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Further Training for Older Workers:  
A Solution for an Ageing Labour Force?

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# 1 Introduction

Older workers nowadays are needed to stay for longer periods in the labour force (OECD, 2005a). While this necessity should eventually lead to a better economic growth, it requires overcoming a series of macro and micro level challenges. In the macro level, institutional and policy changes in Germany involve altering patterns of retirement and encouraging late employment. This is quite challenging for a country which until recently was one of the leading countries to encourage the early retirement of its older labour force (OECD, 2005a). In the last decade, Germany has experienced a meaningful decrease in the share of older workers who retired early, mainly due to reduced options for early retirement (Dietz & Walwei, 2011). Nevertheless, opportunities for early retirement still exist which means that further promotion of policies is needed (OECD, 2012a).

Coping with the challenges in the micro level, however, seems more complicated. It involves changing the attitudes of both employers and older employees towards the extension of employment period. Employers play an enormous role in the execution of recent policies. Since they need to hire, retain and train older workers in order to support continued economic growth (Piktialis & Morgan, 2003), their prejudiced attitudes towards older workers need to change. In this regard, a special concern is given to the skill level of older workers, which needs to be constantly maintained by further training. While the reluctance of employers to train older workers is one of the main causes for their low training incidence (Boockmann & Zwick, 2004; Lazazzara *et al.* 2011) changing their attitudes will determine the extent of training which older workers will participate in.

The extension of employment period might not be easily accepted by older workers and some would probably wish to retire early. While early retirement is often associated with low job satisfaction (Hanisch & Hulin, 1991; Schulte, 2005) the requirement of longer employment may therefore raise the rate of older workers with *low* job-satisfaction. This may pose a challenge for policy makers. Considering studies pointing to a strong association between job satisfaction and labour market behavior (Clark *et al.* 1996 Gazioglu & Tansel, 2002; Schulte, 2005), it is also essential to identify the means by which job satisfaction of these workers can be improved. In this regard, a multiple perspective, according to which the contribution of older workers to the labour force depends on both their skill level and job satisfaction, is needed. Accordingly, the following research deals with two major questions: First, do we recognize an increase in the training participation of older workers over the

years? And second, is the overall job satisfaction of older workers affected by participation in training, and in particular, by an occupational-based manner?

The literature regarding the relationship between training and older workers so far has mostly emphasized the low training incidence of older workers compared to younger ones (Taylor & Urwin, 2001; Warwick Report, 2006; Schmidt, 2007; Schleife, 2008; Tippelt *et al.* 2009; D'Addio *et al.* 2010; Maximiano, 2011). This however might be changing as the participation of older workers in the labour force has increased in the last decade (OECD, 2012b). In this regard, a *trend* analysis as provided by this research, which examines the developments in the training incidence of older workers in the last decade, is essential. Furthermore, the predicted rise in the heterogeneity of older workers in the German labour force due to changing patterns of retirement is a novel topic, which is discussed and examined in this research. Using trend analyses, three additional sub-questions are examined in order to identify developments in the patterns of training participation among *under*-represented groups of older workers (e.g. women, low-skilled and blue-collars). Moreover, the analysis of the relationship between participation in training and job satisfaction of older workers is also driven by the predicted rise in the heterogeneity of the ageing labour force. In this regard, changes in the labour force participation of older workers from different occupational groups due mainly to the reduction of early retirement pathways may significantly alter the average overall job satisfaction of the ageing labour force. Following that assumption, the relation between training and job satisfaction of older workers is examined while differentiating between occupational groups. The analyses are carried out using multivariate methods based on the German SOEP dataset.

Building upon the well-known perspective of the human capital theory, in which older workers are the least likely to participate in training due to a short time-left in employment (Becker, 1993), returns to training of older workers nowadays should increase due to a longer pay-back period (OECD, 2011a; OECD, 2012). This provides incentives to invest in the training of older workers (Riphahn & Trübswetter, 2007; OECD, 2012). Studies of the recent years have already indicated to a positive trend in the training participation of older workers in Germany (Riphahn & Trübswetter, 2007). The current research joins this growing stream of studies by providing new evidences on recent developments in the training incidence of older workers, which may also hint at the success of policies to change patterns of training participation.

The uniqueness of this study lies in focusing on the topic of heterogeneity of the ageing labour force and its implications on both, training and job satisfaction of older workers. Since

the early 1990s, institutional developments have been carried out in Germany in order to encourage the longer employment of older workers (OECD, 2005a). While the general employment rate of workers aged 55-64 has significantly increased in recent years (OECD, 2012b), it is assumed to be also reflected in the share of sub-groups of workers which are less representative in the labour force in older ages. In theory, extension of employment period should also lead to increased investments in the training of these groups. This is especially relevant as findings indicate a low level of skills among workers subjected to early retirement schemes (OECD, 2004b). Examining developments in the training incidence of these workers over the years, as it is done by this research, will contribute to identify new patterns of training participation among older workers.

Furthermore, from the point of view of this study, the job satisfaction of older workers is an important component of their labour force behaviour and should be taken seriously by policy makers and employers nowadays. This perspective is supported by studies indicating a positive effect of job satisfaction on workers' productivity and employment probability (Appelbaum *et al.* 2005; Schulte, 2005). Since the level of job satisfaction in the context of an ageing labour force has not been the target for public debates in Germany so far, it may indicate that job satisfaction is not regarded as an important component, which the economic activity of older workers depends on. In this regard, this study aims to emphasize the importance of older workers' job satisfaction in determining their labour market behavior. Furthermore, assuming a rise in the share of low job-satisfied older workers, such labour force may not provide the efficacy and dedication expected from it. According to the literature on job satisfaction, different job characteristics induce different attitudes among workers from different occupations towards their work, which eventually affects their level of job satisfaction (Ronen & Sadan, 1984). This suggests that a heterogeneous labour force may call for different approaches to deal with the problems emerging from a longer employment period, e.g. increased unsatisfied workers. Following this, the effect of training on the overall job satisfaction of different occupational groups is analysed. The inclusion of training as a determinant of job satisfaction of older workers is therefore one of the novel contributions of this research. Despite the growing share of studies in this field in the recent years, none of these studies concentrate on older workers. Yet, differentiating between the levels of job satisfaction of several occupational groups of older workers, as done by this study, corresponds to the literature on job satisfaction that stresses for an occupational-based differentiation in order to understand variations in job satisfaction (Ronen & Sadan, 1984).



The rest of this work is organized as follows: Chapter 2 provides the basic arguments for the rise in importance of further training for older workers. In this regard, recent developments in demography as well as in the structure and function of the German labour market are described. These developments have led to the problem of labour force shortage in most western countries, which eventually led to the promotion of employment extension among older workers. The chapter provides a thorough investigation of institutional and policy changes in Germany taken place in the last decade and aimed to alter patterns of employment and labour force participation of older workers. These developments also set the theoretical base for constructing the research hypotheses concerning the relation between training and older workers, and the extent of which training determines the job satisfaction of older workers.

Chapter 3 provides the theoretical background for investigating the relationship between older workers and training participation. Following a discussion on the leading theory behind investments in human capital, two opposite approaches with respect to the training of older workers are presented, an *old* and a *new* one. Guided by the human capital theory, the old approach reflects the well-known weak situation of older workers in training. This is contrasted with a new stream of studies, indicating a change in the relation between training and older workers due to the new labour force situation of older workers. Both approaches are used later for analysing the developments in the training of older workers. Furthermore, in order to understand the contribution of training for older workers, the chapter outlines an in-depth theoretical investigation to study the necessity of employability and its relation to training of older workers.

Chapter 4 discusses the literature regarding the relationship between training and job satisfaction of older workers. The contribution of job satisfaction in shaping the labour market behaviour of workers constitutes a main argument for conducting a research on job satisfaction. In this regard, two “outcomes” of job satisfaction, which are relevant for this research, are discussed: Productivity and employment probability. Furthermore, in order to understand the factors influencing workers’ job satisfaction, an account is given to the main determinants of job satisfaction. Related literature on older workers’ needs and preferences is also collected, which could assist to analyse the relation between participation in training and job satisfaction. This follows an investigation of the literature on the needs of different occupational groups of workers. Despite a lack of studies on older workers in particular, this may assist to understand the relation between training and the job satisfaction of different

occupational groups. Finally, the literature on the relationship between training and job satisfaction is discussed.

Chapter 5 describes the methodological approach and methods used for analysing the two research questions. Based on data from the German Socio-Economic Panel (SOEP), the first research question is investigated using a cross-sectional analysis followed by a trend analysis over the years 2000, 2004 and 2008 in order to explore developments in the training incidence of older workers. This is done by applying a logistic regression model in each year. The second research question involves a pooled cross-sectional analysis followed by a longitudinal analysis in order to investigate the relation between training and job satisfaction. The first analysis is conducted by estimating a logistic regression model, and the second by estimating a random-effects logistic regression model.

Chapter 6 investigates developments in the training participation of older workers over the years 2000, 2004 and 2008. An account is first given to developments in the age structure of the sample over the years measured. This follows a deeper examination of the development in the characteristics of older workers over the years which contributes to reveal part of the dynamics behind changes in the labour force participation of older workers. The chapter follows a thorough descriptive investigation of the participation of older workers in professional training courses. The training incidence of sub-groups of older workers is also examined and sheds light on recent developments in older workers training participation. Finally, a multivariate analysis is conducted via logistic regression with the aim to confirm the descriptive result.

Chapter 7 examines the relationship between participation in professional training courses and older workers' job satisfaction. The overall job satisfaction of both, older and younger workers, is first examined and discussed, followed by a specific look at the level of job satisfaction of older workers from different occupational groups. This aims to reveal occupational-based variations in job satisfaction and thus to open a debate concerning the economic implications of increased heterogeneity of the ageing labour force. The relationship between training and overall job satisfaction of older workers is then studied, first, by comparison with younger workers, and second by an occupational-based differentiation. In this respect, the chapter shows how the overall job satisfaction of older workers in general and of different occupation groups in particular changes when training is considered. These findings are embedded in a theoretical model designed to decipher the training-job satisfaction relationship specific to older workers.

In the final Chapter 8, the findings of the empirical investigation are concluded and discussed. The main findings indicate an increased training incidence of older workers over the examined years, as well as a positive relationship between training and job satisfaction of older workers, in general, and of blue-collars in particular. The possible economic and social implications of the research findings are discussed followed by the limitations associated with this study aimed to raise the awareness about the changes needed for future research. Finally, the contribution of this research for policy decisions is discussed. In this regard, a special attention is given to the implications of a heterogeneous ageing labour on future policy.

## 2 An Ageing German Society: Implications and Developments

### 2.1 A New Demographic Era

Like most industrial countries, the population of Germany experiences an ageing process which is projected to accelerate in the following decades due to the large middle-aged cohorts (i.e. post-war baby boomers) moving into old age and later into retirement (Federal Statistical Office, 2009). This development will lead to a dramatic shift in the age structure<sup>1</sup> as in the case of Italy and Japan (Börsch-Supan, 2004). Considering projections regarding continued low fertility rates<sup>2</sup>, a rapid improvement in life expectancy, and an increase in Germany's balance of immigration and emigration, the number of pensioners in Germany is expected to increase dramatically, thus creating new challenges for the German society<sup>3</sup>.

Accelerating the ageing process is the trend towards earlier retirement which begun in the late 1970s and characterized by a growing number of older German workers choosing to retire early (Börsch-Supan & Schnabel, 1997)<sup>4</sup>. The availability of early retirement pension schemes and other programs prior to the official retirement age (i.e. 65 years for both men and women), raised the attractiveness of retirement for older workers, and thus constitutes an important factor in 'pulling' older workers out of the labour market in an early stage (OECD, 2005a). With the worsening of the labour market situation after 1972, especially due to the rising unemployment, early retirement was used as a means to stabilize the labour market by decreasing the supply of older workers (Bucholz, 2008; OECD, 2006). Those developments were resulted in a low retirement age which was far from Germany's official retirement age of 65. For example, the labour force participation rate of older men aged 60 to 65 in the Old Länder was already very low in 1990 (35 percent), while it decreased even more to 33 percent in 1995. Nowadays, the largest cohort consists of persons aged 46 to 47 which are called 'the baby boomers of the 1960s'. According to predictions, the largest cohort in 2037 will consist of persons between the ages 73 to 75 (Tippelt, 2010).

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<sup>1</sup> Age structure at time  $t$  is affected by age structure in the previous period  $t-1$ . Changes in any or all of the vital rates in the past will influence present and future age distributions. As opposed to Germany's classical age structure in the form of a pyramid with a higher share of children in the lower part of the pyramid, the age-structure nowadays resembles a "disheveled fir tree" with higher a share of middle-aged cohorts (30 to under 50 years) compared to a smaller share of older and younger people (Federal Statistical Office, 2009).

<sup>2</sup> Low fertility rate refers to fertility rate of 1.3 children per women which is very close to the fertility rate of Italy and Spain of 1.2 children per women (Börsch-Supan & Wilke, 2004).

<sup>3</sup> Average life expectancy refers to the expected number of years of living for a new-born taking into consideration a particular mortality risk. Continuous decrease in mortality rate and an increase in life expectancy are mostly a result of developments in education, nutrition, income, sanitation and above all, medicine (Federal Statistical Office, 2009).

<sup>4</sup> In 1972 the Landmark Pension Reform offered the opportunity to retire before the age of 65 and without a direct adjustment of retirement benefits.

According to the forecasts made by the ABS (Australian Bureau of Statistics, 2008), the median age of the population in many of advanced and developing countries will increase dramatically in the following decades. Japan, for example, a country with the highest life expectancy rate, is projected to experience a rise in its median age from 44.6 in 2010 to 54.9 in 2050 which is above the definition of 'older workers aged 45' (Stephen *et al.*, 2011). Among the developing countries, the median age of the population in India for example, is projected to increase from 25 in 2010 to 38.6 in 2050 (Stephen *et al.* 2011). With regard to Germany's median age, data from the Federal Statistical Office reveals gender differences in favour of women for many decades. In 1950, for example, it was 36.8 for women compared to 32.2 for men and in 2010 it rose to 45.8 for women and 43.5 for men, while it is projected to continuously increase within the next decades<sup>5</sup> (OECD, 2005a).

## 2.2 Developments in the Structure and Function of the German Labour Market

### 2.2.1 *The Shrinking and Ageing Labour Force*

Enhanced by the demographic developments and the trend towards earlier retirement, the German labour force is getting smaller and older (OECD, 2005a). The working-age population which is defined as people between the ages 20 to 65 is declining and will continue to do so in the next decades. This decrease is mainly consequence of the low fertility which remains a major determinant of the size and age structure of the population from which the labour force is derived<sup>6</sup>. However, declining working-age population is also found to be negatively highly correlated with generous early retirement incentives (Börsch-Supan, 2000). The working-age population in Germany in 2009 amounted to under 50 million people, and according to the predictions made by the Federal Statistical Office (2009), a dramatic decrease is expected to occur after 2020, when their number is predicted to stand between 39 to 41 million in 2035<sup>7</sup>. The ageing process of the German labour force is projected to accelerate due to an increase in the old-age dependency ratio<sup>8</sup> (i.e. the ratio of people aged 65

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<sup>5</sup> For example, from 49.4 in 2020 to 53.9 in 2050 for women and from 46.6 in 2020 to 50.7 in 2050 for men.

<sup>6</sup> In Africa, for example, there is clearly not such problem, due to a persistent high fertility and will see massive growth in the working age population. Moreover, Asia will experience the highest growth rates since it has already the largest population, and by 2020 will contain 62 per cent of the global labour force.

<sup>7</sup> The scope, to which the working age population will decline, however, depends strongly on the level of immigration. Hence, if the balance of immigration and emigration will totals 200000 persons per year in 2060, the German working age population will amounted on 36 million and will further decrease to 33 million if the balance of immigration and emigration will totals 100000 per year.

<sup>8</sup> Further projections of the Federal Statistical office (2009) suggest that the German old age dependency ratio will increase by 80 per cent till 2030s.

and above to the people aged 20 to 64). This will particularly occur in the next decade when the share of people aged 50 and over will increase from 30 per cent to 39 per cent in 2020 (Federal Statistical Office, 2009; OECD, 2005a). According to the OECD projections (2001), a significant rise will be seen in the share of people aged 65 and over in the next decades, while in 2030 they will amount a quarter of the German population. In the EU countries the proportion of workers aged 55 to 64 is 20 percent of the total working age population and predicted to increase to 24 percent in 2030 (Federal Statistical Office, 2011).

Those developments create tremendous pressure on the shrinking labour force (i.e. workers of the middle-age group) which will have to financially support the growing population of pensioners (Börsch-Supan, 2000) as labour supply considered as a major determinant of growth potential. In this respect, declining labour force may lead to a shortage of highly qualified workers in Germany, a finding which can explain projections concerning the negative impact on economic growth (OECD, 2005a). According to the OECD report (2005a), expenditures on old-age pensions in Germany are already high compared to the average OECD countries and can be further extended due to changes in the age-structure<sup>9</sup>. Moreover, according to predictions made by Börsch-Supan (2001), decreased working-age population in Germany may lead to a reduction of 15 percent in wealth (per capita) until 2035, which can be explained by the rapid and earlier decrease of the working-age population compared to the total population. Similarly, the growth of GDP per capita in the OECD countries which was amounted on almost 32 percent per year (between 1970 and 2000), is projected to decline significantly to 1.7 percent over the next 30 years (OECD, 2011b). Such developments, however, could be offset by improvements in technology and employment prospects of older workers (OECD, 2005a). The latter constitutes one of the main targets of policy makers in most industrial countries nowadays.

### 2.2.2 *The Advance in Technology*

The rapid technological advancement characteristic to recent decades have led to a conceptual change regarding the work structure and skill requirements expected of employees. The expertise of workers have become less relevant due to obsolescence<sup>10</sup> which especially increases for people working in the industrial sector with intensive technological

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<sup>9</sup> Predictions also regard a further increase in public spending by 2050 on health and long-term care from 6 per cent to 9 per cent of GDP (OECD, 2005a).

<sup>10</sup> Two types of obsolescence are distinguished by the literature. The first is technical skills obsolescence refers to a decrease in the amount of human capital, and is often a result of physiological reasons (e.g. ageing, sickness). The second is economical skill obsolescence which is due to an increase important of specific human capital consequence of technical developments (Aubert *et al.* 2005).

developments (Schils & Fouarge, ). Such alterations are attributed mainly to developments in microelectronics and the introduction of computer based systems in the early 1980s (Troll, 2000). A survey done by the Microcensus<sup>11</sup> regarding the use of data processing equipment in German companies has reported a 7 percent increase in the number of workers using such equipment between 1985 and 1992 (7-14 percent, respectively). Moreover, a meaningful increase occurred in 1999, as 36 percent of all German employees used computerised equipment on a daily basis (Troll, 2000). This is also supported by data from the Federal Statistical Office of Germany in 2002, indicating that 71 percent have used computers to carry out their everyday business (Petrauschke & Kaumanns, 2003).

Several studies have shown a clear link between investments in a new technology and the demand for skilled workers. Doms *et al.* (1997) used data from a Survey of Manufacturing Technology (SMT), a matched employee-employer dataset and the Census Bureau's Longitudinal Research Database in order to examine the effect of technological advancement on skill-demands. Through a cross-sectional analysis, their findings consist with previous literature in the field (Dunne & Schmitz, 1995; Autor, Katz, and Krueger, 1996; Machin & Van Reenen, 1998; Lehr & Lichtenberg, 1999; Acemoglu, 2000) indicating that technology advanced industries are more likely to hire skilled workers (high educated workers) and to supply them with higher income. Specifically, increased number of technologies in a factory leads to an increase in the number of educated workers (university degree). Abowd *et al.* (2007) found also a strong positive correlation between newly acquired technology and skill requirement, through a cross-sectional analysis of US businesses in wholesale, services and retail trade sectors. Their findings also suggest that technology interacts differently with various skill components. Investments in computers and software are positively correlated with workers' human capital and unobservable individual competence but not with experience. With regard to Germany, an interesting research was done by Spitz- Oener (2006) who used data set from West Germany<sup>12</sup> between 1979 and 1998/9 for examining changes in skills requirements among different occupations in the German labour market. His findings indicate on an increase in the complexity of occupations nowadays which is reflected by a decline in manual and cognitive tasks and by an increase in interactive activities (e.g. doing research). Furthermore, the findings also indicate on the increased use of computers nowadays and suggest it has contributed to broadening these developments, such that manual tasks have

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<sup>11</sup> The Microcensus provides official representative statistics of the population and the labour market in Germany.

<sup>12</sup> The dataset is based on the "Qualification and Career Survey" which is done by the German Federal Institute of the Federal Employment Service (IAB).

been replaced by computers and analytical activities are being accompanied by the help of computers at the workplace. A research made by Jacobebbinghaus and Zwick (2002) concerning German firms used the Mannheim innovation panel for service firms with the waves 1995 and 1997. They show that firms in Germany that intensively use information technology (ICT) have a low number of workers with no degree from apprenticeship or professional degree, but a rather high number of high-qualified workers.

Increasing demands for skilled workers have raised the importance of on-the-job training. According to the research of Bartel and Sicherman (1998) using the National Longitudinal Survey of Youth (NLSY), the rate of training is affected by the rate of technological advancement. In this respect, formal on-the-job training is higher among employees in industries undergoing rapid technological advancements (e.g. manufacturing) than among those working in less technologically advanced industries. More recently, in the study of Gashi *et al.* (2008) using data from the IAB Establishment Panel of Germany found a positive relation between training which were financed by the employer to technological advancement within that company. In particular, they pointed out to simultaneity between training provision and technological advancement. In other words, apart from benefiting from additional training due to developments in technology, the training alone may increase the probability of companies to undergo technological advancements. In addition, technological change affects the rate in which workers with different level of education participate in training. Two opposite findings can be drawn. On the one hand, high rates of technological change induce companies to hire high educated workers and supplying them with on-the-job training, but on the other hand, less educated workers in companies with high rates of technological change will get more training. In this respect, given the general skills of the high educated which allow them to adapt more easily to changes in technology, the educational gap between the high and less educated workers in a specific firm can be narrowed (Bartel & Sicherman, 1998).

### **Technological Change and Older Workers**

Older workers might be affected differently from advances in technology than prime-age workers. Friedberg (2001) who examined the impact of technological change on older workers using data from the Current Population Survey and the New Health and Retirement Study for the U.S. offers two explanations for this statement. First, older workers have generally less formal qualifications and less up-to-date skills than younger workers and therefore are less likely to cope with advances in technology. Second, the decision to invest in



learning new technology would not come easily for older workers consequence of the short period left for them in the labour market. In accordance, the research findings suggest that novel technologies such as the use of computers, reduces the attractiveness of such investment and might therefore leads to an early withdrawal from employment. This finding is supported by Bartel and Sicherman (1993) which examined the effect of technology change on retirement decisions of older workers. Using industrial data on productivity growth and on required training for the years 1960s to 1970s, they suggest that older workers in workplaces which experience a sudden technological change have a higher likelihood to retire earlier instead of participating in training. Similarly, a study done by Givord and Maurin (2004) found that French high-seniority workers had higher risk of losing their job in industries with high rate of computer-used during the 1990s. In contrast, further findings suggest that older workers who use computer at their workplace retire later than non-users, which can be explained by the fact that the use of computers is more attractive for older workers who wish to work longer (Friedberg, 2001). Bartel and Sicherman (1993) also found a relation between late retirement and technological change which depends on the rate of on-the-job training. According to their findings, older workers in companies with a steady technological change are more likely to retire later due to the high amount of training they constantly participate in. This finding is very significant and should be considered by policy planners who are looking for additional and attractive ways to extend the employment period of older workers.

Malul (2009) examined the effect of technological change on the employment situation of younger (aged 18-49) and older (aged 50 and above) workers using data from the Israeli Income Survey for 2004. Based on an analysis of the responses of workers to the technological change, they found that it has a small impact on the employment situation of younger workers since it encourage them to participate in more training and by that to improve their skills. However, the research also implied for a greater impact on the employment situation of older workers since they do not easily tend to participate in more training and thus find it difficult to improve their professional skills. Such differences make the younger workers more employable than older workers. As was argued by Malul (2009), governments should come up with policies which will help older workers to cope with the rapid changes in technology. Lack of government intervention might negatively impact the economy as many older workers will not be able to actively contribute to economy growth. In accordance, since the reduced level of skills consequence of technological change (Dietz & Walwei, 2011) may affect decisions concerning labour market participation of older workers,

a more thorough and profound research on the relationship between new technology and older workers adaptation should be done.

### 2.2.3 *From Industrial to Service Economy*

The last quarter of the twentieth century is characterized by a shift from industrial to a service economy in most industrialized countries<sup>13</sup> (Schettkat & Yocarini, 2006). Post-industrial economies have become service-oriented and new industries have been established (e.g. Computer software, cellular telephony). According to the OECD report “The Service Economy in OECD Countries” (2005b), the service sector has become the most important in all OECD countries, responsible for 70 percent of the economies production. Germany, as Italy, Spain and Austria has been experiencing a structural change in its economy which is expressed by an increase in the share of the service sector. Since the 1970s until 2000 it amounted to 65 percent (OECD, 2005b) and in 2003 it rose to 71 percent (OECD, 2005a). While it is continuously increasing, the share of employees working in industry and agriculture is declining. This development can be mainly detected in the business related services, in particular finance and insurance (OECD, 2005b)<sup>14</sup>. Other services, such as restaurants and trade, have not changed significantly over the last years.

Older workers might be strongly affected by the transition to services as many of them work in the industrial sector, particularly in occupations which require manual work (e.g. elementary occupations<sup>15</sup>; OECD, 2005a). Since this transition is associated with the establishment of new industries which require a different set of qualifications and skills, it raises the question concerning the (re)integration of industrial older workers to the “new economy”. According to the OECD (2005a), Germany will have to ensure that older workers will be able to find new jobs, a highly important approach in light of the new employment and retirement policies aiming at raising the labour force participation of older workers. Taking into account the rapid development in technology mentioned above, such an act is even more

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<sup>13</sup> In 2004, for example, 66.9 percent of all employees in the EU were working in the service sector compared to only 18.7 percent employees working in the manufacturing sector (i.e. 130 million and 36 million, respectively). Among the employees in the manufacturing sector, 5.7 percent worked in a field with medium-high technology and 1.2 percent worked in a field with high-quality technology. In comparison to all EU countries, the majority of workers (in absolute values) in the manufacturing sector work in Germany (8.2 million), followed by Italy (4.9 million), France (4.1 million), the UK (3.8 million) and Spain (3.0 million) (Felix, 2006).

<sup>14</sup> While during the 80s their share was between 10 to 20 percent, in 2005 their share of value added was already between 20 to 30 percent (OECD, 2005b).

<sup>15</sup> According to ISCO (International Standard Classification of Occupations), elementary occupations include simple tasks and work which often requires physical effort. Elementary occupations are classified under the following groups of the ISCO: Sales and services elementary occupations; Agricultural, fishery and related labourers; Labourers in mining, construction, manufacturing and transport.

crucial. This would mean improving their employability through investments in their human capital in order to cope with the rising skill demands emerging from the shift to services.

The qualification level of older workers in Germany has increased over the last years and was mainly a result of the educational boom in the mid-1960s (Brenke & Zimmermann, 2011). According to the *Microcensus*, 33 percent of men and 40 percent of women aged 55 to 74 in Germany did not complete vocational education in 2001, whereas in 2008 it was lowered to one out of eight men and one third of women (Brenke & Zimmermann, 2011). According to the recent OECD report *Education at a Glance 2013* on Germany, the percentages of workers aged 55-64 with tertiary education increased from 20 percent in 2005 to 26 percent in 2011, which is above the OECD average in 2011 of 24 percent, as well as higher than that of the EU21 of 21 percent. While studies indicate that qualification level plays an important role in contributing for the increased labour force participation of older workers (Brenke & Zimmermann, 2011; Federal Statistical Office, 2011), improving the skill level of older workers should result in both, an increased labour force participation and an improved employability. Nevertheless, predictions for the following decades point out to only a slight increase in the educational level of older workers in Germany (e.g. aged 50 to 64)<sup>16</sup>, a data which if realized, might harm their transition to service jobs (OECD, 2005a). In this respect, increasing investments in the skills of older workers in the form of training, particularly those with low and medium skills, should be in top priority (OECD, 2005a).

### **2.3 The Determinants of Employment of Older Workers**

Aiming to overcome the projections concerning increasing age-dependency ratio, the promotion of employment among older workers has become one of the main solutions in the near future. This is in addition to other steps, such as higher fertility rate and a rise in migration, which will only have an effect in the long run. With 63 percent labour force participation rate of older men in 2008, an average retirement age (61 years for women and 62.1 years for men)<sup>17</sup> which is much lower than the official retirement age of 65 (OECD, 2009), and a rather high unemployment rate compared to the average of the OECD and EU, raising employment rates of older workers is not an easy mission.

Work disincentives and barriers in terms of employment for older workers often result in increased fluctuations into retirement or unemployment. Lack of necessary skills in the face of technological change, the disproportionately participation characteristic to declining sectors

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<sup>16</sup> For example, among older workers with high education degree no increase is predicted (OECD, 2005a).

<sup>17</sup> In OECD countries the average retirement age in 2009 stood on 62 (OECD, 2009).

of economic activity (e.g. manufacturing), and early retirement consequence of social security and unemployment incentives, are part of a list of factors affecting employment rates. Thus, identifying obstacles and work disincentives of older workers is essential for the development of the future labour force.

### 2.3.1 “Push” vs. “Pull” Factors: *The Decision to Retire*

The decision to retire among older workers is often accelerated by the existent of various factors. There are "pull" factors which attract older workers into retirement and considered as positive, and factors which “push” them out of employment and considered as negative (Davey & Davies, 2006; Shultz & Morton, 1998). Thus, the retirement decision is not always a voluntary decision, and may also result in a long period of unemployment.

Financial incentives, such as pension schemes and unemployment benefits, constitute one of the main factors which have been “pulling” older German workers out of the labour force early for many years. Such schemes were used in many countries as part of an act to reduce high rates of unemployment by offering jobs for younger people (OECD, 2006). According to Schils and Fouarge (2009), older workers are affected by the institutional structure of early retirement schemes in their country. Countries which are characterized by having highly *generous* early retirement schemes expressed by limited “retirement dates” in which a person can choose from are more likely to have higher rates of older workers who choose retirement over work. In contrast, countries with a flexible early retirement schemes such as Denmark and Finland, offer more "exit points" for retirements, and therefore raise the likelihood of older workers to stay in employment. Germany (as Austria and Belgium) had a very generous early retirement schemes<sup>18</sup> for many years as part of the generous old-age social security system (Börsch-Supan & Schnabel, 1997), which contributed to raising the rates of pensioners. This was especially common among older low-skilled workers who worked for many years in manual jobs (OECD, 2005a)<sup>19</sup>. However, recent changes in the generosity of the German pension system have already resulted in an increase in the retirement age which has led to an increased employment rate among older workers (see section 2.5.1).

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<sup>18</sup> The generosity of the pension system started within the reform of 1972 which allowed the retirement of workers with at least 35 years in the labour force before the official retirement age of 65 and up to age 63. For more information see section 2.3.1.

<sup>19</sup> For example, 36 percent of women aged 50 to 64 with low education participated in the labour force, in comparison to 68 percent participation rate of women with high education (OECD, 2004b).

The high net replacement rate<sup>20</sup> in Germany constitutes another financial incentive for early retirement. It was increased from 63 to 72 percent between 1960 and 1990, and decreased again after the inclusion of the low East German Pensions. The average net replacement rate<sup>21</sup> in Germany of around 70 percent is still higher compared to the U.S.<sup>22</sup> and the United Kingdom (OECD, 2005a) and reflects the aim of the German government to ensure a suitable standard of living for older retirees (Börsch-Supan & Wilke, 2004). Furthermore, implicit taxation on continued work should also be taken into account as an indicator for retirement incentives embedded in pension schemes. According to Duval (2003/2), implicit taxes on continued work tend to rise as people age. Countries with high replacement rate, as in the case of Germany, are more likely to have a higher taxation on continued work. Incentives to work in Germany are very low from age 60 and above (Börsch-Supan & Schnabel, 1999) due to the existing early exit pathways which will fade out completely only in 2016 (OECD, 2005a) and as such, staying in the labour force is not worthwhile until then. This should be primarily considered while aiming to understand the effects of retirement incentives on the labour force participation of older workers.

Opinion of the employer plays a central role in determining the employment chances of older workers. Age discrimination towards older workers through both the hiring process and afterwards at work might induce decisions towards quitting a job or continued unemployment. This issue which has become highly important over the last years in many western countries is the consequence of both costs of early retirement and the rising numbers of older people (Büsch *et al.* 2004). Age discrimination is defined as the unsuitability between the job opportunities of older workers and their level of productivity (Cain, 1986). In this respect, age discrimination among employers occurs even though there is a lack of evidence that work performance declines with age (Salthouse & Maurer, 1996; Schulz, 2000). While the contribution of older workers to their workplace is expressed by factors such as work experience, a commitment to quality (Barth, 2000), high reliability and better attitude (Heywood *et al.* 2010), they may also suffer from negative opinions regarding their technological competence, flexibility, and the ability to adapt to new work patterns (Lyon & Pollard, 1997; Barth, 2000). This is supported by the findings of the IAB Establishment Panel

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<sup>20</sup> This refers to the average net replacement rate for an average earner (Börsch-Supan & Schnabel, 1997). The definition of replacement rate in the German context, as was mentioned by Börsch-Supan and Wilke (2004), “refers to the pension of a worker, who had 45 earnings points, divided by the average net earnings of all current workers”.

<sup>21</sup> According to the OECD (2011b): “net replacement rate is defined as the individual net pension entitlement divided by net pre-retirement earnings, taking account of personal income taxes and social security contributions paid by workers and pensioners.

<sup>22</sup> 53 per cent net replacement rate (Börsch-Supan, 2000).

2002 indicating that three out of ten firms in Germany believe that older workers have difficulties to adapt to new demands (OECD, 2005a). Taking the employees point of view, findings of the European Survey of Working Conditions for the year 2000 indicate that among all workers in Germany 6 percent claimed to experience age discrimination at their workplace<sup>23</sup>.

Lack of measures in workplaces targeted at older workers, such as Old-age-part-time work scheme<sup>24</sup>, special equipment, training measures, reduced working hours and etc., might also reflect the perceptions of employers (e.g. Managers) towards their older staff. According to the findings of the IAB establishment Panel 2002, one of every five firms in Germany offer only one specific workplace measure for their older workers. Among the most used measures offered for older workers in these companies are training, old-age-part-time work contracts, and working in an age-heterogeneous teams. However, the percentage of firms offering measures for older workers is linear to the size of the company. It should be noted that, while old-age-part-time work contract is a useful measure pointing on the positive attitude of the firms towards their older workers, it is also served as a tool for reducing the work of their older employees in an early stage (OECD, 2005a). In other words, it “pushes” them gradually out of the firm and thus explains the decision of early retirement as an effect of exclusionary labour markets (Howze, 1996).

Such negative perceptions of the employers might explain increases in job displacement among older workers, a process which often result in fluctuations into retirement or unemployment (Mckay & Middleton, 1998). Findings from a research made by Johnson and Neumark (1997) indicate that older employees who declared on age discrimination, such as no promotion or dismissal, had higher likelihood of leaving their workplace as well as lower likelihood of being hired, compared with those who did not declared on age discrimination. Older workers, however, may consider working longer knowing that their work conditions will improve. For example, anticipation in terms of opportunities for development, such as training participation and employers/colleagues appreciation, reduces the willingness to retire early (Van Dam *et al.* 2009). Furthermore, a recent study conducted by Boockmann *et al.* (2011) examined the effect of age-specific measures in workplaces on the employment duration of older workers in Germany using German longitudinal employer-employee data for the years 2000-2002. The findings indicate a positive effect of specific measures on the

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<sup>23</sup> The average of older employees reporting to experience age discrimination in the EU 15 was 5 percent (Dietz & Walwei, 2011).

<sup>24</sup> Large firms in Germany are most likely to offer old-age part-time contracts. For example, it was found that among firms with 500 employees and more, 86 per cent offered old-age part-time contracts (OECD, 2005a).

likelihood of older workers (especially aged 55 to 59) to stay in employment. One of the explanations points to the fact that these measures do not involve occupational stress that might promote employees to quit<sup>25</sup>. In this respect, these findings should be taken seriously by policy planners as they point to the importance of employers' involvement in raising participation rate of older workers through the improvement of working conditions of their older staff.

### 2.3.2 *Going Back to Work: Difficulties and Obstacles*

The transition from unemployment back to employment is found to be harder for older than younger workers (Dietz & Walwei, 2011). Due to employers perceptions mentioned above, older job seekers are being discriminated and thus often stay unemployed for a long period of time (OECD, 1998). This, however, might also affect potential employers who are often associate long period of unemployment with low productivity. The latter can be explained by the lack of training which accelerates human capital depreciation among older unemployed. This finding is very relevant to Germany that has one of the highest rates of long-term unemployed among Western countries, a fact which should be seriously considered nowadays as older unemployed are encouraged to go back to work (OECD, 2005a).

Discrimination on the ground of age in Germany has been increased in recent decade (OECD, 2011a) and is relevant mostly in cases of hiring new workers (Büsch *et al.* 2004) due to the high costs associated with hiring older workers as opposed to the low costs of hiring younger ones. This is also supported by Naegele and Walker (2004) who found that in Germany and in the UK many employers do not employ people aged 50 and above. In accordance, the average rate of hiring older workers (over 50 years old) in the OECD countries was half the rate of hiring workers among the ages 25 to 49 (OECD, 2006). Moreover, Büsch *et al.* (2004) who analysed the hiring process of older workers in Norway and Germany suggested that differences in norms between the two countries might explain the different levels of age discrimination. According to Bellmann *et al.* (2003), 40 percent of the companies in Germany do not have older workers while 15 percent would not be willing to hire older workers, a data which indicates on the existent of age discrimination. It was also found that approximately 25 percent of all German firms admit to use recruitment policy which discriminates against older workers. This is also confirmed by the findings of the European Foundation for the Improvement of Living and Working Conditions survey on

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<sup>25</sup> On the contrary, studies suggest that work which involves stressful conditions is associated with higher willingness to retire early (e.g. Lin & Hsieh, 2001).

employees' opinion concerning discrimination features which indicate that, perceived age discrimination such as access to training and recruitment to new job, was more frequent in Germany (OECD, 2005a).

The lack of willingness to hire older workers also relates to the role of training (Koller & Gruber, 2001). The costs associated with specific-training are lower for younger workers than for the older ones. It is consequence of a short time horizon which negatively affects the decision of employers towards hiring older workers as they are concerned with the associated low returns of training (Hutchens, 1988). This is supported by the findings of Heywood *et al.* (2010) with regard to Germany. According to the Hanover Firm Panel for the year 2002, training lowers the likelihood of older workers to be hired and contributes at binding workers to the company. It was also found that delayed compensation, a tactic among firms to motivate their workers and thus to raise productivity, is a negative predictor of hiring older workers in German companies but a positive determinant of hiring younger workers. While unemployed older workers are less "afraid" by delayed compensation due to short time left for retirement, younger workers are being "positively" affected by delayed compensation, considering the firm's point of view.

Germany is known for having strict *employment protection legislations* (EPL) as well as restrictions on fixed-term contract and temporary work agency. The effects of EPL were subjected to debate due to both positive and negative effects on the performance of the labour market. While it is aimed at ensuring the welfare of workers, it might also have a negative effect on employers during the hiring process (OECD, 2004b). This is also true in the case of older workers (OECD, 2005a). On the one hand, older workers in Germany are more likely to stay employed thanks to employment protection (e.g. the *Individual Protection against Dismissal*) which makes it harder and more expensive to lay them off<sup>26</sup>, but on the other hand, the chances of older unemployed to be reemployed or to switch jobs are likely to be negatively affected by such law regulations (OECD, 2005a). This was proven by Daniel and Siebert (2005) in their research on employment protection legislation and the demand for unskilled workers. A possible explanation lies at employers' preference to hire younger workers in order to avoid future costs associated with the firing of older workers. Moreover, based on findings of a survey conducted by the IW Köln (Institute of the German Economy), 80 percent of German employers who were asked about employment protection legislation

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<sup>26</sup> In Germany costs of firing older workers are higher because the legal period of notice extends with the period of employment (§622 BGB). Besides long periods of employment as well as a higher age are social criteria for redundancy (§1 (3) KSchG). Moreover collective labour agreements often set a higher protection against dismissal of older workers, either directly by age or indirectly by period of employment (Eichhorst, 2006).



admitted they relate to it as an obstacle, while 57 percent admitted to be negatively affected by the EPL in the hiring process (OECD, 2005a). This was also examined by the study of Adams (2004) with relation to the US, which demonstrated a positive effect of laws against age discrimination on prolonging the employment of older workers, however no influence was found on the hiring of older workers. According to the OECD (2006), this topic should be attended carefully so that companies will not avoid hiring older workers due to such protection rules. A recommendation is therefore made to improve the *employability* of older workers as the ultimate way for protecting their employment and to avoid strengthening EPL rules in order to raise the chances of older workers to be hired (Heywood *et al.* 2010),

The high costs associated with the hiring and retaining of older workers mentioned above are also reflected by higher wages and higher non-wage (OECD, 2006). Age-earnings profile indicates on an increase of wages with age which explains why employers prefer to replace older workers with younger ones<sup>27</sup>. Such a decision is also driven by the fact that low productivity<sup>28</sup> is often associated with higher ages. Given the ageing labour force, the age-productivity profile should match the age-earnings profile in order to improve the employability rate of older workers and also to lower losses for companies resulted from the gap between wages and productivity (Skirbekk, 2004). With respect to the latter, the human capital theory argues that productivity is mostly a function of educational level but also of work experience (Mincer, 1974). In this respect, it can be argued that longer work experience, as in the case of older workers, contributes at maintaining a high level of productivity also at higher ages. There are two aspects for that: on one hand, older workers might stay highly productive within a familiar area as consequence of years of experience (Rybash *et al.* 1986), but on the other hand, when facing new and unfamiliar work, they might not provide the same level of productivity, since low ability to learn is supported by studies to be a characteristic of older people (Boockmann & Zwick, 2004) This is especially relevant in light of the rapid developments in technology which require highly skilled workers who are able to cope with novel technologies through learning. Apart from the economic implications associated with reduced level of productivity (e.g. a lower economic growth) which might lead to a fewer retention and hiring of older workers, it has also a crucial effect on their employment situation. Older workers might be negatively influenced by their reduced level of productivity as a result of decreased mental ability and fewer opportunities for on-the-job training, and

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<sup>27</sup> Older workers receive *seniority wages* which are higher than of younger workers, and increase irrespective of the productivity of the worker. According to the OECD (2011b), the wages of older workers in Germany are 60 percent higher than of younger workers, which suggest that the employment of older workers is negatively affected by seniority wages (OECD, 2012).

<sup>28</sup> There is still lack of empirical evidence concerning the relation between age and productivity.

therefore decide to leave their job. In this respect, work experience alone is not sufficient to solve the problem of productivity and should be combined with on-the-job training that is appropriate to older workers.

Non-wage labour costs include costs of a company which are not due to direct compensation (Chen & Funke, 2003). A differentiation was done by the Cologne Institute for Economic Research (Institut der deutschen Wirtschaft Köln, IW) which analyses the non-wage labour costs in Germany, between statutory non-wage labour costs and non-statutory labour costs. They first refers to costs such as the contribution of employers to social security, sickness payments and vocational training costs, and the second includes costs such as holiday payments and pension schemes. The utilization of options for early retirement over the last decades coupled with the low aggregate labour demand in Germany, were two of the reasons for the increased non-wage costs (e.g. social security and pension contributions; OECD, 2005a). According to Chen and Funke (2003), high non-wage costs in countries with inflexible wage structure might negatively influence employment and in particular that of older workers. Thus, this issue has become highly important in recent years among German politicians. It was found that the ratio of non-wage labour costs to direct compensation in manufacturing industry in West Germany increased from almost 60 percent in 1972 to 81 percent in 2001. Moreover, high non-wage labour costs in the Old Länder in 2003 were the highest among OECD countries (e.g. double than the non-wage costs in the United Kingdom), while those in the New Länder were higher than in the English speaking countries (OECD, 2005a). The combination of the age-earnings profile mentioned above, with high non-wage costs (e.g. social security contributions), reflects even *higher* labour costs. In this respect, a further adaptation of the age-productivity profile to the overall costs associated with older workers needs to be achieved. This should promote the retention and hiring of older workers, thus their employment situation as well as their level of competitiveness in the labour market. In particular, low-skilled older workers and older unemployed are the ones who need reductions in non-wage labour costs. In addition, since older workers suffer from low opportunities to on-the-job training mostly due to high costs (Becker, 1963), lowering labour costs through a reduction in non-wage labour costs should also raise the importance of on-the-job training for older workers (OECD, 2005a).

Reservation wage, which is the lowest wage offer a job seeker would be willing to accept from a potential employer, is an important component for examining labour supply decisions (Prasad, 2004), and might negatively effects the job-search of older workers. It is mainly determined by a person's last wage (Björn, 2001) but also by other factors such as, the

obligatory missions required for a job search and the level of unemployment benefits (Christensen, 2005). With respect to the latter, findings from a research done by Prasad (2004) using the GSOEP dataset indicate that the availability of unemployment compensation (UC) in Germany plays an important role in raising the reservation wage of many low-skilled workers. Such findings should be taken into account by labour market policy planners, especially in light of the high rate of unemployment among low-skilled workers.

