| simple clerks | 0.974 | 1442 | 0.722 |
| | *0.357* | *0.957* | *0.360* |
| qualified clerks | 0.871 | 1124 | 0.514 |
| | *0.311* | *0.745* | *0.246* |
| manager | 0.56 | 0.688 | 0.382 |
| | *0.255* | *0.685* | *0.207* |
| other | 0.66 | 0.000*** | 0.747 |
| | *0.417* | *0.000* | *0.369* |
| unknown | 1351 | 1816 | 1117 |
| | *0.461* | *-1.193* | *0.478* |
| tenure | 0.967** | 0.960* | 0.964* |
| | *0.014* | *0.021* | *0.019* |
| Regional characteristics | | | |
| east | 2.800** | 9.250*** | 1313 |
| | *-1.312* | *-6.516* | *0.785* |
| unemployment rate | 0.856*** | 0.785*** | 0.905* |
| | *0.040* | *0.055* | *0.055* |
| No. of observations | 12,011 | 7,426 | 4,548 |
| AIC | 13210.1 | 5791.7 | 5463.3 |
| BIC | 13720.3 | 6261.7 | 5900.6 |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10% level. Reference categories for dummy variables are: *BEN* 700–999, *LLFS* full-time, *PSZE* 1 – 9, no plant closure, agriculture, cohort 1940, males, ethnic germans, age = 60, skilled, agricultural, west

**Table 8.3:** Exponentiated coefficients (failure: PRJ-SE; cr: PRJ-DE, change in employer or occupation, job search), full estimation results

| Dependent variable: PRJ-SE<br>Explanatory variable | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| Financial Situation | | | | |
| *BEN* $\geq$ 399 | 0.832* | 0.781 | 0.792 | 0.904 |
| | *0.081* | *0.118* | *0.122* | *0.149* |
| *BEN* 400–699 | 1.061 | 1.094 | 1.098 | 0.908 |
| | *0.075* | *0.128* | *0.136* | *0.106* |
| *BEN* 1000–1299 | 1.026 | 1.046 | 0.913 | 1.173 |
| | *0.079* | *0.146* | *0.118* | *0.134* |
| *BEN* $\geq$ 1300 | 0.983 | 0.909 | 0.927 | 0.947 |
| | *0.088* | *0.145* | *0.137* | *0.148* |
| $\log w^{CJ}$ | 0.949** | 0.937 | 0.967 | 0.918** |
| | *0.025* | *0.038* | *0.043* | *0.035* |
| Labor market attachment | | | | |
| *LLFS* part-time | 1.675*** | 1.645*** | 1.702*** | 1.614*** |
| | *0.099* | *0.160* | *0.180* | *0.140* |
| *LLFS* partial retirement | 1.088 | 0.788 | 1.559 | 1.062 |
| | *0.325* | *0.412* | *0.750* | *0.598* |
| *LLFS* disability retirement | 0.521* | 0.250** | 1.439 | 0.449 |
| | *0.184* | *0.166* | *0.542* | *0.306* |
| *LLFS* unemployed | 0.205*** | 0.116*** | 0.180*** | 0.355*** |
| | *0.039* | *0.035* | *0.065* | *0.111* |
| *LLFS* training | 0.960 | 1.561 | 1.295 | 0.406 |
| | *0.240* | *0.520* | *0.529* | *0.225* |
| *gap* in days | 0.998*** | 0.999*** | 0.998*** | 0.998*** |
| | *0.000* | *0.000* | *0.000* | *0.000* |
| *shui* | 2.592 | 3.884 | 2.138 | 5.054** |
| | *-1.528* | *-3.956* | *-2.210* | *-4.132* |
| no. of unemployment times | 1.015 | 1.025 | 1.019 | 1.020 |
| | *0.013* | *0.027* | *0.022* | *0.022* |
| no. of jobs | 0.998 | 0.994 | 1000 | 0.986** |
| | *0.004* | *0.007* | *0.005* | *0.007* |
| duration of employment history | 1.000 | 1.000 | 0.999 | 1.000 |
| | *0.000* | *0.000* | *0.000* | *0.000* |
| potential experience | 0.652*** | 0.615*** | 0.625*** | 0.690*** |
| | *0.013* | *0.020* | *0.022* | *0.021* |
| firm closure | 0.729** | 0.555** | 0.886** | 0.898 |
| | *0.102* | *0.159* | *0.191* | *0.175* |
| Health | | | | |
| *shsi* | 23.38** | 60.84 | 13.30 | 17.98 |
| | *-36.56* | *-166.7* | *-38.86* | *-46.22* |
| Establishment characteristics | | | | |
| *PSZE* 10 – 49 | 1.114* | 1.287** | 1.086 | 0.972 |
| | *0.072* | *0.155* | *0.111* | *0.091* |
| *PSZE* 50 – 249 | 0.917 | 0.888 | 0.958 | 0.903 |
| | *0.069* | *0.118* | *0.123* | *0.100* |
| *PSZE* $\geq$ 250 | 0.728*** | 0.803 | 0.696** | 0.609*** |
| | *0.066* | *0.113* | *0.112* | *0.088* |