Older unemployed have generally high reservation wages which is due to higher wages prior to the unemployment period (Dietz & Walwei, 2011; Eichhorst, 2006)<sup>29</sup>. Setting a high reservation wage even after a long period of unemployment reduces the chances of workers to be re-employed which can be partly explained by the obsolescence of human capital as the period of unemployment extends (Björn, 2001). Furthermore, due to the high reservation wage of older workers, the search after a new job may result in wage losses for them (OECD, 2006). According to Zwick (2008) who looked at the earnings losses before and after non-employment for German workers<sup>30</sup>, older workers suffer from earnings losses after long periods of unemployment more than younger workers. These findings can be explained by the higher costs associated with human capital investments mentioned earlier, by higher wages as a consequence of seniority and by frequent job replacement due to dismissal. Furthermore, the existence of generous unemployment benefits in Germany might lower the likelihood of older unemployed to be reemployed (Dietz & Walwei, 2011). This can be explained by the basic job search model which indicates that reservation wages rise when unemployment benefits are generous (Moffitt & Nicholson, 1982). In addition, economic theory also suggests that *longer* periods of entitlement for unemployment benefits will result in longer unemployment durations (Lee & Wilke, 2009). This was confirmed by the research of Lee and Wilke (2009) using the GSOEP dataset that examined the effect of extending the entitlement for unemployment benefits to 32 months on the duration of unemployment in the 1980s. In this respect, reductions in the generosity of benefits as well as in the maximum length of entitlement for unemployment benefits can first, help at reducing reservation wages and second, at reducing the time of unemployment, all of which should help at raising the labour force participation of older workers.

## 2.4 Overcoming Pension Costs: Developments in Policy

“Unless OECD countries adapt their employment and social policies to demographic realities, they will face shrinking workforces and declining prosperity” (OECD report *Live Longer*,

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<sup>29</sup> Reservation wage is also comparatively high for older workers that want to change their job (Eichhorst, 2006).

<sup>30</sup> The research was done using data of the IAB (IABS) for the years 1993 to 2001.

*Work Longer*; 2006). This statement is highly relevant to Germany due to the gradually significant change in the age-structure of the population. Since the 90s, several new institutional changes concerning older workers have been conducted in Germany as to cope with the associated financial implications (e.g. the enormous financial burden on the PAYG system), by “pressuring” older workers to stay longer in the labour market. As mentioned above, the availability of early retirement paths through the pension system and unemployment benefits (among other employment barriers<sup>31</sup>) have contributed over the last decades mainly for the decrease in the labour supply and the consequence high unemployment rate of older workers. Thus, adjusting the systems together with removing obstacles towards reemployment is an important step for raising employment rate of older workers (Duval, 2003).

#### 2.4.1 Reforms in the German Pension System

Since late 80s the pension system in Germany (Germany’s pension system) has been changing slowly, exhibiting reforms that were aimed at easing the economic burden on the statutory retirement system. Prolonging the duration of the working life by *reducing* early retirement incentives and elevating the retirement age were on stake and eventually aimed at phasing out early retirement options until 2016 (OECD, 2005a).

From the beginning, the German public pension system<sup>32</sup>, also known as “retirement insurance” (“Gesetzliche Rentenversicherung”, GRV)<sup>33</sup>, was designed in order to supply retirees with the same standard of living as before retirement<sup>34</sup>. It is based on *pay-as-you-go* scheme (PAYG)<sup>35</sup> which means that the pension is *unfunded and* benefits are paid directly by workers<sup>36</sup> and it is offer to all workers apart from low earners and the self-employed (Börsch-Supan, 2000). The most important pension scheme in Germany is The Old-age Pension, part of the German public retirement insurance, which is a first-pillar pension insurance that is

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<sup>31</sup> According to the Federal Ministry for Social Affairs (1996), early exit options were used by 300,000 older workers in 1995.

<sup>32</sup> This system is used by 90 percent of the German labour force. Self-employed which constitutes 3 percent are self-insured and civil-servant (7 percent) have their pension system (Börsch-Supan & Wilke, 2004).

<sup>33</sup> The term “social security” which is used in the US with respect to the pension system is called in Germany “retirement insurance”. The contributions are referred as “insurance premia” in Germany as opposed to “taxes” in the US. (Börsch-Supan & Wilke, 2004).

<sup>34</sup> The average income of a person during his whole lives was calculated. This is in contrast to the United Kingdom and the Netherlands which provided retirees only with a base pension as part of the social security system (Börsch-Supan & Wilke, 2004).

<sup>35</sup> This scheme is dominated in many other European countries beside Germany, such as France and Italy while in the Netherlands, for example, future benefits are being funded (Börsch-Supan, 2000).

<sup>36</sup> Workers’ contribution is amounted around 80 percent while 20 percent is financed by profits of the federal government. For example, the contribution rate in 1998 was 21 percent of monthly gross income which was equally financed by the employee and employer, which consider as very high (Börsch-Supan, 2000).

offered to the insured depends on the years of insurance he or she was managed to collect. Given the several types of old-age pension (e.g. Normal, long service life, women, older disabled and unemployment) the entitlement for benefits depends on the type of pension and the age of retirement<sup>37</sup>.

Since the pension reform in 1972 the German pension system has become very generous which reflected by a high replacement rate and a flexible retirement age (Börsch-Supan & Wilke, 2004). Long-term insured (35 years of insurance) in Germany were able to gain an old-age pension at an *early* age of 63 (Hegelich, 2006; Buchholz, 2008), hereby retiring at the age of 65 (the mandatory retirement age) is mostly a result of lack of insurance hours (Börsch-Supan, 2000). Moreover, women, unemployed and workers with health problems were entitled to an old-age pension at age 60 (Börsch-Supan, 2000). According to Börsch-Supan (2000), the 1972 reform had a significant influence on the retirement age of those receiving an old-age pension as reflected by the dramatic decrease of 3.5 years immediately after the reform<sup>38</sup>. This contradicts the view that retirement age and the labour force participation of older workers were significantly affected by rising unemployment in that time. As was argued by Börsch-Supan (2000), unemployment rate increased first between 1973 and 1975 and then decreased again in the period till 1980. This view was further confirmed by Riphahn and Schmidt (1997) which pointed to the important of the pension reform in 1972 at determining the retirement age in those years.

Aiming at lowering the share of older workers retiring early, the 1992 reform changed the indexation of pension benefits from gross to net income which resulted in reduced benefits (Börsch-Supan & Wilke, 2004). According to Börsch-Supan and Wilke (2004), overcoming pension costs through the new indexation represents one of the main components of recent reforms which assisted at solving the negative implications of the old benefits indexation. Furthermore, adjustment to pension benefits (started in 1997) was introduced together with a gradual increase of the age for early retirement to 65. In contrast to the benefits adjustment conditions prior to the 1992 Reform<sup>39</sup>, the new “adjustment benefits formula” is calculated based on the years of early retirement. In other words, setting the age of 65 as the “pivotal age”, in the words of Börsch-Supan and Wilke, each year of early retirement will result in a 3.6 percent benefits reduction, while postponing retirement will result in an additional

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<sup>37</sup> The benefits are calculated taking into consideration the factors years of contributions<sup>37</sup>, the average annual earning (“earning points”) and factors related to the type of pension coupled with the age of retirement, all of which represent the “base” of a person’s pension. “A current pension value” is the forth factor which connect between the earnings of a worker and the benefits of pensioners (Börsch-Supan & Wilke, 2004).

<sup>38</sup> The average retirement age of men declined from 1973 to 1981 (from 62.2 years to 58.4 years, respectively). As for women, a slight decrease in the retirement age can be seen between those years (OECD, 2005a).

<sup>39</sup> Benefits are relative to service years (SY). In this respect, less service year result in lower benefits.

increase of 5 percent. In this respect, an increase in the number of older people receiving a normal old-age pension with reduced benefits can be already seen. While in 1998 2 percent of all retirees received a reduced old-age pension, in 2003 their share increased to 56 percent (OECD, 2005a).

The ‘Pension Reform Act 1999’ introduced a *gradual* change in the ages (e.g. from 60 to 65 years) for gaining an old-age pension benefits for women, unemployed, disabled and long-term insured<sup>40</sup>. Furthermore, state subsidies to public pension were raised as part of restructuring the pension system to compensate for future shortages in contributors (De Decken, 2002; Hegelich, 2006). This extra outlay, however, was compensated by an increase in tax from 15 percent to 16 percent (Hegelich, 2006; De Decken, 2002). Moreover, the availability of partial retirement, retirement due to unemployment and retirement for women has been limited<sup>41</sup> (Börsch-Supan & Wilke, 2004; OECD, 2005a). Berkel and Börsch-Supan (2003) predicted that developments in pensions such as those seeing above might lead to an increase in the retirement age of men by 1.8 years and of women by 0.7 years. While the average retirement age for gaining an old-age pension was 60 years in 2002 (Börsch-Supan & Wilke, 2004), recent findings of the Deutsche Rentenversicherung Bund (2010) point to an increase of 1.2 years in the average retirement age among older people receiving an old-age pension between 2000 and 2009 (from 62.3 years to 63.2 years, respectively). For men it was increased by more than a year (1.3) and by 0.6 for women. Those figures illustrate the influence of financial incentives in affecting retirement decisions.

Further developments in the German retirement pension can be seen within the pension reform in 2001, also known as ‘Riester Reform’<sup>42</sup>. Aiming at stabilizing the level of contributors, occupational and private pensions (second and third pillar pension insurances, respectively) were promoted and subsidized by the government<sup>43</sup>. Despite their voluntary feature, occupational and private pensions become increasingly necessary for filling the *pension gap*<sup>44</sup> as a result of the reduction in pension benefits<sup>45</sup>, and maintaining a certain

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<sup>40</sup> Benefits will be received completely at age 65 only up to 2017 (Börsch-Supan & Wilke, 2004).

<sup>41</sup> From January 1<sup>st</sup> of 2000, those options are only available for people who were born before 1952 (DRV Bund, 2007).

<sup>42</sup> This reform can to an act on January 1, 2002.

<sup>43</sup> Employees who pay contributions for Riester private pension are entitled to subsidies from two forms, the first is *direct savings subsidy* (mainly targeted on low income earners and families with children) and the second is *tax deduction from income* for workers with qualifying retirement savings. The latest is profitable for high income earners (Börsch-Supan & Wilke, 2004).

<sup>44</sup> This gap is defined as “the difference between today’s and forecasted future gross pension levels” (Börsch-Supan & Wilke, 2004).

<sup>45</sup> Benefits have been cutting down stepwise from 70 to less than 64 percent of average net wages until 2030 (Buchholz, 2008).

standard of leaving in old age (Wehlau, 2009)<sup>46</sup>. While the contribution rate in the past was adapted to the 70 percent replacement rate in Germany, it was changed with the new adjustment formula introduced by the 2001 Riester reform (Börsch-Supan & Wilke, 2004). Based on the new complex formula, the standard net replacement rate will eventually decrease to 64 percent, a step which will result in fewer incentives to retire (OECD, 2005a). According to Börsch-Supan *et al.* (2012), the growth of Riester pension plans in the first years was high, while demands have decreased significantly in 2003 and 2004. In this respect, further improvements in the Riester pension plans took place in 2004 in order to improve the attractiveness of the second and third pillar pensions. For example, entitlement for occupational pensions was improved in order to ensure its entitlement in case of changing jobs. After 2005 an increase in demands for Riester pensions occurred which lasted till the end of 2008, but then it slowed down again. The question whether the *pension gap* will be narrowed thanks to the shift to a pension system that is partially funded by occupational and private pensions, is highly important. According to Börsch-Supan and Wilke (2004), while the pension savings of younger cohorts<sup>47</sup> will help them to close the pension gap over the years due to a long time left in employment, older cohorts who have a limited time will be able to close this gap only by bypassing the maximum saving rates. Based on a simulation made by Börsch-Supan and Gasche (2010) of pension payments for a worker from both, Riester pension and public pension, equilibrium will be achieved by 2047.

The 2004 pension reform also set a higher age-level for early retirement due to unemployment or partial retirement (Hegelich, 2006) which was started to raise stepwise from 60 to 63 in 2006 (DRV Bund, 2007; Dlugosz *et al.* 2009). This kind of early retirement shall phase out fully in 2016 as well as partial retirement and early retirement for women (Eichhorst, 2006). Furthermore, in 2007 it has been decided to raise the statutory retirement age stepwise beginning in 2012 from 65 to 67 years (DRV Bund, 2007)<sup>48</sup>. In this respect, people born in 1958, for example, will be able to gain retirement benefits only at age 66, while the first group to retire at age 67 is people born in 1964 which will occur in 2029 (Bonin, 2009). Raising the retirement age will eventually result in both a reduction of the population of retired people and an enlargement of the working-age population (OECD, 2012a), which will then cover people aged between 20 and under 67 years. Thus, it can lead

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<sup>46</sup> The occupational and private pensions will account for 35 percent of the total retirement income for cohorts born in 1985 and expected to retire around 2050 (Börsch-Supan & Wilke, 2004).

<sup>47</sup> Born after 1970 (Börsch-Supan & Wilke, 2004).

<sup>48</sup> An increase in the mandatory retirement age of one month in each year and per birth cohort has started in 2012. The birth cohort of 1947 is the first to retire at the mandatory retirement age with additional month (Bonin, 2009).

to a lower old-age dependency ratio (Federal Statistical Office, 2009). The changes mentioned above significantly lower the retirement possibilities for older workers in the future. Since mid-1990s, the average retirement age in Germany has slightly increased by five months - from 60.1 years in 1995 to 60.6 in 2009. For men it increased in nine months from 59.8 years in 1995 to 60.7 years in 2009 and for women it slightly increased from 60.5 years in 1995 to 60.6 in 2009. The average retirement age for both men and women stood in 2009 on 60.6 years (Deutsche Rentenversicherung Bund, 2010<sup>49</sup>).

#### 2.4.2 *Reduced Opportunities for Pre-Retirement Pathways*

Pre-retirement programs in Germany enabled older workers to exit the labour force earlier<sup>50</sup>, thus served as an intermediate stage prior to the early retirement through the pension scheme. Such alternative welfare benefits, however, were also *misused* by older workers who are still able to work as an alternative pathway to an early exit from the labour market.

Unemployment of older workers was for several decades a popular pre-retirement scheme in Germany. Given the unemployment reform in late 1980s<sup>51</sup>, older workers were able to gain early retirement benefits after a long period of unemployment (i.e. 32 months; Buchholz, 2008). These reforms together with the economic crises (e.g. 1974-1975 and 1981-1982), contributed to the low labour force participation rate of older workers in that time, particularly of men (e.g. 35%) and to the unemployment rate of older workers<sup>52</sup>. Such a labour market exit was also used by firms to construct attractive pre-retirement schemes for encouraging older employees to exit the labour market early. For example, the difference between the last net salary of a worker and the payments by the unemployment system was compensated by employers (OECD, 2005a).

Reforms in unemployment benefits make long-term unemployment nowadays less attractive for older workers. Benefits for long-term unemployment ('Arbeitslosengeld I'<sup>53</sup>) were cut down from 32 months to 18 months in 2004 for unemployed aged 55 and older. Subsequently, the unemployed receive the lowered "Arbeitslosengeld II" which came to

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<sup>49</sup> The average retirement age refers to pension due to limited earning capacity and old-age pension.

<sup>50</sup> People left the labour force before age 60 (Börsch-Supan & Wilke, 2004).

<sup>51</sup> In 1987 the period for receiving unemployment benefits has been raised for older people (>54 years) from 12 months to 32 months. This led to the so called "57, 4-Reglung", which means that companies fired their older workers at an age of 57 years and 4 months. The older people received unemployment benefits afterwards until they reached the age 60. After that many retired early due to a long period of unemployment (Buchholz, 2008).

<sup>52</sup> This refers especially to workers aged 55-59 (16 percent for men and 19 percent for women), among them those aged 58 to 60 were the most to use the benefits given by the unemployment system in that time (OECD, 2005a).

<sup>53</sup> Arbeitslosengeld I (ALG I) is the unemployment benefit that is usually paid during the first 12 till 18 months of unemployment and oriented on the former income (Eichhorst, 2006).



affect in 2006 (ALG II<sup>54</sup>) (Eichhorst, 2006; Buchholz, 2007). This act was significant in reducing the unemployment rate of older workers in Germany (Dlugosz *et al.* 2009). Furthermore, the “58er-Regelung”<sup>55</sup> (rule of 58; §428 of the Social Code III) which was mainly used by older male workers working in manufacturing (e.g. low skilled workers) was abolished in 2008. While in the past, this regulation aimed at lowering the labour force participation of older employees aged 58 and over, the new act was aimed at the opposite direction. This contributed to the reliability of the unemployment statistics of older workers aged 60 and above (Dietz & Walwei, 2011).

Developments in unemployment benefits in recent years do not fit the aim of former reforms (Dietz & Walwei, 2011). Two significant steps concerning the unemployment conditions of older workers have been taken in 2008. First, similar to the “58er-Regelung”, a new rule was created for older unemployed that received *unemployment assistance* (UA). Based on this rule, older unemployed are not obligated to register as unemployed if they do not find a new job after one year (Dlugosz *et al.* 2009). This regulation, however, creates again a misleading picture concerning the unemployment statistics of older workers (Dietz & Walwei, 2011). Second, benefits for long-term unemployment (‘Arbeitslosengeld I) were raised again to 24 months for people over 57 in 2008. Such step might slow down the trend towards increased labour force participation of older workers. These new regulations coupled with the availability of early retirement option for long-term unemployed workers until 2016, mean that employers can still offer pre-retirement option for their older staff in the next years.

The availability of the *old-age part-time employment act* enabled the employment of older workers on a part-time contract for a longer time, and by that aimed at slowing down the transition of older workers to retirement in an early stage (Naegele, 1999) and raising the integration of younger workers (e.g. Unemployed and trainees; OECD, 2005a). This new legislation was implemented in 1996<sup>56</sup> and was subsidized for a maximum of six years by the Federal Employment Agency. It was available for people aged 55 and older and can be used as a gradual transfer to retirement by reducing working hours stepwise or as a block model (Eichhorst, 2006; Eichhorst & Sproß, 2005). The use of old-age part-time work increased

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<sup>54</sup> “ALG II” (also called Harz IV) is the unemployment benefit that is either paid after the period of ALG I has run out or if there is no valid claim for unemployment benefit I (i.e. due to too short period of public unemployment tax-deposit). It is not oriented on the former salary but functions as a basic social security. The payment also depends on the effort of seeking employment as well as participating in several measures (Eichhorst, 2006).

<sup>55</sup> This regulation was introduced in 1986. According to this regulation, people older than 58 are not obligated to be available for the labour force and do not appear in the unemployment statistics even though they still entitled to unemployment benefits. It was very attractive for older workers since the costs associated with exiting employment earlier were fully covered by the unemployment insurance (OECD, 2005a).

<sup>56</sup> The German translation of this legislation is: Gesetz zur Förderung eines gleitenden Übergangs in den Ruhestand (law concerning the promotion of gradual retirement; Naegele, 1999).

from 2001 to the end of 2003 especially among older workers aged 60 to 64 (from 100,000 persons to almost 300,000, respectively; OECD, 2005a), and since 2006 it was intensively used by workers aged 55 and older. For example, 15 percent of workers aged 55 and over used this option in 2008 (i.e. 500,000 people on average per year; Wanger, 2009). The so-called block model was mostly used by 90 percent of workers aged 55 and older since 2006 (Dietz & Walwei, 2011; Naegele, 1999). Older workers in the block model work in the first phase in a full time employment while earning only 50 percent of their full time salary. In the second phase of the partial retirement period, which was agreed between the employee and employer, the employee is released from work and receives the 50 percent pay he was not paid while he was working. Due to reduce financial incentives attached to the scheme of partial retirement in 2009 (e.g. end of public subsidies for partial retirement), it became unattractive for older workers. In 2010, for example, the number of employees using the option of partial retirement was 90,000 compared to 100,000 in the year before (Brenke & Zimmermann, 2011).

Labour market exit through a disability scheme is a part of the German retirement insurance which offers people who are not capable of working to be entitled to benefits before the official retirement age, thus is essential for the safety of older workers (Börsch-Supan & Roth, 2010). This insurance, however, might also misuse by healthier and capable people who wish to retire early (Börsch-Supan & Jürges, 2011b). The pathway was very popular in the early 80s, as 68 percent of male workers used this option. Although it has become difficult with the years to gain such benefits, it was still intensively during the 1990s. For example, 41 percent men in 1995 retired using this option compared to 35 percent who retired through the use of old-age pension (Börsch-Supan & Schnabel, 1998). Furthermore, it is mostly common among older workers in Germany as reflected by the age structure of those who retired using this option. While the share of people aged 45 and above among people receiving disability benefits in the OECD stood on 70 percent in 1999, in Germany it was 85 percent (OECD, 2005a).

Due to a new disability reform set in 2001 which re-defined the rules concerning the eligibility for disability benefits, access to the scheme was restricted. During this reform, a distinction is made between full and partial disability based on a person's daily working hours, and a full account is given to the years left until the entitlement for benefits at the early age of 60. Such steps resulted in *decreased* share of people entering retirement through disability insurance. This refers mostly to workers aged 55 to 64 among them those aged 55 to 59 experienced the higher decline (OECD, 2005a). Based on statistics from the last years,

among all workers aged 50 to 64 in Germany, 6.5 percent used the benefits of the disability insurance (DI), compared to 12 percent in countries such as Sweden and the Netherlands and 2 percent in France (Börsch-Supan & Jürges, 2011b). Countries differences in the use of disability insurance can be partly explain by the share of older people in each country. In this respect, high share of older people in a country is more likely to result in a higher share of people using the disability scheme. An alternative explanation which was confirmed by Börsch-Supan (2011a) relates to the structure of the disability scheme in each country. The findings suggest that cross country differences might be explained by the generosity of the disability insurance expressed by different set of rules<sup>57</sup>. Although this pattern of early labour force withdrawal was not a problem for Germany (OECD, 2005a), it might be used strongly in the future due to the reduced options for early retirement through the pension system. In accordance, it is essential to understand the way in which pre-retirement pathways are used and misused by workers in order to design a social system which enables a maximum financial support “under increasingly tight financial budget constraints” (Börsch-Supan, 2011). Therefore excess for premature exits should be restricted to people who actually need them (OECD, 2006).

### 2.4.3 *Developments in Employment Policies for Older Workers*

Policy for increasing the integration of older workers in the labour market has concentrated on improving their employment prospects and removing obstacles to employment. Employers' attitude towards their older staff constitutes a key factor for the success of recent policies. As was mentioned above, the hiring process of older workers in Germany might be negatively influenced by the existent of strict employment protection legislations. While in the USA, for example, the Age Discrimination in Employment Act (ADEA) was created for fighting age discrimination at work (OECD, 2006) a new Employment Protection legislation (EPL) reform was created in Germany in 2003 aiming at raising the chances of older workers through the hiring process. For example, an increase is seen from five to ten full-time workers in the minimum number of employees in which employment protection can be effective<sup>58</sup>. Bauer *et al.* (2004) who examined the influence of this new threshold on employment in small companies (less than 30 workers) using employer-employee dataset of West Germany companies, found no statistically significant effect on the turnover of workers. In other words, in workplaces which are under the protection of EPL, the rate of new workers is lower than in

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<sup>57</sup> This explains 75 percent of the cross-country variation.

<sup>58</sup> Under the Protection Against Dismissal Act (PADA).

companies that are under the new legislation which allows for a threshold. However, as stated, those empirical results are not significant. Nevertheless, these results do not mean necessary that EPL does not have a negative effect on the hiring process of workers in small companies (Bauer *et al.* 2004). Furthermore, changes in the conditions for fixed-term contracts for older workers were taken in 2003 offering employers with better incentives for hiring older workers. Fixed-term contracts were now available to older workers aged 52 and over (a decrease from age 58) and were not conditioned on time and material reason. According to the OECD (2005a), the share of older workers using temporary contracts in 2003 was 4 percent which is still very low compared to the share in OECD countries.

Other transitions took place in the labour market policy that developed to a more *active employment policy*<sup>59</sup>. General activities for supporting the integration of the unemployed receiving ALG I into the labour market were created. In accordance, wage subsidies were introduced in order to lower costs associated with the hiring of older workers e.g. seniority wages (OECD, 2006; OECD, 2012a), therefore serve as an instrument to motivate firms to hire unemployed older persons (Stephan, 2009). In Germany, the use of temporary wage subsidies<sup>60</sup> has increased between 2003 and 2008 (from 180,000 to 250,000, respectively; Rothe, 2007). Furthermore, subsidies employment, such as job creation schemes<sup>61</sup> (JCS), was promoted and aims at helping the unemployed to get a temporary employment. For example, special JCS for long-term unemployed (>12 months) aged 55 years and older were created that offer public wage cost supply between 50 and 70 percent of the salary in the first year and a reduction of 10 percent from the second years year until they reach 30 percent (Eichhorst, 2006). According to the findings of Dietz and Walwei (2011) using data of Federal Employment Agency for the years 2007-2010, the use of wage subsidies by older workers was found to be very high, particularly the use of job creation schemes. These findings indicate that policy is more focused on promoting activities that enable a bridge to retirement (e.g. partial work) instead of promoting the integration of older unemployed (Dietz & Walwei, 2011).

In-work benefits are another policy measure for achieving the integration of older workers aimed at narrowing the gap between wage offers and reservation wages. During the Hartz reforms in 2003, the Federal Employment Agency encouraged unemployed people aged

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<sup>59</sup> Such developments particularly regulated by law in social act two and three (SGB II, SGB III) of the German social security statutes.

<sup>60</sup> One example is the program called Eingliederungszuschuss (Stephan, 2009).

<sup>61</sup> JCS refers to the promotion of “fixed-term employment of unemployed persons in need of support through subsidies towards wage costs” (The Federal Ministry of Labour and Social Affairs, 2006).

50 and above to take lower paid jobs by paying them an income support<sup>62</sup>. Furthermore, employers were exempted from their unemployment tax-deposit when hiring a person over 55 years old until the end of 2007. This measure, however, was hardly used (Eichhorst & Sproß, 2005; The Federal Ministry of Labour and Social Affairs, 2006). In 2007, a special integration subsidy for older people (from 50 years on) was implemented (§421f SGB III). This subsidy is paid at least for 12 months (up to 36 months) with a wage cost supply of at least 30 percent and at most 50 percent of the salary. Based on the statistics of the Federal Employment Agency (2007-2010), an increase can be seen over the years in the use of in-work benefits, but still the numbers are low which indicate the low importance (Dietz & Walwei, 2011).

Programs for promoting vocational education and training for older workers in Germany have been taken in the last decade as further steps for improving the employability of older workers. In 2002, a special support of training activities of older workers (from 50 years on) was implemented in which the Federal Employment Agency covers the costs of further training in companies with less than 100 people (Eichhorst, 2005). Since 2005 this subsidy is also available for people from 45 years on who are working for a company with less than 250 employees (§417 SGB III). In 2006, the Federal Labor Office launched the program WeGebAU<sup>63</sup> to maintain and improve the employability of older and less qualified workers. As part of this program, workers aged 50 and older who are working in small to medium sized companies benefited from the training funding (Lott & Spitznagel, 2010). The training cost have been fully paid by the Federal Labor Office if the employer keeps on paying wages while the employee participates in a required and job-related training activity (BMBF, 2006).

Other initiatives were targeted on *all* workers in the promotion of lifelong learning. In 2001, the Federal Ministry of Education and Research was launched a program called *Learning Regions* which offered funding to regional networks that develop programs for promoting further education and training (BMBF, 2004). It is aimed to raise cooperation between firms and training institutes, creating additional networks. According to the OECD (2005a), although such a program was not originally designed to promote the lifelong learning of older workers, the employability of workers could be enhanced till retirement through the use of these programs. Furthermore, new innovation in 2003 was targeted on the unemployed who were offered with training *vouchers*. The unemployed can decide on the kind of training

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<sup>62</sup> This measure is regulated by law in §421 j SGB III. But due to difficult and high administrative efforts as well as a lack of awareness it is hardly used (Eichhorst, 2006).

<sup>63</sup> Weiterbildung Geringqualifizierter und beschäftigter Älterer in Unternehmen = continuing vocational education and training for low-qualified and older workers.

they want to take part in and the training provider (Bellmann & Leber, 2004). In 2008, a program called *Continuing Education Grant* (Bildungsprämie) was launched which was sponsored by the Federal Ministry of Education and Research together with the European Union and the European Social Fund. This grant supports the funding of further education and training for individual and can be either gained as a voucher (The Grant Voucher<sup>64</sup>) or based on a savings plan (The Continuing Education Savings Plan<sup>65</sup>; BMBF, 2010).

## 2.5 The Employment Situation of Older Workers in Germany

A great deal of impact can be attributed to the promotion of early retirement institutions during the 1980s at reducing the share of older workers in the labour market. While in some countries as in the United Kingdom, United States, Denmark and Sweden, this trend was relatively less common, in countries such as Germany, France and Italy, early retirement schemes were commonly used (Van Dam *et al.* 2009). This picture, however, has been changing in recent years due to the various institutional developments mentioned above, aimed at reversing early retirement trend through the encouragement of longer employment. Nevertheless, the question whether older workers will be willing to stay employed or will look for alternative ways to get out of employment despite policy pressure is still highly relevant nowadays.

The target for most European countries<sup>66</sup>, based on the new goal set in 2000 by the Lisbon European Council, was to raise the employment rate for people aged 55 to 64. The EU employment rate for people aged 55 to 64 has increased since 2000 by almost 9 percent, reaching to 46 percent in 2008<sup>67</sup>. This however, is still below the goal of 50 percent set in 2001 by the Stockholm Council (European Commission, 2012). In that respect, only eleven European countries have reached the 50 percent Stockholm target in 2009, leaving behind a considerable number of countries with a 10 percent lower employment rate such as France, Hungary, Italy and Luxembourg. Norway, for example, differs from other European countries

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<sup>64</sup> This is provided to, both, employed and unemployed persons if their annual income “does not exceed 25,600 euro. 50 percent of the costs of continuing education are paid by the Federal Government up to a maximum of 500 euro” (BMBF, 2010).

<sup>65</sup> People are able to “withdraw savings accumulated under the Capital Formation Act (VermBG) and use these funds to finance continuing education measures - even before the end of the blocking period. They do not lose their employees’ savings premium. This makes it easier to finance more extensive and often longer further training courses.

<sup>66</sup> The new goal set by The Stockholm European Council for the EU countries in 2001 to be achieved in 2010 was to raise the employment rate to 50 percent for persons aged 55-64 (European Commission, 2012).

<sup>67</sup> An increase can be seen in the employment rate of women aged 55-64 from 27 percent in 2000 to 38 percent in 2009. The employment rate of men from the same age group across the EU increased from 47 percent in 2000 to 55 percent in 2009 (Federal Statistical Office, 2011).

by having the highest employment rate of people aged 55 to 64, and having a higher proportion of older women in the labour force. This can be explained by the low unemployment rate of older people, better conditions for part-time employment and statutory retirement at the age of 67 (Midsundstad, 2011).

As for Germany, the employment rate of older workers has been low for several decades compared to most European countries, particularly that of men (OECD, 2005a). In 1970 for example, 87.8 percent of older man aged 55 to 59 and 69.5 percent of those aged 60 to 64 have participated in the labour force. Since then these numbers were gradually decreased as 81.1 percent of older man aged 55 to 59 and 35.1 percent aged 60 to 64 participated in the labour force in 1990<sup>68</sup>. This is significantly low compared to other OECD countries such as Japan, which reported 73 percent labour force participation among men aged 60 to 64 in 1990 (Rein & Jacobs, 1992). Furthermore, the employment status of older workers was strongly affected by the reunification of Germany, mainly by the increased inflow into retirement during the 1990s for both men and women. While in the New Länder women were used to work until retirement age, following the reunification many women retired earlier, probably due to the special early retirement schemes for women at the age of 60<sup>69</sup>. At the same time, the share of men retiring early was *increased*, especially among people from the New Länder, due to the exposition to pre-retirement options at the time (OECD, 2005a).

### *2.5.1 Increased Labour Force Participation: Reversed Trend of Early Retirement*

The overall improvement in the employment situation of older workers in the labour market in recent years is in part, a result of the economic growth in Germany in 2005 (Dietz, 2008). Furthermore, this positive picture could be also observed in the late 1990s, much before the economic growth, when the average retirement age has started to rise, implying on the significant affect the institutional reforms had on the employment situation of older German workers (Dietz & Walwei, 2011). While only a small increase in the participation rate of older German workers can be seen until 2003, partly due to the change in the age composition among older workers<sup>70</sup> (OECD, 2005a), there is a significant improvement for workers aged 55 to 64 in recent years (OECD, 2012b). From 37 percent in 2000 to 52 percent in 2007 and 56 percent in 2009, the Lisbon's aim - increase labour force participation of older workers to

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<sup>68</sup> According to the Federal Ministry for Social Affairs (1996), early exit options were used by 300,000 older workers in 1995.

<sup>69</sup> For more details, see section 2.3.1.

<sup>70</sup> In 2003, workers born between the years 1939-1943 have reached age 60-64 (OECD, 2005a).

50 percent - has been achieved (Federal Statistical Office, 2011)<sup>71</sup>. In 2010, the employment rate of workers aged 55 to 64 stood on 57 percent (OECD, 2012b). The increase from 2000 to 2010 was the most prominent for older workers compared to the other age groups, and was the third highest among all OECD countries (OECD, 2012a). While the employment rate of older German workers is already above the OECD average (54 percent; OECD, 2012b) it is, however, still behind the leading countries (e.g. Sweden and Norway, around 70 percent; OECD, 2012b) with respect to the performance of older workers in the labour force (OECD, 2012a). These figures apply to the development in the labour force participation of workers subjected to social insurance contributions (sozialversicherungsspflichtige Beschäftigte), representing 90 percent of the German labour force (Börsch-Supan & Wilke, 2004). In addition, data of the Federal Employment Agency (2010) presented in figure 1<sup>72</sup> reveal that while the employment rates of workers aged 55 to 59 and of workers aged 60 and above were significantly increased between 2004 to 2010 and since 2006 and on (respectively), it was steadily decreased for workers aged 35 and younger and for the middle age group (i.e. aged 35 to 54) from 2002 and 2006<sup>73</sup> (respectively). This positive trend in the labour force participation of older workers was additionally confirmed by Dietz and Walwei (2011) which also considered the demographic effect, such as the growing share of older workers in the population, through an adjustment of the absolute numbers. In other words, the additional findings (through calculations) removed any doubts concerning the certainty of the increase in the labour force participation of older workers. It should be noted however, that despite improvement in the employment rate of older workers in Germany as well as in EU countries, the employment rates of younger workers aged 25 to 54 are still much higher than those of older workers (Federal Statistical Office, 2011). This gap might imply on additional aspects related to the participation of older people which should be taken into consideration (Dietz & Walwei, 2011).

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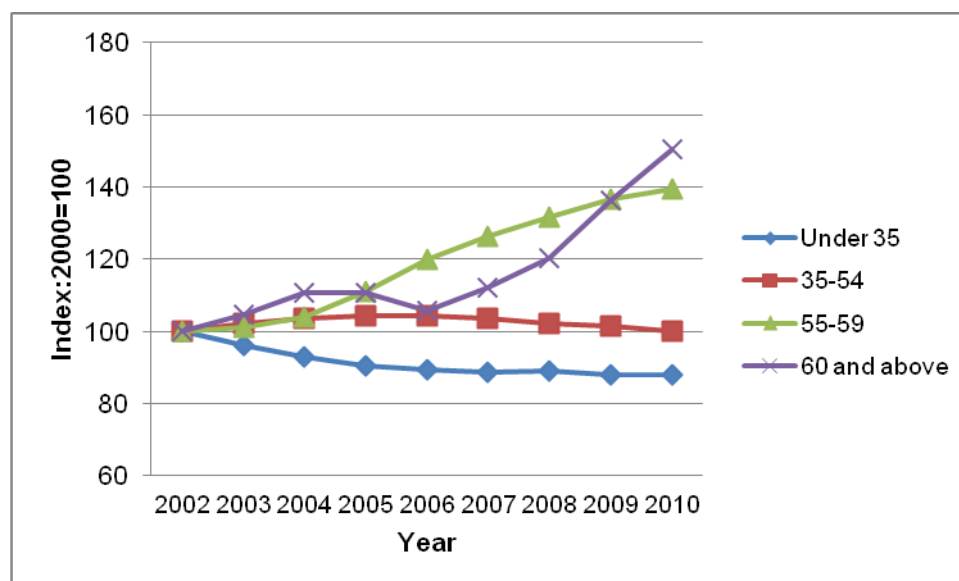
<sup>71</sup> Over the last decade, gender differences in employment rate of workers aged 55 to 64 have decreased: 46 per cent men and 29 per cent women were employed in the German labour market in 2000, compared to 64 per cent and 49 per cent in 2009, respectively (Federal Statistical Office, 2011).

<sup>72</sup> According to Dietz and Walwei (2011), the number of workers aged 50 and over increased by 2.1 million to 7.3 million (roughly).

<sup>73</sup> According to the OECD statistics, a steady decrease can be seen for workers aged 15 to 24 years old between 1987 and 2007 in Europe (from 57 percent to 45 percent, respectively), which explain the increase in the age of the labour force (OECD, 2009).



*Figure 1:* Relative growth of employment of workers subjected to social insurance contributions by age group (2002-2010)



Source: Federal Employment Agency, own calculations

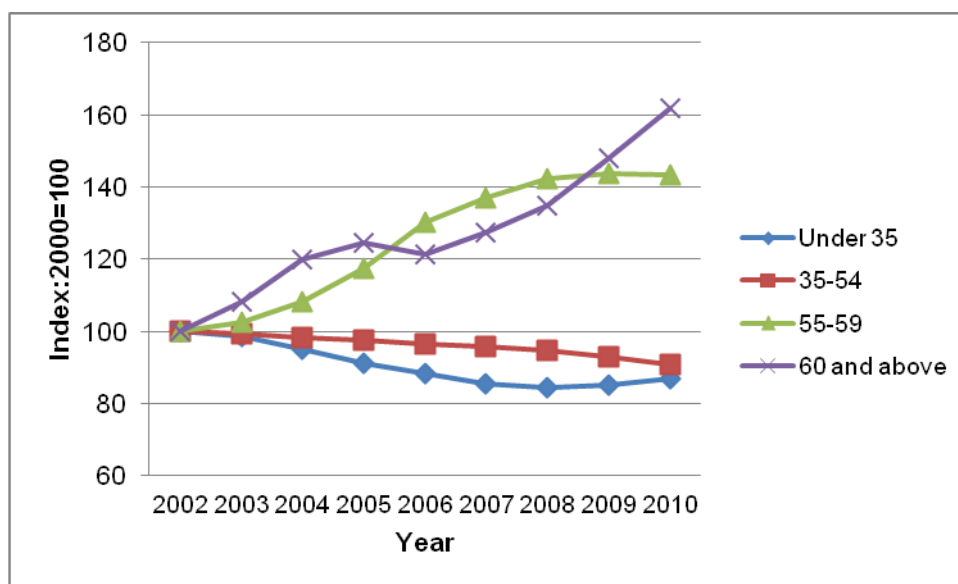
The development in labour force participation of civil servants<sup>74</sup> should be looked at separately as they are entitled to a special pension scheme (consists of first and second pillar benefits) which is more generous than the general pension scheme (OECD, 2005a)<sup>75</sup> and therefore might be affected differently by policy change. Older workers in the German labour force can be found especially among civil servants and self-employed workers<sup>76</sup>. Civil servants have special work conditions that lower their chances to resign or to be dismissed by their employers. Fewer turnovers are resulted in a low fluctuation rate among these workers (Brenke & Zimmerman, 2011). Similar to the trend shown in figure 1, the labour force participation of civil servants aged 55 to 64 increased between 2002 and 2009, while the labour force participation of workers belonging to the middle-aged group and those aged 35 and younger decreased (figure 2; Statistisches Bundesamt, 2010).

<sup>74</sup> Civil servants in Germany constitute 7 percent of the labour force (Börsch-Supan & Wilke, 2004).

<sup>75</sup> While the benefit base of the private sector is the *net* income, it is the *gross* income in the case of civil servants. This results in higher pensions for civil servants (25 percent) than of workers in the private sector (Börsch-Supan & Wilke, 2004). Furthermore, high replacement rate (75 percent of gross income) which can be reached with 40 years of service is another feature represents the generosity of civil servants pension system compared to the private sector pension.

<sup>76</sup> The decision for self-employment requires enough work experience and therefore this group of workers tend to be older (Brenke & Zimmermann, 2011).

Figure 2: Relative growth of employment of civil servant workers by age group (2002-2010)



Source: Federal Employment Agency, own calculations

In recent years we observed a sharp increase in the participation of older women aged 55 and above, which has strongly contributed to the positive development in employment rates of workers (Boersch-Supan & Juerges, 2011). For example, 37 percent of women aged 55 to 64 were employed in 1998 compared to 45 percent in 2010. This can be mainly attributed to the increased importance of part-time employment among older female. In this respect, 44.7 percent women and 9.8 percent men among workers aged 55 to 64 in 2010 were working on a part-time contract (Dietz & Walwei, 2011)<sup>77</sup>. In comparison to the OECD, participation rates of men aged 50 to 64 in Germany in 2003 were much lower (66 percent) than the average of the 30 OECD countries, while the participation rate of women from the same age group was much closer (almost 50 percent) to the average of the OECD countries (OECD, 2005a).

Educational attainment is another important indicator for labour force participation, as statistic data indicate a higher participation rate of older workers with high level of education than their low educational level counterparts in Germany and in the EU countries (Federal Statistical Office, 2011). This refers to all age groups which mean that age does not reduce the likelihood of employment (Dietz & Walwei, 2011). Furthermore, the increased educational level among workers aged 55 to 64 in recent years (see section 2.2.3) has contributed to broadening the employment gap, as high level of education is positively associated with longer employment (Federal Statistical Office, 2011). In 2002, 74.5 percent with tertiary

<sup>77</sup> A general increase in the share of all part time workers aged 55 to 64 can be observed, from 17 percent in 2000 to 25.6 percent in 2010 (Dietz & Walwei, 2011).

education aged 50 to 64 have participated in the German labour force compared to 42.2 percent with primary education. In comparison to the high participation rate among workers aged 25 to 49, it is possible to conclude that older low-skilled workers are much more adversely affected than younger low-skilled workers<sup>78</sup> (OECD, 2004b). Low employment rate of older low-skilled workers can be explained by the fact that early retirement is much *common* among low-skilled workers in Germany. In this respect, since blue-collar workers normally deal with physical work during their working careers, they have higher likelihood to retire early (Dittrich *et al.* 2011). Such decisions might also be induced by industrial developments (e.g. technological advances) in recent decades that raise the demand for high skilled workers and resulted in an increased employment gap between the high and low educated workers (OECD, 2004b). On the contrary, white-collar workers are required to be experienced and thus have established networks which were acquired along the years and are highly appreciated nowadays due to the transition to a knowledge-based economy. Thus they are more likely to stay beyond retirement age (Dietz & Walwei, 2011).

### 2.5.2 *Improvements of Unemployment Rates*

According to the economic theory, the attractiveness of unemployment rises with the generosity of unemployment schemes (Moffitt & Nicholson, 1982). This theory partly explains the high rates of unemployment among older German workers in recent decades, as they were offered with attractive financial packages by the German unemployment system. Developments in the unemployment system in the form of benefits reduction have significantly affected unemployment rates in Germany in recent years (Dlugosz *et al.* 2009). Data of the Federal Statistical Office (2011) revealed that the unemployment rate of people aged 55 to 64<sup>79</sup> in 2009 was 8 percent, compared to the 7.7 percent of the total German population. Specifically, the unemployment rate among workers aged 55 to 59 has decreased from 17 percent in 1997 to 8.2 percent in 2009. As for workers aged 60 to 64, it was first increased from 7.7 percent in 1997 to 11.2 percent in 2004, then gradually decreased to 7.5 percent in 2009. The unemployment rate of workers aged 55 to 64 in 2010 was 1.6 percent above the average unemployment rate of the OECD countries and 0.6 percent points above the total unemployment rate in Germany (OECD, 2012). The improved unemployment rate among workers aged 55 to 59 is largely a result of developments in policy such as the old age

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<sup>78</sup> Among workers aged 25 to 49, 93.6 percent with tertiary education participated in the labour force compared to the high rate of 74 percent among workers with primary education (OECD, 2004).

<sup>79</sup> According to the International Labour Organization (ILO), 475,000 people aged 55 to 64 were unemployed in 2009 (in this context, unemployed are people who are not working but are looking for a job).

part-time employment scheme which conducted in 1996 (OECD, 2005a). Furthermore, the 58er-Regelung mentioned above, in which older people are no more obligated to be available for the labour force, has contributed as well for the decreased unemployment among this age group.

With respect to gender differences, the unemployment rate of older men and women is more or less similar, with a slight improvement over the years towards women aged 55 to 59. For men of the same age group, unemployment was decreased from 15.7 to 8.2 percent (from 1997 to 2009, respectively) and for men aged 60 to 64, it was increased from 7.5 to 12 percent (from 1997 to 2009, respectively). A similar pattern can be seen for women aged 55 to 59 from almost 19 percent to 8.3 percent (from 1997 to 2009, respectively). For women aged 60 to 64, the unemployment rate was decreased between 1997 and 2001 (from 8.1 to 6.4 percent, respectively), then increased again to 10.5 percent in 2006 and to 7.5 percent in 2009 (Federal Statistical Office, 2011). The abolition of the 58er-Regelung in 2008, which has contributed to the visibility of older unemployed aged 58 and above, resulted in an increase in the share of this age group in 2010 (e.g. 280,000 of unemployed aged 58 and older in 2010, a doubled yearly average). In addition, findings of the latest OECD report concerning Germany indicate that the unemployment rates of workers aged 50-64 with tertiary education are much lower than for the less educated (OECD, 2012a). Taking into consideration the correlation between employment rates of older workers and high level of education mentioned above, it is essential to invest in the training of older workers as it contributes at improving their employment situation (OECD, 2012a).

Despite the indications on a decrease in unemployment rate, the likelihood of older people (aged 50 and above) to be employed again is still very low (13 percent; Dietz & Walwei, 2011). This is confirmed by the *Microzensus*, as 480,000 unemployed people aged 55 and older were seeking a job in 2009. In 2010, the transition rate of older unemployed back to employment was 3.9 percent compared with 7.2 percent of younger unemployed (e.g. aged 25 to 49). The transition rate for older workers aged between 55 and 59 was 3.3 percent and for workers aged 60 and above was 2.1 percent (Dietz & Walwei, 2011). As a result, the period of unemployment among older workers has extended. Long-term unemployment rate (one year and more) among older people aged 55 to 64 in Germany is higher than of younger workers, although unemployment rate is more or less the same. In 2009, 62 percent of unemployed aged 55 to 64 were long-term unemployed, compared to a general unemployment rate of only 46 percent (Federal Statistical Office, 2011). These figures illustrate another barrier for older workers in going back to work, but might also indicate the lack of willingness

among older workers to be hired again. The latter can be the results of various factors, mainly financials, which still exist and raise the attractiveness of unemployment as a bridge to retirement.

## 2.6 Summary

The extent to which new policies will cause to a useful change in the retirement behaviour of older workers depends on the willingness and openness of, both, employers and older workers. While studies still indicate on ageism attitudes from the side of employers (OECD, 2011), recent improvements in labour force participation of older workers in Germany indicate the success of policy change in affecting the behaviour of employers and employees. Nevertheless, the latest report of the OECD concerning Germany (2012a) indicates that despite recent reforms for diminishing early retirement options, some opportunities are still available (e.g. entitlement of unemployment benefits for persons aged 58 and older for 24 months). Thus, further policies for enhancing the labour force participation of older workers are needed (OECD, 2012b). For example, the duration of unemployment benefits for workers aged 58 and above (e.g. from 24 months) should be reduced in order to decrease the number of older workers choosing unemployment over work. Further policies should concentrate on raising labour force participation of *low income* workers. While incentives (e.g. low pension level) to work for workers aged 60 to 64 are higher in OECD countries, low income workers have fewer incentives to stay longer in employment as the gap between the pension level and the income assistance level is large. The latter is consequence of their accumulated pension rights which may not be higher than the social assistance level. One recommendation is to change the pension system to be more *progressive*. This can be done, for example, by raising the value of accumulated points of low income workers in order to encourage longer work period. Similarly, giving additional benefits for people who choose later retirement and lower benefits for those choosing early retirement should also encourage longer labour force participation among older workers. Further suggestions are concentrated on renewing the skills of older workers through participation in training. While the employment opportunities of older workers might be negatively affected by their less up-to-date skills, participation in lifelong learning will positively affect the employment chances of older German workers (OECD, 2012b).

### 3 Investments in the Training of an Ageing Labour Force

Further training has become an essential component in workers' human capital (Brunello, 2001) as it contributes to economic performance and growth (Bassanini *et al.* 2005; Picchio & van Ours, 2011). Rapid changes in technology, the gradually shift of Germany towards becoming a service economy and the ageing of the German labour force has led to the creation of new jobs and aroused the need for high-qualified workers (OECD, 2012a) able to cope with high levels of competitiveness and employment. Countries which are characterized with low fertility rate, as Germany, are in a much greater need for trained workers due to constant decline in available skilled workers (OECD, 2005a). Thus, overcoming the shortages of highly qualified workers by raising the investment in the human capital of all workers will play a central role in the future.

Having a future labour force constructed mostly of older workers may raise questions regarding their level of skills. Investing in their training constitutes an essential tool for improving their educational level, a better adaptation to new work requirements, prevention of skill obsolescence (OECD, 2012a), improve employability (D'Addio *et al.* 2010) and preventing them leaving the labour market early (Fouarge & Schils, 2009). Of particular interest are older low-skilled and industrial workers who represent the main target group for recent pension and labour market policies, as they are the most affected by early retirement institutions. This would require a greater effort from policy planners to enable the upgrading of low-skilled older workers which suffer from a lack of training (OECE, 2005a).

The following chapter begins with a general overview on the various aspects associated with the theory of human capital investments, followed by a more specific look at the aspects of the theory with regard to older workers. It then proceeds to the literature on training participation and discusses the case of older workers and the problems associated with their low training incidence. The chapter continues by discussing the late developments in the training participation of older workers in Germany. The last part of the chapter discusses the modern concept of employability and the importance of further training at raising the employability of older workers.

### 3.1 Human Capital Investment: Theory and Concepts

#### 3.1.1 *The Human Capital Theory: The Concept of Training*

The Human Capital Theory framed by Becker (1975)<sup>80</sup>, is an economic approach for analysing skills (Mincer, 1989a) which is appropriate for understanding the viability of employee participation in training (Becker, 1993). According to this theory, the decision to invest in training has financial constraints as it considers the costs and profits associated with the training. When the costs are lower than the expected returns, both employers and employees will invest in training (Becker, 1975; Mincer, 1989b). The costs include the length of the training and the level of effort invested by the trainees and employers, coupled with the material and equipment spent (Becker, 1993). Returns on training are divided into two kinds: monetary and non-monetary returns. While the monetary returns refer to an increase in worker's productivity which is expected to elevate his future earnings (Lynch, 1992; Mincer, 1989a; Pischke, 2001; Evertsson, 2004), non-monetary returns refer to returns such as promotion, employment stability (Büchel & Pannenberg, 2004) and job security (Bassanini, 2006; Lang, 2012), all of which are expected to rise with the training investment. Although there are only few empirical studies concentrating on the relation between training and non-monetary returns, recent studies have pointed to a weak correlation between training and wages which is in contrast to the human capital theory (Pischke, 2001; Leuven & Oosterbeek, 2008; Görlitz, 2011).

A distinction is made by the human capital theory between general and specific training. General training is characterized by its transferability, meaning it can be utilized in several firms in addition to the one providing the training (O'Connell & Byrne, 2012). Thus, workers' marginal productivity can be raised in other firms as well, and will result in an increase in earnings in a competitive labour market (Becker, 1964; Acemoglu & Pischke, 1998). The human capital theory hypothesizes that general training will not be paid by employers but that employees will either directly pay for general training or by receiving lower wages during the time they are being trained. Specific training is considered a much better investment for employers since it can be used only within the specific firm (Becker, 1993)<sup>81</sup>. In accordance, employers will be able to cover the costs of the training investment (Schleife, 2008) while general training will be provided only when the costs are free (Becker, 1993). In other words, the optimal investment is achieved when the marginal costs of training

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<sup>80</sup> Becker, G. S, (1962). "Investment in Human Capital: A Theoretical Analysis", in: *The Journal of Political Economy*, Vol. 70, No. 5, Part 2: Investment in Human Beings, p. 9-49.

<sup>81</sup> In some cases, job-specific skills can be used in other firms as well that have the same type of work as in the firm where the skills have been acquired (De Grip *et al.* 1998).

are equal to the marginal benefits which start with the training and continue until the end of the working relationship (Acemoglu & Pischke, 1998). On the contrary, general training would be a much reasonable investment for employees rather than specific training as long as they can achieve higher returns from the training investment than from other investments (Pfeifer, 2008). Nevertheless, new evidences point to the importance of markets imperfections with regard to training. In such markets, general training will be provided and financed by employers, and employees who participate in general training will not receive lower wages (Loewenstein & Spletzer, 1999; Acemoglu & Pischke, 1999; Pischke, 2000)<sup>82</sup>. That means that labour markets imperfections allow for part of the training returns to be captured by employers and by that, to serve as incentives for employers to invest in general training. Another important aspect discussed by the human capital theory is job mobility which is very relevant due to its interrelation with training (De Grip *et al.* 1998). While participation in training directly raises the human capital of workers, job mobility may indirectly raise the need for learning new skills (De Grip *et al.* 1998). According to the human capital theory, the mobility of workers is affected by whether investment in human capital has occurred and whether the investment is general or specific. It is assumed that workers with work-specific skills are more likely to have low job mobility and therefore have a higher likelihood to stay within their firm, while workers with more general skills are more likely to leave the firm, thus have higher job mobility<sup>83</sup>.

### 3.1.2 *The Investment Decision: Older Workers in View of the Theory*

Building upon the human capital theory, there are two distinguished perspectives concerning the decision to invest in further education and training of older workers that should be considered: employers and employees. From the employer point of view, investment in the

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<sup>82</sup> In Germany, general training in the form of *apprenticeship* training is offered voluntarily by firms to all workers who enter the labour market. Based on this special case<sup>82</sup>, Acemoglu and Pischke (1999) developed a theory which indicates on the *willingness* of firms to invest in *general* training despite the associated costs. Such an investment on the side of employer can be explained by the existent of labour market *imperfection*, as opposed to the perfectly competitive labour market assumed by the human capital theory (Acemoglu & Pischke, 1999; Bassanini *et al.* 2007). According to their arguments, compressed wage structures are arising due to union organization, i.e., cause to a situation where returns on training investment can be partly captured by employers.

<sup>83</sup> The *Job Matching Theory* also addresses the issue of job mobility while offering a different perspective. The theory argues that “workers are not equally well suited for all positions” (Barron *et al.* 1989) and thus focuses on the match between the worker and the characteristics of his job and refers to the quality of this match. The latter determines the productivity and the wages. In accordance, a good match is more likely to lead to workers’ decision to stay at the current job, whereas a bad match might encourage workers to look for a new job, meaning for “a better match” (De Grip *et al.* 1998). Therefore, job mobility is a result of imperfect match between workers and jobs. Such imperfection matches are further accelerated nowadays by technological and organizational changes.



human capital of older employees is not worthwhile since the net training costs associated with their training are much higher than those of younger employees (Becker, 1975). This can be illustrated by several reasons. First, older workers have shorter working time left. Consequently, the likelihood to return the investment is low (Becker, 1975; Mincer, 1989; Bartel & Sicherman, 1993; Schleife, 2008). Second, the return from training at higher ages is lower as a result of depreciation in the human capital of older employees which is mainly affected by skill obsolescence. For this reason, the higher the rate of technical changes in a specific firm, the higher the depreciation rate within employee's human capital. Given that, older employees often have less update and valuable skills than their younger counterparts (Schleife, 2008; Dieckhoff, 2007). Third, older employees are often conceived by their employers as less trainable because of their age, in opposed to younger workers (Harper, Khan, Saxena & Leeson, 2006; Warwick Report, 2006). Fourth, employers also prefer to invest in further education and training of their educated employees since lower training costs are associated with high qualified people (Brunello, 2001; Slowey, 2008; Pfeifer, 2008). It has been argued that highly educated employees have spent more years in formal education therefore they have much more knowledge base than non-educated employees and are more likely to gain knowledge in the years they are working. In general, younger employees nowadays are more educated compared to older employees, therefore it is more likely that they will participate in further training programs more often than their older counterparts (Lesson, 2006).

Based on the human capital theory, several predictions about the training decision of older employees can be derived: First, older employees have fewer incentives to invest in further education and training activities, consequence of the short time they got left in the labour force (Bartel & Sicherman, 1993). Second, technical change will motivate older employees not to take part in training activities. The high amount of trainings they will be asked to participate in might not feel as a worthwhile investment for them (Yeatts, Folts & Knapp, 1999; Bartel & Sicherman, 1993; Ahituv & Zeira, 2008). Third, the age discrimination seems to be a central factor affecting their decision not to participate in training and leave their job, as employers tend to invest in training younger employees (Davey & Davies, 2006,; Harper, Khan, Saxena & Leeson, 2006).

### *Job Mobility and Older Workers*

Age is an important determinant of job mobility (Groot & Verberne, 1997). Based on the human capital theory, over the years, older workers gain a lot of experience and human capital

which may result in a firm-specific productivity (Becker, 1975). Such knowledge and experience cannot always be used in another job, meaning it is not transferable as general knowledge. As such, older workers exhibit lower job mobility than younger ones, leading to longer average job tenure (Groot & Verberne, 1997). Taken together, job mobility of older workers will result in a lower wage gain than for younger workers (Mincer, 1962). The job matching theory postulates that younger workers are more mobile than older ones, consequence of lack of experience which eventually narrows the information available for job-worker match. Less training may lead to a bad match which can promote the hiring of younger workers. As for older workers, matching jobs based of mostly specific skills is difficult and might lead to a long job search (Barron *et al.* 1989).

The human capital theory postulates a relation between depreciation of human capital and retirement. According to that, human capital depreciation that results from non-participation in training of older employees will accelerate retirement. Without further training, older employees will gain lower skills level which will reduce the demand for them in the labour force (Schleife, 2008) and enhances them to retire (Hirsch, Macpherson & Handy, 2000; Leeson, 2006; Davey & Davies, 2006). Lack of further training or promotion may encourage older workers to retire early, especially in the face of constant change when education and training are necessary for their jobs (Harper, Khan, Saxena & Leeson, 2006; Davey & Davies, 2006; Howze, 1996; Ahituv & Zeira, 2008). This implies that the “mobility” of older workers is a one way out of the labour force. This topic is highly relevant nowadays as mobility is seen as an essential part of workers employability (de Grip *et al.* 2004)<sup>84</sup>.

### 3.2 The Incidence of Training

The increase in importance of continued training is reflected by the rise in the incidence of training in recent decade across the OECD countries (OECD, 2005c). According to the report *Education at a Glance* (2005)<sup>85</sup>, the proportions of companies providing formal training in the Netherlands, for instance, increased between 1993 and 1999 (from 46 to 82 percent, respectively; OECD, 2005c). In Germany, the percentages of firms providing formal training increased between those years but in much lesser extent (from 60 to 67 percent, respectively). The incidence of training among German employees was increased from 24 to 32 percent (between 1993 and 1999, respectively) which is much lower than the rate of participation in

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<sup>84</sup> More information on this topic is presented in section 3.3.

<sup>85</sup> The data contain information from the European Communities 2002, European Social Statistics and Continuing Vocational Training Survey (CVTS 1 & 2) for the years 1993 and 1999 (OECD, 2005c).

countries, such as Denmark with 53 percent participation in 1999 (O'Connell & Jungblut, 2008). Findings of Riphahn and Trübswetter (2007) based on the German Socioeconomic Panel (GSOEP) data for the years 1993 and 2004 show that the incidence of training (taken during the last three years) was increased for workers between the ages 25 to 65. Likewise a recent study conducted by Grund and Martin using the SOEP for the years 1989 to 2008 indicate on an increase in the incidence of training (taken in the last year) in Germany. Nevertheless, findings of the European Union Labour Force Survey indicate a 6 percent participation rate in further education and training (taken during the four weeks prior to the survey)<sup>86</sup> of workers aged 25 to 64 in Germany in 2004, which is much behind the Nordic countries and Switzerland. Sweden, for instance, the most leading country, had the highest rate of participation in training in 2004 (35 percent). Furthermore, with more than 45 percent training participation rates and above 30 annual hours of training per worker in 2004, Scandinavian countries together with France and New Zealand represent the most leading countries with respect to the incidence of training (OECD, 2004b).

### 3.2.1 *The Determinants of Training: A General Overview*

The literature on the incidence of training reveals the important of individual, job, firm and institutional characteristics in determining workers' participation in training. Among the individual characteristics, gender differences are apparent with men having a higher probability than women to participate in training (Booth, 1991; Green 1991; Lynch, 1992; Blundell *et al.* 1996; Arulampalam & Booth, 1997; Evertsson, 2004). Since the training investment is associated with costs, employers prefer to invest in men as their probability of staying within the firm is much higher than of women, hereby associated with low training costs as opposed to the higher costs associated with women training. In this respect, less training among women lowers their opportunities for promotion as well as for gaining higher wages. Moreover, women are more likely to participate in specific training whereas men are more likely to take part in general training which is more rewarding (Evertsson, 2004). In Sweden, for example, gender differences in training participation might be a result of employers' discrimination, since most training takes place during work time is financed by the employers (Evertsson, 2004). In contrast, Bassanini *et al.* (2005) found gender differences, although small, with women having a higher likelihood than man to take part in training. These results, however, varied between countries.

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<sup>86</sup> Training refers to the four weeks prior to the survey.

Studies indicate that workers on temporary contracts and on part-time job are less likely to take part in training (Blundell *et al.* 1999; Bassanini *et al.* 2005). Furthermore, small and medium sized enterprises show a below-average training level (Blundell *et al.* 1999; Bellmann & Leber, 2008), while big enterprises are likely to show the highest participation in training (Green, 1991; Shields, 1998; Grund & Martin, 2010). For example, statistics of the IAB (2006) show that the demand for training courses increases with company size. While all large firms that participated in these studies offer training to their employees, only 4 out of 10 companies with 49 employees and less do so. Nevertheless, the results show that the small numbers of SMEs that actually carry out further education (internal or external) integrate a relatively high rate of employees. That means that every second employee in training-active SMEs takes part in further education. In comparison, approximately every fifth person takes part in training in larger training-active companies (Bellmann & Leber, 2008). Furthermore, training is more likely to occur in the first half to one year of job tenure, which is consequence of increased investments in the skills required for the new job (Green, 1991). According to the findings of Shields (1998) based on data from the UK's Labour Force Surveys, between job tenure had no impact on the likelihood of men to receive training, but a strong significant effect on the likelihood of full-time employed women. Using the explanation suggested by Green (1993), these results indicate the importance of training for women who returned to work after not being in the labour force for a while.

Industry is another important determinant of participation in training. Shields (1998) found that industry has a positive effect on the training of both men and women. For instance, workers in public services such as education and health as well as those working in finance are more likely to take part in training than those working in manufacturing. In contrast, Booth (1991) found that industry has no effect on the likelihood of training for women, but has a positive effect on the likelihood of men. Occupational group (blue-collar, white-collar or civil servant workers) was also found to significantly affect the training probability of workers. While blue-collar workers are the least likely to take part in training, civil-servant workers have the highest training probability (Pischke, 2000; Riphahn & Trübswetter, 2007).

The complementarity between education and training has been a focus for many studies (Booth, 1991; Blundell *et al.* 1996; Acemoglu & Pischke, 1999; Bassanini *et al.* 2005; O'Connell & Jungblut, 2008). Guided by an economic perspective, prior education plays a central role in employers' decision to train their workers since low training costs are associated with high qualified people (Brunello, 2001; Slowey, 2008; Pfeifer, 2008). Data of the 2003 EU Labour Force Survey on several OECD countries (OECD, 2005c) offer evidence

to a significant influence of educational attainment on the likelihood of non-formal job-related continuing education and training. For example, 61 percent of workers in the US with the highest level of formal education (tertiary education) took part in training compared to 14 percent of workers with the lowest level of formal education (lower secondary). The same pattern can be seen for Germany with 26 percent participation among the highly educated compared to 4 percent among the low-educated in 2003. This is also supported by data of the German *Mikrozensus* for the years 1996-2004. However, despite the higher incidence among the high-skilled, the training incidence of low-skilled workers was increased between those years (Riphahn & Trübswetter, 2007). Furthermore, findings indicate that in countries with high rate of training participation, the gap between low and high educated workers is smaller. For example, Denmark with the highest overall rates of participation (46 percent), the rate of high educated in training was 59 percent compared to 31 percent participation among the low educated (O'Connell & Jungblut, 2008).

The *compensation perspective* of lifelong learning postulates that training as a way of improving one's knowledge and skills should be given to less educated people (Fouarge & Schils, 2009). As low-educated workers often lack the skills and abilities for coping with new technologies, they might receive lower wages and are more likely to get unemployed (Machin, 2001). In this respect, up-grading the skills of the low-educated via training can be very helpful at improving their productivity as well as raising their labour force participation rate (de Grip & Zwick, 2005). A recent study conducted by Fouarge *et al.* (2013), offers several explanations for the low training participation among low-educated workers. This was done by examining the returns to training investment by skill level (e.g. wages), and workers' motivation to take part in training. Using three representative surveys of the Dutch labour force for the years 1994-2006, they found positive returns to training for the low-educated workers which are *not* significant different from the returns to training of high-educated workers<sup>87</sup>. This suggests that differences in the participation in training by skill level *cannot* be explained by the argument concerning differences in the economic returns to training<sup>88</sup>. Moreover, the motivation to take part in training of low-educated workers was found to be significantly lower than that of high-educated ones. This can be explained by a combination of a low preference to engage in work and personal characteristics, such as "less openness to

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<sup>87</sup> The wage increase for low-educated workers who took part in training after two years was 5.8 percent, much higher than the rate of increase (2.8 percent) for low-educated who did not participate in training. As for the high-educated, 4.7 percent increase was found for those who took part in training and 5.8 percent for those who did not train.

<sup>88</sup> From an economical point of view, this finding should encourage low-skilled workers to participate in training if they are concerned with the financial gains after it.

experience and exam anxiety". The latter might be a result of negative experience with exams in school. This explanation was also suggested by Illeris (2006) who examined the psychological processes and barriers for the low incidence of learning activities among low-educated workers. On the one hand, low-skilled workers have less desire to learn due to their fear of experiencing the same negative feelings that they had in school such as a sense of failure, but on the other hand, taking part in learning should actually be a solution for coping with these feelings. In this respect, a recommendation was made to involve these workers in learning activities. Furthermore, incentives that are connected to their problem of skepticism concerning their ability to learn should be introduced to them as well. This refers to computer skills and extending the knowledge concerning work-related topics (Illeris, 2006).

The relationship between training and educational attainment also depends on the type of training. Lynch (1992), who examined the relationship between on-the-job training and off-the-job training<sup>89</sup> using U.S. data, found a positive, statistically significant relationship between participation in off-the-job training and educational attainment, but no relationship was found between education and on-the-job training. These findings were also confirmed by Ariga and Brunello (2006) using the results of a survey conducted in Thailand in 2001. They also found a *negative*, statistically significant relationship between education and on-the-job training. This suggests that the companies under investigation compensated for the lack of human capital of their low educated workers by raising investments in their on-the-job training. An explanation for the negative relationship lies on the marginal costs of on-the-job training which are higher for the high educated. In the US, the incidence of training of low-skilled workers compared to the high-skilled is lower than in Germany and other EU countries. This difference can be explained by the fact that the low-skilled in such countries are *more* skilled than those in the US, despite the fact that the level of skilled German workers is the same as the one of the American (Freeman & Schettkat, 2000). Furthermore, low-skilled workers in Germany are more likely than high-skilled workers to participate in *internal* training, therefore it may partly explain findings suggesting that wage returns on training are lower for the low-skilled than the high-skilled (De Grip & Zwick, 2005). In this respect, the likelihood of low-skilled workers to engage in training courses might be negatively affected by this as they expect low wage increase or even no increase. In the case of low-skilled older workers, it might induce decisions concerning retirement. According to Freeman and Schettkat (1999), low-skilled workers should receive training for improving

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<sup>89</sup> On-the-job training (OJT) is taken place in the office and is more likely to be specific, while off-the-job training is taken place in the class room which might be inside or outside the workplace (Ariga & Brunello, 2006).

their basic skills which is necessary for participation in specific training. This will help to overcome this skill gap which might also lead to better wage and productivity returns for low skilled workers from the training investment (Acemoglu & Pischke, 1999).

The relationship between educational attainment and training also varies between *age* groups. Generally, younger workers nowadays have a higher level of education compared to older ones (Taylor & Urwin, 2001) and therefore are likely to participate in training programs more often than their older counterparts (Lesson, 2006). Moreover, educated younger workers acquired their education more recently hereby possess more up-to-date skills than older workers (Brunello, 2001). According to the Eurostat statistics, 15 percent of prime-age workers (aged 25-54) in the EU with high level of qualifications participated in training in 2001 compared to 9.7 percent of high-skilled older workers aged 55 to 64. However, differences can also be seen in the rate of participation between low-skilled prime age and older workers, though not large (2.7 and 1.8 percent, respectively; De Grip & Zwick, 2005). This pattern was also confirmed by Riphahn and Trübswetter (2007) using the German *Microzensus* for the years 1996-2004. Their findings also point to an increase in the incidence of training<sup>90</sup> for low and high skilled workers from all ages between those years, but on a much larger increase for high-skilled workers than for low-skilled for all the age groups. This positive pattern, on the one hand, might point to an increased importance in recent years to up-grade the skills of all workers, including the low-skilled, but on the other hand, it points to the existing skill gap in training which has become even larger over the years.

### 3.2.2 *Training Participation: The Case of Older Workers*

Older workers are becoming a target for further education and training (Tippelt, 2005). The concept of 'lifelong learning' which has re-emerged concerning the organization and training of adults in the 21<sup>st</sup> century, has become strongly connected to older workers as well (Manheimer, 1998; Hake, 1999; Knapper & Copley, 2000; Finsen, 2002), as was declared by the European Commission (2003): "*Access of workers to training is an essential element of the balance between flexibility and security and the participation of all workers should be supported, taking into account the returns on investment for workers, employers as well as society as a whole...It is important that there is a significant increase in investment by firms in the training of adults with a view to promoting productivity, competitiveness and active ageing*". In accordance, employers are faced with challenges to retain and train their older employees (Callahan *et al.* 2003; Armstrong-Stassen, 2005). While this means that employers

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<sup>90</sup> Training refers to the last calendar year.

need to develop a positive attitude towards their older staff as well as towards future potential older workers, it also means that older workers themselves should have the *willingness* to cope with the new professional requirements via participation in training.

While older workers are among those with the highest need for training (European Commission, 2004<sup>91</sup>), most studies indicate a *low* training incidence of older workers compared to younger ones (Mincer, 1989; Bartel & Sicherman, 1993; OECD, 1999; Taylor & Urwin, 2001; Warwick Report, 2006; Schmidt, 2007; Schleife, 2008; Tippelt *et al.* 2009; D'Addio *et al.* 2010; Maximiano, 2011). While country differences in training participation vary between surveys due to different definitions of continuing education and training (Warwick Report, 2006), findings of the OECD (2003) indicate that this age gap (e.g. between workers aged 25-49 and those aged 50-64) in training<sup>92</sup> incidence is true for all OECD countries<sup>93</sup>. With respect to Germany, the share of older German workers in 2004 aged 50 to 64 who took part in further education and training during the *four* weeks prior to the survey was 3.5 percent, which is one of the lowest among the 21 OECD countries. The age gap in training participation in Germany is equally seen for employed, unemployed and inactive persons (OECD, 2005a). Furthermore, despite findings of the OECD report *Education at a Glance* (2011) pointing to a high performance of Germany in formal and non-formal education among OECD countries, the Nordic countries are still leading with respect to average overall participation and average of older workers (OECD, 2012a). In accordance, among German workers aged 55 to 64 in 2007, less than 30 percent took part in education or training compared to 60 percent participation of workers in Sweden (OECD, 2011a). Based on the results of the BMBF study “Weiterbildungsverhalten und Interesse Älterer” (EdAge)<sup>94</sup> pointing to a decreased training incidence with age, Tippelt *et al.* (2008) suggested three types of effects which might explain the differences in participation rate between different age groups. The first is *age* effect which means that people change their educational behaviour when they are getting older. The second effect is *cohort* effect which means that different cohorts are shaped by their environment and conditions. The third effect is *period* effect which refers to the influence of developments in policies.

Less training for older workers is definitely a problem as it has a negative impact on their productivity as well as their employability (Warwick Report, 2006; Zwick, 2011). Low

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<sup>91</sup> According to the European Commission (2004): “Member states have to make it easier for all workers to get the training they need by improving access to training throughout life. *Priority* should go to those most in need namely the low-skilled, older workers and employees in small firms”

<sup>92</sup> Data contain information on education and training taken during the previous 12 months (OECD, 2003).

<sup>93</sup> The age gap in Austria and the Netherlands, for example, is particularly large, whereas in Norway it is less noticeable.

<sup>94</sup> The EdAge study analyses further education behavior and educational interest of people in the age 45 to 80.



training incidence, however, is not come along with studies indicating that older workers are less likely to quit their job voluntarily (Doering *et al.* 1983), a fact which should contribute at raising their likelihood to participate in training, as returns on investment are likely to be higher for them than for younger workers (Warr, 1993). Taking also into consideration the fact that job performance of older workers is still *not* found to be significantly different than that of younger workers (Warr, 1993), and that they are able to obtain their competences and performance on a high level (Tippelt, 2010), older workers should be consider as valuable as younger ones, and the age gap in training participation should not be as wide. In accordance, low training incidence indicates on the existent of other influential factors in this equation, *lowering* the chances of older workers to be trained, and thus to be employable.

Investigation of the literature regarding the likelihood of training of older workers reveals a wide range of studies which focus on the *time left* in employment as one of the main indicators for investment in training (Mincer, 1989; Bartel & Sicherman, 1993; Schleife, 2008). In this respect, a short time left for older workers in the labour force might lead to less time to “enjoy” the return on the training investment, the same as was declared by the human capital theory. Furthermore, high absenteeism rate is often mentioned as another disincentive for investing in the training of older workers (Warwick Report, 2006). The latter are perceived as more expensive than younger workers, due to “a perceived higher rate of absenteeism and sick leave” (Gellatly, 1995). This was confirmed by a recent research of Lazazzara *et al.* (2011) who found that HR professional are more likely to train older workers with lower absents. This is, however, in contrast to findings pointing to a lower absenteeism among older workers than younger ones. While it was found that younger workers have on average greater mobility and high rates of absenteeism characterized by frequent short period of absenteeism, older workers have a longer but not often period of absenteeism (Warwick Report, 2006).

The “time left” for workers in employment is also influenced by early retirement institutions. Fouarge and Schils (2009) examined the difference between younger and older workers in their training participation and explained it through the early retirement institutions in different European countries. They assumed that the existence of early retirement schemes shorten the time left for older workers to payback the investment on training even to a *higher* degree. Their findings suggest that in countries with generous early retirement options, the probability to retire early is much higher and the training probability of older workers is reduced consequence of those generous offers. In this respect, training is not such an efficient tool to keep older workers in paid employment. However, having a flexible early retirement

system means that a worker's decision towards the time of his retirement is not limited to a certain date exit, hereby participation in training might be more attractive for them. Likewise Warr and Fay (2001) found that financial incentives play a role in the motivation of older workers to take on training courses. Low motivation is due to low financial incentives to participate. This is also supported by Bassanini, *et al.* (2007) who found a negative relation between older workers' training probability and the implicit tax on continued employment.

As mentioned above, the perceptions of employers towards older workers affect their (employers) behaviour. Such negative perceptions, as put forward by Lazazzara and Bombelli (2011), "are not purely based on biological age, but also depend on cultural dimensions, organizational characteristics and other aspects such as the specific country or the role and the company in which the worker is employed". According to Tippelt (2010), the image of older people as they considered as less capable of learning new things, is one of the major barriers for participating in continuing education. Furthermore, employers might see older workers as *less* willing to take part in training (Boockmann & Zwick, 2004), which might directly influence their decision to invest in the training of their older staff. Other employers might see older people as less productive and fit than their younger counterparts (Bellmann & Leber, 2008), thus might be indirectly negatively affected by such perceptions and will invest less in older workers training (Lazazzara *et al.* 2011). Findings from a research conducted by Taylor and Walker (1998) indicate that, employers were more probable to see older workers as hard to train. On the one hand, employers who aimed at raising the number of older workers were *more* likely to say that older workers wanted to train. On the other hand, those who reported that workers in the firm did not receive training after the age of 50, were more likely to say that older workers did not want to participate in training activities and looked forward to retirement. These results emphasize the importance of positive attitudes on the side of employers as a pre-condition for improving the employability of older workers via training.

Findings of a research conducted by Warr (1993) indicate that in cases where employers admitted to be influenced by age through the hiring process, fewer older managers than younger ones participate in training which is mainly due to their (employers) low belief regarding their abilities to learn new things. According to Warr (1993), it is often the case that organisations develop a culture in which training is seen as more appropriate to younger workers, while older workers in these organisations often develop such beliefs concerning themselves. This is also true with respect to the voluntary development at different ages. According to Warr and Birdi (1998), older workers are less motivated to *voluntary* take on learning activities partly because of a lower confidence concerning their ability to learn. In

contrast, older workers who had a history of participating in training were more motivated to take on another activity the same as younger workers. Warr and Sheffield (1993) suggested that in order to motivate older managers to up-grade their skills, their fear from failure should be reduced. This can be done by offering them training separately from their stuff, which will focus on the familiarisation of special concepts concerning the desire topic (e.g. computer). However, this depends on the *awareness* of employers regarding the implications of an ageing workforce which eventually should encourage them to take on practices that are appropriate for older workers. This is an important step as the empirical literature concerning employers' efforts to design special methods for the training of older workers is very little (Amstrong-Stassen & Templer, 2005).

#### *The Training Incidence of Low-Skilled Older Workers*

The case of low-skilled older workers should be discussed separately from two reasons. The First, new pension and labour market policies concerning older workers are mostly targeted on the low-skilled since they have been the most affected by early retirement and unemployment institutions in recent decades, and still have the highest risk of leaving the labour market early. The second reason, which is resulted from the first one, low-skilled older workers are therefore those who need the most training (Bassanini, *et al.* 2007). The latter should, in theory, contribute to their labour force performance and their adaptation to new jobs especially in light of technological change, as well as at reducing their likelihood to retire early.

Low-skilled older workers have even lower likelihood to take part in training courses (De Grip & Zwick, 2005). In the EU countries, for example, 1.8 percent of low-skilled<sup>95</sup> older workers aged 55 to 64 participated in training than low-skilled prime-age workers (aged 25-54). In Germany, as well as in Italy, France and Spain, the participation of low-skilled older workers is very low, compared to a high participation among older high-skilled in countries such as the Netherlands and the UK. The OECD report on Germany (2005a) indicates large differences in training participation between low and high skilled older workers in 2003. For example, 1.7 percent of low-skilled workers aged 50 to 64 took part in training, comparing to 17.3 percent participation rates of the high-skilled from the same age group. As was argued by Bassanini *et al.* (2007), "learning begets learning suggests that those individuals who are disadvantaged in the education process are also likely to be at a disadvantage in their labour

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<sup>95</sup> This regards workers with less than upper secondary education (De Grip & Zwick, 2005).

market learning". This implies that the gap between low-educated and high-educated workers will rapidly grow.

Recent research of Behaghel and Greenan (2010) investigated the relation between technical and organizational changes and training incidence, using a matched employer-employee dataset of the French manufacturing sector in the 1990s. The findings show that in firms with a higher rate of advanced information technologies, older workers in low-skill occupations (clerks and blue-collar) significantly participate less in training (in computer skills and team work) while this cannot be applied for high-skill older workers. The results support their assumption concerning an age-biased technological change which is varied between groups of older workers and the type of training. Furthermore, since the group of low-skilled older workers is the most affected by age bias, this might be a result of the accelerated skill obsolescence which is much stronger than that experienced by high-skilled older workers. Another explanation concerns the difficulty facing low-skilled older workers to learn computers, which might be a result of lack in the basic skills required for overcoming the difficulties in learning computer. While this is especially true for this dataset as it refers to workers in the 90s, it might not be the case for today's older low-skilled workers. The latter are more educated than their previous counterparts and therefore should be able to cope more easily with difficulties associated with the acquisition of skills.

### 3.2.3 *The "Time-Left" Indicator: The Longer the Employment, the Higher the Training?*

The *extension* of working lives caused by the recent policy acts in Germany<sup>96</sup> means that returns to training of older workers should increase due to a longer pay-back period (OECD, 2011a). While the human capital theory predicts that early retirement schemes have a negative impact on human capital investments of older workers (Becker, 1975), reducing incentives for an early labour force exit should lead to the opposite result. Thus, extended employment provides employers as well as older employees with incentives to invest in training (Riphahn & Trübswetter, 2007; OECD, 2012a).

Findings from recent years indicate a positive development in the participation of older workers in training (Shields, 1998; Riphahn & Trübswetter, 2006; Montizaan *et al.* 2010; OECD, 2012). Shields (1998), for example, investigated the changes in the determinants of training over time (between 1984 and 1994) using the UK's Labour Force Surveys (LFS). The shift in the characteristics of the British labour force e.g. the ageing of the labour force was

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<sup>96</sup> For detailed information, see section 2.4

assumed to lead to a *decrease* in the incidence of training of the whole labour force, as older workers are less likely to take part in training. However, the findings indicate an increase in the probability of training of older workers over the examined year. In other words, the age-training profile flattered with greater growth in the proportions of older workers receiving training than of younger workers. Furthermore, a study conducted by Montizaan *et al.* (2010) examined the effect of changes in pension benefits on the participation of workers in training, using matched survey data and administrative data in the Netherlands for male workers working in the public sector. They compared workers who are entitled to the old generous pension schemes (born before 1 January 1950) with workers who born after the break and are entitled to the new pension. Their findings indicate a positive relation between “the expected time to retirement (changes in pension rights) and training participation”. This suggests that human capital investments of older workers are *positively* affected by the extension of employment. These findings confirm the findings of Fouarge and Schils (2007) who point to a positive relation between training and the type of the pension scheme (generous vs. flexible) which determines the age of retirement. More recently, findings of the OECD (2012a) indicate also a *positive* correlation between effective retirement age<sup>97</sup> and participation in training for all OECD countries.

With respect to Germany, findings from recent years indicate an *increase* in the incidence of training of older workers which is parallel to the increase in the duration of employment (Riphahn & Trübswetter, 2006; 2007). Riphahn and Trübswetter (2006) used data from the German *Mikrozensus* for the years 1996 and 2004 to investigate the progress over the years in the participation of older workers in training activities (taken in the previous year). They hypothesize that the effect of the age parameter on the probability to participate in training at older ages is getting weaker. Similar to the findings of Shields (1998), their findings suggest that older German workers received more training over the years. According to Riphahn and Trübswetter (2006), despite the gap in the probability of training in favour of younger workers which is remained also in 2004, the positive rise over the years in older workers’ training may indicate a change in employers’ behavior towards older workers.

It should be noted, however, that other factors are also projected to positively influence investments in the skills of older workers. In accordance, as education is strongly connected to training (OECD, 2003), and the level of education among future cohorts of older workers is expected to increase for all OECD countries, the incidence of training among older workers

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<sup>97</sup> The average effective retirement age is “calculated as a weighted average of (net) withdrawals from the labour market at different ages over a 5-year period for workers initially aged 40 and over. The data contains information on males aged 50-59 in 2009 (OECD, 2012a).

might be positively affected by this development towards higher participation which will narrow the age gap (D' Addio *et al.* 2010). Furthermore, the training incidence of older workers may be influenced by occupational mobility. While the latter was found to decrease with age, older employees represent a *stable* part of the organization than younger ones, thus investing in their training should be worthwhile (Bellmann & Leber, 2008).

### **3.3 The Enhancement of Employability through Training**

The contribution of training in raising the productivity of workers is well known described in the literature (Becker, 1975; Bartel, 1995; Dearden *et al.* 2006) as well as its positive relation to the labour market performance of workers (OECD, 2012a; Bartel, 1995; Picchio & van Ours, 2011). Training helps individuals to cope with the requirements emerging from changes in technology, prevents skill obsolescence, improves educational level (OECD, 2012), and raises the spectrum of abilities (Picchio & van Ours, 2011), all of which contribute at keeping the workers attractive for the labour market, namely employable. In particular, training is crucial (essential) for improving the weak employability of older workers.

Findings indicate a positive relationship between employment rates and educational level. Based on former estimates concerning the OECD countries, an additional year of average education is associated with an increase of 1.1-1.7 percent in participation and employment rates (OECD, 2004a). More recently, findings of the OECD (2012a) show that employment rates of workers with tertiary education are 10 percent higher than of those with upper secondary education, while this participation gap is more significant for older workers. In other words, the decline in employment rates is slower for the educated ones than for those with lower levels of education (OECD, 2010). Similarly, the OECD report (2004b) indicates a positive significant cross-country correlation between participation in training and employment and activity rates. At the individual level, data of the European Community Household Panel (ECHP) for the years 1994-2000 reveal that participation rates are higher for people who participated in training in the last two years than people with the same characteristics that did not take part in training (OECD, 2004a). This is also reflected in the average unemployment rate which was lower for people who took part in training the last two years compared to those who did not (OECD, 2004b).

A further investigation of the gap between employment and unemployment rates while taking into consideration the effect of training and the accumulation of skills was done by the OECD (2004a) using the ECHP for several selected countries including Germany. While 10 percent increase in education and training courses is associated with an average increase in

the probability of being employed (between 0.3-0.4 percent), an increase of 10 percent in former education and training is associated with an average decrease in the probability of being unemployed (between 0.15-0.2 percent). These findings are stronger for women and younger workers. Furthermore, Dieckhoff (2007) examined the effect of continuous training on the performance of workers in Germany, Denmark and the United Kingdom, using data from the European Community Household Panel (ECHP). The research findings show that the impact of continuous training varies between countries. With respect to Germany, training raises the likelihood of finding a new job for unemployed persons and decreases the likelihood of becoming unemployed. Similarly, findings of the OECD (2004b) indicate that workers who receive training one year before losing their job are more likely to find a new job two years later than their peers who did not take part in training. In Germany, the share of re-employed trained workers aged 25-54 was a bit above 10 percent higher than the share of workers without training. In contrast, in countries such as France, Greece and Denmark, very small differences were observed between trainees and non-trainees in the likelihood of re-employment.

### 3.3.1 *The Modern Concept of 'Employability'*

Over the recent decades the concept of 'employability' has been steadily developing reflecting the difficulty associated with its definition. During 1950s and 1960s, for example, employability was seen in terms of peoples' potential to be employed with a focus on workers' general attitudes towards employment and their perceptions towards themselves. While in the beginning of 1970 attention was on people' occupational skills and knowledge, in the end of 1970 it moved to the acknowledgment of general skills as relevant to the sustainability of workers in the labour market. This was partly a result of the economic recession in the industrialized world which created difficulties to stay employed or to find a job, thus raised the significance of transferable skills (Sanders & de Grip, 2004).

Workers' employability has gained importance during the 1990s as the model of "lifetime employment", characterized by a single employer was replaced by a new and dynamic model which emphasizes "careers" (de Grip *et al.* 2004). The latter, as argued by Hyatt (1996), is characterized by a high degree of flexibility (e.g. workers ability to cope with changes). Adopting the comprehensive and modern definition of De Grip *et al.* (2004), "employability refers to the capacity and willingness of workers to remain attractive for the labour market (supply factors), by reacting to and anticipating changes in tasks and work environment (demand factors), facilitated by the human resource development instruments

available to them (institutions)". It is implied that workers alone are not responsible for their employability, but rather it is the joined responsibility of the firms where they are employed and governmental policies. Given the above definition, the employability of workers, namely their willingness and capacity to stay employed, is determined by several indicators (Sanders & de Grip, 2004). Three important ones are found in the literature to have an impact on workers' employability: participation in training, mobility and flexibility (de Grip *et al.* 2004). The last two indicators are relevant as they are affected by training.

De Grip *et al.* (2004)' definition offers a new perspective with regard to employability which emphasizes also the contextual factors in determining the extent in which employable workers are required. In other words, instead of looking at the individual side (supply side) only, the authors include "sector of economy" based on the assumption that the need for training investments and flexibility is determined by the specific sector of economy (demand side). The need for employability in each sector is driven by four main developments: Technological, organizational, international competition and demographic developments. As described in chapter one, technological developments accelerate human capital obsolescence and raise the need for upgrading skills. This widens the gap between workers' current human capital and the required human capital, which can be bridged by the employability of workers. Furthermore, organizational developments raise the need for employable workers due to the high level of flexibility required in today's modern organizations (Riddell & Sweetman, 2000). Changes in the international environment expressed by increased international competition raise the need for workers who are able to cope with such rapid developments. In this respect, knowledge and capacity have become the focus of industrialized countries in order to improve their strategies regarding competition, which can be accomplished by training and flexibility (de Grip *et al.* 2004). The last important development regards the changes in demography which accelerate the need for employable workers, particularly older ones, as their labour force participation is needed.

Following the definition of de Grip *et al.* (2004), the human capital theory emphasizes the return on the training investment as an indicator for worker's willingness to take part in training (Becker, 1963). In this respect, the willingness of workers to spend time, money and energy on the upgrading of their skills is very crucial for their financial development (e.g. higher wage) but also for their personal development in terms of better position in their job (de Grip *et al.* 2004). According to de Grip *et al.* (2004), low willingness on the side of employees to invest in training may prevent personal development, which might result in a higher degree of human capital obsolescence, as well as lowering their attractiveness in the



labour market. Furthermore, the capacity of individuals to take part in training is a very important indicator of employability as well. Initial education is thus an important component of capacity reflecting one's ability to learn. Meta-cognitive knowledge, such as "knowing where to find specific information" is also part of workers' capacity as it helps for the learning process. The acknowledgment of one's capacities to learn new things is a third type of knowledge which affects decision concerning participation in training.

The mobility of workers (internal and external), yet another important indicator of today's employability, fosters knowledge and experience as it allows for gaining more general skills as opposed to job-specific skills acquired after long job tenure. Internal mobility refers to workers' willingness and ability to change to other position in their workplace, while external mobility (job to job) is the willingness and ability to change employers (de Grip *et al.* 2004). External mobility can also be expressed through a complete exit from the labour market via exit routes such as early retirement, unemployment, disability (Groot & van den Brink, 2000). This implies that in some cases (e.g. retirement) mobility means also leaving the labour market. The ability of workers to be mobile (internal and external) depends on the skills and experience acquired in the last job. In this respect, having job-specific skills might lower the capacity and chances of workers to be mobile across jobs in cases of dismissal, for instance if such skills are not transferable (de Grip *et al.* 2004). Furthermore, the willingness and capacity of workers to be functional flexible is another determinant of employability. There are two kinds of functional flexibility. The first is qualitative functional flexibility which is workers' willingness and capacity to perform other jobs beside those which are formally included in the normal job description. The capacity is determined by workers' flexibility in the past and years of experience. As in the case of worker's capacity to be mobile, experience is very important (de Grip *et al.* 2004). The second is quantitative functional flexibility which refers to the willingness and capacity to be more flexible concerning hours of work. This may include working extra hours or in different shifts. According to Groot and van den Brink (2000), flexibility also refers to the number of assignments a worker can perform as well as the extent in which he can do it by himself.

A distinction was also made by Groot and Maassen van den Brink (2000) between internal and external employability. Internal employability is the ability and willingness of a worker to stay in his current job, and implies on his or her human capital value in the internal labour market. External employability is the capacity and willingness to change to another job in another workplace, which thus points to the worth of a worker's human capital "in the external labour market". Likewise Sanders and De Grip (2004) distinguish between external

and internal employability, while distinguishing between two groups of “internally employable workers”: The first is called job-match employability which refers to the chances of workers to stay employed at the same job and with the same employer, and the second form is called firm-internal employability which refers to the likelihood of workers to change their job within their workplace.

### 3.3.2 *Training and the Employment Prospects of Older Workers*

Following the definition of employability discussed above, older workers have a weak employability compared to younger ones (OECD, 2012a). The obsolescence of skills experienced by them explains part of the decline in their employment prospects, which is further enhanced by their low participation in training. The latter lowers their value in the labour market even to a greater extent. Upgrading their skills via training opportunities should contribute to offsetting this skills depreciation (D’Addio *et al.* 2010; OECD, 2011b; 2012) and thus at raising their competence which is needed for improving their productivity (OECD, 2004b), as training has a positive impact on the ability to cope with changes in work demands (Lee *et al.* 2008). This will help in raising their employment prospects (OECD, 2004b, 2012a).