Table 8.3 – continues...

Table 8.3 – continued

| Explanatory variable | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| *PSZE* unknown | 0.381*** | 1.065 | 0.039*** | 0.322** |
| | *0.142* | *0.634* | *0.044* | *0.153* |
| *shw*50 | 1.012 | 1.140 | 0.932 | 1.061 |
| | *0.122* | *0.235* | *0.188* | *0.192* |
| share of high skilled | 0.675* | 0.550** | 1.272 | 0.56 |
| | *0.143* | *0.164* | *0.487* | *0.236* |
| share of females | 1.118 | 1.311 | 1.041 | 1.152 |
| | *0.118* | *0.221* | *0.193* | *0.179* |
| share of part-time | 1.162*** | 1.171* | 1.199 | 1.027 |
| | *0.058* | *0.096* | *0.105* | *0.077* |
| mining/manufacturing | 0.8 | 1.366 | 0.653** | 0.633** |
| | *0.117* | *0.423* | *0.138* | *0.117* |
| energy/water supply | 0.864 | 1.553 | 0.608 | 0.67 |
| | *0.318* | *0.666* | *0.495* | *0.363* |
| construction | 0.903 | 1.414 | 0.78 | 0.691 |
| | *0.147* | *0.494* | *0.177* | *0.159* |
| trade | 0.752** | 1.074 | 0.713 | 0.592*** |
| | *0.108* | *0.333* | *0.145* | *0.106* |
| transportation | 0.817 | 1419 | 0.679 | 0.570** |
| | *0.130* | *0.452* | *0.168* | *0.131* |
| finance | 0.805 | 1.494 | 0.593 | 0.509** |
| | *0.169* | *0.540* | *0.229* | *0.170* |
| economic services | 0.694** | 0.984 | 0.667* | 0.647** |
| | *0.103* | *0.314* | *0.138* | *0.119* |
| public administration | 0.614*** | 0.821 | 0.593** | 0.456*** |
| | *0.094* | *0.263* | *0.133* | *0.091* |
| administration | 0.666*** | 1.014 | 0.690* | 0.405*** |
| | *0.105* | *0.337* | *0.148* | *0.093* |
| Individual characteristics | | | | |
| female | 1.079 | 1.119 | 0.969 | 1.047 |
| | *0.074* | *0.140* | *0.112* | *0.111* |
| cohort 1941 | 0.997 | | | |
| | *0.056* | | | |
| cohort 1942 | 1.050 | | | |
| | *0.060* | | | |
| immigrants | 1.563*** | 1.749* | 1.342 | 1.189 |
| | *0.244* | *0.523* | *0.360* | *0.274* |
| germans | 1.437** | 1546 | 1467 | 1150 |
| | *0.211* | *0.413* | *0.370* | *0.248* |
| age = 61 | 1.844*** | 2.713*** | 1.550*** | 1.752*** |
| | *0.175* | *0.403* | *0.264* | *0.284* |
| age = 62 | 3.239*** | 4.014*** | 3.313*** | 2.661*** |
| | *0.380* | *0.850* | *0.739* | *0.480* |
| age = 63 | 4.110*** | 4.265*** | 4.405*** | 3.794*** |
| | *0.480* | *0.985* | *-1037* | *0.762* |
| age = 64 | 9.228*** | 12.34*** | 11.44*** | 5.114*** |
| | *-1411* | *-3970* | *-3355* | *-1186* |
| age = 65 | 10.53*** | 13.93*** | 13.74*** | 5.181*** |
| | *-1364* | *-4966* | *-3473* | *0.996* |

Table 8.3 – continues...