Using data from the European Community Household Panel (ECHP) on the Netherlands, Picchio and van Ours (2011) investigated the effect of on-the-job training on workers’ likelihood to be retained in the labour force. Their findings indicate that older workers who participated in training were more likely to stay employed. Furthermore, findings of the OECD (2004b) show that training taken with the previous employer raises the probability of being in a permanent contract, while the probability was found to be the highest for workers belonging to the groups with low wage returns for training. For example, the probability of workers aged 45 to 54 to have a permanent contract increased by 0.7 percent for each year in which they took part in training. Further findings of the OECD (2004a) using data of the European Community Household Panel (ECHP) for the years 1994-2000 indicate that the labour force participation rate of workers aged 45 to 54 (older prime-age workers) and women are affected the most from participation in training. This was confirmed by the findings of Fouarge and Schils (2009) in their cross-country investigation. They found that the participation rate of older workers in the labour force is positively correlated with their participation in training. Countries with higher training rates of older workers, such as the Northern European countries, have higher participation rates of older workers in their labour force (Fouarge & Schils, 2009). These findings support the results presented earlier pointing

to the positive relation between training and employability expressed by higher employment rates.

Enhancing the employability of workers through training contributes to raise their human capital and thus their worth in their workplace but also on the labour market. This is possible due to the increased importance of workers' flexibility nowadays which emphasizes transferable skills. On the one hand, having task flexible workers means that they can cope much easily with changes in the labour market, thus raising their productivity, but on the other hand, it also means that their skills can be on a greater help in other firms as well, thus raising their potential for mobility (Acemoglu & Pischke, 1999). Given the above, employers who are wishing to raise their workers' employability in its "modern format" might be facing an "employability paradox", as was argued by Gespersz and Ott (1996). This paradox however does not seem to apply to older workers as evidences indicate that most job mobility occurs in the beginning of the working lives (Groot & Verberne, 1997). Having more specific human capital consequence of more experience and job tenure implies that the general knowledge of older workers is limited which is a barrier to job mobility (OECD, 2012a). According to the findings of de Grip and Zwick (2005), younger workers have a higher likelihood to leave their job within the next five years than older workers. Findings of the OECD indicate that workers who participated in training tend more often to move to a better job and less often to do it involuntary. This however relates in most cases to young (aged 25 to 34) and educated workers (e.g. at least upper secondary education; OECD, 2004b). In contrast, less training can lead to involuntary job loss, which is more often among older workers and less educated ones (OECD, 2004b). These findings indicate the high level of flexibility among younger workers, which allows for external mobility compared to the low flexibility among older workers which is due to acquiring more specific human skills.

Given the above, low mobility among older workers reduces their attractiveness in the labour market and thus their chances to find a new job in the event of job loss. Nevertheless, lower mobility also means that the relationships between older workers and their employers are usually stable (Groot & Verberne, 1997). This may have implications on the employment prospects of older workers. While increased accumulation of job-specific human capital will reduce the willingness of (older) workers to leave the firm, longer time in the firm is more likely to result in more job-specific training. The latter can be explained by the fact that employers will be more willing to invest in the training of such workers since they are less likely to leave the firm. Furthermore, additional job-specific training might raise the chances for upward mobility (internal mobility), meaning to a better position in the same firm (De

Grip *et al.* 1998). Groot and Massen van den Brink (2000), for example, found a positive association between formal work-related training and internal employability reflected by the extent to which the worker can be employed in other jobs in the firm where he or she works (flexibility). Their findings also suggest that different kinds of human capital investments significantly raise the capability of workers to solve problems in the firm with less help. The latter may lead to lower production costs as workers are able to cope with problems, which might indicate on a higher level of productivity.

Low-skilled older workers in Germany as well as in UK and Italy face difficulties to stay in work, which is reflected by a meaningful decrease during the 1990's. This was also confirmed by Data of the European Labour Force Survey for the years 1988-2000 that show that the share of low-skilled among older workers aged 55 to 64 decreased during those years in almost all European countries (de Grip & Zwick, 2005). The employability of low-skilled workers in general is being harmed consequence of the growing need to up-grade the skills level of workers in a changing technical world (Borghans & De Grip, 2000). This group of workers is more likely to be negatively affected (e.g. job loss) from skill obsolescence from two kinds: Technical and economic (de Grip & Zwick, 2005). While the former affects the value of a worker itself and is consequence of a normal aging process and illness or due to careers' breaks, the latter affects the value of workers' human capital and is a result of developments in the job (e.g. changes in the production process) or work environment (de Grip & van Loo, 2002). For example, technological change is more likely to affect the human capital of blue-collar than of white-collar workers (Ramirez, 2002). Furthermore, lack of training lower their level of skills even to a greater extent, thus locates them out of employment or in low level jobs with poor income.

Nevertheless, the demand for skills might (also) be beneficial for low-skilled workers if they receive training (Acemoglu & Pischke, 1999). While low-skilled older workers are more likely to leave the labour force than high-skilled older ones (OECD, 2004b; Dietz & Walwei, 2011), investing in their training is essential as it is an important component of older workers' retention (Amstrong-Stassen & Templer, 2005). In accordance, the 2003 Employment Guidelines of the European Commission have focused on raising the employability of all workers by improving access to training, in particular for low-skilled workers (European Commission, 2003). A research conducted by Sanders and De Grip (2004) focused on the effect of training participation and task flexibility of low-skilled workers on their firm-internal and firm-external mobility, using data of the Dutch OSA Labour Force Survey for the years 1998 and 2000. They found that training contributes only to their firm-internal employability,

while it does not play a role with respect to their external employability. In other words, training increases the opportunities of low-skilled workers for improving their position within their workplace, but it does not contribute to raise their employment chances via finding a new job. Findings of a research made by Fouarge *et al.* (2013) on the likelihood of being unemployed indicate that low-educated workers who took part in training courses in the last two years had significantly lower probability to be without a job than low-educated who did not participate in training. This finding points to the importance of training in improving one's employability. The social costs of not giving enough training to low-skilled workers are very important. This might result in a job loss among those workers since their skills are not valuable for the labour market (De Grip & Zwick, 2005).

As was discussed in Chapter 2, the employment prospects of older workers can be harmed by the existence of wage-productivity gap which is consequence of their higher wages (e.g. seniority wages; Skirbekk, 2004). This gap is also compressed by skill obsolescence to a greater extent in the case of older workers, which also raises the risk of losing one's job (Bassanini, 2006). In accordance, training can assist to improve their productivity by developing new skills and improving old ones (OECD, 2006). This will help to close the gap between older workers' wages and productivity (Bassanini, 2006; Lang, 2012) and will thus result in an improvement in older workers' employability (Lang, 2012). Nevertheless, learning is affected by the changes resulted from the process of aging, such as decreased vision and hearing as well as changes in attention, memory, and the speed of processing. Therefore, older workers may be faced with challenges in the process of learning new skills, and the acquisition of such skills may take them longer than for younger workers (Charness & Czaja, 2006). In this respect, studies indicate that the forms of training as a mean for determining the work performance of older workers are found to be crucial for the effectiveness of training. Kubeck *et al.* (1996) examined the relationship between age and job-related training outcomes and they show that it takes much longer to train older workers than younger ones, and older workers are generally less familiar with the training material than younger workers. This was also supported by Aubert *et al.* (2004) who found that the adaptability of older workers to a new technology partly depends on the length of the learning period. Zwick (2011) examined the differences during the life cycle between training characteristics (contents, financing and extent) and training efficiency using the Continuing Training as Part of Lifelong Learning (WeLL) dataset. He found that the content of training and the training forms for older workers are similar to that of younger ones, and that older workers participate more in presentations and seminars than in on-the-job training. His

findings also suggest that the training goals and the “self-assessed effectiveness of training” are different for older and younger workers. For example, older workers aged 55 and older see training goals, such as the opportunity for getting higher wages, being more productive, being promoted, and for better adaptation to changes at work, less important than younger workers do. Furthermore, Zwick (2011) argues that low incidence of training among older workers is a result of not getting adequate training, as was proved in his study. In other words, a life cycle perspective with respect to training characteristics should be changed towards an age-related training approach.

In order to raise the attractiveness of training for older workers and its effectiveness several steps are recommended such as teaching methods that are more suitable for the need of older workers (Goldstein, 1993; Aubert *et al.* 2004; Callahan *et al.* 2003, Zwick, 2011) as well as giving more importance to experience and prior education (D’Addio *et al.* 2010). For example, Goldstein (1993) argues that when older workers are given with enough time to be trained, their performance will be as good as younger workers in the end of the training program and during work. This was supported by Aubert *et al.* (2004), who argue that lengthening the learning period might contribute to a better adaptation of the older staff since the introduction of a new technology is often associated with relative short time. This implies that the attractiveness of training due to technological changes might rise among older workers if it will be introduced in a way that is more suitable for them. In other words, their willingness to take part in training will increase. Callahan *et al.* (2003) found a significant training effect on the performance of older workers in training, offering additional evidence for studies showing that older people can and do learn. They argue that training forms which are better suited for older workers’ motivation are therefore more attractive for them and will raise their performance than other training. Examining different instructional methods, their findings suggest that older workers, who learn in small groups or are given the chance to learn at their own pace, showed a higher training performance than those who have been trained in large groups or had to learn fast. In this respect, training that combines several methods might be more appropriate for older workers.

### **3.4 Summary**

The participation of older workers in training has gained importance in recent years (European Commission, 2003). Policies for the extension of employment provide employers as well as older employees with incentives to invest in training (OECD, 2012). This is especially relevant since older workers are among those with the highest need for training

(European Commission, 2004), but have a very low training incidence (Tippelt *et al.* 2009; D'Addio *et al.* 2010; Maximiano, 2011). Findings from recent years indicate an increase in the participation of older German workers in training (Riphahn & Trübswetter, 2006; 2007) which may reflect a change in employers' attitudes towards their older workers (D'Addio *et al.* 2010). Raising investments in the training of older workers can assist to improve their productivity by developing new skills and improving old ones (OECD, 2006). Training is a key factor for ensuring their labour force integration through improving their employability. In particular, low-skilled older workers are those with the most need for training (Bassanini, *et al.* 2007) as they suffer the most from skill obsolescence. Since Germany has a higher participation rate of high-skilled older workers and a very low rate of low-skilled older ones (Federal Statistical Office, 2011), additional training might help the low-skilled to overcome the disadvantage associated with their low employment rate (OECD, 2004b). Finally, training can be helpful in reducing the chances of older workers to leave the labour force early, as studies indicate a positive relationship between training and employment probability (Picchio & van Ours, 2011).

## **4 The Job Satisfaction of Older Workers**

The previous chapter discusses the importance of further training for the success of the ageing labour force. The current chapter raises the topic of job satisfaction as another essential component which determines the contribution of workers to their workplace. In this regard, the analysis of workers' subjective evaluation of their work, namely their job satisfaction, may assist to understand dynamics in the labour market, as satisfaction is found to be related to labour market behaviour (Freeman, 1978). This includes workers' decisions concerning the level of effort to invest in their job, staying or quitting a current job, and further participation in the labour force (Clark, 1996). Identifying the factors which affect the job satisfaction of older workers could help policy makers to know how to further foster their employment. This is particularly relevant as many unsatisfied older workers are asked to stay longer period in the labour force nowadays.

The chapter begins by discussing the various definitions of the term job satisfaction followed by the literature on the aspects associated with labour market behaviour which are related to job satisfaction. It then describes the main literature on the determinants of job satisfaction, followed by a closer look at job satisfaction with regard to older workers. The last section discusses the literature on the relation between training and job satisfaction.

### **4.1 Job Satisfaction and Labour Market Behaviour**

While job satisfaction was commonly used in industrial psychology, sociology and management science, it was hardly analysed by economists (Clark, 1996). Locke's (1976) definition of job satisfaction as a "pleasurable or positive emotional state resulting from the appraisal of one's job" reflects the complexity of this concept as it depends on both, individual's objective circumstances and his psychological situation (Freeman, 1978). A deeper understanding of the concept is achieved by relating it to the notion of morale and job involvement. A person who is involved in his job (e.g. being highly committed for contributing and emotionally affected by his working experience) "should be more likely to feel extremely satisfied or extremely dissatisfied with it (depending upon his degree of success), while an uninvolved person would have less extreme emotional reactions to the same or analogous job experiences" (Locke, 1976). This is related to the topic of organizational commitment which has gained importance as a relevant factor in explaining work-related behaviour, and is defined as the type and strength of a worker to the company



(Arnold *et al.* 1998; Bartlett, 2001). An extension of the definition emphasizes the importance of mental challenges such as complexity tasks, the opportunity to improve skills by learning new things, and measure of achievement at contributing to a higher satisfaction (Clark, 1996). Finally, according to the definition of Kalleberg and Griffin (1978) “job satisfaction is viewed as an overall attitude people have toward their jobs that is largely determined by two sets of characteristics: job rewards, representing the various types of benefits and utilities that people obtained from their jobs, and work values, representing the importance placed on these rewards by individuals”. This definition implies the differences in workers’ job satisfaction which may be caused by variation in work values.

Recent developments in applied economics expressed by increased interaction between economic and psychology, have led to the inclusion of job satisfaction as a variable of subjective<sup>98</sup> well-being in economic research (Clark *et al.* 1998). The common belief among economists that utility depends on a person’s income was further developed and job satisfaction is started to be seen in recent years by economists as a sub-utility function (Clark & Oswald, 1996) representing utility from working. It was first introduced by Freeman (1978) who included it as an economic variable as it appeared to contain also information on unobserved job characteristics which is not able to be captured by objectives factors, and thus can be used for explaining economic behaviour (Freeman, 1978). Such behaviour refers to productivity (Clark, 1996; Gazioglu & Tansel, 2002; Appelbaum *et al.* 2005) and mobility, while the latter can be expressed in the forms of absenteeism (Clegg, 1983) and quits (Hamermesh, 1977; Freeman, 1978; Akerlof *et al.* 1988; Clark *et al.* 1998).

Productivity can be affected by job satisfaction through several ways. For example, absenteeism due to dissatisfaction from work means that the productivity level of the person who is absent equals zero. In cases where a substitute was found, productivity is still more likely to decrease. Similarly, quits may also happen due to low job satisfaction. This could raise the costs for the company which will than result in lower productivity (Böckerman, 2012). Job satisfaction is also found to be a strong predictor of performance. In a research conducted by Iaffaldano and Muchinsky (1985) which examined the relationship between different facets of job satisfaction and job performance, an average correlation of 0.17 was found. On the other hand, Judge *et al.* (2001) found a very high average correlation of .30 between job satisfaction and work performance which even increases in more professional jobs than in jobs with less complexity.

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<sup>98</sup> According to Freeman (1978), subjective variable is one that “measure “what people say” rather than “what they do”.

Withdrawal from work as a feature of labour market behaviour is strongly connected to job satisfaction (Gazioglu & Tansel, 2002; Clark *et al.* 1998). “In fact, several studies conclude that job satisfaction is as a good predictor of quits as wages” (Clark *et al.* 1998). The decision of workers to stay or to quit their job was first examined by economists based on objective factors (e.g. wages and hours of work) as subjective values of jobs were not able to be objectively measured (Levy-Garboua *et al.* 2007). It was further developed to examining job evaluation as it was perceived by employees’ themselves via overall job satisfaction (Clark, 2001). The relationship between job satisfaction and quits were analysed for the first time from an economical point of view by Freeman (1978) using two different US sources (NLS Older Men and Michigan Panel Survey of Income Dynamics). His Empirical results indicate that labour market mobility in the form of quitting is positively and significantly affected by job satisfaction, and is even more important than wages in predicting quits (Freeman, 1978). These results were confirmed by other studies which used different datasets (Akerlof *et al.* 1988; Clark *et al.* 1998; Clark, 2001; Levy-Garboua *et al.* 2007). For example, Clark *et al.* (1998) used the German Socio Economic Panel (GSOEP) for the years 1984-1993 and came to the conclusion that *dissatisfied* workers are statistically more likely to quit their job than those reporting high level of job satisfaction. They also found a weak relation between level of income and quits. One of the suggested explanations is that income does not completely reflect “what determines worker behaviour in a job, as measured by the decision to leave it voluntarily or not” (Clark *et al.* 1998). Clark (2001) used the British Household Panel Survey (BHPS) while coming to the same conclusion. In addition, he found that job security and pay, as two of the seven examined aspects of job satisfaction, are the most powerful in predicting quits. This finding, which is based on an extra question in the BHPS<sup>99</sup>, helps to overcome the drawback of such studies regarding a general suspicion concerning the real preferences of what people say.

A more recent study conducted by Kristensen and Westergard-Nielsen (2004) used the European Community Household Panel (ECHP) for Danish families between the years 1994-2000. Their findings indicate that the inclusion of job satisfaction raises the prediction value of quit behaviour. Moreover, one of the most likely aspects to lead to quitting is dissatisfaction with the type of work, whereas the aspect with the lowest likelihood to lead to a worker quitting his job is dissatisfaction with job security. Levy-Garboua *et al.* (2007) also

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<sup>99</sup> In addition to a question concerning an overall job satisfaction, the BHPS asked respondents to rate their level of satisfaction based on seven aspects of their job. The aspects are promotions, total pay, relation with supervisors, job security, ability to work on their own initiative, the actual work itself, and hours of work (Clark, 2001).

used the GSOEP dataset for the years 1985-2003 and concluded that job satisfaction should be used more often by economists. Besides gaining additional hidden information, it may also be an opportunity to improve their statistical traditional methods. According to Clark (2001), the significant relationship between job satisfaction and quits, even after controlling for the effect of powerful predictors such as wages and hours of work, indicate on the importance of unmeasured variables in predicting utility at work. Studies have also focused on the effect of older workers' job satisfaction on decisions regarding withdrawal from the labour market via retirement. Based on interviews about work attitudes, health and level of satisfaction, Hanisch and Hulin (1991) found that older workers with high social class and more occupational control have more job satisfaction and most likely to choose work over retirement, while dissatisfied workers are more likely to choose retirement over work.

Absenteeism, which is found to be positively linked to job satisfaction as well, is normally used to regard an unplanned absence of employee from his workplace (Jones *et al.* 2009), and might result in increased costs for the firm (e.g. other employees need to work extra hours, the lost associated with the output of the absent worker, etc.). Clegg (1983), for example, used data on England and found that low job satisfaction is associated with higher likelihood for absenteeism and quits. Likewise Drago and Wooden (1992) used data from a survey in 1988 on workers from Canada, Austria, New Zealand and the United States in order to examine the reasons for absenteeism from work. Their findings indicate a positive association between the extent to which workers worked together in harmoniously and closely and low levels of absenteeism if the workers had a high job satisfaction. In contrast, high levels of absenteeism were found when the level of job satisfaction was low.

Using the findings mentioned above, researchers were able to measure the financial effect of workers attitudes on workplaces. For example, in an interesting research conducted by Mirvis and Lawler (1977), data of 160 tellers from 20 branches in a Midwestern banking organization was collected in order to examine the costs associated with levels of job satisfaction and motivation in a work setting. By correlating employees attitudes (job satisfaction measures) and behaviour e.g. absenteeism and turnover (behavioural data was collected in the firm one month after the attitude questionnaire), their main findings suggest that higher level of job satisfaction is associated with lower costs. This was done by estimating the saving costs associated with improved employee's level of satisfaction. Such a method can be very helpful for firms at revealing the costs associated with dissatisfied workers and thus the implications of improving workers' job satisfaction on outcomes such as turnover and absenteeism.

## 4.2 Job Satisfaction: Theory and Evidence

### 4.2.1 *The Determinants of Job Satisfaction*

While a strong association between job satisfaction and labour market behaviour is well known in the scientific literature (see section above), identifying the determinants of job satisfaction is important as it may help to learn more about the labour market behaviour of workers (Jürges, 2003). Among the main determinants of job satisfaction in the literature are wage and relative wages, age, gender, union membership, health, hours of work, firm size, occupation and industry.

In a research conducted by Clark and Oswald (1996) using data of British workers, an attempt was done to further extend the economics literature on workers' well-being. For this purpose, the theory that *happiness depends on comparison level of income*<sup>100</sup> was examined using new data on workers' feelings with regard to their job (e.g. self-reported levels of job-satisfaction). The main findings indicate a negative relation between workers' reported satisfaction levels and their comparison income levels. In another research, Clark (1996) used data on 5000 British employers to examine the relation between three types of job satisfaction (pay, with work itself, and overall satisfaction). He found that absolute income is highly positively correlated with satisfaction with pay, but has a weaker positive relation with overall job satisfaction. The latter was also found by Clark and Oswald (1996). Two explanations are suggested for this finding. First, income is might be given, among other things, to compensate for workers' difficulties of their job. This means that workers with higher incomes should be less satisfied as they are probability involved harder jobs. Second, absolute income "is evaluated relative to some comparison level and not in an absolute sense". Therefore absolute income may not be a good measure of relative income.

Hours per week, namely part-time or full-time work, also constitute an important determinant of job satisfaction. Using data on UK graduates, Belfield and Harris (2002) found positive relationship between hours of work and job satisfaction for men. Burgard and Görlitz who used the GSOEP dataset also found that part-time workers are less likely to have high job satisfaction than full-time workers, while this is true for both men and women. In contrast, Clark (1996), which examined different facets of job satisfaction, found that hours of work per week are strongly negatively correlated with satisfaction with pay but are less strongly correlated with overall job satisfaction. Similarly, Logan *et al.* (1973) examined satisfaction

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<sup>100</sup> Comparison level of income refers to an income against which the individual compares himself. In cases where his income is lower than his comparative income, he might feel unhappy (Clark, 1997).

patterns between full and part time workers and found that part-time workers are more satisfied with their job than their counterparts in full-time jobs.

Gender is often included in the analysis of job satisfaction. Clark (1996), for example, found higher level of job satisfaction among women. This was also confirmed by the findings of Clark (1997) and Belfield and Harris (2002). This observation is rather surprising since the jobs of women are known as being worse than of men, therefore a low level of satisfaction for women is expected. One of the explanations put forward by Clark (1996) suggests that women have in general lower expectations concerning their job than men, thus have higher level of job satisfaction. However, gender differences disappeared for younger and high-educated workers since the likelihood for having higher expectations is higher for both of them. Another explanation suggested by Clark (1996) concerns the *participation (selection) effect*, in which leaving the labour force may be easier for dissatisfied women than for dissatisfied men which than might result in more satisfied women in the labour force. In contrast to the findings above, Kaiser (2002) used the European Community Household Panel (ECHP) for the years 1995 to 1997 and found that gender differences vary between countries with, for example, a much lower job satisfaction for women in the Netherlands and Portugal than for women in Germany, Denmark and United Kingdom. Other studies suggest no gender differences in the effect on job satisfaction such as the study of Sumner and Niederman (2004) who found a relative similar level of job satisfaction among men and women working in IT firms.

Union membership, yet another determinant of job satisfaction, is found to be negatively correlated with job satisfaction (Freeman, 1978; Borjas, 1979; Clark, 1996) while in other cases a positive correlation was found (Leppel *et al.* 2012) or even no correlation (Bryson *et al.* 2004). For instance, Clark's (1996) findings point to a *negative* relationship between union membership and *all* the three measures of job satisfaction. One of the explanations suggested by him is that "unions, by providing workers with a voice, encourage them to stay in jobs they dislike and to try to change their working conditions". Furthermore, good health is also found to be positively associated with job satisfaction (Clark, 1996; Gazioglu & Tansel, 2002a; Georgellis & Lange, 2007; Leppel *et al.* 2012). This finding can be interpreted in two ways. On the one hand, workers with poor health are more likely to response in such way with regard to "all aspects of their life", but on the other hand, it might be that these workers work only in jobs which are less satisfying. The former explanation tends to be more powerful in explaining the results (Clark, 1996).

Studies indicate that workers in larger organizations are less satisfied (Clark, 1996; Gazioglu & Tansel, 2002a; Jones *et al.* 2009), while those with the highest level of satisfaction are to be found in smaller workplaces (establishments). The latter, according to Clark (1996), has a weak association with satisfaction with pay because higher incomes are usually given in large establishments. The same finding is found by Gazioglu and Tansel (2002a) using data of British employees Workplace Employee Relations Survey (WERS97). Gazioglu and Tansel (2002b) suggested that the lack of control for the quality of employee-manager relationships might be the reason for the low satisfaction in larger establishments. However, after controlling for those relationships, no effect of establishment size on job satisfaction was found. Occupational group, such as blue or white collar worker, also play a role in determining job satisfaction. Studies found that blue-collar workers have the tendency to be less satisfied with different aspects of their job, such as income, than white-collar workers (Lee *et al.* 1981).

Many empirical studies have suggested that overall job satisfaction is a non-linear function of age. In this respect, a U-shaped relationship between age and job satisfaction were often found. While positive job attitudes were found to be more likely among younger workers in their beginning of their working life and among older workers, the level of job satisfaction of adults in their 20s and 30s is more likely to be reduced (Warr, 1992; Clark, 1996; Clark *et al.* 1996; Gazioglu & Tansel, 2002a; Georgellis & Lange, 2007; Jones *et al.* 2009; Burgard & Görlitz, 2011). The latter might be consequence of thoughts concerning reduced occupational opportunities and interest (Warr, 1992). Clark (1996), for example, found that older workers aged 60 and above were the most satisfied in all three types of job satisfaction. He suggested that *participation effect* might partly explain the high satisfaction among older workers aged fifty and over. This means that older dissatisfied workers may find retirement easier, and that more satisfied older workers stay in the labour force. However, this argument, as noted by Clark, cannot be regarded to the whole U-shaped relationship. Clark *et al.* (1996) offered an explanation which relies on the relation between workers' perceptions of their job and their job expectations. While lack of experience and information regarding the working world, as in the case of younger workers, might explain their high satisfaction, more knowledge and thus more cases to compare to, might explain the decrease in satisfaction among workers in their mid-thirties. Beside the participation effect, acknowledgment in the few job opportunities one has might result in decreased job aspirations among older workers and thus in higher satisfaction. Furthermore, Clark *et al.* (1996) also found a strong non-linear relationship between age and job satisfaction particularly for full-time workers and for men

while Burgard and Görlitz (2011) found statistically significant U-shaped relationship for both male and female. Another possible explanation for the high job satisfaction among older workers concerns their better jobs which are consequence of building up experience and seniority over the years. Better jobs are characterized by having better conditions in terms of extrinsic factors such as salary, and intrinsic factors such as autonomy and skill, all of which contribute to higher job satisfaction (Wright & Hamilton, 1978).

The literature on job satisfaction has been extended in recent years and includes the impact of education on workers' job satisfaction. While many studies indicate a significant positive correlation between education and job satisfaction (Verhofstadt & Omeij, 2003; Verhofstadt *et al.* 2007), other studies indicate the opposite (Clark & Oswald, 1996; Grund & Sliwka, 2005; Jones *et al.* 2009; Burgard & Görlitz, 2011). For example, Clark and Oswald (1996) found that job satisfaction declines with level of education which might be a result of the high aspirations caused by education. Verhofstadt *et al.* (2007) who used a sample of Flemish youth in their first job came to two contradicts conclusions. First, as many other studies, they found that high educated workers are more satisfied than low educated workers and explained it by the better quality of their job. Second, taking into account indicators of the quality of the first job, the opposite was found – with low educated having the highest level of satisfaction in their (first) job than their high educated counterparts, similar to the findings of Clark and Oswald (1996). This can be explained by the fact that higher level of education comes along with high expectations concerning one's first job. Using Flemish survey data, Verhofstadt and Omeij (2003) likewise came to the two contradicts conclusions mentioned above. In addition, they also examined the relation between educational mismatch and job satisfaction<sup>101</sup>. Their findings suggest that job satisfaction of both women and men was negatively affected by over-education, but the negative impact was bigger for women. The latter might mean that women wish a job which is suitable to their level. Under-educated men, however, had a higher level of job satisfaction than under-educated women. These results join to a line of studies concentrating on the relation between educational *mismatches* and job satisfaction (Allen & van der Velden, 2001; Büchel, 2002; Verhaest & Omeij, 2004). Verhaest and Omeij (2004), for instance, used a Flemish data on 23 years old workers and found that after controlling for educational attainment, over-educated workers had lower satisfaction than high educated workers. Büchel (2002) in his research on German firms using the German Socio Economic Panel (GSOEP) found, in contrast to the findings above, no significant differences between over qualified workers and job satisfaction.

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<sup>101</sup> The variable of educational mismatch was measured using the following question: "Is according to your opinion your level of education too high, too low or appropriate to your job?" (Verhofstadt & Omeij, 2003).

Other studies concentrate on *skill* mismatches. For example, Allen and van der Velden (2001) examined the relation between skill mismatches and educational mismatches and its effect on job satisfaction. They found that skill mismatches are a better determinant of job satisfaction than educational mismatches. In particular, they found a significant negative relation between skill mismatches and job satisfaction, and an insignificant relation between education mismatches and job satisfaction. In contrast, in a research conducted by Groot and van den Brink (1999) using a Dutch panel survey called CERRA-I of workers aged between 43 and 63, skill mismatches were not found to have a significant direct effect on job satisfaction. This difference can be a result of the specific age of the workers in the sample. Furthermore, findings of a research conducted by Vieira (2005) using the European Community Household Panel (ECHP) for Portugal for the years 1994-1999, suggest that overall job satisfaction as well as satisfaction with pay, security, working hours and type of work is negatively affected by perceived over-education.

#### 4.2.2 *Variation in Job Satisfaction between Groups of Workers*

Very little literature exists on the job satisfaction of older workers. The arguments suggested above only explain why high level of job satisfaction is found especially in older ages. However, for explaining variation in the job satisfaction of different groups of older workers, these arguments are less relevant (Eichar *et al.* 1991). Despite the growing importance of continued participation of older workers in the labour force, little attention has been given so far to the needs and interests of older workers (Kanfer & Ackerman, 2004). Considering studies on career development (among middle-aged and older workers) indicating that *changes* in motivational variables with age may explain successful outcomes at work, rather than chronological age (Simpson *et al.* 2002), the attraction and retention of older workers can be achieved through understanding their needs.

Studies have pointed out to the nature of work as an important factor in the decision of workers to continue working or to retire early (Hanish & Hulin, 1990; Taylor & Shore, 1995). In this regard, workers in less challenging jobs are more likely to retire early (Schmitt & McCune, 1981) as well as people working in stressful jobs with bad working conditions (Lin & Hsieh, 2001), or in dissatisfying jobs (Higgs *et al.* 2003). Findings indicate that extrinsic rewards are valued by older workers as less important (Eichar *et al.* 1991) while *intrinsic* rewards, such as feeling useful and valued, are seen by them as highly important (Valentine *et al.* 1998; Kanfer & Ackerman, 2004). Older workers often seek high involvement and personal enjoyment (Valentine *et al.* 1998), as well as enhancement of their skills (Greller &



Stroh, 2004), while limited job opportunities may cause to a sense of “getting old” (Karp, 1987). According to van Dam *et al.* (2009), lack of congruence between the needs of older workers and their work conditions induces decisions to retire early. Their findings indicate that older workers “prefer the work setting to be stimulating, rewarding and enabling professional development when continuing working”. Warr (1997) however argues with regard to the effect of different job characteristics on workers’ motivations that with age the importance of job security and physical security is more likely to increase, while the importance of job variety and job demands is more likely to decrease. According to Higgs *et al.* (2003) who examined the factors effecting the decision to retire early, dissatisfaction with work is one of the factors.

### *Occupational-based Differentiation*

Studies point to occupation-based differences in workers’ perceived aspects of their job (extrinsic vs. intrinsic) which eventually affects their level of job satisfaction (Ronen & Sadan, 1984). According to Hu *et al.* (2010), different work experiences might cause to such dissimilar conceptualizations between occupational groups. According to Berger (1986), different occupational groups, such as blue and white collars, may differ in their job satisfaction as a result of having different job characteristics. For example, blue-collar jobs are often involved in physical (Hu *et al.* 2010), dirty and even risky work. They are often under supervision and have *fewer* opportunities for development, growth and upward mobility (Halle, 1984; Hennequin, 2007). These kinds of jobs are often very demanding and the workers have low influence on the effort to invest in their job (Van den Broeck *et al.* 2009). In contrast, white-collar jobs are characterized as ‘resourceful jobs’ in which the workers have usually a challenging job and more control over their work (Van den Broeck *et al.* 2009). In this respect, Hu *et al.* (2010) found that blue-collars perceive aspects of their job differently than white-collar workers, therefore resulting in different levels of job satisfaction. For example, job security is found to be more important for blue-collar workers than for white-collars. Findings indicate that white-collars (e.g. engineers) choose job characteristics, such as achievement, promotion and recognition, as more important than characteristics such as security, salary, and working conditions (Armstrong, 1971). In this regard, Higgs *et al.* (2003) found that dissatisfaction from work can rise when workers feel *insecure* about their abilities. As for civil-servant workers, findings indicate that intrinsic factors such as ‘interest and skill involved’ are found to be more important for their job satisfaction, while extrinsic factors such as ‘payment’ and ‘physical working conditions’ are associated with a low job

satisfaction (Tatsuse & Sekine, 2011). Berger (1986) found that male white-collar workers rated intrinsic characteristics of their job (e.g. challenge and interest) as more important than extrinsic characteristics (e.g. income). Blue-collar workers however rated both type of characteristics equally. One of the explanations suggested by Berger (1986) concerning the male white-collar workers is that their jobs may provide them with more extrinsic rewards “thereby allowing the white-collar employees to give more attention to being challenged and stimulated by their jobs i.e. to seeking intrinsic rewards”. Differences between female in white and blue-collar jobs were not found. This led to the possible explanation that women tend to find jobs that “compatible with their preferences”.

Other studies found differences between blue and white collars in the ways they think about their job. The meaning of “Successes”, for example, is seen by blue-collar workers differently than by white collars, as was analysed by Hennequin (2007). While “Successes” is determined by status, reputation and opportunities in professional jobs, in blue-collar jobs it is different. Reputation, for example, can be gained by blue-collar workers but usually among their near peers. They can face challenges which are appreciated if they contribute to the performance of their working group (Hennequin, 2007). According to Hennequin (2007), the perceptions of blue-collar workers are influenced by psychological, material and social aspects. Interestingly, blue-collar workers look for other aspects in their work beside money, for example. The criteria used by them to define success are those who also found by other studies in executives. Psychological aspects, such as autonomy and challenges, also emerged. Although these aspects are not part of their job, they are looking for them in order to feel successful.

### **4.3 The Relation between Training and Job Satisfaction**

The inclusion of training as one of the determinants of job satisfaction was hardly done by studies, despite the fact that both training and job satisfaction are shown to have a positive impact on labour market productivity (Georgellis & Lange, 2007). A first “clue” for the relation between training and job satisfaction lies in non-monetary returns to training. While recent studies indicate a weak correlation between training and monetary returns (e.g. wages; Pischke, 2001; Leuven & Oosterbeek, 2008; Görlitz, 2011<sup>102</sup>), non-monetary returns might be very helpful at explaining the training investment (Burgard & Görlitz, 2011). It thus refers to

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<sup>102</sup> For example, Görlitz (2011) examined the effect of training on wages of workers in Germany using an estimation technique which was first used by Leuven and Oosterbeek (2008). The idea is to compare the wages of employees that planned to take part in training but did not do it from several reasons, with the wages of employees that participated in training. Their findings indicate that the estimated wage returns on training were not significant.

returns such as promotion, employment security and employment probability. Because of low or even no effect of training on wages, such aspects might affect the satisfaction of workers (Burgard & Görlitz, 2011), therefore implying the indirect effect of training on job satisfaction.

Employment security is defined as “the likelihood of maintaining the employment relationship with unmodified working conditions (including pay) and the expected cost of job loss, which in turn, can be seen as the product of the probability of job loss and its cost conditional on losing the job” (OECD, 2004b). The findings of the OECD (2004b) based on data of the European Community Household Panel for the years 1994-2000 show that training taken with previous employers has a positive impact on the perceived job security of workers from all categories (gender, age and educational attainment). However, the perceived job security of workers with low estimated wage increase is, surprisingly, the most affected by training taken with previous employers than of workers with high estimated wage. In this respect, workers aged 45 to 54 and those with less than upper secondary education have the highest perception of job security after training participation. In a similar research using the same dataset (ECHP) for the years 2003, Bassanini (2006) focused on subjective perceptions of job security and examined the impact of training on the performance of workers in labour market groups in the EU countries. Likewise the findings indicate that training taken with the previous employer significantly affects *only* the wages of young or high-educated workers, but benefited *older* and low-skilled workers by contributing to their employment security (e.g. “lower job loss and/or greater chances to be re-employed quickly and in less precarious jobs”), as it was perceived by them. This can be explained by the skill obsolescence expressed by older workers which widen the gap between productivity and wage, and by that their risk of losing their job increases (OECD, 2004b; Bassanini, 2006). Thus, participation in training is crucial for keeping their level of competences in order to have a good match between their productivity and wage (OECD, 2004b). As a result their chances to stay employed increase which thus likely to raise their perceived job security. Bassanini (2006) findings also suggest that training taken with the *current* employer contributes to wage increase as well as higher job security among *all* workers.

A recent research conducted by Lang (2012) using the German Socio-Economic Panel (SOEP) for the years 2000, 2004 and 2008, confirm the results presented above. The positive effect of training on their perceived job security found for older workers is realized only for those with *irregular* training incidence, while workers who had frequent training participation before they were observed, had no higher perceived job security after their last participation in

training. This can point to the effect of *frequent* training on reducing one's worries concerning losing a job. In this respect, older workers do not participate often in training therefore are more concerned with their future employment. In addition, Lang also found that different goals regarding training older and younger workers have may affects their wage and job security. While older workers' aim of training is mainly "to adjust their skills to the new requirements of their job", younger workers take part in training which aim at "qualifying them for professional advancement or introducing them to a new job". While for the former training might contribute to narrow the productivity gap at their work, for the latter it might help to explain their wage increase.

### *Training and Job Satisfaction*

The literature on training and job satisfaction is very little, and with regard to older workers only one study is available as for now. Gazioglu and Tansel (2002), for example, examined the impact of training taken in the last year on the level of job satisfaction of workers using a Britain dataset for the year 1997. Their findings suggest that training increases the job satisfaction of workers compared to no training. Georgellis and Lange (2007) further extend the analysis by focusing on the impact of employer-sponsored training on job satisfaction using data from the West German sub-sample of the German Socio Economic panel (SOEP) for the years 1984 to 2002. Their findings show that organization-sponsored training has a positive effect on the job satisfaction of men but not on that of women. Rowden (2002) examined the relationship between workplace learning, such as formal and informal learning, incidental learning and the job satisfaction of workers. A significant positive relationship among all measures of workplace learning and job satisfaction was found. Furthermore, in a survey from 2000 of 271 professionals, learning new skills was found to be the most important factor of job-satisfaction (Blum & Kaplan, 2000). Bauer (2004) used the European Survey on Working Conditions (ESWC) which covers all EU member states in order to understand the influence of High Performance Workplace Organizations (HPWOs<sup>103</sup>) on utility from working. This was done by examining the relation between HPWOs and self-reported job satisfaction. Their findings suggest that workers involved in HPWOs are more likely to have higher job satisfaction, thus such organizations contribute at raising workers' overall utility from working.

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<sup>103</sup> These organizations are characterized by having a holistic organization with less hierarchical structure, self-responsible teams, multi-tasking, a higher involvement in decision making of all workers including low skilled, and "the replacement of vertical by horizontal communication channels". In such workplaces it is often the case that special training measures are implemented (Bauer, 2004).

Jones *et al.* (2009) discussed the importance of distinguishing between general and specific skills and its relation to one's job satisfaction. The transferable characteristic of general skills might contribute at raising job satisfaction since it can be used elsewhere. In contrast, specific skills limit the mobility of workers and thus may reduce the satisfaction of workers as they will face reduced return on such skills if they will move to other job. In this respect, mismatches between workers skills and education with job requirements may reduce their level of job satisfaction. Jones *et al.* (2009) used the British 2004 Workplace Employee Relations Survey (WERS) to investigate the relationship between training, job satisfaction and workplace performance. They found that training taken in the previous twelve months is positively correlated with all examined forms of job satisfaction (e.g. pay, job security, work itself).

Using data of the European Community Household Panel for Denmark for the years 1995 to 1999, D'Addio *et al.* (2007) examined the determinants of job satisfaction separately for women and men. Using a fixed-effect approach (fixed effects ordered logit models) they found a positive significant effect of training on the job satisfaction of men but rather an insignificant affect for women. Burgard and Görlitz (2011) likewise focused on gender differences in the relation between training and job satisfaction using the German Socio Economic Panel. Similar to the assumption of Clark and Oswald (1996), they assumed that workers' satisfaction with their job can measure the utility from working. In other words, job satisfaction can serve as a proxy for utility due to the difficulty to measure utility. Focusing on the years 2000, 2004 and 2008 (those years include various questions on training participation), they found that the relation between training and job satisfaction vary between men and women. In this respect, a significant positive correlation was found between participation in training (taken in the last three years) and the job satisfaction of male workers, while for women the opposite was found. A possible explanation suggested by Burgard and Görlitz (2011) for the weak effect of training on women job satisfaction may be the various types of training (e.g. the financing and the duration of training) that might differently affect men and women job satisfaction. In accordance, this assumption was examined and a correlation was found between training characteristics and the job satisfaction *only* of men, but no correlation was found for women. In this respect, the assumption mentioned above cannot serve as an explanation for the gender differences in the relation between training participation and job satisfaction.

The relation between training and job satisfaction with a special focus on *older workers* has not been addressed in the scientific literature so far. The only research on this topic was

conducted recently by Leppel *et al.* (2012) using the third of four Widener Elder Pennsylvania Surveys (WEPS) which includes information on baby boomers and the elderly<sup>104</sup>. They hypothesized a positive relation between job satisfaction and the availability and quality of job training<sup>105</sup>. Their findings suggest that job satisfaction was higher for individuals employed in organizations provided training opportunities especially for older workers<sup>106</sup>. This finding indicates on the willingness of employers to promote their older staff. Furthermore, level of satisfaction increased with perceived quality of training. In other words, workers who rated the training as excellent, for example, had higher job satisfaction. The research findings, according to Leppel *et al.* (2012), have implications for public policy. Policies that encourage organizations to train their older staff and to adopt measures and practices especially for older workers, will contribute at raising the productivity of the labour force and to a healthier economy.

The theoretical framework suggested by Leppel *et al.* (2012) to support the potential help of training in improving job satisfaction, is the *Job Characteristics Theory* which is based on the job characteristics model. The latter aims at explaining factors determine *positive job-related outcomes*, such as job satisfaction (Leppel *et al.* 2012). According to the job characteristics model, five job-related characteristics help to promote three psychological states that eventually lead to positive job-related outcomes such as internal work motivation, work effectiveness, general job satisfaction, and growth satisfaction (Hackman & Oldham, 1976; Kulik *et al.* 1987). The five job characteristics are skill variety, task identity, task significance, autonomy and feedback from job. *Skill variety* is the degree to which a variety of different activities are required in a job that involve the use of individual's different skills and talents. *Task identity* refers to the extent to which the job requires the completion of a visible outcome. *Task significance* is the impact the job has on other peoples' lives, "whether those people are in the immediate organization or in the world at large" (Kulik *et al.* 1987). The above three job characteristics are particularly important in promoting *the experienced meaningfulness of work*, which is the first critical psychological state. This means that the work done by individuals must be seen as worthwhile, valuable or important. The forth job

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<sup>104</sup> Only workers born in 1964 and earlier were included in the analysis.

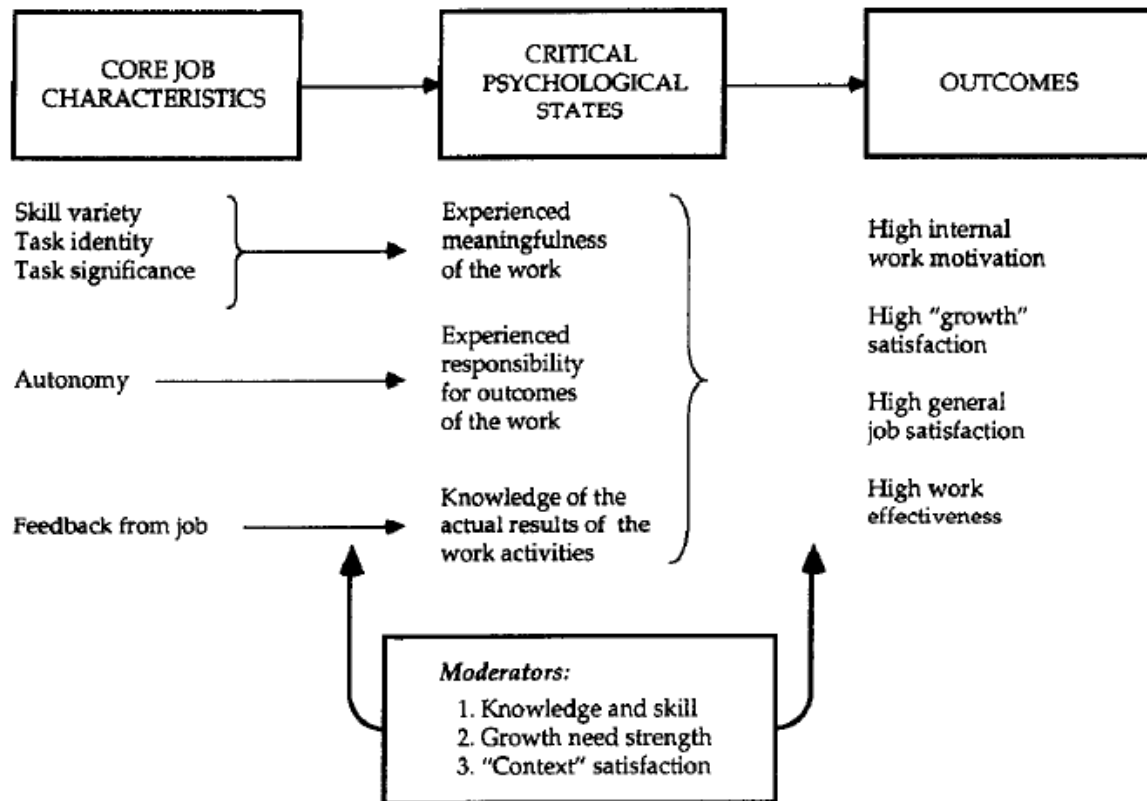
<sup>105</sup> In order to check the availability of training respondents were asked whether the organization offers training to improve the skills of older workers. For examining quality, respondents were asked to rate the training they got at their workplace (excellent, good, fair or poor). It should be noted that the questions on training were posed also to people who did not participate in training. Therefore it is not possible to know from the data who received training and who did not.