Table 8.3 – continued

| Explanatory variable | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| age = 66 | 63.33*** | 50.28*** | 34.39*** | 147.6*** |
| | *-11607* | *-18771* | *-12462* | *-43763* |
| age = 67 | 272.3*** | 195.6*** | 663.7*** | 337.1*** |
| | *-63790* | *-76783* | *-229298* | *-163788* |
| age = 68 | 880.1*** | 1959.5*** | 345.4 | |
| | *-224375* | *-791959* | *-279403* | |
| age = 69 | 6502*** | 14685*** | | |
| | *-3600883* | *-9511528* | | |
| low skilled | 3.365*** | 3.996*** | 4.075*** | 2.598*** |
| | *0.283* | *0.538* | *0.583* | *0.342* |
| high skilled | 0.086*** | 0.069*** | 0.057*** | 0.113*** |
| | *0.013* | *0.018* | *0.015* | *0.027* |
| unknown skill level | 1.772*** | 1.646** | 1.735** | 2.206*** |
| | *0.229* | *0.327* | *0.425* | *0.350* |
| Career job characteristics | | | | |
| simple manual | 1.533* | 1284 | 1491 | 4.141*** |
| | *0.336* | *0.446* | *0.513* | *-1763* |
| qualified manual | 1.478* | 1374 | 1482 | 3.563*** |
| | *0.335* | *0.508* | *0.504* | *-1547* |
| technical | 1.138 | 0.774 | 1.808 | 2.769** |
| | *0.291* | *0.334* | *0.658* | *-1309* |
| engineering | 1.575* | 1172 | 1365 | 5.744*** |
| | *0.432* | *0.548* | *0.622* | *-2832* |
| simple service | 1.433* | 1.144 | 1.505 | 3.829*** |
| | *0.310* | *0.393* | *0.503* | *-1618* |
| qualified service | 1.115 | 0.643 | 1.263 | 3.778*** |
| | *0.282* | *0.285* | *0.485* | *-1693* |
| semi professional | 0.585* | 0.343** | 0.469 | 4.942*** |
| | *0.185* | *0.171* | *0.224* | *-2280* |
| professional | 1.390 | 1.460 | 1.368 | 2.113 |
| | *0.424* | *0.686* | *0.607* | *-1380* |
| simple clerks | 1.435 | 1.111 | 1.393 | 3.490*** |
| | *0.327* | *0.401* | *0.512* | *-1504* |
| qualified clerks | 1.276 | 1.011 | 1.409 | 2.662** |
| | *0.285* | *0.360* | *0.477* | *-1160* |
| manager | 0.892 | 0.66 | 0.876 | 2.653* |
| | *0.242* | *0.294* | *0.438* | *-1343* |
| other | 0.718 | 0.129 | 0.426 | 4.041** |
| | *0.456* | *0.168* | *0.263* | *-2609* |
| unknown | 1.450* | 1.224 | 1.327 | 3.800*** |
| | *0.316* | *0.429* | *0.442* | *-1602* |
| tenure | 1.026*** | 1.026** | 1.044*** | 1011 |
| | *0.008* | *0.013* | *0.016* | *0.013* |
| Regional characteristics | | | | |
| east | 2.819*** | 0.802 | 2.451 | 4.417** |
| | *0.802* | *0.961* | *-1.750* | *-2979* |
| unemployment rate | 0.909*** | 1.033 | 0.919 | 0.871** |
| | *0.025* | *0.120* | *0.064* | *0.059* |
| No. of observations | 12,011 | 4,731 | 3,957 | 3,323 |

Table 8.3 – continues...

Table 8.3 – continued

| Explanatory variable | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| AIC | 28637,2 | 8124,7 | 8344,5 | 8373,4 |
| BIC | 29147,4 | 8557,7 | 8759,2 | 8770,5 |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10% level. Reference categories for dummy variables are: *BEN* 700–999, *LLFS* full-time, *PSZE* 1 – 9, no plant closure, agriculture, cohort 1940, males, ethnic germans, age = 60, skilled, agricultural, west

**Table 8.4:** Exponentiated coefficients (failure: PRJ-DE; cr: PRJ-SE, change in employer or occupation, job search), full estimation results

| Dependent variable: PRJ-DE<br>Explanatory variable | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| Financial Situation | | | | |
| *BEN* $\geq$ 399 | 0.489*** | 0.442** | 0.336*** | 0.728 |
| | *0.099* | *0.150* | *0.116* | *0.282* |
| *BEN* 400–699 | 0.719** | 0.701 | 0.590** | 0.911 |
| | *0.105* | *0.162* | *0.156* | *0.269* |
| *BEN* 1000–1299 | 0.988 | 0.835 | 1.168 | 1.013 |
| | *0.137* | *0.207* | *0.296* | *0.244* |
| *BEN* $\geq$ 1300 | 0.646*** | 0.589* | 0.924 | 0.400*** |
| | *0.106* | *0.164* | *0.269* | *0.137* |
| $\log w^{CJ}$ | 1.298*** | 1.289*** | 1.637*** | 1.189 |
| | *0.077* | *0.111* | *0.218* | *0.137* |
| Labor market attachment | | | | |
| *LLFS* part-time | 0.248*** | 0.278*** | 0.188*** | 0.209*** |
| | *0.050* | *0.096* | *0.068* | *0.074* |
| *LLFS* partial retirement | 2.595*** | 5.390*** | 1.494 | 2.542*** |
| | *0.501* | *-1.724* | *0.573* | *0.777* |
| *LLFS* disability retirement | 2.561*** | 3.154*** | 1.171 | 2.191* |
| | *0.542* | *-1.054* | *0.510* | *-1.001* |
| *LLFS* unemployed | 2.260*** | 2.539*** | 1.410 | 2.612*** |
| | *0.316* | *0.608* | *0.338* | *0.721* |
| *LLFS* training | 1.509 | 0.818 | 1.687 | 1.569 |
| | *0.413* | *0.454* | *0.598* | *0.814* |
| *gap* in days | 1.000 | 1.000 | 1.000* | 1.000 |
| | *0.000* | *0.000* | *0.000* | *0.000* |
| *shui* | 0.033*** | 0.378 | 0.085 | 0.000*** |
| | *0.030* | *0.594* | *0.129* | *0.001* |
| no. of unemployment times | 0.995 | 1.003 | 0.987 | 1.017 |
| | *0.026* | *0.052* | *0.058* | *0.042* |
| no. of jobs | 1.000 | 0.994 | 1002 | 1.006 |
| | *0.006* | *0.008* | *0.012* | *0.012* |
| duration of employment history | 1.001** | 1.001* | 1.001** | 1.000 |
| | *0* | *0.001* | *0.001* | *0.001* |
| potential experience | 0.688*** | 0.597*** | 0.632*** | 0.75*** |
| | *0.021* | *0.036* | *0.037* | *0.043* |
| Health | | | | |

Table 8.4 – continues...