<sup>106</sup> The training questions were from two kinds. The first is whether the organization provides "training to upgrade skills of older employees", while no definition of older workers is given in this survey. The second question is offered to all respondents, including those who did not take part in training: "how would you rate the training you receive at work?"

characteristic is *Autonomy* which refers to the level of freedom a worker has in determining the way his work should be carried out. This characteristic, according to the model, leads to the second psychological state – *Experienced responsibility for outcomes of the work*. This means that an individual must feel that the work outcomes are under his or her responsibility. Finally, *feedback from job*, the fifth job characteristic, refers to the extent to which the individual is provided with direct and clear information concerning the effectiveness of the way he or she perform their job. This characteristic leads to the third psychological states – *knowledge of the actual results of the work activities* – that means that, “the individual must know and understand, on a continuous basis, how effectively he or she is performing the job” (Kulik *et al.* 1987, p.280-281).

According to Kulik *et al.* (1987), the three critical psychological states are crucial for being motivated and satisfied, while the absence of one of the three states, will lead to *reduced* work motivation and satisfaction. In other words, “the theory predicts that when job holders find their work meaningful, experience personal responsibility for work outcomes, and have regular, trustworthy data about how they are doing, then they will both perform well and feel good about it” (p.281). It should be noted that, it is often the case that not all job characteristics are in the same level. In order to foster the three critical psychological states that will later lead to the positive outcomes discussed above, it is thus important that the motivating potential of a job will be at least high in one of the three characteristics that contribute to experienced meaningfulness, and high in the characteristic of autonomy and job feedback. A low level of autonomy, for example, will result in less experienced responsibility which will have a negative impact on the “overall motivating potential of the work”.

Figure 3: The Job Characteristics Model



Note: Picture taken from Kulik *et al.* (1987)

Nevertheless, the theory points to the differences between individuals characteristics that might lead to different responses to a job high in motivating potential. In accordance, three characteristics of the individual are suggested by the theory to have an impact on the degree to which the job characteristics influence the critical psychological states, and to which the latter influence the job outcomes. The first characteristic refers to the important of sufficient *knowledge and skills* workers need to have as a condition for the effectiveness of their work. In this respect, workers with enough knowledge and skills doing a job with high motivating potential (e.g. high in all five characteristics), are more likely to have positive feelings concerning their job. In contrast, workers with less knowledge and skills working in highly motivating jobs are likely to be frustrated and unhappy at their work. Such feelings might lead to a psychological or behavioural withdraw from work. While the first means moving to a new workplace, the second means becoming less involve in their work. It should be noted that, low motivating job will lead to low job motivation with or without knowledge and skills. The second characteristic is *psychological needs*. People with higher need for personal growth



will react positively for opportunities for personal development in their job. In contrast, people with low level of motivation for growth, might be less enthusiastic to use opportunities for development provided by their job. The last characteristic refers to the satisfaction of workers with *work context* such as pay, co-workers, job security and managers. In this respect, less satisfaction with one of those factors might lead to less willingness to respond positively to a highly motivating job. This can be explained by the fact that workers are putting a lot of effort in coping with such work context problems, instead of focusing on the work itself. This theoretical framework, as suggested by Leppel *et al.* (2012), should be useful at understanding the role of training in shaping the job satisfaction of workers. In this regard, training, for example, can raise the quality of the match between workers and the characteristics of their job and job satisfaction reflects employees' evaluation of "the quality of the match" (Kristensen & Westergard-Nielsen, 2004). According to Clark (2001), a poor job match reflected by a low job satisfaction, is more likely to result in quits, while a good match reflected by a high job satisfaction should raise the likelihood of staying.

#### 4.4 Summary

While studies indicate a positive relation between employees' satisfaction and labour market behaviour (e.g. productivity, quits and absenteeism), understanding the means by which workers perceived their work is essential (Hamermesh, 1999) as it can assist to learn more about their labour market behaviour (Jürges, 2003). This becomes even more relevant nowadays given the increased labour force participation of older workers. Studies indicate that the needs and interests of workers changes with age. As a result, older workers perceived aspects of their job differently than younger workers, therefore may differ in their job satisfaction. Such variations can be seen among occupational groups of workers due to having different work experience (Hu *et al.* 2010).

Recently, studies have started to include training as a determinant of job satisfaction, while findings indicate a positive relationship between participation in training and level of job satisfaction (e.g. Burgard & Görlitz, 2011). With respect to older workers, only one study examines the effect of training on the overall job satisfaction of older workers and which came to the same conclusion regarding a positive relationship (Leppel *et al.* 2012). In order to support the *potential* help of training in improving job satisfaction, the Job Characteristic Model is suggested. According to this model, work characteristics help to promote (three) psychological states that eventually lead to positive job-related outcomes (e.g. internal work

motivation, work effectiveness, general job satisfaction, and growth satisfaction; Hackman & Oldham, 1976; Kulik *et al.* 1987).

## 5 The Methodological Approach

This chapter describes the methodology for examining the two research questions. The previous chapters provided the theoretical background for understanding the necessity of both training and job satisfaction for older workers, and for analysing the associated research questions. The empirical investigation of this research involves several methods. The analysis of the development in the training incidence of older workers in Germany is conducted using cross-sectional data and involves a trend analysis, whereas the analysis of the relation between training and job satisfaction is done using pooled cross-sectional data, which is further supported by a panel data analysis.

The chapter begins with a discussion on the rationale behind conducting the research in the setting of Germany. It continues with a general overview on the SOEP dataset, followed by a description of the research sample and its limitations. It then describes the operationalization process of the dependent, independent and control variables separately for each analysis, and continues to the methods of analysis. The last section describes each sample in terms of individual and employment characteristics of respondents.

### 5.1 Country Selection: The Case of Germany

This research investigation operates in the setting of the German labour force. Beside the practical aspects associated with the decision to focus on Germany, it is mainly driven by internal developments on the macro-level. As discussed in detail in Chapter 2, institutional and policy developments of the last decade in Germany aimed to raise the employment rate of older workers by reversing the early retirement trend and encouraging late employment (OECD, 2005a). These developments stand in the background of this research as they are assumed to *indirectly* affect the participation of older workers in training. In other words, higher rates of older workers staying longer in the labour force due to policy change should make human capital investments in the form of training worthwhile, both for employers and employees (OECD, 2012).

As also discussed in Chapter 2, concerns about raising labour force participation of older workers are not unique for Germany. Most European countries aimed to raise the employment rate of their older people based on the target set by the Stockholm Council in 2001 (European Commission, 2012). Nevertheless, the intensity according to which German institutions have undertaken the mission of stopping the shrinking of the labour force, at least

in terms of its quantity, makes the analysis in the setting of Germany very interesting and important. Finally, the institutional developments also set the time range in which developments in the training of older workers are expected, namely between the years 2000 and 2008, where main policies have taken place<sup>107</sup>.

## 5.2 The Data Source and Sample Size

In my analysis I apply data from the German Socio-Economic Panel<sup>108</sup> (SOEP). The SOEP is a longitudinal study of private households of the population in Germany which is collected on a yearly basis by the German Institute for Economic Research (DIW). It was begun in 1984 and consists of a representative micro data of individuals, households and families for measuring persistence and variations in living conditions (Wagner *et al.* 2008; Wagner, Frick & Schupp, 2007). It was first conducted in West Germany (the Federal Republic of Germany) and West Berlin. In 1990 an additional sample of the population of East Germany (The German Democratic Republic, GDR) was added to the original sample. The most recent wave (2010) contains more than 19,000 persons living in approximately 11,000 households (Wagner *et al.* 2008; Wagner, Frick & Schupp, 2007). The SOEP interviews all adult members in the household (older than 16 years). A broad range of information are supplied by the panel study through a yearly questions on various important topics such as education and qualification, income and social security, labour market and occupational dynamics, health and housing. By providing such information, the SOEP enables a detailed investigation of the factors influencing the training participation of workers as well as their job satisfaction. While information on job satisfaction is collected every year, on training it is collected every couple of years.

### *The Sample*

This research uses data from the years 2000, 2004 and 2008 since those years contain *comparable* question on participation in professional training courses (Burgard & Görlitz, 2011)<sup>109</sup>. The information on respondents' job satisfaction is also taken from those years since the aim of the second analysis is the relation between training and job satisfaction. In order to determine the age range of the sample, it is first essential to define what is meant by the term

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<sup>107</sup> For detailed information on institutional and policy developments, see Chapter 2, section 2.4.

<sup>108</sup> Panel or a longitudinal data are obtained by selecting a population while observing the same units for several time periods. This can be done by "interviewing subjects and collecting both present and past data at the same time, or by tracking the subjects once they have been included in the survey" (Cameron & Trivedi, 2005).

<sup>109</sup> The question also exists in the wave of 1993. However, this year was not included in the analysis due to seven years difference between 1993 and 2000 compared to the *four* years difference between 2000, 2004 and 2008.

“older workers”? There is no consensus in the literature regarding the age in which a person becomes an older worker. The age category used to define ‘older workers’ varies between studies. While some use the age 45 years and older (Rogers & O’Rourke, 2001), others take older workers to be as young as 40 (e.g. the Age Discrimination in Employment Act in the United States) or older than 50 years (Stamov-Rossnagel & Hertel, 2010). The highest age in the literature under the term “older workers” is 75 years old (Warr, 2000). This however depends on the aim and field of the study. Studies on labour force participation usually refer to “older workers” as those aged 50 or 55 and older (Kooij *et al.* 2008), which is due to the decline in labour force participation occurring especially from these ages. Older workers in the current study are defined by chronological age (calendar age) and refer to workers between the ages 55 to 64<sup>110</sup>. This cohort represents a growing proportion of the labour force in many industrialized countries as a result of the phenomenon of population ageing (Rogers & O’Rourke, 2001). In accordance, it was decided to restrict the analyses to people between the ages 35 to 64. One reason to include the group of workers aged 35-39 is because they are not classified in the literature as older workers, thus serve as the reference group<sup>111</sup>. A second reason is that they are also included under the category of *prime-age workers* e.g. aged 35-55<sup>112</sup>.

As described in the introduction, this research aims to connect in the theoretical level between institutional and policy developments causing to an extension of employment and changes in the behavior of employers and employees towards training. It then aims to connect between training and *job* satisfaction. Therefore, the research is restricted to *employed* people working 15 hours and more per week, namely on part-time or full-time job. The inclusion of part time workers in the sample lies in two reasons<sup>113</sup>. First, part-time employment is often used by older workers than younger ones (Federal Statistical Office, 2011), and second, changes in the conditions for part-time employment in the last decade (e.g. the old-age part-

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<sup>110</sup> Chronological age is seen by some researchers as a poor measure to be used with respect to the work setting (Settersten & Mayer, 1997; Wolf *et al.* 1995). The explanation behind this argument lies in the fact that individual at the same (chronological/calendar) age may not have the same characteristics in terms of family status, health and work level (Kanfer & Ackerman, 2004). Ageing is a process that affects each person differently on the personal, societal, and organizational level (Settersten & Mayer, 1997). Neugarten and Hagestad (1976) also mentioned that chronological age might be useful in cases where, for example, a comparison is done between people in order to distinguish who is younger. Chronological age is still seen through its practical and convenient uses, and thus “*it has become a prominent criterion for classifying and ordering society*” (Neugarten & Hagestad, 1976).

<sup>111</sup> This is true for the first analysis. In the second analysis this age group is combined with the group of workers aged 40-45 due to sample limitations.

<sup>112</sup> People under the age of 35 are excluded from the research since the focus is on developments among prime age and older workers.

<sup>113</sup> It is often the case that part-time workers are not included in the analysis of training determinants (e.g. Riphahn & Trübswetter, 2006; 2007; Shields, 1998).

time employment act legislation) were aimed to raise the labour force participation of workers aged 55 and older (this is already reflected in an increased labour force participation of older women working part-time; Dietz & Walwei, 2011). Furthermore, self-employed<sup>114</sup>, trainees<sup>115</sup>, and military service were excluded from the analysis.

For investigating the developments in older workers participation in professional training courses (first research question; Chapter 6), the independent variable age group and the control variables are collected a year before the survey, meaning *before* the participation in training (as training refers to courses taken during the year prior to the survey). This was done in order to account for possible changes in the characteristics of the sample which could have taken place after the participation in training (e.g. changing employment status from full to part time employment). Therefore, such a step is crucial when examining the *determinants* of training. In accordance, variables are collected from the wave of 1999 for the sample of 2000, from 2003 for the sample of 2004 and from 2007 for 2008. Table 1 presents the size of the sample in each year. As shown, the sample of 2000 is much smaller than that of 2004 and 2008. This can be explained by joining of new respondents to the SOEP in 2000 (innovation sample). This means that no information on their individual and employment characteristics is available in 1999, and therefore, in the process of matching the control variables collected in 1999 with the sample of 2000, those participants were excluded from the sample. Furthermore, given the nature of this research question, according to which the training likelihood of older cohorts of workers is compared over the years, the research does not involve combining those samples to a panel. Instead, each cross-sectional sample is analysed *separately*.

*Table 1:* Sample size (first analysis)

	2000	2004	2008	Total
N	3,632	6,416	6,077	16,125

Source: SOEP, own calculations

For investigating the relation between training and older workers' job satisfaction (second research question, Chapter 7) the information on respondents (individual and employment

<sup>114</sup> Self-employment is highly common among older workers. According to Brenke and Zimmermann (2011), the decision for self-employment requires enough work experience and therefore this group of workers tends to be older. Nevertheless, the reason for the exclusion lies in the assumption that their labour force participation is not affected by latest policies, as their decision towards retirement does not depend on external factors such as the official retirement age or early retirement pathways. Therefore, no change is expected with respect to their training. In the absence of employer, the decision to participate in training depends only on *their* willingness.

<sup>115</sup> This refers to respondents who were on a status of trainees.

characteristics) is collected at the time of the interview, namely *after* the participation in training. This act is essential for raising the credibility of the analysis. In other words, since the analysis aims to examine whether training has an effect on the job satisfaction of older workers, the dependent variable and the independent variables are collected after the time frame when training could have taken place. In accordance, variables are collected in 2000, 2004 and 2008.

In contrast to the first analysis, the second one does not involve a trend analysis. Instead, the three cross-sectional samples were combined to a *pooled cross-sectional* dataset, separately for each age group. This means that a separate sample which consists of workers aged 55 and older is constructed. As it is explained below, the analysis in part involves comparing between older workers and younger ones, therefore two additional pooled cross-sectional samples are created. Such a methodological step (pooling the data) is normally done in order to increase sample size (Wooldridge, 2002) and was also the reason behind combining the three sample' years<sup>116</sup>. Table 2 presents the sample size for each age group. As shown, the sample of workers aged 55-65, yet the main target of the second analysis, is less than half the samples of workers aged 35-44 and 45-54<sup>117</sup>.

*Table 2:* Pooled cross-sectional by age group (second analysis)

	35-44	45-54	55-64	Total
N	7,839	6,970	3,342	18,151

Source: SOEP, 2000-2008, own calculations

Given the panel nature of the SOEP, namely that the *same* persons might be counted twice or even three times due to three time periods, pooling cross-sections could be seen as problematic. Therefore, an *unbalanced panel* is constructed which is used to support the results of the pooled cross-sectional analysis<sup>118</sup>. This means that the number of time periods is

<sup>116</sup> This is essential due to the low number of training participants among older blue-collars discussed in the first analysis (Chapter 6).

<sup>117</sup> It should be noted that, respondents who joined the SOEP in 2000 and were excluded from the first analysis (see above) were included in the second one. This was possible since the variables in the second analysis are collected *after* the participation in training, namely in the time of the interview (see section 5.3.1). This resulted in a bigger sample in 2000. The two other samples (2004 and 2008) are smaller than their parallel ones in table 1 (first analysis). These differences are caused by missing values on some of the relevant variables. In other words, some respondents did not fill up all the required information and were excluded from the sample. Nevertheless, the number of training participants aged 55-64 in 2004 and 2008 stayed the *same* as in the first analysis, meaning they had no missing values.

<sup>118</sup> A balanced panel dataset in which all individuals in the panel are observed the same number of time periods (Wooldridge, 2002) is not possible. As mentioned in the introductory chapter, this analysis examines the overall job satisfaction of training participants aged 55-65 from different occupational groups (blue-collars, white-collars and civil-servants). In this regard, given the low number of training participants among blue-collar

not the same for all individuals (Wooldridge, 2002)<sup>119</sup>. By having an unbalanced panel there is *no* loss of people in the data since even those with one time period in the pooled cross-sectional dataset are included. This is highly relevant due to the low number of older training participants from the different occupational groups<sup>120</sup>. Table 3 describes the sample size for workers aged 55-64. As shown, the panel consists of 3342 observations, as in the pooled cross-sectional sample, and 2637 respondents. The high number of respondents implies the high number of respondents with only one time period.

*Table 3:* The panel dataset

	Aged 55-64
N	3342
n	2637

Note: n refers to the number of subjects, and N to the complete amount of observations.

Source: SOEP, 2000-2008, own calculations

Table 4 presents the distribution of respondents aged 55-64 in the panel. As shown, 27.38 percent participated in 2000, 17.94 percent in 2004 and 29.58 percent in 2008. The share of older workers which are observed more than once is much smaller. In this regard, 9.82 percent are observed in 2000 and 2004, 13.42 in 2004 and 2008, and less than half percent in 2000 and 2008. Information on all years exists only for 1.63 of the sample.

*Table 4:* The distribution of respondents aged 55-64 over the years (unbalanced panel)

Percentage	2000	2004	2008
29.58			x
27.38	x		
17.94		x	
13.42		x	x
9.82	x	x	
1.63	x	x	x
0.23	x		x

Source: SOEP, 2000-2008, own calculations

workers aged 55-64 in each sample year, a balanced panel data would mean losing a considerable amount of older workers especially among blue-collars.

<sup>119</sup> The panel composed of the same number of training participants as in the pooled sample (table 2).

<sup>120</sup> Table 1 in the Supplements presents the percentage and absolute numbers of training participants by occupational group, separately for each age group. Focusing on workers aged 55-64, the number of blue-collar training participants is the lowest (60) compared to the other occupational groups.



### 5.3 Operationalization of Key Variables

This section describes the operationalization process of the variables used for the first and second analysis. As it is discussed in the following, this process is mainly affected by sample limitations expressed by a low number of training participants aged 55 and older.

#### 5.3.1 *The Dependent Variables Training and Job Satisfaction*

To study the training incidence of older workers the participation in training is examined. The dependent variable ‘participation in professional training courses’ is constructed based on the following question in the SOEP questionnaire: “*There are different opportunities available if one wants to educate himself further. Think back on the last three years. Have you in that time period done any of the following to further your professional education?*” Respondents are then offered with three options to choose from by answering *yes* or *no*. The three options are - “*Regularly read scientific or professional publications; attended professional conventions or congresses; participated in professionally oriented courses, including those which are still in progress*”. Based on the last option the dependent variable is summed to a *binary*<sup>121</sup> variable with the option *yes* ( $y=1$ ) for participating in professional training courses and *no* otherwise ( $y=0$ ). For the purpose of this analysis, the question is restricted to the last *year* instead of the last three years. This is done by constructing a dependent variable which calculates for *each* person twelve months backward from the time of his interview<sup>122</sup>. For example, if a respondent is interviewed in May 2000 and declared on participation in training, he will be included as ‘one’ only if his training course has taken place between the time of the interview and April 1999. In contrast, respondents who answered *yes* for the third option but not in the range of 12 months backward, are not included as one, but as zero.

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<sup>121</sup> A binary dependent variable, also called a dummy variable, has two values. The one coded as 1 referring to a *positive* outcome, and the other coded as 0 referring to a negative outcome.

<sup>122</sup> This calculation was possible by the use of three variables, which are available in the SOEP. The first contains information on the month of the interview, the second on the month of the most recent course and the third on the year of the most recent course. The construction of the dependent variable was involved several steps. In a first step, a variable was constructed containing information on the month of the interview plus twelve months. This allows knowing the range in which each person who participated in professional training courses in the original question (in the last three years) is “allowed” to be included under the category of “yes”. In a second step, a second variable was constructed containing information on the *month* when the last course begun while restricting the answers to courses taken in the year before. This was possible through the use of a third variable “year of the course”. In other words, the new variable restricts the answers only to courses taken place in the months between the interview and the year before. In a third step, another variable was constructed which subtracts the second variable from the first. In the last step, the dependent variable ‘participation in professional training courses’ was constructed with 1 refers to all respondents who participated in training during the last *twelve* months prior to the interview (using the third variable with the option <13, namely not more than 12 months), and 0 otherwise.

The rationale behind restricting the question for the last twelve months lies in the lack of information on the training courses. In the SOEP questionnaire, respondents who answer yes for participating in professional training courses are requested to answer a set of questions concerning the last *three* most recent training courses<sup>123</sup> they took part in. This means that information on the year and month, which is necessary for constructing the dependent variable, is available *only* with regard to the three most recent courses, all of which could occur in the first year prior to the survey. Given the information mentioned above, according to which all the independent variables are collected before the *event* (participation in training), going three years backward in order to collect information on a person (i.e. individual and employment characteristics) is too far away from the event. It was therefore not possible to construct a dependent variable which will capture the whole three years<sup>124</sup>. Therefore, calculating twelve months backward for each person raises the chances that the collected information in this time point represents the person's characteristics before the event. Another reason for limiting the question to the last year is to make the research *comparable* with other studies which also refer to training during this time range (Shields, 1998; Riphahn & Trübswetter, 2006).

The operationalization of training is also influenced by sample size limitations. As discussed in Chapter 3, the participation of workers in training is negatively affected by age (Mincer, 1989; Bartel & Sicherman, 1993; OECD, 1999; Taylor & Urwin, 2001; Warwick Report, 2006; Schmidt, 2007; Schleife, 2008; Tippelt *et al.* 2009; D'Addio *et al.*, 2010; Maximiano, 2011). This implies the difficulty that could be involved in measuring the training of older workers. Studies on workers' training often concentrate on a certain type of training, such as employer-sponsored training (Georgellis & Lange, 2007), general (Pfeifer, 2008) or specific training (Schleife, 2008). The SOEP offers a variety of questions on training, which is very useful for the current research. For example, information on who held the course (employer, training institute, etc.) and the associated training-costs could help to differentiate between employer-employee funded training<sup>125</sup>. Similarly, information on the purpose of the instruction (e.g. retraining for a different profession or job, adjustment for increasing

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<sup>123</sup> E.g. "We would now like to know more about the courses you attended. If you have attended several courses in the last three years, please give information for the last three only" (<http://panel.gsoep.de/soepinfo2012/>).

<sup>124</sup> This suggests that information on possible courses that might have happened two or three years before the survey is not available in the SOEP.

<sup>125</sup> When aiming to point to the indirect relation between developments in policies and changes in the training participation of older workers, as in this research, such information (employer-employee funded training) could help to have a more detailed picture concerning the trend in older workers' training over the years. In other words, the assumed indirect impact of longer employment on the training likelihood of older workers could be better proved by examining the participation of older workers in employer-funded training and their participation in employee-funded training.

requirements for the job, introduction to a new job) may be useful for determining whether the training courses are job-related or not. This however was *not* possible in this research as it would involve losing training participants among the older groups. Therefore, a much broader definition of training is considered in this research, in which training refers to professional courses<sup>126</sup> taken by employed person. This definition encompasses courses that are funded by the employers as well as employees, courses who held in different settings, and courses that were taken from different reasons. This definition contributes to a bigger sample of older training participants<sup>127</sup>.

To study the relation between training and job satisfaction of older workers (second analysis), the overall job satisfaction of older training participants is examined. The dependent variable *job satisfaction* is constructed based on the following question in the SOEP: “*How satisfied are you today with the following areas of your life?*” Respondents are asked to choose between eleven scales, with zero refers to *totally unhappy* and 10 to *totally happy*. As mentioned earlier, workers’ job satisfaction is collected based on the frequency of the training question in the SOEP, namely every four years starting in 2000 until 2008. The operationalization of job satisfaction is conducted as follows: A cross-tabulation of job satisfaction (on ordinal scale) with the training variable in the pooled dataset of workers aged 55-65 indicated a very *low* number of training participants in the beginning of the scale. This required re-defining the variable (job satisfaction)<sup>128</sup>. Two methodological approaches are available (for). The first, keeping the ordinal characteristic of the variable but reducing the number of scales (e.g. three instead of eleven), and the second, changing the variable to a binary one. Both approaches should contribute for a better distribution of respondents in each cell, on the one hand, but involve losing information on the job satisfaction of training participants, on the other hand. Based on the method used by Burgard and Görlitz (2011), the dependent variable job satisfaction was collapsed into a binary variable which equals one ( $y=1$ ) if respondents have high job satisfaction and zero ( $y=0$ ) if they have low job satisfaction. For determining this classification, mean job satisfaction was used as a threshold. On a scale from 0 till 10, mean job satisfaction in the pooled sample of workers aged 55-64 is 7<sup>129</sup>, thus under the category of *high* job satisfaction ( $y=1$ ) are included individuals who reported job satisfaction score higher than 7. Those who reported 7 or less are included as

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<sup>126</sup> This definition is also relevant for the second analysis where professional training courses constitute the independent variable and its effect on job satisfaction is examined.

<sup>127</sup> For information on the sample size of training participants by age group and year, see table 3 in the Supplements.

<sup>128</sup> This examination is conducted in the pooled dataset of the two other age groups as well.

<sup>129</sup> The same procedure is carried out for the sample of workers aged 35-44 and 45-54.

having a low job satisfaction<sup>130</sup>. Nevertheless, the original ordered variable was intensively used in the descriptive part of the analysis by calculating its mean.

### 5.3.2 *The Independent and Control Variables*

The independent variable *age group*, which is used in the first analysis (the training incidence of older workers), is operationalized by a series of six dummies variables indicating the age group: 35-39, 40-44, 45-49, 50-54, 55-59 and 60-64. The last two age groups are included under the category of *older workers*, as defined by this research (see section 5.2). As discussed in the Chapter 2, workers aged 55 and older are subjected for early retirement schemes and therefore are the target of recent pension and labour market policies (OECD, 2005). The decision to create *two* older age groups lies in findings pointing to different developments in the employment rate of workers aged 55-59 and 60-64 over the years. While a strong increase is observed in the labour force participation of workers aged 55-59 in recent years (the baby boomers; OECD, 2005a; Dietz & Walwei, 2011; Brenke & Zimmermann, 2011), the employment rate of workers aged 60-64 was steadily increased but more moderately. A cross-tabulation between age and training in each survey year resulted in a reasonable number of training participants aged 55-59 and 60-64. This allows analysing each age group separately. As for workers aged 55 and younger, *prime-age* workers, creating four age groups with five years difference makes them comparable to the older age groups. The reference group however are respondents aged 35-39.

The *control* variables used in the first analysis include a number of individual and firm characteristics, which have been found to be important in earlier studies to affect the training decision of individuals and firms<sup>131</sup>. In addition, a consideration is also given to the *affinity* of the variables to older workers, namely their possible impact on the training probability of older workers. The control variables are gender, educational-degree, employment-status, occupational-group, industry, work duration and size of the firm, industry and work duration<sup>132</sup>. As will be discussed later, these variables are also included in the second analysis together with income and health.

Training differences between men and women are estimated by including the variable gender. As mentioned in Chapter 3, studies point to a higher training incidence among men

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<sup>130</sup> For more information on this method, see Kassenböhmer and Haisken-DeNew (2008).

<sup>131</sup> See Chapter 3, section 3.2.

<sup>132</sup> Despite empirical evidences indicating the importance of nationality and work contract in determining the likelihood of training, these factors were not included in the final model due to *low* numbers of training participants resulted after cross-tabulating between training and each one of these variables.

compared to women (Booth, 1991; Green 1991; Lynch, 1992; Blundell *et al.*, 1996; Arulampalam & Booth, 1997; Evertsson, 2004). Considering recent findings indicating an increase in the labour force participation of older women in Germany (Boersch-Supan & Juerges, 2011)<sup>133</sup>, this research assumes improved training incidence among older women over the years. Therefore, the inclusion of gender is essential as it might affect the likelihood of older workers to participate in training (see Chapter 6).

The operationalization of human capital was done using the International Standard Classification of Education (ISCED-1997)<sup>134</sup>. For the purpose of the first analysis, two versions of an educational variable are created, a short and a long one<sup>135</sup>. This again was a result of sample limitations associated with low cases of older workers. While the original variable in the SOEP is composed of seven categories<sup>136</sup>, the new variable (long version) is composed of four *dummies*, indicating the highest educational degree attained. In this respect, a distinction is made between ‘a general elementary degree’, ‘a middle vocational degree’, ‘a higher vocational degree’ and ‘a higher educational degree’. General elementary is named by ISCED ‘lower secondary or second stage of basic education’ and refers to the completion of basic education started in the first stage. In other words, it is more specialized education and the end of this stage usually means that compulsory education is over. Respondents with ‘inadequately’ education (in ISCED – ‘primary education or first stage of basic education’) are included under this category. Middle vocational degree, yet the second lowest level of education, refers to upper secondary education which begins at the end of a period of compulsory education. It was joined together with the category ‘vocational+Abi’<sup>137</sup> (the name of the category in the SOEP questionnaire) which refers to a post-secondary non tertiary education. The third level of education, higher vocational degree, refers to the first stage of tertiary education which does not lead directly to an advanced research qualification. The highest educational degree attained, higher education, refers to second stage of tertiary

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<sup>133</sup> This trend is also seen over the years 2000, 2004 and 2008 based on the SOEP dataset (see Chapter 6, section 6.1.2.1).

<sup>134</sup> ‘ISCED is designed to serve as a framework to classify educational activities as defined in programmes and the resulting qualifications into internationally agreed categories. The basic concepts and definitions of ISCED are therefore intended to be internationally valid and comprehensive of the full range of education systems irrespective of the situation in a particular system’ (ISCED, 2011).

<sup>135</sup> One variable is used for describing developments in the level of education among older workers over the years (long version), while the other one is used when the effect of training is taken into consideration, thus in the descriptive part and as a control variable in the multivariate analysis (see Chapter 6).

<sup>136</sup> It should be noted that under the category of higher education also people with PhD degree are included. This is due to a lack of more specific information concerning the type of university degree, which does not allow differentiating more in the categories. Thus the information offered by the ISCED variable in the SOEP is not completely parallel with that defined by the OECD (for more information see: [http://www.diw.de/documents/dokumentenarchiv/17/diw\\_01.c.410636.de/pgen-v28.pdf](http://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.410636.de/pgen-v28.pdf)).

<sup>137</sup> Abi = Abitur (university-entrance diploma).

education which could lead to an advanced research qualification (ISCED, 2011). As will be seen later in Chapter 6, the long version was used for describing alterations in the level of education of older workers over the years.

The *short* version is a dummy variable indicating workers with high qualifications (1) and low qualifications (0), the reference group. The first category is composed of higher educational degree (tertiary education) and higher vocational degree and the second one of middle vocational degree and general elementary. Using the short version results in *less* information concerning the relation between qualification and training, on the one hand<sup>138</sup>, but in higher numbers of older training participants in each category, on the other hand. The latter should contribute to raise the reliability of the results.

Since older workers have on average lower education but more work experience compared to younger workers, their human capital increases, as experience is associated with accumulated professional knowledge over the working years. This might positively influence their training participation. In order to control for this effect the variable work duration, which refers to years with the same employer, is included as a proxy for work experience. As discussed in Chapter 3, older workers have usually longer job tenure in part due to low job mobility therefore accumulate specific human capital over the years (Becker, 1975). This is operationalized by a dummy variable which allows observing differences between people who are working more than 10 years with the same employer (1) compared to those working less than 10 years (0), the reference group.

The research also controls for the effect of *industry sector*. Based on the Statistical Classification of Economic Activities in the European Community, abbreviated as NACE, two versions of the variable are created, a long and a short one. The long version is composed of ten industrial dummies (manufacturing, construction, wholesale and retail, transport, finance, real estate, public administration, education, health and social work and other) and is used for describing developments in the distribution of industrial sectors of workers over the examined years (see section 5.5). For the multivariate analysis (Chapter 6), a new variable is created and composed of three dummies (manufacturing; services<sup>139</sup>; other). This decision is due to the low number of people in some industrial sectors resulting from cross-tabulating industry with the dependent variable training. The rationale behind creating those three

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<sup>138</sup> In other words, less categories means lower variations and therefore less specific information regarding the impact of each educational category.

<sup>139</sup> This decision is due to the low number of people in some industrial sectors resulting from cross-tabulating industry with the dependent variable training. The *manufacturing* sector stayed as it is, while under the category *services* are included transport, finance, real estate, public administration, education, health and social work. The category *others* includes Agriculture and Mining, Construction and Wholesale and Retail.

categories lies in the late structural developments in the German labour market expressed by increasing service sector and declining manufacturing sector (OECD, 2005a; see Chapter 2).

Training differences between occupational groups are estimated by including the variable occupational group, which is composed of three dummies indicating whether a person is a blue-collar, a white-collar or a civil servant. As discussed in Chapter 3, improving the basic skills of particularly (older) industrial workers through training becomes highly important due to the shift to a service economy, but also due to policies which make it difficult for these workers to get out of the labour market early<sup>140</sup>. In this regard, the inclusion of this variable in the model is also important since it may affect the training participation of older workers. Furthermore, the research also control for employment status which is restricted to respondents working 15 hours and more per week. A dummy variable for respondents working less than 30 hours per week (part-time work) and those working 30 hours and more (full-time work) is included in the model. In this way differences between full and part time workers are estimated.

The main independent variable used in the second analysis is participation in professional training courses and is operationalized in the same way as in the first analysis (section 5.3.1). Furthermore, some of the control variables discussed above (gender, educational-degree, employment status, occupational group, and industry), are considered to be important determinants of job satisfaction as well. Therefore, they are included in the model for examining the likelihood of job satisfaction and were operationalized in the same way. Yet, two additional control variables known by the literature to determine the job satisfaction of workers were added – health and earnings<sup>141</sup>. The variable *health* is operationalized by a series of four dummies: very good, good, satisfactory and bad. The variable gross hourly pay (in log) refers to the total amount of pay in each month which includes regular pay, overtime pay, and any other payments in Euro, *divided* by working hours per week (this variable was centralized). Finally, the research also control for cohort effect. This is done by including three dummies: for 2000 (reference group), 2004 and 2008<sup>142</sup>.

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<sup>140</sup> As mentioned in Chapter 3, blue-collar workers are more likely to make use of early retirement pathways due to dealing with physical work during their working careers (Dittrich *et al.*, 2011) and because of technological changes which raise the demand for highly-skilled workers (OECD, 2004a).

<sup>141</sup> For detailed information on the determinants of job satisfaction in the literature see Chapter 4, section 4.2.1.

<sup>142</sup> When using a pooled cross-section, it is important to follow the year for each observation (Wooldridge, 2002).

## 5.4 The Method of Analysis: Regression Models for Binary Outcomes

As discussed in section 5.2, the participation in professional training courses (first analysis), is analysed using cross-sectional data<sup>143</sup>. This means that the variation between people in one point of time is examined, while the variation *within* each person in the dataset over time (e.g. panel) is not taken into consideration. The training incidence is investigated each year separately followed by a trend analysis for examining developments in the training incidence over the years. Furthermore, the relation between training and older workers' job satisfaction (second analysis), is analysed, in a first step, using pooled cross-sectional data, and in a second step using panel data. Therefore, the method of analysis is determined by the type of dataset used.

### First Analysis

#### *Cross-Sectional Analysis: Logistic Regression*

In order to examine the relationship between the binary outcome variable *participation in professional training courses* (Y) and the independent variable *age group* (X) a Logistic Regression Model is applied (Long & Freese, 2006; Best & Wolff, 2010). It is a nonlinear regression model which estimates the probability of the dependent variable in the model to be 1 ( $Y=1$ )<sup>144</sup>, namely that participation in training occurs. The nonlinear characteristic of a logistic model uses maximum likelihood estimation (MLE)<sup>145</sup> instead of the least squares estimation which is often used in traditional multiple regression. MLE “involves finding the values of the parameter(s) that give rise to the maximum likelihood” (Bewick *et al.* 2005), namely to the smallest possible deviance between the predicted and observed values (Newsom, 2012).

As mentioned, each sample year (2000, 2004, and 2008) is analysed separately meaning that the same regression model (same independent variables) is applied in each year, resulting in three logistic regression models. The analysis then involves comparing the estimated coefficients of the main independent variable age group (consists of six dummies) of each regression model. More specific, since the associated *hypothesis* argues that the participation of older workers in professional training courses increases over the years, a comparison of the

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<sup>143</sup> A cross-sectional data comprises a sample of individuals, firms, households, states, etc., collected at a given point in time or during the same time period (Wooldridge, 2002). Interviews in the SOEP were taken place during different months within the same year. Nevertheless, it can still be viewed as a cross-sectional data set.

<sup>144</sup> This kind of regression serves as an alternative technique, which was first introduced in the 1970s to cope with the limitations emerged from using Ordinary Least Squares (OLS), to analyse a binary outcome (Peng & So, 2002). This became popular in social sciences and educational research (Peng *et al.* 2002) and is mostly used for estimating the effect of an independent variable on the outcome binary variable, while controlling for the effect of *confounding* variables (Karlson *et al.* 2012).

<sup>145</sup> This is more appropriate than using Ordinary Least Squares (OLS) (Wooldridge, 2002).



coefficients is performed which is further supported by a significance t-test<sup>146</sup>. This is done in order to see whether the observed changes in the training probability of older workers over the years are significant.

The scientific literature emphasizes that the interpretation of logistic regression coefficients is not straightforward as in linear regression. In the latter, a change in the coefficient of the independent variable is attributed to the inclusion of control variables. In logit model, however, the coefficient changes not only because of confounding (Karlson *et al.* 2012). According to Mood (2010), the familiar problem of *bias* in effect estimates consequence of the correlation between omitted variables and the independent variables in Ordinary Least-Squares regression (OLS) exists also in logistic regression, but is more complicated. The coefficients in logistic regression are affected by omitted variables if they (the omitted variables) are correlated or *not* with the independent variables. This raises the problem associated with interpreting and comparing coefficients in a logistic regression<sup>147</sup>. First, odds ratios (OR) and log-odds ratios (LnOR) which are often used in a logistic regression, reflect unobserved heterogeneity, therefore it is difficult to interpret them as a linear regression. Second, comparing odds ratios (OR) and log-odds ratios across models, even when the same independent variables are included, is not possible as *unobserved heterogeneity*<sup>148</sup> can vary across the different point in time or samples (Mood, 2010). Therefore, OR and LnOR are less appropriate when aiming to compare them across models (Karlson *et al.* 2012; Mood, 2010)<sup>149</sup>.

Several solutions have been proposed by the literature to overcome the problems associated with interpreting and comparing logistic regression coefficients. Mood (2010) points to the difficulty in finding estimates that enable to achieve all purposes in an analysis, as it is often requested by researchers<sup>150</sup>. In this regard, an appropriate solution suggested by Best and Wolf (2012) and which is used in this study, is the Average Marginal Effects (AME). AME represents the average effect of the independent variable on the probability that the event  $P(y=1|x)$  happens, and consider the *easiest* solution for the interpretation and comparison of the logistic regression coefficients. By using AME it is possible to overcome

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<sup>146</sup> This t-test is calculated by hand since Stata does not allow comparing between the waves. The formula for calculating the t-test is found in the Supplements.

<sup>147</sup> In linear regression, the effects on the observed dependent variable are estimated in a way that the coefficients can be compared across models (Mood, 2010).

<sup>148</sup> Unobserved heterogeneity is the variation in the dependent variable that is caused by variables that are *not* observed (i.e. omitted variables; Mood, 2010).

<sup>149</sup> Despite studies pointing to the differences between non-linear and linear models (Allison, 1999) studies still compare models with log-odds ratios and odds ratios.

<sup>150</sup> For example, researchers often want that the same estimates will be comparable across time points, over models, will capture nonlinearity etc (Mood, 2010).

the problem discussed above by Mood (2010) concerning the unobserved heterogeneity. In other words, AME offer the advantage that non-correlated non-observed heterogeneity will not be biased (Best & Wolf, 2012).

## Second Analysis

### *Pooled Cross-Sectional Data Analysis: Logistic Regression*

In order to investigate the relation between the binary outcome variable *job satisfaction* (Y) and the independent variable *training* (X), a logistic regression model is applied using the pooled cross-sectional data. The analysis of a pooled cross-section is much like that of a cross-sectional data (Wooldridge, 2002). In this regard, the description of the logistic regression model in the previous section, and the associated problems of interpretation, hold for the current model as well. Furthermore, apart from the control variables discussed in section 5.3.2, the model includes assumptions concerning the relationship between the independent variables. In this regard, the effect of training on job satisfaction is determined also by its relationship with occupational group, which means that the main independent variable of interest, training, is *interacted* with occupational group. The latter consists of three categories – blue-collars, white-collars and civil servants. Analysing the coefficients is done using AME as in the first analysis.

### *Panel Data Analysis: Random Effects Logistic Regression*

The second method for analysing the relationship between job satisfaction and training involves using a panel regression model. Such a model enables to account for changes on the individual level over the years (Engel & Reinecke, 1996) and for individual unobserved heterogeneity, namely changes *within* individuals that cannot be observed (e.g. someone personality). The latter is one of the main advantages of a panel analysis (Brüderl, 2005). Therefore, in order to account for the bias associated with the estimated coefficients of the pooled logistic regression due to individual unobserved heterogeneity, a panel model called *random-effect logistic regression* is applied. The assumption behind this model is that the individual specific effects which we cannot observe are uncorrelated with the independent variables<sup>151</sup>. Therefore, time-variant variables (e.g. training) which change over time, and time-invariant variables (e.g. sex, education) which do not change over time, can be included

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<sup>151</sup> The assumption behind the fixed-effects model, in contrast, is that the individual specific effect is correlated with the independent variable. Therefore, in this model time invariant is excluded from the model (Brüderl, 2005).

and estimated in the model (Engel & Reinecke, 1996; Brüderl, 2005)<sup>152</sup>. Since I am interested also in the effect of time-invariant variables, this model is preferred. Another advantage of the random-effect logistic regression is that it can also handle an unbalanced panel (Wooldridge, 2010).

## 5.5 Univariate Description

### *First Analysis*

Table 5 below presents the individual and employment characteristics of SOEP respondents aged 35 to 64 for the years 2000, 2004 and 2008. As mentioned in section 5.3.2, based on previous studies on the incidence of training, those are the main factors affecting the likelihood of workers<sup>153</sup> to participate in training. Changes in these characteristics over the years might be reflected also in changes in the probability of training. A detailed investigation of those factors with relation to training is conducted in Chapter 6. As shown in table 6, the characteristics of the sample have changed over the examined years. The share of female increased between 2000 and 2008 (42.07 percent to 46.03 percent, respectively), which corresponds with findings from the Federal Statistical Office indicating an increase in the participation of women over the last decade. The share of part-time employment increased and the share of full-time employment slightly decreased. Furthermore, an increased share of high-educated workers can be seen as well as an increased share of workers with higher vocational degree. This corresponds with recent findings of the OECD report *Education at a Glance* (2011a) indicating an increase in the supply of German workers with tertiary education in recent years, which has resulted in an increased employment rates. A significant decrease, however, is seen in the share of workers with general elementary degree, the lowest level of education. The share of blue-collar workers significantly decreased, whereas the share of white-collar workers significantly increased over the years. These findings can be in part supported by that of Riphahn and Trübswetter (2007) which point to the same trend using data from the *Mikrozensus*, but only for the years 1996 and 2004.

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<sup>152</sup> The results of a Hausman test turned out to be insignificant, which means that the random-effects model can be used.

<sup>153</sup> For detailed information on the determinants of training, see Chapter 3, section 3.2.

Table 5: Labour Force Characteristics of SOEP Respondents for 2000, 2004 and 2008 (%)

	2000	2004	2008
	N=3632	N=6416	N=6077
<b>Average age</b>	46.45	47.15	47.85
<b>Age group</b>			
35-39	23.43	19.78	15.99
40-44	22.38	21.52	21.24
45-49	18.94	21.07	21.46
50-54	16.13	17.21	18.89
55-59	13.08	13	15.04
60-64	6.03	7.42	7.37
<b>Gender</b>			
Male	57.93	55.47	53.97
Female	42.07	44.53	46.03
<b>Educational level (ISCED)</b>			
General elementary	14.65	10.63	8.75
Middle vocational	52.86	50.75	52.92
Higher vocational	8.92	9.38	9.51
Higher education	23.57	29.24	28.81
<b>Employment status</b>			
Full-time	88.05	85.32	84.40
Part-time	11.95	14.68	15.60
<b>Occupational group</b>			
Blue-collar workers	39.01	29.40	29.26
White-collar workers	52.97	59.40	60.06
Civil-service workers	8.01	11.21	10.68
<b>Size of the firm</b>			
20<200	51.60	50.81	50.17
200<2000	25.22	24.28	23.30
2000 and more	23.18	24.91	26.53
<b>Length with firm</b>			
Less than 10 years	52.70	43.67	42.80
10 years or more	47.30	56.33	57.20
<b>Industry</b>			
Manufacturing	30.53	26.64	25.70
Construction	7.13	5.52	4.97
Wholesale and retail	12	10.69	10.83
Transport	5.45	5.61	5.69
Finance	3.99	4.49	4.59
Real estate	4.10	7.17	7.85
Public administration	11.21	11.55	10.58
Education	6.75	9.62	9.54
Health and social work	10.57	10.44	12.56
Other	8.26	8.28	7.68

Source: SOEP, 2000, 2004, 2008, own calculations

As also shown in table 5, the share of people with longer work duration increased and the share of workers working in large enterprises slightly increased. A look at the distribution of sector of industry indicates the biggest share of people working in manufacturing, in wholesale and retail and in the service sectors (e.g. public administration, education and

health and social work), while all the other sectors have a much smaller portion. The portion of the service sectors significantly increased during the examined years. One possible explanation for the latter development might be the shift from industrial to a service economy which characterizes the last quarter of the twentieth century (Schettkat & Yocarini, 2006)<sup>154</sup>.

As for development in the age structure of the sample, it is noticeable that the average age of workers increased between 2000 and 2008 (from 46.45 to 47.8, respectively), representing the rise in the number of mature and older workers. The share of workers aged 35 to 39 significantly decreased between 2000 and 2008 (from 23.43 to 15.99 percent, respectively) while a slight decrease in the share of workers aged 40 to 44 is observed during those years. The share of workers aged 50 to 54, however, increased (from 16.13 percent to 18.89 percent). As a steady increase in the number of workers aged 50 to 54 has been observed in the German labour force since 1998, a suitable explanation may lie in the demographic developments occurred in that period (Dietz & Walwei, 2011). Furthermore, the share of workers aged 55 to 59 slightly decreased between 2000 and 2004, from 13.08 to almost 13 percent, while in 2008 it increased up to 15.04 percent. This age group represents the larger birth cohorts (i.e. Baby boomers) of the 1950s which has been increasing in recent years (OECD, 2005a). As for workers aged 60-64, a moderate increase is observed between 2000 and 2004 (from 6.03 to 7.42 percent, respectively) while a minor decrease is observed between 2004 and 2008. These findings are supported by other German datasets. For example, using data from the *Federal Employment Agency*, Dietz and Walwei (2011) describe the employment situation of German workers aged 15 to 64 for each year since 1998. While workers aged 60 to 64 and 50 to 54 have experienced a steady rise since 1998, the participation of workers aged 55 to 59 steadily decreased from 1998 to 2003 and started to increase *only* from 2004. The same trend is also supported by the findings of Brenke and Zimmermann (2011) based on data from the Federal Statistical Office for the year 1998-2009. However, it should be noted that despite the positive trend seen over the years for workers aged 50 and above, their shares are still behind these of the youngest age groups (table 1). This is especially true for the oldest age group which still constitutes a low portion of the whole sample in 2008.

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<sup>154</sup> For more information on this topic see Chapter 2, section 2.2.3.

### *Second Analysis*

Table 6 presents the main individual and employment characteristics of SOEP respondents, separately for each age group. As shown in the column of workers aged 55-64, the share of men is meaningfully higher than that of women (60 and 40 percent, respectively). This corresponds with the findings of other datasets pointing to lower labour force participation rates of women aged 55 and older compared to their male counterparts in Germany (Federal Statistical Office of Germany, 2011)<sup>155</sup>. The same gender gap, though not as big as for older workers, can be seen for younger workers. As also shown, the share of older workers with middle vocational degree is the highest (46.20 percent) followed by a smaller share of workers with higher educational degree (33.51 percent). These findings are also observed among younger workers but with a smaller share of high-educated workers and a bigger share of workers with middle vocational degree. A high share of high-educated older workers in the labour force is usually a result of the low educated who leave the labour force early (Dietz & Walwei, 2011; OECD, 2005a)<sup>156</sup>.

As also shown in table 6, the share of older workers reporting a satisfactory health condition is the highest (42 percent) while the share of workers with very good health is the lowest. Comparing to the other samples, it is noticeable that the share of people with a good health decreases with age, and the share with a satisfactory or bad health increases with age. Furthermore, the share of part-time employment is very low among older workers (13.29 percent), and similar shares can be seen among younger workers. As for occupational groups, the share of older white-collar workers is the highest (56.37 percent) and that of civil servants is the lowest (16 percent). Similar proportions are observed in the other samples, but the share of older civil-servant workers is the biggest. This corresponds with other findings indicating the highest share of older workers in the German labour force especially among civil-servant workers (Brenke & Zimmerman, 2011).

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<sup>155</sup> Chapter 6 describes developments over the years in the labour force participation of older workers by gender. This trend analysis reveals improvements in the share of older women despite a general lower share than men.

<sup>156</sup> Chapter 6 describes developments in the share of older workers between 2000 and 2008 by level of education.

*Table 6: Labour Force Characteristics of SOEP Respondents Separately by Age Group (%)*

	<b>35-44</b>	<b>45-54</b>	<b>55-64</b>
	N=7839	N=6970	N=3342
<b>Training Participation</b>			
No	73.36	73.87	78.99
Yes	26.64	26.13	21.01
<b>Gender</b>			
Male	56.93	53.76	60.05
Female	43.07	46.24	39.95
<b>Educational Degree (ISCED)</b>			
General Elementary	10.03	11.13	11.61
Middle vocational	55.42	51.99	46.20
Higher vocational	10.52	8.79	8.68
Higher education	24.03	28.08	33.51
<b>Health</b>			
Very Good	10.70	6.57	4.85
Good	51.27	44.03	37.25
Satisfactory	29.68	37.10	41.59
Bad	8.34	12.30	16.31
<b>Employment Status</b>			
Full-time	85.28	86.43	86.71
Part-time	14.72	13.57	13.29
<b>Occupational Group</b>			
Blue-collar worker	33.54	30.89	27.89
White collar worker	59.20	57.45	56.37
Civil-servant worker	7.26	11.66	15.74
<b>Industry Sector (NACE)</b>			
Manufacturing	30.07	27.56	25.91
Construction	7.12	5.95	5.39
Wholesale and retail	13.25	10.82	9.99
Transport	5.78	6.44	5.12
Finance	4.98	4.52	4.28
Real estate	7.72	6.50	6.94
Public administration	9.80	12.15	12.90
Education	6.15	10.92	15.74
Health and social work	12.26	12.01	10.71
Other	2.88	3.13	3.02
<b>Years</b>			
2000	37.82	32.31	30.82
2004	34.53	34.35	33.78
2008	27.64	33.34	35.40

Source: SOEP, 2000-2008, own calculations

As for sector of industry, the highest share of older workers (26 percent) works in manufacturing, while the lowest share works in finance. The share of the service sector is relative high with almost 16 percent work in education and 13 percent in public administration. Highest share of workers in manufacturing is seen also in the samples of both workers aged 35-44 and 45-54 (30 and 28 percent, respectively). The share of older workers

in education however is pretty high compared to younger workers. Finally, the percentage of the cohorts increases over the years. The share of workers aged 55-64 consists of 31 percent in 2000 and 35 percent in 2008. The opposite is observed for the sample of workers aged 35-44 between 2000 and 2008 (from 38 to 28 percent, respectively).



## **6 Human Capital Investments in a Shrinking Labour Force: How Do Older Workers Fit in?**

This chapter investigates the development in the participation of older workers in professional training courses in Germany. In particular, I examine whether a noticeable increase in their likelihood of receiving training can be recognized over the years of the SOEP survey. The initial prediction of the human capital theory is that older workers are less likely to participate in training programs due to the associated lower net returns both for the company and for the worker (Becker, 1993). However, as the employment period of older workers nowadays is extended given the effect of policies, such prediction might not be relevant. Taken together, this chapter tests the hypothesis that the participation of older German workers in professional training courses increases nowadays as their time in employment becomes longer<sup>157</sup>.

In order to analyse the training participation of older workers, I first follow the development in the share of older workers over the years of the SOEP sample. I then distinguish between three indicators - gender, educational attainment and occupational group - all of which are assumed to have significant influence on the labour force participation of older workers. It allows me to construct a theoretical base which could explain part of the alterations in the training incidence of older workers. The chapter continues by a thorough descriptive investigation of the participation of older workers in professional training courses, which is further examined by a multivariate analysis.

### **6.1 Changing Structure of the German Labour Force over Time: An Analysis based on the SOEP Dataset**

#### *6.1.1 Improvement in the Labour Force Participation of Older Workers*

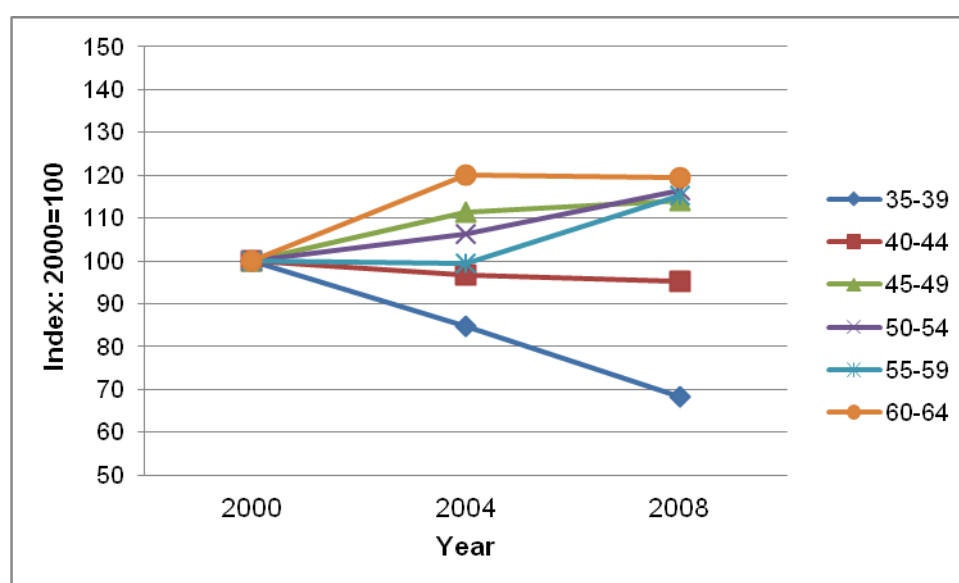
As discussed in Chapter 2, the German labour force has been experiencing structural changes over the last decade. In particular, the improved employment situation of older workers aged 55 and older in recent years constitutes a main change. As this development can partly explain alterations in the training participation of older workers over the years it is examined below.

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<sup>157</sup> As it will be explained later (section 6.2), the current study assumes that developments in the training incidence of older workers over the tested years where policies for extending employment have taken place, could imply a positive connection between longer employment and training participation of older workers. This analysis is in a way similar to the research conducted by Riphahn and Trübswetter (2007). Using the data from the German *Mikrozensus* of 1996 and 2004 they tested the same hypothesis.

As shown in Chapter 5 (table 5), a rise in the labour force participation<sup>158</sup> of older workers is observed between 2000 and 2008. In order to understand which age group experienced the strongest increase over the examined years, the share of each age group, using the percentages in table 5 (see Chapter 5), is normalized for the year 2000 and the relative growth of employment<sup>159</sup> is calculated for 2004 and 2008. As shown in figure 4, the significant decrease discussed in Chapter 5 can be clearly detected for the youngest group of workers as well as the improved employment situation of older workers. The relative growth in the share of each age group is the strongest among workers aged 60-64 between 2000 and 2004. The strongest relative growth between 2004 and 2008 is observed in the share of workers aged 55-59. This positive trend seen for older workers might indicate a changing behaviour among employers and employees as a result of policy development (OECD, 2005a). The latter is especially true as most of the important policies, which were targeted to raise employment rate among older workers, have been carried out during the examined years<sup>160</sup>.

Figure 4: Relative growth of employment by age group<sup>161</sup> and year



Note: The relative growth of employment was calculated using the share of each age group in every year presented in table 5 (see Chapter 5): The values for each age group were set to 100 for the year of 2000. Source: SOEP, own calculations

<sup>158</sup> Using the term “labour force participation” means *only* with respect to developments found in the SOEP dataset. In this respect, this research does not make conclusion concerning the German labour force in general. However, as it will be shown later, the findings point to similar trends found in the German labour force by other datasets.

<sup>159</sup> The term *employment* refers to the share of each age group i.e. percentages.

<sup>160</sup> The intense use of partial retirement, for example, should be strongly accounted for the improved employment situation of German workers aged 55 and older (Dietz and Walwei, 2011; See Chapter 2).

<sup>161</sup> Data includes only employed people who participated in the SOEP survey in those years.

### 6.1.2 *Developments in the Characteristics of Older Workers*

Increased labour force participation of older German workers is strongly attributed to improvements in the employment rate of older women (Boersch-Supan & Juerges, 2011) and high educated older workers (Federal Statistical Office, 2011). In addition, recent pension and labour market policies also play an important role in raising employment among under-represented groups of older workers. As early retirement options were mostly used by low skilled and industrial older workers (OECD, 2005a, 2006), increased employment rate of these workers due to reduced opportunities to retire may also contribute to the positive trend seen in the labour force participation of workers aged 55 and older over the last decade.

This section describes the development in the characteristics of *older* workers over the years in the SOEP sample. In particular, a distinction is made between men and women, educational degree and occupational group<sup>162</sup>. Identifying changes in the distribution of older workers by those indicators over time may contribute to reveal part of the dynamics behind developments in the labour force participation of older workers, and thus may also shed light over recent developments in older workers training participation.

#### 6.1.2.1 **Gender Developments: Older Women Strike the German Labour Force**

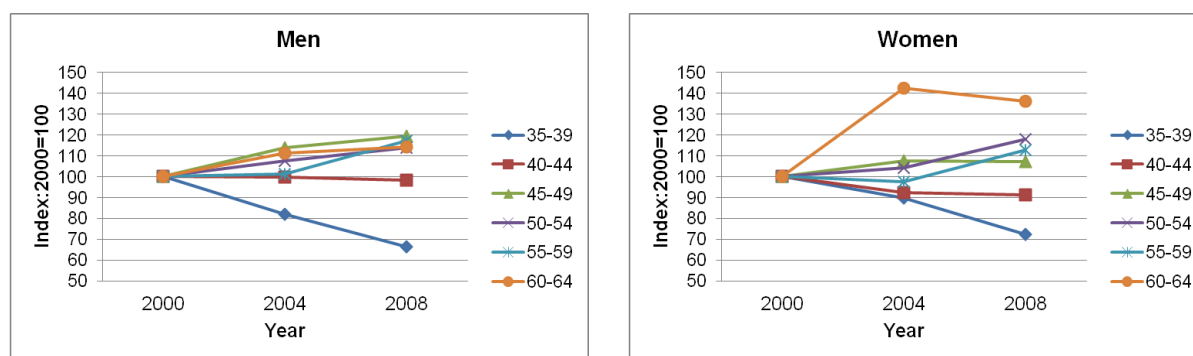
Figure 5 describes the relative growth of employment among men and women by age group and year based on the SOEP. As shown, the relative growth of employment<sup>163</sup> was significantly higher for men aged 50 and above, superior to workers under the age of 45. In particular, the relative growth in the share of workers aged 60-64 was strong between 2000 and 2004, while that of workers aged 55-59 only from 2004. In contrast, the share of men aged 35-39 went down significantly between 2000 and 2008. These findings correspond to those of the Federal Statistical Office indicating an increased labour force participation of men aged 55-64 between 2000 and 2009 (from 46 percent to 64 percent, respectively).

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<sup>162</sup> Occupational group refers to the following occupational categories of workers: Blue-collars, white-collars and civil servants.

<sup>163</sup> This relates to the relative growth in their share in the sample over the years.

Figure 5: Relative growth of employment for men and women by age group and year



Note: The relative growth of employment for each gender group was calculated using the share of each age group in every year presented in table 8 below: The values for each age group were set to 100 for the year of 2000.

Source: SOEP, own calculations

With respect to women, a meaningful increase in the share of those aged 50 and above occurred over the examined years (fig.5), similar to the trend seen for men. The relative growth of the share of women aged 60-64 was the strongest between 2000 and 2004, as shown by the steeper line. Between 2004 and 2008, however, a slight decrease can be seen. In contrast, the youngest age group of women experienced the strongest relative decline over the years, the same as their men counterparts. Furthermore, a steady relative growth in the share of women aged 50-54 is observed since 2000 whereas for women aged 55-59 it is detected only from 2004, similar to the trend seen for men. As mentioned above, the positive trend of participation shown for both men and women aged 55-59 might be attributed to the *demographic* factor, namely to the steady increase over the last years of this large birth cohorts from the 50s (OECD, 2005a). These findings with respect to women correspond to the findings of other European datasets pointing to increasing female labour force participation rates in recent decades (Vlasblom & Schippers, 2004; Dietz & Walwei, 2011). As the characteristics of cohorts of women have changed over the years e.g. improved educational level<sup>164</sup> (Vlasblom & Schippers, 2004), their attention towards employment have changed as well, thus resulting in increased labour force participation. Another explanation suggested by the literature, which might be more suitable for explaining alterations among older women, is the increased importance of *part-time* employment<sup>165</sup> (Dietz & Walwei, 2011). As this might explain part of the findings above (fig.5), it is also examined.

<sup>164</sup> Section 6.1.2 describes the development in the level of education among different cohorts separately for women and men.

<sup>165</sup> As mentioned in Chapter 2 (section 2.4.2), the old-age part-time employment act legislation was available for people aged 55 and older since 1996. Since 2006 it was intensively used by workers aged 55 and older.

Table 7 below contains the share of part-time<sup>166</sup> workers by age group and year separately for women and men. As it can be seen, the share of part-time work among women is significantly *higher* than that of men in all the age groups and all the years, which indicates that part-time employment stayed “a female domain”, as put forward by Dietz and Walwei (2011). Looking at developments along the years, a meaningful increase can be seen in the share of women aged 60-64 working part-time between 2000 and 2008 (from 26 to 39 percent, respectively), and decreased share of part time women aged 55-59. The percentages of older men in part-time work were hardly increased along the years<sup>167</sup>. Taken together, the special increase in the share of women aged 60-64 (fig.5) could be explained by the increased use of the option of part-time employment between 2000 and 2008, as suggested above, while the rising share of women aged 55-59 from 2004 might be attributed to a higher share of women taking on a full-time job<sup>168</sup>.

*Table 7:* The share of part-time workers by gender, age Group and year

Age Group	Women			Men		
	2000	2004	2008	2000	2004	2008
35-39	27.19	32.15	31.79	0.56	1.77	1.85
40-44	27.70	31.08	36.03	1.11	1.45	1.87
45-49	25.31	31.73	31.36	0.27	1.13	1.33
50-54	24.71	27.20	29.58	1.55	1.35	1.55
55-59	29.80	29.81	25.86	1.81	1.47	2.36
60-64	25.76	33.51	38.73	3.92	5.84	2.91

Source: SOEP, own calculations

It should be noted that, when comparing the share of men and women aged 60-64 in 2008 (table 8 below) it is noticeable that women still constitute a smaller portion of the whole

<sup>166</sup> Part-time work in this research is defined as people working less than 30 hours (but not less than 15 hours).

<sup>167</sup> It should be noted that part-time employment is also seen as a means to raise participation of younger women in the labour force. Having a part-time job allows the combination of being active in the labour market and taking care of the family. In this respect, it was found that part-time work in Germany is frequently preferred by women as a working arrangement, whereas in countries such as Finland and Sweden, it is less preferred (Jaumotte, 2003).

<sup>168</sup> As it is essential to determine whether the relation between the variable age group and employment status (part-time/full-time) for each gender group, shown in table 7, could have occurred by chance or not, a chi-square test of independence was used. This test examines the *null* hypothesis that age group and employment status are independent ( $H_0$ ) from each other, against the *alternate* hypothesis that these variables are dependent ( $H_a$ ). In other words, it tests whether the proportions of women/men in part-time and full-time employment are the *same* for each of the six age categories ( $H_0$ ) or whether there are differences ( $H_a$ ). The results of the significant test are as follow: for the sample of women, statistically non-significant results ( $p$ -value>0.05) are found in 2000 and 2004, which means that the null hypothesis can be accepted - the variables are independent. In contrast, statistically significant results ( $p$ -value<0.05) are found in 2008, which means that the null hypothesis is rejected while accepting the alternate hypothesis and concluding that there are differences. In other words, the high share of women aged 60-64 on part-time employment, shown in table 2, can be thus used for explaining part of the findings shown by figure 4. As for men, the results from the test were significant only for the sample of 2004.

sample (of women) than their men counterparts, despite the trend seen above (fig.5). This is also true for the age group 55-59. These findings are in line with previous one indicating remaining differences in employment rates between men and women aged 55 to 64, on the one hand, but decreased gender gap over the last decades on the other hand (Federal Statistical Office, 2011).

*Table 8:* The share of women and men by age group and year

Age Group	Women			Men		
	2000	2004	2008	2000	2004	2008
35-39	20.94	18.73	15.41	25.24	20.62	16.49
40-44	23.63	21.74	21.24	21.48	21.35	21.25
45-49	20.94	22.61	22.35	17.49	19.84	20.70
50-54	17.21	17.89	20.31	15.35	16.66	17.68
55-59	12.96	12.57	14.52	13.17	13.35	15.49
60-64	4.32	6.48	6.19	7.27	8.18	8.38
	100	100	100	100	100	100

Source: SOEP, own calculations

### 6.1.2.2 Changing Distribution of Older Workers with Different Educational Level

While a positive correlation between employment rates and skill level has been suggested by previous studies (Federal Statistical Office, 2011; OECD, 2004b)<sup>169</sup>, the educational level of older cohorts of workers may play an important role in determining their labour force participation (Brenke & Zimmermann, 2011)<sup>170</sup>. Thus, improvements in the educational level of older workers over the years should explain part of the increased share of older workers described above (fig.4). Nevertheless, as recent policy developments may raise the labour force participation of low-qualified older workers as well, such a trend could also affect the age structure of the labour force. Those parallel developments are examined in the following section.

Figure 6 (left) shows the average years of schooling and training<sup>171</sup> among respondents, depicted by age group and year. While workers under the age of 50 have higher average years of schooling in 2000 than workers aged over 50, it is noticeable that it increases again from age 60. High level of qualification among workers aged over 60 can be partly explained by a

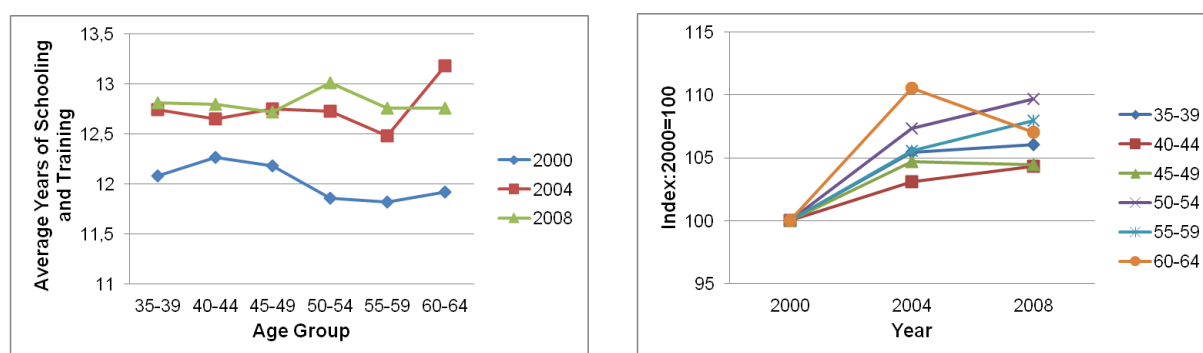
<sup>169</sup> For more information, see Chapter 3, section 3.3.

<sup>170</sup> For more information, see Chapter 2, section 2.51.

<sup>171</sup> This variable in the SOEP was calculated using the maximal years of *schooling* as well as the maximal years of *occupational training* for each person.

*selection effect*: increased share of high educated older workers due to the early labour force exit of low educated older workers. The existence of various channels for early retirement which were mainly used by workers with low education has been accelerating this development (Dietz & Walwei, 2011; OECD, 2005a) as well as advanced developments in technology, which have also played a central role in encouraging the early exit of the unskilled<sup>172</sup>.

**Figure 6:** Average years of schooling and training by age group and year (left) and relative growth of years of schooling (right)



Note: The relative growth of years of schooling (right) was calculated using the share of each age group in every year presented in fig.6 (left): The values for each age group were set to 100 for the year of 2000.

Source: SOEP, own calculations

Figure 6 (left) also shows that the average years of schooling significantly increased for all age groups between 2000 and 2004, especially among workers aged 50 and above. This is better illustrated by figure 6 on the right which describes the relative growth of schooling for each age group over the years. One likely explanation for this special increase might be the reduced share of low educated workers due to job loss or retirement, in the case of older workers. This can be supported by the findings of the OECD report (2005a, 2005b), according to which the shift from industrial to a service economy resulted in increased share of the service sector in Germany especially between 2000 and 2003, while the share of workers in agriculture and industry is steadily decreasing since then (OECD, 2005a, 2005b)<sup>173</sup>. As for

<sup>172</sup> As mentioned in Chapter 2 (section 2.2.2), older workers might be less eager to invest in learning new technologies, because of lower qualifications, on average, than younger workers and due to a short time left for them in the labour force, which makes the learning process less attractive. As a result, many of them are more likely to choose early retirement over work (Friedberg, 2001).

<sup>173</sup> This likely explanation is also discussed in section 6.1.3 with respect to developments in the share of older blue-collar workers between those years.

the oldest group, the selection effect used above may also explain the high average years of schooling in 2004<sup>174</sup>.

As also shown in figure 6, the average years of schooling of workers aged 50-59 increased between 2004 and 2008, though much moderately as between 2000 and 2004, while that of workers under the age of 50 stayed almost at the same level. The average years of schooling of workers aged 60-64 however decreased between 2004 and 2008. The latter finding, though might have happened by chance given the descriptive characteristic of this analysis, is of interest. In this respect, considering the argument in the beginning of the section, according to which the share of low-skilled older workers is expected to increase over the years, such a finding could be therefore thus the result of reduced incentives for early retirement between those years<sup>175</sup>.

The distribution of labour force participation of respondents by educational degree<sup>176</sup> and age group for each survey year is presented in tables 9a, 9b and 9c. It offers more detailed information concerning the trend described by figure 6. As it can be seen, a similar share is observed for respondents aged 35-59 with higher educational degree (second stage of tertiary education) in 2000, indicating that age does not necessarily lowers the likelihood of being in employment. This is supported by the findings of Dietz and Walwei (2011) with regard to Germany. Furthermore, the share of workers aged 60-64 with higher education in 2000 is the highest among all other age groups with the same level of education, supporting the selection effect explanation described above. The share of workers with middle vocational degree is the highest for each age group and year. This educational category, as mentioned in the methodological chapter, refers to people with upper secondary education and post-secondary non-tertiary education<sup>177</sup>, the original categories in ISCED. According to the OECD report (2013b), vocational qualifications in the German labour market are very important, the same

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<sup>174</sup> Nevertheless, given the large difference in the average years of schooling between workers aged 55-59 and those aged 60-64 in 2004 (12.48 average years of schooling compared to 13.18, respectively), a Two Sample T-Test of Independence was performed in order to determine whether the means (years of schooling) of the two older age groups are different from each other (independent) in the sample of 2004. The findings indicate a two-tailed *p*-value of 0,001. Thus, the null hypothesis can be rejected and it can be concluded that the means of schooling of workers aged 55-59 and aged 60-64 are different from each other.

<sup>175</sup> E.g. a reduction in unemployment benefits (from 32 months to 18 months) in 2004, as well as the act of abolishing the “58er-Regelung” (the “58er-Regelung” was used mainly by low-skilled male older workers), are among the policy acts which have taken place between those years (See Chapter 2 for more information).

<sup>176</sup> As described in detail in the methodological chapter (4), the categorical variable “educational degree” is based on the international classification scheme ISCED-1997 (International Standard Classification of Education), while each of the categories represents the highest level of education attained.

<sup>177</sup> As described in Chapter 5, due to low number of respondents in the category “vocational + Abi” (post-secondary non-tertiary education), it was joined together with the category middle vocational. This resulted in a share of 7.76 percent.



as educational attainment<sup>178</sup>. This is reflected in the structure of educational attainment in Germany, which is characterized by low rates of tertiary attainment, on the one hand, but high rates of upper secondary<sup>179</sup> attainment, on the other hand (OECD, 2012b).

*Table 9a:* The share of respondents by educational degree and age group in 2000

Educational Level	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
General elementary	12.46	13.16	12.50	17.75	17.89	20.09
Middle vocational	56.64	54.12	54.65	51.37	48	42.47
Higher vocational	9.75	8.61	8.87	8.87	9.26	6.39
Higher education	21.15	24.11	23.98	22.01	24.84	31.05
	100	100	100	100	100	100

Source: SOEP, own calculations

*Table 9b:* The share of respondents by educational degree and age group in 2004

Educational Level	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
General elementary	9.77	9.99	10.28	11.32	13.07	9.87
Middle vocational	55.79	53.51	51.92	47.46	48.68	37.18
Higher vocational	9.77	10.50	8.43	9.69	8.39	8.82
Higher education	24.67	26	29.36	31.52	29.86	44.12
	100	100	100	100	100	100

Source: SOEP, own calculations

*Table 9c:* The share of respondents by educational degree and age group in 2008

Educational Level	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
General elementary	8.74	7.59	8.74	8.71	9.41	10.94
Middle vocational	56.89	54.69	54.83	52.09	47.92	45.98
Higher vocational	9.77	11.85	8.74	7.75	9.41	9.15
Higher education	24.59	25.87	27.68	31.45	33.26	33.93
	100	100	100	100	100	100

Source: SOEP, own calculations

<sup>178</sup> This is also reflected by the lower unemployment rate of people with vocational qualifications compared with general upper secondary education (OECD, 2013b).

<sup>179</sup> As mentioned in the methodological chapter, using the International Standard Classification of Education (ISCED 1997), upper secondary education begins at the end of a period of compulsory education. In tables 12-14 it is included under the category *middle vocational* (see Chapter 5 for detailed information on this variable).

Looking at developments along the years, the share of workers from all age groups with the lowest level of education, namely general elementary<sup>180</sup>, significantly decreased between 2000 and 2004, while that of high educated workers increased for *all* age groups only between 2000 and 2004, supporting the positive trend shown above. Between 2004 and 2008, an increase can only be seen in the share of high-educated workers aged 55-59<sup>181</sup>. In contrast, the share of high educated aged 60-64 decreased between 2004 and 2008, while the share of those with middle vocational degree increased, which corresponds with the reduced average years of schooling, shown in figure 6 (left).

### *Gender Differences by Level of Education*

A further investigation of the relation between level of education and employment participation can be made by distinguishing between men and women. Knowing which gender group drives the findings shown above (tables 9a-9c), might be useful for a better understanding of the positive trend in the share of older workers described by figure 4. A first look at both graphs (fig.7 below) indicates significant differences in the average years of schooling in favour of men, particularly with respect to workers aged 50 and over. It is also noticeable that the *older* the women are the lower their average years of schooling in 2000, whereas this is not the case for men. While men aged 60-64 have the highest average years of schooling (12.27) among all male workers in 2000 (even higher than the youngest group), women aged 60-64 have the *lowest* average years of schooling among all female age groups in 2000. In this respect, the selection effect explanation used above might be relevant for explaining the high average years of schooling among the oldest group of men but not among women. As for the latter, an explanation regarding a weak relation between level of education and employment seems more appropriate. Such relationship might be a result of bad work conditions for older women in that time which might speed up retirement decisions also among the high-educated ones. These differences are also seen when looking at *educational attainment*<sup>182</sup>. Taken together, the very low average years of schooling found for women aged 55 and older in the sample of 2000 could be in part a result of high-educated older women choosing retirement over work.

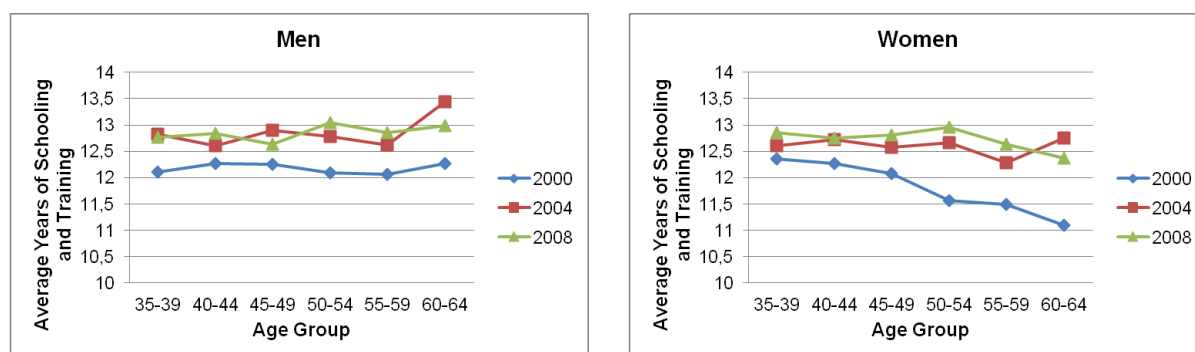
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<sup>180</sup> Again, this category includes people with primary education as well as lower secondary education. See Chapter 5 for more detailed information on this category.

<sup>181</sup> This might be in part supported by the OECD report *Education at a Glance 2013* in Germany (2013b), according to which the percentages of people aged 55-64, who have attained tertiary education increased in recent years, from 20 percent in 2005 to 26 percent in 2011, which is higher than the OECD average (e.g. 24 percent in 2008).

<sup>182</sup> According to the OECD report on Germany (2005a), men from all ages and all level of education have higher earnings than women, while this gap is bigger for people with low level of education. Given that, having a steeper age-earnings profile lowers the motivation of women to continue to work at older ages (OECD, 2005a).

Figure 7: Average years of schooling and training of men and women by age group and year



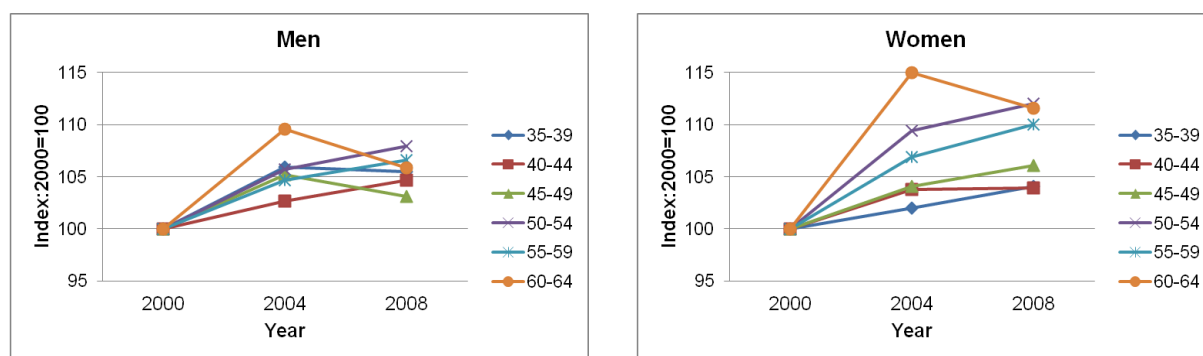
Source: SOEP, own calculations

As also shown in figure 7, the average years of schooling of both men and women increased over the examined years. Women aged 55-59, for example, had on average 11.57 years of schooling in 2000 compared to an average of 12.64 in 2008. A strong increase is seen for the oldest group from 11.09 to 12.75 average years (from 2000 to 2004, respectively), and then a slight decrease to an average of 12.37 in 2008. As for men, the average years of schooling of workers aged 60-64 was significantly increased from 2000 to 2004 (from 12.27 to 13.44, respectively) and then decreased to 12.99 in 2008. These findings are supported by those of the *Microcensus* indicating a significant rise between the years 2001 and 2008 in the share of men and women in Germany aged 55 and older finishing vocational education<sup>183</sup>.

The meaningful increase in the average years of schooling for women aged 60-64 might be in part explained by improvements in the working conditions of women which may have accelerated decisions in favour of continued employment among high-educated women. As shown above (section 6.1.1, table 7), the use of part-time work significantly rose among women of this age group between 2000 and 2008, which could be due to improvements in the conditions for gaining a part-time contract in an old age. In this respect, a look at the level of education among part-time female workers aged 60-64 over the years (see tables 2a-2c in the Supplements) reveals that most of the increase in the average years of schooling can be attributed to women with *higher* educational degree taking on part-time jobs (from 1 percent in 2000 compared to 30.65 percent in 2004). Therefore, this might serve as an explanation for the meaningful rise in the average years of schooling seen for women aged 60-64 (fig.7).

<sup>183</sup> E.g. in 2001, 33 percent of men and 40 percent of women aged 55 to 74 in Germany did not complete vocational education, whereas in 2008 it was lowered to one out of eight men and one third of women.

Figure 8: Relative growth of schooling by age group and year for men and women



Note: The relative growth of schooling was calculated for each gender group using the share of each age group in every year presented in figure 7: The values for each age group were set to 100 for the year of 2000.

Source: SOEP, own calculations

Figure 8 describes the relative growth of years of schooling by age group and year separately for men and women<sup>184</sup>. Such an illustration may help to understand which gender group experienced the strongest growth in education over the examined years, and thus to shed light on the general trend in the level of education of older workers (fig.6). As shown, the relative growth is *steeper* for women aged 50 and above, superior to that seen for women under the age of 50 and stronger than their men counterparts. This might imply that improvements in the educational level of older workers seen above (fig.6) are mainly attributed to improvements in the educational level of older *women*. Thus, this might serve as another explanation for the increased share of older women in the SOEP sample (fig.5). As argued by Hakim (1995), gaining more education contributes to the desires of women to have a professional career. This is also supported by the findings of a research conducted by Euwals *et al.* (2007) using data from the Dutch Labour Force Survey 1992-2004, which indicate that increased level of education among women have also contributed to the improved labour force participation rates among Dutch women<sup>185</sup>. The latter is due to the correlation between educational level and employment rates (Federal Statistical Office, 2011).

<sup>184</sup> The calculations were done using the findings presented in figure 7.

<sup>185</sup> It should be noted that results from a research conducted by Vlasblom and Schippers (2004) indicate that increases in the participation rates of women cannot be attributed to improvements in educational level or fertility. Instead, behavioural changes among women drove the rise in women's employment.

### **6.1.2.3 Blue vs. White Collars: Variations in the Share of Older Workers from Different Occupational Groups**

As mentioned above, workers of the industrial sector are the most likely to make use of early retirement options, the same as low-qualified (OECD, 2005a, 2006), and thus are projected to be highly affected by recent policy changes. This should result in an increased employment rate of industrial older workers in the German labour force, therefore could also explain alterations in the share of older workers in the labour force over the years found in the SOEP sample (fig.4). In this respect, the following section describes changes in the share of blue-collar workers, white-collar workers and civil servants over the examined years by age group.

The distribution of labour force participation of respondents from different occupational groups depicted by age group and year is shown in tables 10a-10c. It is noticeable that civil servants have the lowest share, while the share of white-collar workers is the highest. This is valid for all age groups in all the examined years. Moreover, it is also noticeable that the share of civil servants increases with age, with those aged 60-64 having the highest share in the sample. As mentioned in Chapter 2, older workers in the German labour force can be found especially among civil servants due to special work conditions that lower their chances to be dismissed by their employers or resign (Brenke & Zimmerman, 2011)<sup>186</sup>. Looking at developments along the years, the share of blue-collar workers from all age groups was significantly decreased between 2000 and 2004. A likely explanation for this development, used earlier (section 6.1.2), may concern the shift from industrial to a service economy, characterizing the last quarter of the twentieth century (Schettkat & Yocarini, 2006), and which was stronger in Germany especially between 2000 and 2003 (OECD, 2005a, 2005b). In the case of older workers, such a development may accelerate early retirement decisions. The latter is especially true given the availability of pre-retirement options in that time<sup>187</sup> which were intensively used by manufacturing workers as a way for retirement (Dietz & Walwei, 2011).

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<sup>186</sup> The age-earnings profile of civil servants may also play an important role in keeping them in employment in an old age as it increases with age. This is in contrast to the age-earnings profile of public German workers which is relative flat (OECD, 2005a).

<sup>187</sup> For more information see Chapter 2, section 2.4.2.

*Table 10a:* The share of respondents by occupational group and age group in 2000

Occupational Group	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
Blue-collar worker	42.19	38.25	38.52	39.08	38.32	32.42
White-collar worker	52.53	53.89	53.49	51.02	54.11	56.16
Civil servant	5.29	8.86	7.99	9.9	7.58	11.42
	100	100	100	100	100	100

Source: SOEP, own calculations

*Table 10b:* The share of respondents by occupational group and age group in 2004

Occupational Group	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
Blue-collar worker	33.33	30.99	29.51	27.36	27.94	21.22
White-collar worker	59.89	62.02	59.62	58.51	56	59.77
Civil servant	6.78	6.95	10.87	14.13	16.07	21.01
	100	100	100	100	100	100

Source: SOEP, own calculations

*Table 10c:* The share of respondents by occupational group and age group in 2008

Occupational Group	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
Blue-collar worker	29.32	30.75	30.37	29.27	28.12	23.88
White-collar worker	62.96	61.66	61.35	58.19	56.67	57.14
Civil servant	7.72	7.59	8.28	12.54	15.21	18.97
	100	100	100	100	100	100

Source: SOEP, own calculations

These developments result in a rising share of civil servants and white-collar workers from all age groups between 2000 and 2004, while a special increase should be noted for the older civil servants. For instance, the share of those aged 55-59 was more than doubled, rising from 7.58 to 16.07 percent. Similarly, the share of workers aged 60-64 was almost doubled, rising from 11.42 to 21 percent. These findings are supported by Brenke and Zimmermann (2011) based on data from the Mikrozensus which point to the same trend in the labour force participation of older civil servants in Germany between 2000 and 2009<sup>188</sup>. As mentioned in Chapter 2, older civil servants have special work conditions and higher wages which may therefore lower their willingness to retire early, as opposed to older blue-collar workers. In

<sup>188</sup> For more information see Chapter 2, section 2.5.1.

this regard, it is the lack of such regulations, which could also explain the decreasing share of blue-collar older workers (less protected by law), hereby subject for dismissal. Interestingly, no meaningful changes can be observed between 2004 and 2008, while this is true for the share of workers of all occupational groups and all age groups. In particular interest is the slight increase seen for blue-collar workers aged 55-64, opposite to the trend shown for this group between 2000 and 2004. When considering the meaningful reduction of early retirement pathways after 2004 (see Chapter 2), it could partly explain the trend seen in the data<sup>189</sup>.

### *Summary*

The findings in this section showed that the age structure of the SOEP sample changed over the years 2000, 2004 and 2008, towards increased share of workers aged 55 and older. Changes in the characteristics of older workers over the years were also found. First, an increase was observed in the share of women aged 55-59 between 2004 and 2008, similar to the trend seen for men, thus confirming the results found by other datasets. However, the relative growth seen for women age 60-64 was superior to that of their men counterparts. Furthermore, the share of high-educated workers aged 55-64 was also increased between 2000 and 2008. As level of education is positively correlated with employment rate, this development might also explain the general rise in the share of older workers in the SOEP (Chapter 5, table 8). Finally, changes in the distribution of workers aged 55 and older from different occupational groups are observed. Although the share of blue-collar workers decreased meaningfully between 2000 and 2004, it slightly increased between 2004 and 2008.

## **6.2 Human Capital Investments in Older Workers: Bivariate Analysis**

Despite a rise in the share of highly educated individuals in recent years (OECD, 2011a, 2012b), the gap between demands and supply in Germany still exists. Taking into account the rapid technological development and the increasing international trades, lifelong learning is becoming essential for ensuring the continued contribution and employability of *all* workers (OECD, 2005a). At the same time, the ageing process experienced by the German labour force and which is projected to accelerate in the next decades (OECD, 2005a), affects its productivity level, and thus raises the importance of improving the skill level of older workers as well (OECD, 2011a).

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<sup>189</sup> The 2004 Reform, for example, set a higher-age level for early retirement due to unemployment or partial retirement<sup>189</sup>, thus may serve as an explanation for the latter development (Hegelich, 2006).

The participation of older workers in training is known to be negatively affected by their *short* payback period which lowers the returns on the training investment, as argued by the Human Capital Theory (Becker, 1963). However, as discussed in Chapter 3, the extension of employment period consequence of policy change should contribute to raise the returns on older workers training, thus the training incidence of older workers is expected to increase (OECD, 2011a). Taken together, the first *hypothesis* of this study, as mentioned in the beginning of this chapter, argues that:

**H<sub>1</sub>:** *The participation of older workers in professional training courses increases nowadays as their time in employment becomes longer*

This hypothesis implies that longer employment leads to decisions among employers to invest in older workers' training and among older workers themselves to participate in training<sup>190</sup>. As it is shown in the multivariate analysis, the attention is given only to developments in the characteristics of the sample over the years, namely to the determinants of training and its association with training<sup>191</sup>. However, as discussed in Chapter 2, most relevant pension and labour market policies, aiming at raising employment rate of older workers, were taken place during the examined years. Therefore, increase in the training participation of older workers over those years may imply a positive relation between extension of employment and participation in training, namely on the success of policies to encourage employers as well as older employees to invest in training<sup>192</sup>.

Furthermore, the analysis in the previous section indicates changes in the characteristics of older workers over the years of the survey (see section 6.1.2), which is partly supported by previous findings<sup>193</sup>. Such developments could imply a new pattern of labour force participation according to which the share of workers, which are under-represented in the German labour force in older ages (e.g. women, blue-collar and low-qualified), increases. This raises questions regarding the skill level of such workers especially as their numbers

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<sup>190</sup> As described in Chapter 5, the term "older workers" in this study refers to workers between the ages 55 and 64. Therefore, this study hypothesizes an increased training participation among workers aged 55-59 and 60-64.

<sup>191</sup> This was also done by Riphahn and Trübswetter (2007) using a probit estimation approach for investigating the probabilities of training. By comparing changes in the coefficients estimates between 1996 and 2004 they could determine that the training probability was increased for older workers over the examined years. They also found that the variables' correlations with training have changed over time, suggesting that "the sensitivity of training to its determinants may have increased over time".

<sup>192</sup> Section 3.2.1 in Chapter 3 presents the findings of recent studies supporting this idea, namely that human capital investments of older workers are positively affected by the extension of employment.

<sup>193</sup> This refers to the improved participation of older women and high-qualified older workers in the German labour force. For my knowledge, there is no information on the employment rate of blue-collar and low skilled older workers in the German labour force.



might continue to increase due to the effect of policies. In accordance, three additional *sub-questions* are asked:

**A:** Is a similar trend in the training incidence observed among older men and women over the years of the SOEP survey?