Table 8.4 – continued

| Explanatory variable | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| *shsi* | 30.90 | 0.006 | 0.989 | 1.001*** |
| | *-93.73* | *0.032* | *-5.869* | *-4.476* |
| Establishment characteristics | | | | |
| *PSZE* 10 – 49 | 0.944 | 0.782 | 1.073 | 0.793 |
| | *0.136* | *0.182* | *0.288* | *0.242* |
| *PSZE* 50 – 249 | 1.191 | 1.029 | 1.348 | 0.975 |
| | *0.173* | *0.252* | *0.348* | *0.285* |
| *PSZE* $\geq$ 250 | 1.550*** | 1.610* | 1.373 | 1.609 |
| | *0.249* | *0.416* | *0.390* | *0.485* |
| *PSZE* unknown | 1.273 | 0.635 | 0.875 | 2.015 |
| | *0.612* | *0.462* | *0.865* | *-1.711* |
| *shw*50 | 0.952 | 1.301 | 0.365* | 0.858 |
| | *0.252* | *0.552* | *0.193* | *0.417* |
| share of high skilled | 0.621 | 0.883 | 0.709 | 0.915 |
| | *0.262* | *0.624* | *0.553* | *0.611* |
| share of females | 1.745** | 1.658 | 1.706 | 2.846** |
| | *0.414* | *0.642* | *0.787* | *-1.429* |
| share of part-time | 0.57*** | 0.472*** | 0.854 | 0.491*** |
| | *0.084* | *0.128* | *0.232* | *0.125* |
| firm closure | 1.363 | 1.486 | 2.453*** | 1.007 |
| | *0.258* | *0.445* | *0.794* | *0.478* |
| mining/manufacturing | 1.281 | 0.686 | 1.683 | 2.418 |
| | *0.484* | *0.369* | *-1.379* | *-1.600* |
| energy/water supply | 2.569* | 0.816 | 1.854 | 12.39*** |
| | *-1.372* | *0.854* | *-2.031* | *-9.307* |
| construction | 1.339 | 0.985 | 0.954 | 3.458* |
| | *0.530* | *0.556* | *0.801* | *-2.485* |
| trade | 1.130 | 0.751 | 1.047 | 1.699 |
| | *0.435* | *0.4* | *0.881* | *-1213* |
| transportation | 0.853 | 0.613 | 0.633 | 2.979 |
| | *0.355* | *0.362* | *0.557* | *-2.151* |
| finance | 0.956 | 0.335 | 0.314 | 7.513*** |
| | *0.482* | *0.277* | *0.388* | *-5.638* |
| economic services | 0.925 | 0.535 | 0.714 | 2.317 |
| | *0.374* | *0.308* | *0.609* | *-1.619* |
| public administration | 1.413 | 0.78 | 1.046 | 4.106** |
| | *0.553* | *0.428* | *0.872* | *-2.810* |
| administration | 1.898 | 1.500 | 1.110 | 3.777* |
| | *0.764* | *0.823* | *0.988* | *-2.727* |
| Individual characteristics | | | | |
| female | 1.327* | 1.326 | 2.292*** | 1.021 |
| | *0.193* | *0.313* | *0.573* | *0.245* |
| cohort 1941 | 0.815** | | | |
| | *0.084* | | | |
| cohort 1942 | 0.603*** | | | |
| | *0.076* | | | |
| immigrants | 0.56** | 0.845 | 0.324** | 0.393** |
| | *0.131* | *0.360* | *0.150* | *0.171* |
| germans | 0.795 | 0.925 | 0.549 | 0.946 |

Table 8.4 – continues...