**B:** Is a similar trend in the training incidence observed among high- and low-qualified older workers over the years of the SOEP survey?

**C:** Is a similar trend in the training incidence observed among blue-collar, white-collar and civil servants over the years of the SOEP survey?

These sub-questions are quite innovative as they imply a change in the training pattern of different groups of older workers which are the *least* likely to take part in training (see Chapter 3, section 3.2.1). The investigations of these sub-questions (in contrast to the main hypothesis) will remain mostly on a *descriptive* level<sup>194</sup>, since confirming the results on a multivariate level is beyond the scope of this research. In this respect, the aim is to examine whether new trends in the participation of older workers in training can be identified, thus opening a door for further research.

Taken together, this section investigates the participation of older German workers in professional training courses taken during the last twelve months<sup>195</sup> based on the SOEP for the years 2000, 2004 and 2008. In the first step, a descriptive analysis is conducted. After a general overview, which includes investigating developments in the distribution of training by several indicators, all of which are known by previous studies to influence the incidence of training (section 6.2.1)<sup>196</sup>, a differentiation via age groups is performed (H<sub>1</sub>; section 6.2.2). The descriptive analysis is then extended by examining the three sub-questions followed by a correlation analysis. Finally, a multivariate analysis via logistic regression (section 6.3) is

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<sup>194</sup> As it will be shown later in the multivariate analysis (section 6.3), the relationships between age and training are examined while controlling separately for the effect of gender (model 2), qualification level (model 3) and occupational group (model 4). This procedure aims to examine whether the likelihood of older workers to participate in training is affected by the inclusion of each one of these variables. The results of this analysis should supply with additional support for the descriptive findings. Nevertheless, a further multivariate examination is required which is not carried out this research.

<sup>195</sup> Among the training participants, the majority (during the examined years) participated in order to adjust to new demands in their current job.

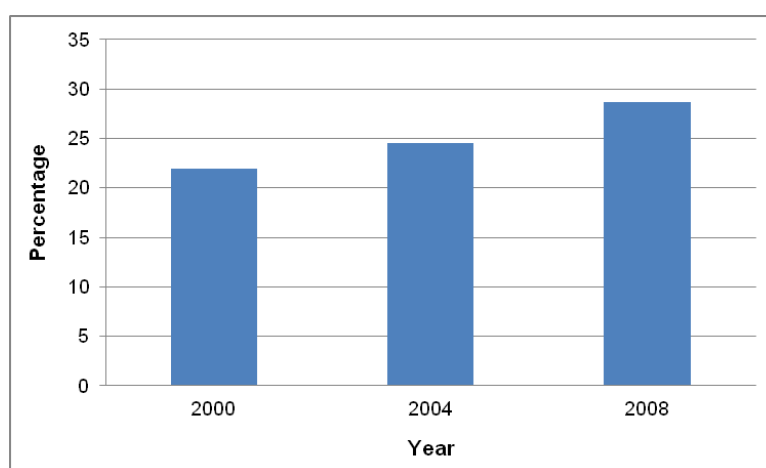
<sup>196</sup> Despite the main focus of this research on older workers' training, examining developments in those characteristics is essential as they will be included later in the regression model as control variables. This means that changes in the correlation of each variable with the probability of participation in training over the years might be reflected in changes in older workers' training probability over the years.

carried out for each survey year in order to examine the relation between older workers and training participation while controlling for the effect of relevant variables.

### 6.2.1 *The Incidence of Training: A General Overview*

A look at the incidence of professional training courses among *all* workers in each sample year (fig.9) indicates a general increase between 2000 and 2008 (from 21.92 percent to 28.58 percent, respectively). These findings are in line with those from previous studies investigating the training incidence of workers in Germany (Schmidt, 2007; Riphahn & Trübswetter, 2006; 2007). Table 11 contains information on the incidence of professional training courses by several indicators<sup>197</sup>. As mentioned earlier (6.1), these indicators are known by previous studies to have an effect on the likelihood of training. As shown in table 11, gender differences are small, with a slight advantage for women in the years of 2000 and 2008. Furthermore, both women and men exhibited a significant increase in training participation between 2000 and 2008, rising from 22.13 to almost 30 percent for women and from 21.75 to 27.72 percent for men, respectively. The most significant increase occurred for both men and women between 2004 and 2008, while the positive trend in training participation is stronger for women than for men.

*Figure 9:* The incidence of professional training courses among workers aged 35-64



Source: SOEP, own calculations

The incidence of training is found to be the highest among workers with higher educational degree which corresponds with previous studies indicating the complementarity of education

<sup>197</sup> Those indicators will be further used in the multivariate analysis.

and training<sup>198</sup>, also known as the *accumulation* perspective (Becker, 1993; Riphahn & Trübswetter, 2007b; OECD, 2011a). Nevertheless, an increase in the training participation between 2000 and 2008 is seen for all levels of education, which may be the result of recent policies encouraging investments in the training of all workers due to the rising skill demands. In this respect, improved share of low-qualified workers (general elementary and middle vocational) taking part in training may imply that the *compensation* perspective of lifelong learning, according to which workers with low level of education are the most needed to receive training, gains importance in recent years. A deeper investigation of those relations across age groups is presented later (section 6.2.2).

*Table 11:* The incidence of professional training courses among workers aged 35-64 by several indicators

			2000	2004	2008
Gender	Male		21.77	25.71	27.72
	Female		22.12	22.86	29.85
Educational (ISCED)	Degree	General elementary	11.28	14.52	15.04
		Middle vocational	17.34	18.24	22.23
		Higher vocational	29.01	34.22	37.54
		Higher education	36.10	35.66	41.40
Employment Status	Full-time		22.42	25.49	29.60
	Part-time		18.20	18.99	23.47
Occupational Group	Blue-collar		8.26	10.13	12.37
	White-collar		28.64	27.95	32.68
	Civil-servant		43.99	43.39	49.92
Industrial (NACE)	Sector	Manufacturing	15.96	18.61	21.45
		Construction	10.04	13.56	14.90
		Wholesale and retail	12.39	14.58	18.69
		Transport	21.21	21.11	25.72
		Finance	29.66	32.99	34.41
		Real estate	25.50	24.57	28.09
		Public administration	39.56	36.71	39.50
		Education	38.37	41.82	47.07
		Health and social work	23.44	27.61	34.73
		Other	23.67	19.40	26.34
Length with the Firm	Less than 10 years		19.85	22.70	26.49
	10 years or more		24.21	25.79	30.15
Size of the firm	20<200		17.77	20.31	23.48
	200<2000		21.83	25.87	31.14
	2000 and more		31.24	31.48	35.98

Source: SOEP, own calculations

<sup>198</sup> See Chapter 2 for more information.

As also shown in table 11, full time workers have the highest training incidence in all the years, while the share in training of both full and part time workers increased over the years. These findings are in line with previous studies (Blundell *et al.* 1999; Bassanini *et al.* 2005). Furthermore, the incidence of training conditioned on occupational group was found to be the highest among civil servant workers. This can be supported by recent findings of the *AES* for 2010 indicating a participation of 64 percent of German civil servants compared to 43 percent of German workers from other groups (BMBF, 2011). The existence of law regulations concerning civil servants in Germany, which obligate them to regularly improve their skills, may partly explain these findings. Employers of such workers are also encouraged to enhance their skills<sup>199</sup>. Furthermore, white-collar workers have the highest share in training after civil servants, and blue-collar workers have the lowest share. The findings of *The European Economic and Social Committee* (2009) support this trend<sup>200</sup>. In addition, the incidence of training increased among workers from all occupational groups between 2000 and 2008, but especially among the blue-collar workers (from 8.26 percent in 2000 to 12.88 percent in 2008). Such a development may suggest, similar to the case of low-skilled workers, that it becomes increasingly important to improve the skill level of workers with fewer skills. This may also be intensified by the shift to a service economy, which particularly affected the skill level of industrial workers.

As for the industrial sector, the incidence of training is the highest for workers in the service sector, such as education, public administration, health and social work, while the lowest incidence is seen for workers in the industrial sector such as construction. This is valid for all the years. It is also noticeable that all sectors of industry experienced an increase in training incidence between 2000 and 2008. A meaningful increase is especially observed for the educational sector and health and social work (from 38.37 to 47.07 percent and from 23.44 to 34.73 percent, respectively) which may be in part explained by the recent shift to a service industry, mentioned earlier (6.1.2.3) that accelerated human capital investments. In addition, sectors with the lowest training incidence in 2000 such as manufacturing sector, construction and wholesale and retail experienced a meaningful increase between 2000 and 2008 which is quite interesting given the decrease in the share of these sectors (see table 5, Chapter 5). In this respect, the argument suggested above with respect to blue-collar workers,

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<sup>199</sup> E.g. § 67 Laufbahnverordnung for the state of Bavaria.

<sup>200</sup> Findings of the *Austrian Chamber of Labour* indicate that, despite a very low participation rate of blue-collar workers, a variation in participation is found between different groups of industrial workers. For example, 60 percent of those working in construction participated in training, compared to a much less rate among other blue-collar workers (Vogt, 2007).

may be relevant also for explaining the positive development in the training incidence among these sectors of industry.

As also shown by table 11, the incidence of training is higher for workers with longer work tenure, namely more than ten years at the same company. These findings are in contrast to previous ones pointing to a higher training incidence among workers with shorter work tenure (Green, 1991, 1993; Shields, 1998). Over the years, the share of both groups in training significantly increased, while the gap between the groups stayed constant with an advantage to those with longer tenure. This finding is especially relevant for older workers as they are more likely to have longer work tenure than younger workers due to low job mobility (Groot & Verberne, 1997; see Chapter 3, section 3.1.2). Furthermore, the incidence of training is found to be the highest among those working in large firms, which is supported by previous studies. Looking along the years, a meaningful rise is especially seen in the share of workers in medium (200-2000) and small firms (below 200).

A further investigation using a chi-square test of independence was carried out<sup>201</sup> in order to determine whether the pattern of frequencies between training and each one of the control variables, shown in table 11, could have occurred by chance or not<sup>202</sup>. As already mentioned earlier, this test does not offer any information about the strength of the association but only conveys the existence or non-existence of the relationship. Significant groups' differences then imply a correlation between the independent and dependent variable<sup>203</sup>. The findings of the test (see table 4 in the Supplements) indicate significant relationships between the dependent variable and the control variables. It is also apparent that the level of significant of some variables has changed over the years. As shown, there is no statistically significant relationship between gender and training participation in 2000 and 2008, but a statistically significant relationship exists in 2004. This means that the null hypothesis concerning non-differences between men and women in their relation to training can be rejected only in 2004. Furthermore, statistically significant relationship is found between employment status and training in 2004 and 2008, and statistically significant relationship is found between educational degree and the training in all the examined years. The same can be stated for the association of occupational group, industrial sector, size of the firm and work duration with

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<sup>201</sup> When aiming to say something about the population using a random sample, descriptive statistics via percentages are not enough. Thus, the chi-square test of independence is essential as it is an inferential statistic. In other words, it allows answering questions concerning the population.

<sup>202</sup> This tests examines the *null* hypothesis that the dependent variable 'participation in professional training courses' and each one of the control variables in the table are statistically independent ( $H_0$ ), against the *alternate* hypothesis that the variables are dependent ( $H_1$ ).

<sup>203</sup> The hypothesis for each one of the associations described in table 11 takes the form of a *two-tailed* test, which means that I test whether the groups are different from each other.

the dependent variable. These findings together with those presented in table 11, give a first support for the assumptions concerning an association between training and the chosen control variables.

In order to determine the degree of the association namely the *strength*<sup>204</sup> of the relationship between training participation and the control variables, correlations were calculated. As these relationships will be later examined in the multivariate analysis, such investigation is useful for getting a first look at which variables have more power in predicting the dependent variable (professional training courses). Table 12 presents the coefficients and the significant level for each variable resulted from the correlations<sup>205</sup>. As shown, no correlation was found between gender and the dependent variable in all the years, implying that gender cannot predict training.

*Table 12:* Correlation analysis of training and each one of the independent variables

Variables	2000 (N=3,632)	2004 (N=6,416)	2008 (N=6,077)
Gender	.004	-.033**	.015
Educational Degree	.215***	.202***	.212***
Employment Status	-.033*	-.059***	-.061***
Occupational Group	.281***	.241***	.257***
Sector of Industry	.227***	.207***	.204***
Size of the Firm	.130***	.107***	.119***
Work Duration	.052**	.035**	.040**

Source: SOEP, own calculations, \* $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

As expected from other studies, a strong correlation is found between educational degree and training in all the years measured. While the strength of the association decreases between 2000 and 2004 (from 0.215 to 0.202, respectively), it increases in 2008 (0.212). Furthermore, no correlation is seen between employment status (part-time) and the dependent variable in 2000 and 2004, but a weak significant relationship is apparent in 2008. As for occupational

<sup>204</sup> Due to the nature of nominal data, the values, which are obtained from calculating the correlations have positive values (fall between the ranges of 0-1). In other words, negative correlations are mathematically impossible.

<sup>205</sup> The level of a variable (e.g. nominal, ordinal) determines the types of correlations, which needs to be carried out. In accordance, for examination of the association between two categorical variables with two values (2x2; e.g. sex, employment status and work duration) a *Phi-coefficient* is used. It is a chi-square coefficient, which depends on the strength of the relationship and sample size. It ranges between -1 to 1. For the examination of the association between three and four values (2x4; 2x3; e.g. education degree, occupational group, size of the firm and industrial sector) a *Cramer's V* test was carried out. This test is often used to measure a nominal association as it depends less (as opposed to the Phi coefficient) on sample size. It ranges between 0 and 1, but in 2x2 tables the range is -1 to 1. A very strong correlation (relationship) then refers to values above .25; a strong correlation refers to values between .15 and .25; a moderate relationship refers to values between .11 and .15; weak relationship refers to values between .06 and .10; no relationship refers to values between .01 and .05.

group, a very strong correlation is seen in 2000, which becomes a bit weaker in 2004 and then gets stronger in 2008. A strong correlation is also found between sector of industry and training which gets a bit weaker over the years but stays on a high level. Furthermore, a moderate correlation is seen between size of the firm and training in 2000, which gets slightly weaker in 2004 and then gets stronger in 2008. Finally, no correlation is found between work duration and training as shown by the small coefficients. Yet, knowing these correlations does not provide any information on how they relate, namely the direction of the association (at least to some of the variables). In section 6.3, a further investigation via regression analysis is conducted, providing information on the direction of the relationship of training with each of the variables<sup>206</sup>.

### 6.2.2 *The Training Incidence of Older Workers*

As described in section 6.1, the average age of workers in the sample increased during the years 2000, 2004 and 2008. Despite higher share of prime-age workers in each year relative to that of workers over the age of 50, the improved employment situation, as reflected by the relative growth of each age group over the years, can be mostly detected for the *older* age groups, similar to the development shown by other German datasets<sup>207</sup>. This raises the importance of investing in the human capital of older workers, which becomes worthwhile consequence of increased time-left in the labour force, as argued by the research hypothesis.

Figure 10 describes the incidence of professional training courses of respondents by age group and year. As it can be seen, the training incidence in the sample of 2000 and 2004 is the highest among the younger age groups and the incidence decreases with age<sup>208</sup>. These results are supported by the Human Capital Theory (Becker, 1993) as well as by other studies<sup>209</sup> all of which were pointing to a negative correlation between participation in training and age. However, as also illustrated by figure 10, the training incidence in 2008 increased from age 50 until it decreased again from age 60. In other words, the training gap between older and

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<sup>206</sup> It should be noted however that, while the correlations' findings indicate a better predictive power for some variables (e.g. educational attainment, occupational group, firm size and industry) on the one hand, and low or even no predictive power for some variables (e.g. gender, employment status and work duration) on the other hand, it raises the question whether all variables should be included in the multivariate analysis as control variables. In this respect, based on previous studies pointing to the importance of these variables as determinants of training, and considering the statistically significant relationships with the dependent variable, all the measured variables are included in the multivariate analysis.

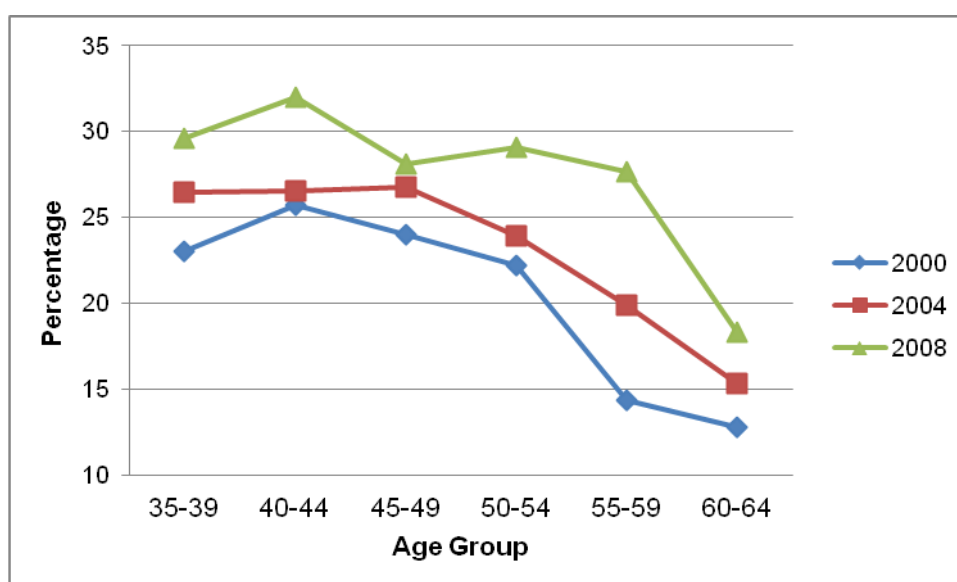
<sup>207</sup> See Chapter 3, section 3.2.1 for more information.

<sup>208</sup> Table 3 in the Supplements presents the frequencies.

<sup>209</sup> See Chapter 3, section 3.2.2 for detailed information.

younger workers was meaningfully narrowed over the years<sup>210</sup>. This may indicate a slowing down in the negative effect of age, and therefore a growing pattern of training participation among older workers. Looking at developments along the years, the incidence of training increased for workers of all age groups during the examined years, and particularly between 2004 and 2008. For example, the training incidence of workers aged 55-59 increased from 14.32 to 27.68 percent and from 12.79 to 18.30 percent for workers aged 60 to 64 (between 2000 and 2008, respectively). These findings are in line with other reports indicating an increase in the training incidence of older workers in Germany (Wilkins & Leber, 2003; BMBF, 2006; Tippelt, Schmidt & Kuwan, 2008).

Figure 10: The incidence of professional training courses by age group and year<sup>211</sup>



Source: SOEP, own calculations

Figure 11 offers additional information by describing the relative growth of training participation for each age group over the years. As can be seen, workers aged 55-64 experienced the strongest growth of training, particularly those aged 55-59 between 2004 and 2008, illustrated by the steeper increase. This finding may indicate that older workers have benefited the *most* from increased investments in training over the years<sup>212</sup>. Interestingly, this finding corresponds with the relative growth in the share of this age group in those years,

<sup>210</sup> For example, in 2000 the training gap between workers aged 35-39 (the reference group) and aged 55-59 was around 8.5 percent in favour of the youngest group, while in 2008 it was already less than 2 percent, in favour of the youngest group (see table 3 in the Supplements).

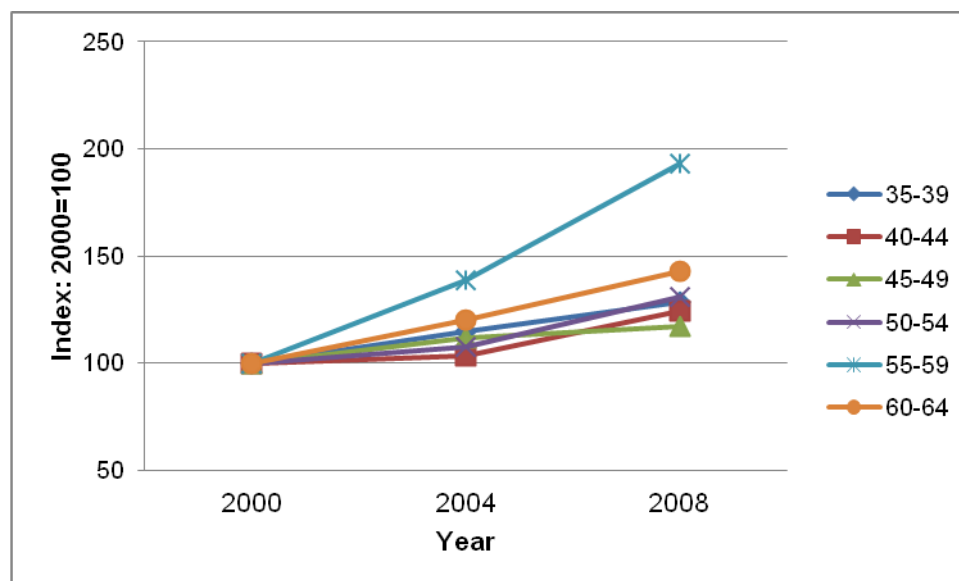
<sup>211</sup> The following figures refer to training that took place during the 12 months preceding each survey.

<sup>212</sup> This initial finding can be supported by that of Riphon and Trübswetter (2007) which pointed to increased training participation among older workers over the years 1996 and 2004 based on the Macrozensus dataset.



shown by figure 4, which may imply a connection between increased share of this age group and developments in their training incidence. Furthermore, as also discussed in detail in Chapter 2, several policies aiming to promote human capital investments among *older* workers have been taken place between 2004 and 2008, which may in part explain the significant increase especially among older workers and in those years<sup>213</sup>.

Figure 11: Relative growth of training by age group and year



Note: The relative growth of training was calculated using the share of each age group in every year, presented in table 3 in the Supplements. The values for each age group were set to 100 for the year of 2000.

Source: SOEP, own calculations

Further examination was done using a chi-square test of independence<sup>214</sup> and correlations. The results are presented in table 13 below, separately for each year. As shown, significant relationship is apparent in all the years, namely that the null hypothesis can be rejected and the alternate is accepted – the incidence of training significantly differs between the age groups. Furthermore, a weak but statistically significant relationship is apparent between training and age group in all the years, and this relationship becomes *weaker* over the years, as shown by the decreased coefficients' size. In this regard, the descriptive results above as well as the changing strength of the association over the years provide first evidence to the research hypothesis regarding a decrease in the relevance of age as a leading predictor in the probability of older workers to participate in training. For confirming these initial results a

<sup>213</sup> For more information see Chapter 2, section 2.4.3.

<sup>214</sup> The null hypothesis ( $H_0$ ) argues that there are no differences between the age groups in their relation to training, while the alternate hypothesis ( $H_a$ ) argues that the groups are significantly different from each other.

further investigation via regressions is conducted later (section 6.3). This type of empirical examination reveals the direction of the effect of *each* age group on the likelihood of training as well as changes over the years.

*Table 13:* Chi-square test of independence and correlations of training and age group

	2000	2004	2008
Chi-square	$\chi^2(5)=35.89$ $p<.001$	$\chi^2(5)=41.07$ $p<.001$	$\chi^2(5)=31.69$ $p<.001$
Cramer's V Value	.099***	.080***	.072***
N	796	1,568	1,737

Source: SOEP, own calculations; \* $p<0.05$ ; \*\*  $p<0.01$ ; \*\*\*  $p<0.001$ , degrees of freedom in brackets<sup>215</sup>

### The Training Incidence of Older Workers by Gender

While the analysis above (table 8) revealed that the share of both men and women aged over 50 was increased between 2000 and 2008, this trend was more noticeable for women (fig.5). The improved employment situation of older German women over the recent decade, as discussed in Chapter 2, raises questions regarding their ability to integrate properly in the labour force, and thus raises the necessity of participation in training. While previous studies point to a higher training incidence among men than women (see Chapter 3, section 3.2.1), this might be changing nowadays as the contribution of older women to the labour market is also considered. In this respect, the positive trend in the training incidence of older workers, shown by figure 10 above, may be in part attributed to developments in the training incidence especially among older women. This is examined in the following section.

Table 14 describes the incidence of training by age group and year, separately for men and women. As it can be seen, gender differences are apparent between all age groups and all the years. Looking at developments along the years, it is noticeable that the training incidence of both men and women of all age groups increased over the years of the survey. Among the older groups, the training incidence of men aged 55-59 and 60-64 steadily increased between those years, while that of women aged 55-59 first decreased between 2000 and 2004 before it meaningfully increased. In 2008, however, the gender gap in training almost disappeared for the group of 55 to 59 as shown by the similar share of men and women in training (27.76 and 27.59 percent, respectively). With regard to workers aged 60-64, differences in training participation still exist in 2008 in favour of men. Interestingly, the gap in training between the

<sup>215</sup> The degrees of freedom (DF) is equal to “the numbers of levels (k) of the categorical variable minus 1 (DF=k-1).”

age groups was meaningfully *narrowed* for both men and women in 2008, with older workers having a much similar share in training as younger workers. This however is not valid with respect to women aged 60-64 which are still lag behind compared to the other age groups.

When comparing these findings (table 14) with those presented in table 8 above (section 6.1.2.1), it is noticeable that, despite a similar share of men aged 55-59 in the sample of 2004 as in 2000, their training incidence in 2004 was much higher than in 2000. As for women aged 55-64, developments in their share in the labour force over the years (based on the SOEP) correspond to developments in their share in training. Despite the descriptive feature of these findings, it could be suggested that increased labour force participation of older women (aged 55-59) in recent years may speed up decisions concerning investments in their training.

*Table 14:* The incidence of professional training by gender, age group and year (%)

	Women			Men		
	2000	2004	2008	2000	2004	2008
34-39	24,69	29,99	28,54	22,03	29,02	30,5
40-44	23,82	26,89	30,81	27,21	26,32	33
45-49	25,31	25,85	32,16	22,83	27,62	24,45
50-54	19,39	22,11	30,99	24,46	25,46	27,24
55-59	17,17	13,93	27,59	12,27	24,42	27,76
60-64	10,61	17,84	14,45	13,73	13,75	20,73

Source: SOEP, own calculations

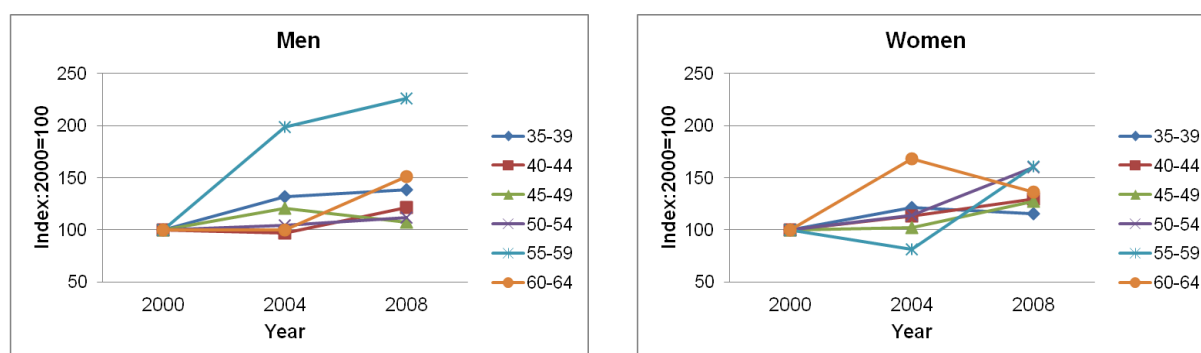
In order to get a deeper understanding about the forces behind the positive development in the training of older men and women, a further examination was done taking into account the employment status (see tables 5a and 5b in the Supplements). This is relevant given the high share of older women in part-time employment found above (table 7). The descriptive results indicate that despite an increased incidence of training among both full and part-time women aged 60-64 between 2000 and 2004, most of the increase can be attributed to the rising share of *part-time* women participating in training during those years. This corresponds to the increased share of older women of this age group on part-time jobs between those years, shown above in table 7. In other words, increased share of part-time working women between 2000 and 2004 is reflected by an increased incidence of training. This preliminary descriptive result is quite interesting considering the well known negative association between part-time employment and training (Blundell *et al.* 1999; Bassanini *et al.* 2005)<sup>216</sup>. In contrast, the

<sup>216</sup> This finding is not examined via regression as it is not the focus of the analysis. Nevertheless, it may open a door for further investigation as for the relation between employment status and training. Given the increased

significant increase among the group of women aged 55-59 in training, shown in table 14 might be attributed mainly to the training participation of full-time female workers between 2004 and 2008 (from 15.08 to 32.23 percent, respectively; see Supplements, table 5a). Interestingly, despite an even higher share of part-time women aged 60-64 in 2008, no increase can be seen for part-time women of this age between those years. As for older men, the descriptive results indicate that most of the increase could be explained by the positive development in the training of men in full-time jobs.

In order to determine, at least on a *descriptive* level, which gender group of older workers might have experienced the strongest growth in training over the years, namely benefited the most from increased investments in training, the relative growth of training by age group and year was calculated separately for men and women using the percentages in table 15. As shown in figure 12, the relative growth of training of men aged 55-59 was superior to the younger age groups in 2004 and 2008, while this is true also for the oldest age group, but only in 2008. These developments might imply that *older* men have benefited the most from increased investments in training over the years of the survey. Similarly, the relative growth in training among the oldest group of women in 2004 was superior to the younger age groups, while for women aged 55-59 it can be detected only in 2008. Given the above, the general increase in the incidence of training among workers aged 55-59 between the years 2000 and 2004 (fig.10) could be mainly attributed to this development among men, while the general increase between 2004 and 2008 might be more attributed to the positive trend seen for women aged 55-59 between those years. This might imply that investments in the training of older women started much later (e.g. 2004) than for men (e.g. 2000).

Figure 12: Relative growth of training by age group and year for men and women



Note: The relative growth of training for each gender group was calculated using the share of each age group in every year, presented in table 15. The values for each age group were set to 100 for the year of 2000. Source: SOEP, own calculations

employment rate of older workers, according to which many of them work in part-time jobs (Dietz & Walwei, 2011) it becomes important to raise investments in the training of these workers as well.

The findings above are examined via significant test and correlations separately for the samples of women and men<sup>217</sup>. The findings are summarized in table 15. As shown, statistically significant relationship between training and age group is seen for the samples of women and men in all the years measured. This implies differences in the affect of age on training among both women and men. Moreover, the correlation coefficient indicates moderate relationship between training and age for men and a weak relationship for women in the sample of 2000. In other words, age is a stronger predictor of training for men than for women in this year.

*Table 15:* Chi-square test of independence and correlations of training and age group among men and women separately for each year

	Women			Men		
	2000	2004	2008	2000	2004	2008
Chi2 Value	$X^2(5)=12.75$ $p<.05$	$X^2(5)=28.06$ $p<.001$	$X^2(5)=23$ $p<.01$	$X^2(5)=29.97$ $p<.001$	$X^2(5)=27.94$ $p<.001$	$X^2(5)=21.97$ $p<.001$
Cramer's V	.091*	.099***	.090***	.119***	.088***	.081***
N	1,528	2,857	2,797	2,104	3,559	3,280

Source: SOEP, own calculations, \* $p<0.05$ , \*\*  $p<0.01$ , \*\*\*  $p<0.001$

The strength of the relationship for each gender group changed over the years. While for men it significantly decreased between 2000 and 2008, for women it got stronger between 2000 and 2004 but then it became weaker in 2008. This supports the findings presented above (table 15) indicating a decreased training gap between the age groups, for both men and women. Nevertheless, the difference in the coefficients' size between men and women in 2008 (though still consider to be weak) could indicate that age has a stronger effect in predicting training among women than men. Based on the descriptive results above (table 15), this could be explained by the fact that in 2008 differences between the age groups are still visible among women but less among men. Furthermore, the decreased strength of association among men which is observed already in 2000 and which is detected for women only in 2004, supports the explanation suggested above, according to which changes in the association between age and training, may have started much earlier for men and later for women, thus supporting the descriptive findings.

<sup>217</sup> The hypothesis behind performing the test is a two-tailed test, meaning testing whether the age groups are different from each other in their relationship to training (the alternate hypothesis,  $H_0$ ).

### The Training Incidence of Older Workers by Educational Level

Given the significant improvement in the training incidence of workers aged 55-64 between 2000 and 2008 in the SOEP survey (fig.10), it is important to see whether this positive trend can be partly explained by recent trends in the training incidence of *high* and *low* qualified older workers. This is relevant for two reasons. First, the level of education<sup>218</sup> increased meaningfully among older cohorts in the sample over the years of the survey (section 6.1.2), which should be reflected in an increased training participation among high-educated workers given the complementarity relationship between education and training<sup>219</sup>. Second, investments in the human capital of all workers have become highly important in recent years as part of the promotion of a lifelong learning perspective (European commission, 2003) as a mean to cope with rising skill demands. This, in theory, means that workers which are normally less likely to receive training e.g. low-qualified ones are becoming a target for human capital investments as well, thus the compensation perspective may also be promoted<sup>220</sup>. This should positively affect the training participation of low-qualified older workers, especially as their labour force participation is expected to rise due to reduced opportunities for early retirement. In accordance, developments in the incidence of training among low- and high-qualified older workers may explain part of the general improvement in the training incidence of older workers shown above (fig.10). Those two parallel developments are examined below.

This kind of examination, namely the training incidence of *low*- and *high*-qualified older workers, is a new research topic. In a recent study conducted by Riphahn and Trübswetter (2007) using data from the *Mikrozensus* the incidence of training of high and low qualified older workers in Germany was examined. Their findings indicate a higher increase in the training incidence of high- than low-qualified older workers from 1996 to 2004, supporting the complementarity relationship between training and education. The current analysis offers additional information concerning this parallel trend by, first, using the SOEP dataset, and second, by focusing on the year 2008 as well. The research does not assume a

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<sup>218</sup> This was verified, first, by looking at the average years of schooling and training for each age group over the years, and second, by looking at the distribution of each age group in each year by level of education (educational degree). The latter offers a deeper look at the positive trend with respect to the educational level of older workers. Both analyses led to the general conclusion that older cohorts in recent years are more educated than their former counterparts.

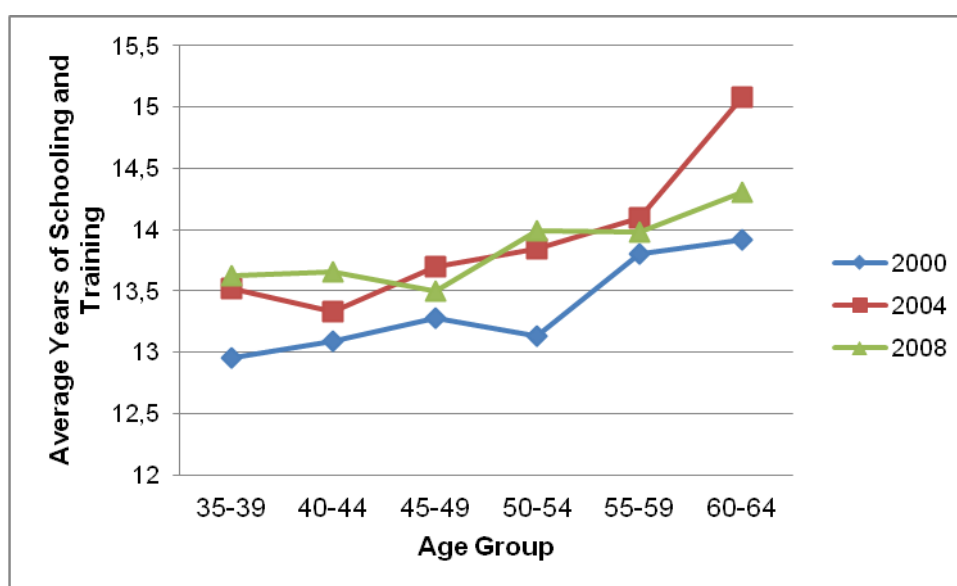
<sup>219</sup> As described in detail in Chapter 3 (3.2.1), the complementarity between education and training has been a focus of many studies, all of which were pointing to a positive correlation between level of education and training. The literature on the determinants of training also provides evidence for a higher likelihood among high educated older workers to take part in training compared to their older counterparts with low level of education.

<sup>220</sup> The compensation perspective, as already mentioned in Chapter 3, emphasizes the importance of improving the skills of the less educated since they need it the most. However, evidence for the promotion of training among low-educated workers is difficult to find.

changing pattern of training participation towards a higher incidence among low-qualified older workers, but rather *continued* increase in the incidence of training for both high- and low-qualified older workers.

Figure 13 describes the average years of schooling among respondents that participated in professional training courses prior to the survey for each age group and year. As shown, average years of schooling among training participants increases with age. This may indicate that the incidence of training of older workers is more affected by their level of education compared to younger workers. This trend stays relative stable along the years. Nevertheless, it is noticeable that the average years of schooling among training participants aged 60-64 meaningfully decreased between 2004 and 2008. Interestingly, this development corresponds with the development shown above (fig.6) indicating a drop in the average years of schooling among workers aged 60-64 between 2004 and 2008. Such a similarity could imply that the training participation of older workers conditioned on level of education shifted towards increased participation among the low-educated ones.

*Figure 13:* Average years of schooling among respondents that participated in professional training courses by age group and year



Source: SOEP, own calculations

A further investigation was done by calculating the incidence of training conditioned on the categorical variable *educational degree*. This could allow identifying, first, which level of education raises the incidence of training, second, whether a change in the distribution of training by educational level can be observed over the years for each age group, and third, which age group experienced the highest growth of training between 2000 and 2008

conditioned on qualification level. For doing so, the four categorical variables, used above (see section 6.1.2), were re-constructed and resulted in *a dummy* variable indicating people with a high and a low qualification<sup>221</sup>. Table 16 presents the distribution of participation in professional training courses by educational degree and age group for the years 2000, 2004 and 2008. As shown, the incidence of training is the highest among high-qualified workers while this concerns all age groups and all the years. These findings are supported by the human capital theory (Becker, 1993) as well as by previous studies, all of which pointed to a positive correlation between participation in training and level of education<sup>222</sup>. Using the explanation presented in Chapter 3 (section 3.2.1) regarding the accumulation perspective of lifelong learning, it can be argued that people with high human capital are more probable to enlarge their knowledge base at work than people with low level of education, thus raising their likelihood of participating in training.

While differentiating between the age groups, it is noticeable that high-qualified prime-age workers (aged 35-54) have a higher training incidence in 2000 than their older counterparts<sup>223</sup>. A similar pattern of participation can be also seen with low-qualified prime-age workers receiving significantly more training than their older counterparts with the same level of qualification in 2000 (e.g. 17.86 percent of workers aged 35-39 compared to 8.95 percent of workers aged 55-59)<sup>224</sup>. These findings could suggest that the training incidence of older workers in 2000 is more (negatively) affected by their age than their level of education compared to younger workers.

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<sup>221</sup> For more information on the way in which this variable was created see Chapter 5.

<sup>222</sup> For more information see Chapter 3, section 3.2.1.

<sup>223</sup> Another possible explanation suggested by the literature and which could be partly used in this case as well, connects between the educational level and the time when it was acquired. This implies that younger workers possess more up-to-date skills than high-educated older workers and thus have a higher training incidence (see Chapter 3, section 3.2.1).

<sup>224</sup> This partly explains the trend described in figure 12 in which lower average years of schooling among the younger training participants may be the result of higher training incidence among the low-qualified, opposite to the trend seen for the older groups.



*Table 16:* The incidence of professional training courses by educational level, age group and year (%)

	High Qualification			Low Qualification		
	2000	2004	2008	2000	2004	2008
35-39	34,60	39,36	43,41	17,86	19,71	22,41
40-44	37,22	37,30	47,02	20,11	20,41	22,89
45-49	37,61	37,57	37,26	17,32	20,21	22,92
50-54	38,12	33,85	41,11	15,06	16,95	21,35
55-59	24,69	33,86	39,49	8,95	11,26	18,89
60-64	23,17	24,21	26,94	6,57	5,36	11,76

Note: High qualification refers to higher education and higher vocational. Low qualification refers to general elementary and middle vocational.

Source: SOEP, own calculations

Looking along the years, an increase in the share of high-qualified workers receiving training is observed for all age groups and all the years. This finding might indicate that the pattern of training participation did not change over time, namely that training is more probable among the high-qualified. As for the development among the older groups, a meaningful increase is observed for workers aged 55-59 between 2000 and 2008 (from 24.69 to 39.49 percent, respectively), while the share of workers aged 60-64 in training slightly increased (from 23.17 to 26.94 percent, respectively). These findings are interesting considering the similar shares of high-qualified workers from both older age groups in 2008 (33 percent; see section 6.1.2.2, table 9c). On the one hand, such a development could imply that age (aged 60-64) still has a negatively affect the training participation of workers, despite high level of qualifications. On the other hand, the small differences between the training incidence of high-qualified workers aged 55-59 and their younger counterparts (especially aged 45-54) in 2008, may imply a reduction in the negative effect of age on the incidence of training (yet another support for the main hypothesis – H<sub>1</sub>) and a *rise* in the positive effect of qualification level.

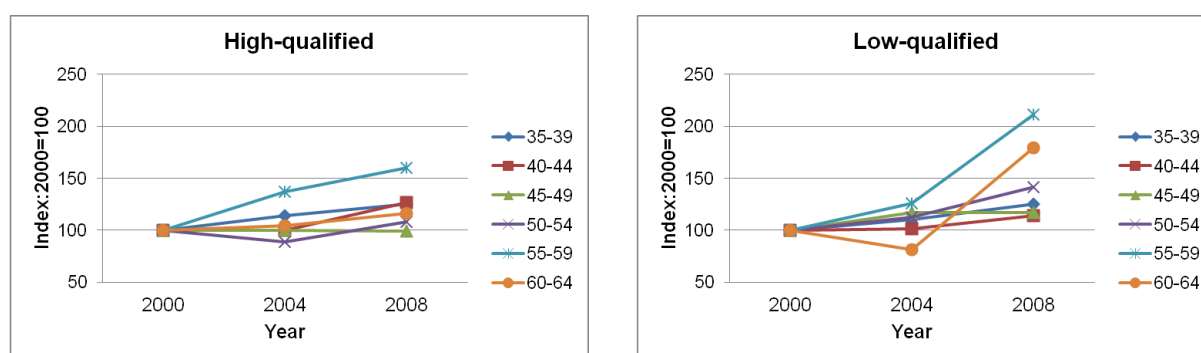
As also shown in table 16, the incidence of training increased among low-qualified workers from all age groups over the years, but a meaningful increase is observed for workers aged 55-64, which resulted in a decreased training gap between the age groups in 2008. Interestingly, the training incidence of low-qualified aged 60-64 significantly increased between 2004 and 2008 (from 5.36 to 11.76, respectively)<sup>225</sup>. For identifying which age group might be affected the most by the rising investments in training over the examined years, the relative growth of training of low- and high-qualified workers was calculated using the

<sup>225</sup> The findings of Riphahn and Trübswetter (2007) using the *Mikrozensus* also point to an increased training participation among low-qualified older workers in Germany but between 1996 and 2004.

findings in table 16 (e.g. proportions). As shown by figure 14, the relative growth of training of low-qualified workers is the strongest among those aged 55-59 in 2004 and 2008, and aged 60-64 in 2008. This positive trend might indicate an increased awareness among employers to improve the skills of their low-qualified older workers, thus promoting the compensation perspective of lifelong learning as well. In this respect, the drop in the average years of schooling of training participants aged 60-64 between 2004 and 2008 (fig.13) might be explained by the increased share of low-qualified workers from this age group participating in training between those years.

As for high-qualified workers, a steady moderate relative growth of training is observed among workers aged 55-59 over the years, *superior* to the other age groups. Comparing between the figures, the strongest relative increase of training can be detected for low-qualified older workers. In other words, despite a very low training incidence in all the years compared to their high-qualified counterparts (table 16), they seem to benefit the most from increased investments in training particularly between 2004 and 2008<sup>226</sup>.

Figure 14: Relative growth of training of high- and low-qualified workers by age group and year



Note: The relative growth of training for each educational degree was calculated using the share of each age group in every year, presented in table 16. The values for each age group were set to 100 for the year of 2000.

Source: SOEP, own calculations

Table 17 contains the results of a chi-squared test of independence and correlation analysis for testing the relationship between training and age group for each educational level. As shown, a statistically significant relationship is apparent between training and age group for each educational group in all the years. Furthermore, statistically significant moderate relationship

<sup>226</sup> This could indicate that investments in the human capital of low-qualified older workers have gained importance only in recent years as their time horizon in the labour force has started to increase due to reduced opportunities to retire early.

is apparent between training and age for high-qualified workers in 2000, and those relationships get weaker between 2000 and 2004 but then become stronger in 2008. In other words, the power of age at predicting the likelihood of training among high-qualified workers did not change meaningfully over the years. In this respect, the observed significant differences in the incidence of training between the age groups in 2008 (table 16) might explain the moderate strength of the relationships. Similarly, statistically significant moderate relationships are seen for low-qualified workers in 2000 and 2004, which got meaningfully weaker in 2008. In this respect, the significant increase in the share of low-qualified workers aged 55-64 in training between 2004 and 2008 and the *reduced* training gap with the other age groups (table 16), might partly explain the small coefficient size in 2008.

*Table 17:* Chi-square test of independence and correlations of training and age group among high- and low-qualified workers

	High Qualification			Low Qualification		
	2000	2004	2008	2000	2004	2008
Chi2 Value	X <sup>2</sup> (5)=14.45 p<.01	X <sup>2</sup> (5)=19.48 p<.01	X <sup>2</sup> (5)=26.80 p<.001	X <sup>2</sup> (5)=29.85 p<.001	X <sup>2</sup> (5)=48.31 p<.001	X <sup>2</sup> (5)=18.65 p<.01
Cramer's V	.110***	.088**	.107***	.110***	.111***	.070**
N	1180	2478	2329	2452	3938	3748

Source: SOEP, own calculations, \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

### The Training Incidence of Older Workers by Occupational Group

As the shift from industrial to a service economy and the rapid technological changes<sup>227</sup> mean a tremendous impact on the skill level of industrial workers, particularly older ones<sup>228</sup>, raising investments in their human capital is essential. This gains even higher importance as the labour force participation of industrial older workers (blue-collar) might continue to increase due to policy change. As shown in section 6.1.2.3, the distribution of occupational group among older age groups in the SOEP sample changed between the years 2000 and 2008. Specifically, the share of blue-collar workers aged 55-64 decreased dramatically between 2000 and 2004, but then slightly increased between 2004 and 2008. In the following, a

<sup>227</sup> As mentioned in Chapter 2 (section 2.2.3), the rapid technological changes accelerate human capital depreciation especially for industrial workers, as they possess even less up-to-date skills than older workers in other sectors.