Table 8.4 – continued

| Explanatory variable | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| | *0.167* | *0.366* | *0.216* | *0.380* |
| age = 61 | 3.555*** | 3.369*** | 8.21*** | 2.19*** |
| | *0.658* | *-1.073* | *-3.027* | *0.917* |
| age = 62 | 8.373*** | 19.18*** | 12.37*** | 3.065*** |
| | *-1.789* | *-7.255* | *-5.196* | *-1.147* |
| age = 63 | 17.14*** | 34.35*** | 50.98*** | 5.082*** |
| | *-3.891* | *-15.145* | *-22.539* | *-2.217* |
| age = 64 | 30.33*** | 67.88*** | 70.82*** | 17.43*** |
| | *-8.107* | *-35.94* | *-41.38* | *-7.791* |
| age = 65 | 24.75*** | 91.33*** | 53.95*** | 20.28*** |
| | *-6.567* | *-61.73* | *-28.07* | *-9.65* |
| age = 66 | 178.0*** | 610.9*** | 674.2*** | 157.8*** |
| | *-52.85* | *-401.2* | *-343.7* | *-93.95* |
| age = 67 | 451.6*** | 1426.8*** | 2178.6*** | 281*** |
| | *-158.5* | *-923.5* | *-1350.5* | *-243.2* |
| age = 68 | 857.6*** | 2250*** | 3108*** | |
| | *-358.5* | *-1598* | *-2659* | |
| age = 69 | 8019*** | 25485*** | | |
| | *-4823* | *-21731* | | |
| low skilled | 2.697*** | 3.357*** | 2.867*** | 1.99** |
| | *0.429* | *-1.038* | *0.831* | *0.586* |
| high skilled | 0.093*** | 0.025*** | 0.072*** | 0.144*** |
| | *0.026* | *0.014* | *0.037* | *0.065* |
| unknown skill level | 0.275* | 0.187* | 0.849 | 2721 |
| | *0.199* | *0.19* | *0.937* | *-2042* |
| Occupational characteristics | | | | |
| simple manual | 0.897 | 1.104 | 0.613 | 0.903 |
| | *0.307* | *0.888* | *0.505* | *0.437* |
| qualified manual | 1.188 | 1.450 | 0.682 | 1.148 |
| | *0.407* | *-1152* | *0.570* | *0.573* |
| technical | 0.773 | 0.919 | 0.424 | 1.091 |
| | *0.306* | *0.806* | *0.386* | *0.663* |
| engineering | 0.587 | 0.811 | 0.216 | 0.954 |
| | *0.29* | *0.778* | *0.227* | *0.745* |
| simple service | 0.581 | 0.485 | 0.533 | 0.414* |
| | *0.204* | *0.388* | *0.430* | *0.209* |
| qualified service | 0.288** | 1080 | 0.048** | 0.135*** |
| | *0.147* | *0.965* | *0.067* | *0.098* |
| semi professional | 0.942 | 0.953 | 0.702 | 0.590 |
| | *0.381* | *0.839* | *0.607* | *0.388* |
| professional | 0.403 | 0.952 | 0.015*** | 0.581 |
| | *0.271* | *-1170* | *0.021* | *0.578* |
| simple clerks | 0.974 | 1.015 | 0.662 | 1.213 |
| | *0.357* | *0.825* | *0.573* | *0.706* |
| qualified clerks | 0.871 | 0.945 | 0.579 | 0.573 |
| | *0.311* | *0.765* | *0.493* | *0.297* |
| manager | 0.560 | 0.162 | 0.330 | 1.124 |
| | *0.255* | *0.198* | *0.307* | *0.724* |
| other | 0.660 | 0.639 | 0.000*** | 0.000*** |

Table 8.4 – continues...

Table 8.4 – continued

| Explanatory variable | Total | 1940 | 1941 | 1942 |
|---|---|---|---|---|
| | *0.417* | *0.571* | *0.000* | *0.000* |
| unknown | 1351 | 1733 | 1098 | 1033 |
| | *0.461* | *-1362* | *0.895* | *0.525* |
| tenure | 0.967** | 0.960 | 0.937** | 1.018 |
| | *0.014* | *0.024* | *0.026* | *0.029* |
| Occupational characteristics | | | | |
| east | 2.8** | 15.84* | 9.95* | 0.0846* |
| | *-1.312* | *-24.90* | *-13.20* | *0.108* |
| unemployment rate | 0.856*** | 0.72** | 0.78* | 1.202 |
| | *0.040* | *0.113* | *0.102* | *0.158* |
| No. of observations | 12.011 | 4.731 | 3.957 | 3.323 |
| AIC | 13210.1 | 4434.1 | 3574.8 | 3315.8 |
| BIC | 13720.3 | 4867.1 | 3989.5 | 3712.9 |

*Notes:* Standard errors are clustered at the individual level in italics; ***/**/* denotes statistical significance at the 1/5/10% level. Reference categories for dummy variables are: *BEN* 700–999, *LLFS* full-time, *PSZE* 1 – 9, no plant closure, agriculture, cohort 1940, males, ethnic germans, age = 60, skilled, agricultural, west

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