<sup>228</sup> Older workers are highly represented in declining industries such as manufacturing (OECD, 2005a). For example, 49 percent of blue-collar workers aged 55-64 in 2000 were employed in manufacturing, 48.09 percent in 2004 and 45.16 percent in 2008 (see Chapter 2, section 2.2.3).

distinction between the share of blue-collar workers, white-collar workers and civil servants in professional training courses was done for each age group and year. The results below (table 18) might also shed light on the developments in the training incidence of older workers described above (fig. 9).

Table 18 presents the distribution of participation in professional training courses by occupational group and age group for the years 2000, 2004 and 2008. As shown, civil servant workers have the highest training incidence and blue-collar workers have the lowest<sup>229</sup>. This concerns all age groups and all the years. It is also noticeable that the training incidence decreases with age for blue-collar workers while this cannot be detected for the other occupational groups. For example, 10.58 percent blue-collar workers aged 35-39 participated in training in 2000 compared to 4.95 percent aged 55-59, and zero participation among the oldest group. Interestingly, the share of white-collar workers aged 60-64 in 2000 was 16.26 percent and that of civil servants was 32 percent.

*Table 18:* The incidence of professional training courses by occupational group, age group and year (%)

	Blue collar			White collar			Civil servant		
	2000	2004	2008	2000	2004	2008	2000	2004	2008
35-39	10,58	12,53	14,04	29,98	32,37	34,31	53,33	43,02	50,67
40-44	10,61	11,45	13,85	34,42	32,09	37,94	38,89	44,79	57,14
45-49	7,92	11,03	14,39	31,52	30,65	32,13	50,91	48,3	49,07
50-54	6,99	8,28	11,61	27,76	24,92	33,38	53,45	50	50
55-59	4,95	6,87	9,34	19,46	20,34	29,34	25	41,04	55,4
60-64	0	3,96	4,67	16,26	14,91	19,14	32	28	32,94

Source: SOEP, own calculations

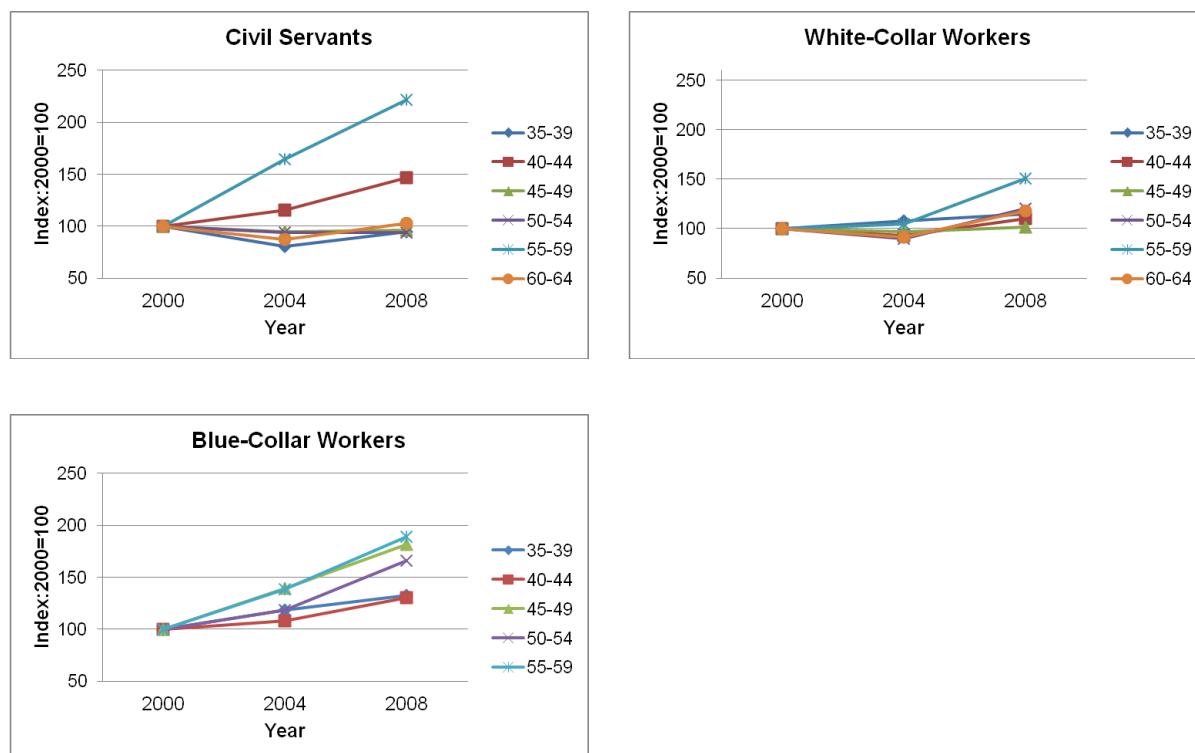
Looking along the years, the share of workers of all age groups in training increased among all occupational groups between 2000 and 2008, but the effect of occupation stayed constant over the years. Of particular interest is the steady increase in the training incidence of blue-collar workers aged 55-64, which is quite interesting when considering the meaningful decrease in their share between 2000 and 2004, shown in tables 10a-10c above. Figure 15 describes the relative growth of training of blue-collar workers, white-collar workers and civil servants by age group and year, using the proportions in table 18<sup>230</sup>. As shown, the relative growth of training is the strongest among workers aged 55-59 from all occupational groups,

<sup>229</sup> This is supported by the findings of other studies (Pischke, 2000; Riphahn & Trübswetter, 2007).

<sup>230</sup> As a result of a lack of training participants among blue-collar workers aged 60-64 in 2000 (table 18), the relative growth of training was not calculated for this age group.

similar to the trend found for high- and low-qualified older workers (table 16). Among the older workers, the strongest relative increase can be detected for civil servants aged 55-59 between 2000 and 2008. Blue-collar workers experienced a steady moderate relative growth of training from 2000 and their white-collar counterparts only from 2004.

*Figure 15:* Relative growth of training for workers from different occupational groups by age group and year



Note: The relative growth of training for each occupational group was calculated using the share of each age group in every year, presented in table 18. The values for each age group were set to 100 for the year of 2000.

Source: SOEP, own calculations

The bivariate analysis presented above was further examined via chi-squared test<sup>231</sup> of independence and correlations (tables 19a, 19b and 19c). The results indicate statistically significant relationships between training and age for blue-collar workers in 2004 and 2008<sup>232</sup> and for white-collar workers and civil servants in all the years. Looking at the size of the correlations' coefficients for the sample of blue-collar workers (table 19a), statistically significant weak relationship is apparent in 2004 and 2008. These findings support the

<sup>231</sup> This analysis was aimed to examine whether the relationship between the dependent variable 'participation in professional training courses' and the independent variable 'age group' for each occupational group is statistically independent ( $H_0$ ), against the alternative hypothesis ( $H_a$ ) that the relationships are not independent.

<sup>232</sup> As a result of a lack of training participants among workers aged 60-64 in 2000, the significant test and correlations could not be calculated.

descriptive findings (table 18) indicating small differences in the training incidence of blue-collar workers from different age groups in 2004 and 2008. However, while a similar strength of a relationship is observed in both years measured, such finding might imply that no meaningful differences in the training incidence of blue-collar workers happened during those years.

*Table 19a:* Chi-squared tests of independence and correlations of training and age group among blue-collar workers

	2000	2004	2008
Chi2-value	---	$X^2(5)=11.3, p<.05$	$X^2(5)=11.23, p<.05$
Cramer's V	---	.079*	.079*
N		1886	1,778

Source: SOEP, own calculations, \* $p<0.05$ , \*\*  $p<0.01$ , \*\*\*  $p<0.001$

*Table 19b:* Chi-squared tests of independence and correlations of training and age group among white-collar workers

	2000	2004	2008
Chi2-value	$X^2(5)=28.85, p<.001$	$X^2(5)=57.15, p<.001$	$X^2(5)=34.96, p<.001$
Cramer's V	.122***	.122***	.097***
N	1924	3881	3,650

Source: SOEP, own calculations, \* $p<0.05$ , \*\*  $p<0.01$ , \*\*\*  $p<0.001$

*Table 19c:* Chi-squared tests of independence and correlations of training and age group among civil servants

	2000	2004	2008
Chi2-value	$X^2(5)=12.25, p<.05$	$X^2(5)=14.24, p<.01$	$X^2(5)=2.18, p<.01$
Cramer's V	.205*	.140**	.144**
N	291	719	649

Source: SOEP, own calculations, \* $p<0.05$ , \*\*  $p<0.01$ , \*\*\*  $p<0.001$

As for white-collar workers (table 19b), a moderate strength of association is apparent in 2000 and 2004 and a weak one in 2008, indicating a *decrease* in the effect of age in predicting the likelihood of training between 2004 and 2008. These findings support the trend seen in table 18, in which the training gap between the age groups of white-collar workers is smaller in 2008 compared to the other years. Furthermore, a strong statistically significant correlation is apparent for civil servants in the sample of 2000 (table 19c) which gets weaker over the years, indicating that age has less power in predicting the likelihood of training in 2008. This can be

supported by the descriptive results pointing to a decreased training gap between the various age groups of civil servants. Taken together, these findings may indicate that most of the increase in the training incidence of older workers can be detected to developments among civil servants and white-collar workers.

### *Summary*

The bivariate analysis performed in this section yielded the following results. Firstly, the training incidence of workers aged 35-64 in the SOEP increased between the years 2000 and 2008. In particular, workers aged 55-64 experienced the strongest relative increase of training over the years, implying that older workers may have benefited the most from increased investments in training (fig.10). This was confirmed by a correlation analysis indicating weak but statistically significant relationships between training and age in all the years measured, which became *weaker* over the years. These preliminary results provide first evidence to the research hypothesis, according to which a decrease in the relevance of age in predicting the likelihood of training is expected.

Secondly, a positive trend in the training incidence of older workers was observed for *both* men and women. This development led to two additional (preliminary) findings. First, the training gap between the various age groups, for both men and women, decreased over the years, which might be due to a stronger relative growth of training among older workers compared to the younger ones (fig.11). This was supported by a correlation analysis. Second, the difference in the training incidence between men and women aged 55-59 decreased over the years. This could be mainly attributed to the meaningful rise in the share of women aged 55-59 in training between 2004 and 2008 (fig.12), resulting in a *similar* training incidence as of their men counterparts in 2008. Despite improvements in the share of men and women aged 60-64 in training, the training gap remained with an advantage for men.

Thirdly, a positive trend was observed for both high- and low-qualified older workers between 2000 and 2008. This development resulted in a reduced training gap between the various age groups, for both high- and low-qualified workers, which could be mainly due to improved training incidence especially among workers aged 55 and older (fig.13). Furthermore, despite higher proportions of high-qualified workers aged 55 and older in training in all the years relative to their low-qualified counterparts, it is the latter which benefited the most from increased investments in training between 2004 and 2008, as illustrated by the strong relative growth of training in 2008 (fig.13). This was partly supported by a correlation analysis.

Finally, an increased training incidence among blue-collar, white-collar and civil servants aged 55-64 was observed over the years. Nevertheless, the findings of the correlation analysis indicated that meaningful changes in the relationship between training and age over the years can be detected only for white-collar workers and civil servants.

### 6.3 Developments in the Likelihood of Older Workers to Participate in Professional Training Courses over Time: Multivariate Analysis

The bivariate analysis above can be seen as an indication that the research hypothesis, according to which older workers are more likely to participate in professional training courses over the examined years, is *true*. For further investigation of the relationship between the dependent variable ‘participation in professional training courses’ and the independent variable ‘age group’, a multivariate analysis via regression is carried out for each sample year. As discussed in Chapter 5, a logit model is applied to estimate the likelihood of training, which is considered to be an appropriate approach for estimating a model with a binary outcome. The interpretation of the coefficients is based on The Average Marginal Effect (AME)<sup>233</sup> which is more appropriate when aiming to compare between nested models (Best & Wolf, 2012)<sup>234</sup>. After a stepwise regression procedure<sup>235</sup> the resulting model includes the following control variables, all of which are categorical ones: Gender, qualification level, employment status and occupational group, length with the firm, sector of industry and firm size<sup>236</sup>. A Likelihood-Ratio Test was computed for assessing the parameters in each model. This is done by “comparing the likelihood of obtaining the data when the parameter equals zero (L0) with the likelihood (L1) of obtaining the data evaluated at the MLE (maximum likelihood estimation) of the parameter” (Bewick *et al.* 2005)<sup>237</sup>. Moreover, in order to examine the fit of the model, namely to determine whether the chosen model describes the observed outcome in the data adequately (Archer & Lemeshow, 2006) a Chi-squared Goodness-of-Fit Test was applied. This test involves examining the closeness of the predicted

<sup>233</sup> This method means that in the first step a marginal effect is computed for each case, and in the second step all the computed effects are averaged.

<sup>234</sup> See Chapter 5 for more information.

<sup>235</sup> There are several methods for choosing the control variables for the final regression model. A *stepwise* (forward) regression is a method for testing the significance of inclusion or removal of the tested variable. This is done by checking the change in likelihood as a result of including or removing a specific independent variable.

<sup>236</sup> As described in detail in Chapter 5, some variables, which are often mentioned in the literature as having an effect on the likelihood of training, are not included in the current model due to sample limitations. For more information concerning the rationale behind the construction of this model, see Chapter 5.

<sup>237</sup> The results from the likelihood ratio test indicate that all the variables in the model contribute significantly in predicting the participation in professional training courses.



values to the observed values<sup>238</sup>. The findings of the test indicate that the model (in each sample year) fits the data well<sup>239</sup>.

The estimated results from the logistic regression for the likelihood of participation in professional training courses are presented in tables 20 - 22. The Average Marginal Effects, the resulted  $p$ -values<sup>240</sup> and the standard errors are displayed for each survey year. Before turning to the main variable of interest, age group, the estimates of the average marginal effects of the control variables in the final model (No.5) are first discussed. As shown in tables 20-22, the estimates of the average marginal effects confirm some of the findings in the literature (see Chapter 3) as well as the results from the bivariate analysis presented above. Holding all the other variables constant<sup>241</sup>, women are significantly less likely to take part in professional training courses than men in the year 2000 and even less likely in 2004. More specific, being a woman decreases the probability to participate in professional training courses by 3.2 percent in 2000 and by 3.9 percent in 2004. These findings correspond to previous studies pointing to a lower training likelihood among women compared to men (see Chapter 3, section 3.2.1). The estimations results for the year 2008 indicate a directional change in the size of the coefficient with women having a higher likelihood to take part in training than men (1.8 percent higher), but the findings are insignificant.

Being high-qualified raises the likelihood to participate in training by 7.1 percent than being low-qualified in 2000, while these results are highly significant ( $p < 0.001$ ). These findings support the complementary relationship between qualification level and training

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<sup>238</sup> In accordance, the Chi-Squared Goodness-of-Fit Test is a test “of the observed against expected number of responses using cells defined by the covariate patterns”. It evaluates the null hypothesis  $H_0$  (that the data are governed by the assumed distribution) against the alternative hypothesis (that the data are not drawn from the assumed distribution). A high  $p$ -value indicates *small* differences between the observed and the estimated values, but a low  $p$ -value (large  $X^2$  value) might indicate that the model does not represent reality well (Kohler & Kreuter, 2009). An alternative commonly used test for examining the overall fit is the Hosmer-lemeshow goodness-of-fit test (Kuss, 2002). Nevertheless, as the model contains only categorical variables, this test was not used. Furthermore, another way of assessing the fit of a regression model is R-squared. While it is a very valuable measure for examining the fit of a linear regression model, it is *less* appropriate and useful for assessing the overall fit of logistic regression. The values of  $R^2$  are usually much lower for models of logistic regression than of linear regression. Therefore, it was not used in the current analysis (Mittlböck & Schemper, 1996).

<sup>239</sup> The  $p$ -value of the  $Chi^2$  is *much* higher than 0.05 in all the three logistic estimations, which indicates that the model fits the data well. In other words, the non-significant results expressed by a  $p$ -value of 9 percent for both 2000 and 2004 and 7 percent for 2008, is not small and thus the null hypothesis that the difference between observed and estimated values is completely random, meaning the null hypothesis cannot be rejected.

<sup>240</sup> The two-tail  $p$ -values test the hypothesis that each coefficient is different from 0. In order to reject this hypothesis, the  $p$ -value has to be lower than 0.05. When the latter is true it is possible to conclude that the specific variable has a significant effect on the dependent variable in the model. In other words, the null hypothesis can be rejected.

<sup>241</sup> Since the regression model includes more than one explanatory variable, interpreting the estimates Average Marginal Effects for a certain variable is conditioned on holding all the other variables *fixed* or “*under control*”. In other words, the increase in the  $b$  coefficient (which shows how much the predicted value of the dependent variable changes with a one-unit increase in the independent variable) is calculated by *controlling* for the effects of the other independent variables, meaning by adjusting to the effect of all other independent variables (Kohler & Kreuter, 2009).

found by previous studies on the determinants of training (Blundell *et al.* 1999; Bassanini *et al.* 2005; Ariga & Brunello, 2006; Riphahn & Trübswetter, 2007b; see Chapter 3). The estimated coefficients in 2004 and 2008 indicate increased likelihood of training for workers with high than low qualifications. On a 1 percent significant level, high-qualified people have 8.2 percent higher likelihood to participate in training in 2004 than low-qualified, and in 2008 their probability rose to 9.2 percent.

*Table 20:* Logistic regression analysis for the likelihood of participation in professional training courses (2000)

	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Age group</b>					
35-39	ref.	ref.	ref.	ref.	ref.
40-44	.024 (.019)	.024 (.019)	.020 (.018)	.010 (.018)	.010 (.018)
45-49	.008 (.020)	.008 (.020)	.004 (.019)	-.003 (.019)	-.007 (.019)
50-54	-.008 (.021)	-.008 (.021)	-.005 (.021)	-.021 (.020)	-.025 (.020)
55-59	-.098 (.026)***	-.098 (.026)***	-.102 (.025)***	-.108 (.024)***	-.118 (.024)***
60-64	-.120 (.036)***	-.120 (.036)***	-.131 (.035)***	-.147 (.034)***	-.161 (.034)***
<b>Gender</b>					
Male		Ref.			Ref.
Female		-.000 (.013)			-.032 (.014)*
<b>Educational Degree (ISCED)</b>					
Low Qualification			Ref.		ref.
High Qualification			.166 (.012)***		.071 (.013)
<b>Employment Status</b>					
Full-time					ref.
Part-time					-.037 (.022)
<b>Occupational Group</b>					
Civil-servant				Ref.	ref.
White-collar Worker				-.108 (.019)***	-.034 (.021)*
Blue-collar Worker				-.341 (.021)***	-.220 (.020)***
<b>Sector of Industry (NACE)</b>					
Manufacturing					ref.
Services					.053 (.017)***
Other					-.022 (.020)
<b>Work Duration</b>					
Less than 10 years					ref.
10 years and more					.028 (.014)*
<b>Size of the Firm</b>					
20<100					Ref.
200<2000					.027 (.014)
2000 and more					.068 (.016)***
<b>Log-likelihood null model</b>					-1909.8747
<b>Log-likelihood end model</b>					-1677.7196
<b>Likelihood Ratio Test Chi2</b>					464.31***
<b>N</b>					3632

Note: Coefficients are based on Average Marginal Effects (AME); \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; standard errors in parentheses; Source: SOEP, own calculations

*Table 21:* Logistic regression analysis for the likelihood of participation in professional training courses (2004)

	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Age group</b>					
35-39	Ref.	Ref.	Ref.	Ref.	Ref.
40-44	.000 (.016)	.001 (.016)	-.002 (.015)	-.003 (.015)	-.008 (.015)
45-49	.002 (.016)	.004 (.016)	-.003 (.015)	-.011 (.015)	-.015 (.015)
50-54	-.024 (.017)	-.023 (.017)	-.037 (.017)*	-.049 (.016)***	-.057 (.017)***
55-59	-.068 (.019)***	-.067 (.019)***	-.075 (.019)***	-.094 (.019)***	-.101 (.019)***
60-64	-.126 (.025)***	-.127 (.025)***	-.158 (.025)***	-.171 (.025)***	-.186 (.025)***
<b>Gender</b>					
Male		Ref.			Ref.
Female		-.030 (.010)***			-.039 (.011)***
<b>Educational Degree (ISCED)</b>					
Low Qualification			Ref.		Ref.
High Qualification			.172 (.009)***		.082 (.011)***
<b>Employment Status</b>					
Full-time					Ref.
Part-time					-.054 (.016)***
<b>Occupational Group</b>					
Civil-servant				Ref.	Ref.
White-collar Worker				-.137 (.014)***	-.073 (.015)***
Blue-collar Worker				-.354 (.017)***	-.242 (.021)***
<b>Sector of Industry (NACE)</b>					
Manufacturing					Ref.
Services					.057 (.013)***
Other					-.019 (.017)
<b>Work Duration</b>					
Less than 10 years					Ref.
10 years and more					.012 (.011)
<b>Size of the Firm</b>					
20<100					Ref.
200<2000					.029 (.012)*
2000 and more					.048 (.012)***
<b>Log-likelihood null model</b>					-3567.8509
<b>Log-likelihood end model</b>					-3241.6976
<b>Likelihood Ratio Test Chi2</b>					652.31***
<b>N</b>					6416

Note: Coefficients are based on Average Marginal Effects (AME); \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; standard errors in parentheses; Source: SOEP, own calculations

**Table 22:** Logistic regression analysis for the likelihood of participation in professional training courses (2008)

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
<b>Age group</b>					
35-39	Ref.	Ref.	Ref.	Ref.	Ref.
40-44	.022 (.018)	.022 (.018)	.015 (.018)	.025 (.018)	.019 (.017)
45-49	-.014 (.018)	-.015 (.018)	-.018 (.018)	-.013 (.018)	-.022 (.018)
50-54	-.005 (.019)	-.005 (.019)	-.014 (.019)	-.014 (.018)	-.025 (.018)
55-59	-.019 (.020)	-.019 (.020)	-.035 (.020)	-.036 (.020)	-.050 (.020)**
60-64	-.128 (.028)***	-.127 (.028)***	-.144 (.027)***	-.159 (.027)***	-.164 (.027)***
<b>Gender</b>					
Male		Ref.			Ref.
Female		.011 (.011)			.002 (.012)
<b>Educational Degree (ISCED)</b>					
Low Qualification			Ref.		Ref.
High Qualification			.183 (.010)***		.092 (.011)***
<b>Employment Status</b>					
Full-time					Ref.
Part-time					-.073 (.017)***
<b>Occupational Group</b>					
Civil-servant				Ref.	Ref.
White-collar Worker				-.150 (.016)***	-.088 (.017)***
Blue-collar Worker				-.386 (.018)***	-.262 (.022)***
<b>Sector of Industry (NACE9)</b>					
Manufacturing					Ref.
Services					.054 (.015)***
Other					-.007 (.018)
<b>Work Duration</b>					
Less than 10 years					Ref.
10 years and more					.014 (.012)
<b>Size of the Firm</b>					
20<100					Ref.
200<2000					.045 (.014)***
2000 and more					.065 (.013)***
<b>Log-likelihood null model</b>					-3636.3386
<b>Log-likelihood end model</b>					-3318.3586
<b>Likelihood Ratio Test Chi2</b>					635.96***
<b>N</b>					6077

Note: Coefficients are based on Average Marginal Effects (AME); \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; standard errors in parentheses; Source: SOEP, own calculations

As for people on a part-time job, the estimated coefficient shown in model 5 for the year 2000 indicates a 3.5 percent less chance to take part in training than people working full-time, but this effect is insignificant. In 2004 and 2008 the same relationships are apparent with an even higher likelihood for full-time workers to participate in training than part-time ones, and these effects are highly significant ( $p < 0.001$ ). Using the explanation suggested by Shields (1998), part-time work has the same effect as age on the likelihood of training, as both mean that the

time in employment is short for bringing back the investment on training. Furthermore, occupational group plays a key role in determining the likelihood of workers to participate in professional training courses. On a 1 percent significant level, the training likelihood for blue-collar workers in 2000 is especially low, with 23 percent less chance than for civil servants, the reference group. White-collar workers, however, had a 5.1 percent less chance to participate in training than civil servants. These findings correspond to the descriptive results indicating significant differences in the share of each group in training with an advantage to civil servants (table 11). Comparing between the years, the training probability of both blue- and white-collar workers decreased over time (25 and 8.9 percent in 2004 and 28 and 11 percent in 2008, respectively). These highly significant results correspond partly to those of Riphahn and Trübswetter (2007) with regard to Germany describing a decrease in the probability of training for blue- and white-collar workers between the years 1997 and 2004. However, these estimations do not support the findings of the bivariate analysis (table 11), according to which the training incidence increased for blue- and white-collar workers between 2000 and 2008.

Sector of industry plays also a key role in determining participation in professional training courses. The estimated coefficients show that workers in services (e.g. education, social work, health and public administration) have 5.2 percent higher probability to take part in training in 2000 than workers working in the manufacturing sector, the reference group. This holds true at a 1 percent significant level. Furthermore, people working in *other* sectors (e.g. construction and wholesale and retail)<sup>242</sup> have a 2.1 percent less probability to take part in training in 2000 than manufacturing workers, but these results are insignificant. The estimates of the Average Marginal Effects increased between 2000 and 2004 with workers in services having 58 percent higher likelihood than the reference group. Between 2004 and 2008 their likelihood decreased to 54 percent. As already suggested earlier, one possible explanation for these findings are the structural developments in recent years which are expressed by the shift from industrial to service economy, and which raises the importance of training in the service sector. In terms of work duration, workers working with the same employer for more than 10 years have 3 percent higher training probability than those working less than 10 years in 2000. This effect is significant at a 5 percent significant level. These findings are in contrast to previous studies pointing to a higher training probability among workers in the beginning of their job (e.g. the first year; Green 1991; Greenhalgh &

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<sup>242</sup> As mentioned in Chapter 5, under this category are included also people working in construction and wholesale and retail due to a very low number of participants.

Mavrotas, 1994). Between 2000 and 2008 the positive effect slightly decreased but the coefficient estimates are insignificant in both years.

In accordance with previous studies, firm size has a positive effect on the probability of training (Shields, 1997; Riphahn & Trübswetter, 2007). Holding all other variables at their mean, workers in large firms (2000 and more) have 7.1 percent higher likelihood of training in 2000 compared to those working in small firms (20 to 200 workers), the reference group, and this finding is highly significant ( $p < 0.001$ ). Workers in medium-size companies have a 3 percent higher training probability, but these results are not significant. The coefficient estimate for the year 2004 indicates that the positive effect decreased (5 percent) but then increased again in 2008 (6.7 percent). The positive effect of medium firm size increased to 4.7 percent in 2008, while this effect is highly significant<sup>243</sup>.

The above estimations confirm the bivariate analysis performed in section 6.2.1. The increase in the average marginal effects of the control variables between 2000 and 2008 indicates changes in their correlations with training over the years. These changes may imply that the “sensitivity of training to its determinants may have increased over time”, as argued by Riphahn and Trübswetter (2007)<sup>244</sup>.

### **The Training Probability of Older Workers**

Turning to the estimated average marginal effect of each age group while controlling for the effect of all the other independent variables, the estimated coefficients presented in tables 20-22 indicate that age has a negative effect on the probability to participate in training. This effect is highly significant ( $p < 0.001$ ) and is valid for all the years. Looking at the year of 2000 (table 20), for example, being in the age group of 55-59 reduces the probability to participate in professional training courses by 11.8 percent compared to workers aged 35-39, the reference group, and by 16.1 percent for workers aged 60-64. These estimations are supported by other studies<sup>245</sup> and confirm the descriptive results presented above indicating a reduced training incidence with age (figures 10 and 11). In 2004, workers aged 55-59 have 10.1 percent less probability than their youngest counterparts, an improvement of almost 2 percent compared to 2000. This estimation supports the findings of the bivariate analysis, according to which share of workers of this age group in training was significantly higher in 2004 than in 2000 (e.g. 19.9 and 14.32, respectively). As for the oldest age group, the estimation

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<sup>243</sup> These findings correspond with the findings of the descriptive analysis presented in table 11.

<sup>244</sup> They estimated a probit model for examining the training probability separately for 1996 and 2004. Their findings indicate as well a change in the marginal effects of the characteristics over the years.

<sup>245</sup> See Chapter 3, section 3.2.1 for more information.

coefficient indicates 18.6 percent less probability to participate in training than workers aged 35-39, which is 2.5 percent less than their training probability in 2000. In other words, they are less likely to take part in professional training courses in 2004 than in 2000. These findings support the bivariate analysis, according to which the gap between the training incidence of this age group and workers aged 35-39 slightly increased in 2004, on the one hand, but not support the descriptive findings pointing to a higher training participation of older workers in 2004 compared to 2000, on the other hand (see also table 3 in the Supplements).

In 2008, workers aged 55-59 are already 5 percent less probable than workers aged 35-39, an improvement of almost 5.1 percent from 2004. This again supports the descriptive findings according to which the share of these workers in training increased from 20 to 28 percent (between 2004 and 2008, respectively). Furthermore, workers aged 60-64 are 16.4 percent less probable to participate in training than their younger counterparts, an improvement of 2.2 percent than their probability in 2004. This confirms the descriptive findings, indicating a higher training incidence in 2008 (18.3 percent) than in 2004 (15.3 percent). Nevertheless, their training likelihood is much lower compared to that of workers aged 55-59 and the other age groups<sup>246</sup>.

In order to determine whether the *differences* in the training probability of workers aged 55-59 and 60-64 over the years are statistically significant, a significance t-test<sup>247</sup> was conducted<sup>248</sup> separately for each age group. In this regard, the first test examined differences between the estimated coefficients in 2000 and 2004, the second between 2004 and 2008, and the third examined differences between 2000 and 2008. The findings of the tests support part of the research hypothesis ( $H_1$ ). Focusing on workers aged 60-64, *non-significant* differences in the average marginal effects over the years are found<sup>249</sup>. In other words, the differences in the estimated coefficients, indicating an increased training incidence of workers aged 60-64 (between 2004 and 2008), cannot be confirmed. A likely explanation for this finding might be that the training incidence of this group was negatively affected by their *short* time left for them in employment compared to their younger counterparts. This explanation may suggest

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<sup>246</sup> Looking at the estimated coefficients of the other age groups (workers aged 40-54) it is noticeable that their training probability did not improve over the years, opposite to the findings of the bivariate analysis. These findings are non-significant and therefore should be carefully interpreted. Nevertheless, these findings could imply that older workers benefited more than younger workers from increased investments in training.

<sup>247</sup> The null hypothesis behind performing this test argues that there are no differences in the training of older workers between 2000 and 2004 (first test), 2004 and 2008 (second test), and 2000 and 2008 (third test). The alternate hypothesis argues that there are differences in the training of older workers between 2000 and 2004 (first test), 2004 and 2008 (second test), and 2000 and 2008 (third test).

<sup>248</sup> This test was calculated by hand. See Supplements for the formula of this test.

<sup>249</sup> This concerns the three tests.

that it is still not paying off for employers to train them given low returns to training, and may also not pay off for older workers themselves to invest in professional training courses.

As for workers aged 55-59, the findings of the tests are as follows: The differences in the training probabilities between 2000 and 2004 turned out to be *not* significant. This implies that the null hypothesis, according to which there are no differences in the training of older workers between 2000 and 2004, can be accepted. However, the second test, namely for examining the differences in the training probabilities between 2004 and 2008 turned out to be *significant*. This implies that the null hypothesis is rejected and the research hypothesis, according to which workers of this age group are statistically significantly more likely to participate in training in 2008 than 2004, is confirmed. As for the differences between 2000 and 2008, the test was *significant* as well. In other words, the training probability of workers aged 55-59 significantly increased between 2000 and 2008, yet another support for the research hypothesis. These findings may suggest that *longer* employment period due to institutional and policy changes encouraged employers to invest in the training of workers aged 55-59, and the latter to participate part in training. In contrast to the explanation given to the oldest age group, having a longer time in employment may raise the profitability to invest in the training of workers aged 55-59.

#### *The Effect of Gender, Qualification Level and Occupational Group*

Three additional sub-questions were examined in the last section (6.2) in order to identify trends in the training incidence of older workers with different characteristics. For confirming the findings obtained by the bivariate analysis, at least in part, three regression models were performed (2-4). In accordance, the relationships between age and training are examined while controlling separately for the effect of gender (model 2), qualification level (model 3) and occupational group (model 4)<sup>250</sup>. This kind of analysis, however, only points to the *existence* of an effect of the control variables on the training probability of older workers in each year<sup>251</sup>.

*Model 2* includes gender as a control variable. As shown in table 20, when controlling for the influence of gender, *no* change in the average marginal effects of each age group is observed in 2000, and the effect of gender is non-significant. In 2004 (table 21), a slight change in the average marginal effects of workers aged 55-59 and 60-64 can be seen in model

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<sup>250</sup> In this way the effect of age is also adjusted for the potentially *confounding effect* of gender, qualification level, and occupational group.

<sup>251</sup> In order to identify whether the estimates average marginal effects associated with the variable age group varies by gender, qualification level, and occupational group, a further investigation is needed using an interaction term. This is however beyond the scope of the analysis in this chapter.



2 compared to the estimations in model 1, implying gender differences in the probabilities of older workers to participate in training. The gender variable is highly significant. These estimations support the descriptive results (table 14), in which men aged 55-59 have a much higher share in training than their female counterparts in 2004, while women aged 60-64 have a much lower training probability than male of the same age group (24.42 and 13.93 percent, respectively). In 2008 (table 22), the training probability of workers aged 55-59 in model 2 was the same as in model 1, indicating no gender differences in the probability of training of workers of this age group. The effect of gender was positive but not-significant. This finding corresponds to the descriptive results pointing to a similar training incidence of women and men aged 55-59 in 2008 (27.59 and 27.76 percent, respectively). Taken together, the training probability of older workers seems to vary between men and women only in 2004 while in 2008 it has not effect.

Turning to *Model 3*, it is noticeable that the estimate average marginal effect of each age group changes when qualification level is included in the regression model. Focusing on the older groups, workers aged 55-59 have 10.4 percent less probability to participate in training than workers aged 35-39 in 2000, a decrease of 0.6 percent from their probability without controlling for the effect of education (model 1). This is also true for the oldest age group with 13.2 percent less training probability than the reference group, a decrease of 1.2 percent from the estimated coefficient of the reduced model (No.1). These findings indicate that the level of education of older workers influences their training probability, similar to descriptive results. The differences between the estimated coefficient of model 1 and model 3 indicate however that the training probability of workers aged 60-64 is *more* affected by their level of education than of workers aged 55-59<sup>252</sup>. In other words, the training gap between low- and high-qualified workers is bigger for those aged 60-64 than 55-59, corresponding with the descriptive results. In 2004 (table 21), the training probability of workers aged 55-59 decreased by 0.7 percent compared to their probability in model 1, while that of workers aged 60-64 decreased by 3.2 percent, an even bigger difference than in 2000. These highly significant results support the findings of the bivariate analysis (table 16), according to which the difference in the training incidence between low and high-qualified workers aged 55-59 (in favour of the high-qualified) increased. This is also true for workers aged 60-64. The estimated coefficients in 2008 (table 22) indicate that, when education is included in the model (model 3), the probability of both, workers aged 55-59 and 60-64, is reduced by 1.6

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<sup>252</sup> Given the descriptive findings in 2000 pointing to a bigger gap in the training incidence of low- and high-qualified workers aged 60-64 (, these findings are not surprising (6.5 and 23,1 percent, respectively).

percent compared to their probability without controlling for education (model 1). The findings are non-significant for workers aged 55-59, but highly significant for the oldest one. These estimated coefficients partly confirm the descriptive results (table 16) indicating a *higher* training incidence of low-qualified workers aged 60-64 in 2008, which resulted in a decreased training gap with their high-qualified counterparts. Taken together, the likelihood of training of older workers seems to vary when controlling for the effect of qualification level, and this effect changes over the years, similar to the descriptive results.

*Model 4* includes occupational group as a control variable. As shown in table 20, significant differences are observed between the estimated coefficients of each age group in model 4 compared to the estimates in model 1. Workers aged 55-59 have 10.8 percent less probability to participate in training than those aged 35-39, a decrease of 1 percent from the estimate of the regression model without controlling for the effect of occupational group. Workers aged 60-64 have 14.7 percent less probability than the reference group, a decrease of 2.7 percent from the estimated coefficient shown in model 1. As in the case of qualification level (model 3), these findings suggest that the training probability of older workers is influenced by their occupational group. This is clearly seen in the descriptive results (table 18) indicating meaningful differences in the training incidence of blue-collar workers, white-collar workers and civil servants aged 55-64. In 2004 (table 21) the training probability of workers aged 55-59 and 60-64 was reduced by 2.6 and 4.5 percent, respectively, when controlling for the effect of occupational group. Comparing to the results obtained after controlling for the impact of education (table 21, model 3), it is noticeable that the probability of workers aged 55-59 and 60-64 is lower when occupational group is included in the regression model than when qualification level. This implies a *greater* variation between the different occupational groups with respect to training in each group of older workers. In 2008, the average marginal affect decreased by 1.7 percent for workers aged 55-59 and by 3.1 percent for the oldest group when controlling for occupational group (model 4), suggesting a decreased training gap between the occupational groups of older workers over the years<sup>253</sup>. Taken together, the training probability of workers aged 55-64 seems to vary when controlling for the effect of occupational group, and this effect changes over the examined years, similar to the descriptive findings.

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<sup>253</sup> This however do not correspond with the descriptive results (table 18) which indicate an increased training incidence of blue-collar older workers between 2004 and 2008, on the one hand, but remaining meaningful differences between the occupational groups, on the other hand.

## 6.4 Summary

This chapter examines developments in the participation of older workers in professional training courses in Germany over the years 2000, 2004 and 2008 based on the SOEP dataset. The hypothesis behind this analysis argues that the training incidence of older German workers increases as their time in employment becomes longer. In other words, increased time in the labour force due to institutional and policy developments should raise the returns to training of older workers, therefore elevating the profitability of such an investment, both for the employers and older workers.

Examination of the changes in the age structure of the German labour force and the characteristics of older workers over the years based on the SOEP sample led to the following findings: First, the share of workers aged 55-64 in the sample increases between 2000 and 2008, corresponding with other German datasets. Second, the share of older women and high qualified older workers rises between 2000 and 2008, which is also supported by the findings of other German datasets. The share of blue-collar older workers in the sample decreases meaningfully between 2000 and 2004 but then it increases slightly between 2004 and 2008. These preliminary findings could reflect a change in the pattern of labour force participation of under-represented of older workers. Considering the further impact of reduced early retirement pathways, an increase in the labour force participation of workers which are less represented in the labour force at older ages is expected. Such a development should eventually lead to a heterogeneous ageing labour force.

The bivariate analysis led to the following preliminary results. First, the training incidence of workers aged 55-59 in 2000 is way behind that of their younger counterparts, but in 2008 it is almost the same. This however is not observed for the oldest group which still has a very low training incidence compared to the other age groups in 2008. Second, the training incidence of *all* workers (aged 35-64) increases over the examined years, however the *relative* increase is the strongest for workers aged 55-64 between 2000 and 2008. Third, three additional sub-questions are examined, aiming to identify developments in the training participation of under-represented groups of older workers. In accordance, an increase is observed in the training participation of older women, particularly aged 55-59, over the examined years. This is resulted in a decreased training gap between men and women aged 55-59 in 2008. Furthermore, the training incidence of both high- and low-qualified older workers increases between 2000 and 2008, with the highest participation among high-qualified workers. Nevertheless, the strongest relative increase of training is observed for low-qualified older workers between 2004 and 2008. Finally, the strongest relative growth of

training is observed for *older* workers from all the occupational groups. Of particular interest is the steady increase in the training participation of older blue-collar workers, which is similar to the trend seen for older low-qualified workers.

The multivariate analysis supports the research hypothesis to a certain degree. Firstly, despite the positive trend found in the bivariate analysis, the participation of workers aged 60-64 in training did not increase over time, as hypothesized. This could be the result of the short time left for them in the labour force which reduces the profitability to invest in their training, as argued by the human capital theory. Secondly, workers aged 55-59 are significantly more likely to participate in professional training courses in 2008 than in 2004 and 2000, as hypothesized. These findings may reflect a growing pattern of human capital investment among employers and older employees as a reaction to policy change. As suggested above, higher returns to training due to increased time in the labour force for older workers may explain decisions towards investments in their training, just as argued by Riphahn and Trübswetter (2007).

Finally, the multivariate analysis shows that the participation of older workers in professional training courses is influenced by gender, qualification level and occupational group. Accordingly, when controlling separately for the effect of each one of these indicators, the likelihood of older workers to have training changes, and this is valid for all the years. As argued by this study, expected increase in the heterogeneity of the ageing labour force due to institutional and policy changes should raise the need for investing in the training of older workers which are normally under-represented in the labour force, such as women, low-qualified and blue-collar workers. Thus, further investigation is needed in order to identify trends in the training incidence of under-represented groups of older workers.

## 7 Job Satisfaction of Older Workers: Does Participation in Professional Training Courses Make a Difference?

Improving productivity level of older workers through enhanced training is an important target for policy makers in Germany (OECD, 2005a). As shown in the previous chapter, the training incidence of workers aged 55-59 was significantly increased in Germany between 2000 and 2008. Such data should reduce concerns regarding the ability of older workers to contribute to economic growth. However, another concern to cope with is increased labour force participation of under-represented groups of older workers e.g. blue-collar, which results mainly due to a reduction of early retirement options. While studies indicate a high implementation of early retirement schemes by unsatisfied workers (Hanisch & Hulin, 1991; Schulte, 2005), the requirement of longer employment nowadays could therefore increase the rate of low job-satisfied older workers. This leads to the assumption that an ageing labour force may also be a *less* satisfied one.

As job satisfaction is found to be positively correlated with both productivity (Clark *et al.* 1996; Appelbaum *et al.* 2005) and the willingness to stay in employment (Clark *et al.* 1996, 1998; Gazioglu & Tansel, 2002; Schulte, 2005), an unsatisfied ageing labour force may pose an economic problem as these aspects constitute two of the main targets for policy makers in Germany nowadays (OECD, 2005a). If one could imagine a scenario in which older workers are “captured” in an unsatisfied, low paid, hard job for longer periods – what would encourage them to keep on working in a beneficial manner, for them as individuals but also for the labour force?

This chapter investigates the relationship between the participation of older workers in professional training courses and their overall job-satisfaction. More specifically, I examine the extent of which the overall job satisfaction of older workers is affected by training and in accordance, whether this effect differs between different occupational groups of older workers. Focusing on training as a determinant of job satisfaction is a relatively novel point of view. This however may be changing as participation in training becomes essential for the success of the ageing labour force (OECD, 2012b), and the job satisfaction of older workers may gain importance given the extension of employment period.

Despite the positive trend in the training incidence of older workers in recent years (Riphahn & Trübswetter, 2006; 2007), their likelihood to participate in training is still very low compared to younger workers, as shown in the previous chapter (see also Schleife, 2008; Tippelt *et al.* 2009; D’Addio *et al.* 2010; Maximiano, 2011). This could generate differences

in perceptions of training between older and younger workers. Considering also the age factor, according to which people change attitudes towards aspects of their job with age (Valentine *et al.* 1998), the second research hypothesis argues that participation of older workers in professional training courses has a positive effect on their overall job satisfaction which is stronger than for younger workers. Focusing on older workers, differences in the rate of training between occupational groups may also generate different attitudes towards training, which eventually leads to variations in job satisfaction. Accordingly, the *third* hypothesis argues that the effect of training on job satisfaction *varies* between occupational groups of older workers (e.g. blue-collars, white-collars and civil servants).

To this end, the remainder of this chapter is as follows: The chapter begins with a description of the overall job satisfaction of different age groups in the sample, followed by a differentiation between occupational groups. It then discusses the hypotheses and the descriptive findings concerning the relation between training and job satisfaction of older workers, followed by the results of the multivariate analyses and the final conclusions.

## 7.1 The Job-Satisfaction of Workers in Germany based on the SOEP

The job satisfaction of workers, as discussed in Chapter 3, increases with age. Studies on this topic often describe a curvilinear pattern that is based on a distribution of highly satisfied workers aged less than 20, followed by workers in their twenties or thirties representing the least satisfied, and eventually by workers aged 60 and above being the most satisfied (Clark *et al.* 1996; Clark, 1996; Warr, 1992; Gazioglu & Tansel, 2002). As this research focuses on individual older than 35, such a trend is not expected. Table 23 describes the mean job satisfaction and percentage reporting high<sup>254</sup> job satisfaction for each age group. As shown, mean job satisfaction is the highest among workers aged 35-44, than it decreases with workers aged 45-54 having the lowest satisfaction, and increases again for workers aged 55-64. High level of job satisfaction among older workers is often explained by *participation effect*, according to which satisfied older workers prefer to keep on working while the unsatisfied ones find retirement easier (Clark *et al.* 1996; see Chapter 3)<sup>255</sup>. This explanation however might be less appropriate nowadays as the options for unsatisfied older workers to retire early are limited (OECD, 2005a). This implies that the average overall job satisfaction of the ageing

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<sup>254</sup> High job satisfaction refers to people who reported 8, 9 or 10 on a scale from 0 till 10: 0 equal the lowest job satisfaction and 10 equal the highest.

<sup>255</sup> This explanation of Clark *et al.* (1996) refers mainly to workers aged 60 and older.

labour force decreases. Assuming this is true, the economic implications of an unsatisfied ageing labour force cannot be good.

*Table 23:* Mean and percentage of reported job satisfaction by age group

	Mean Job-Satisfaction (SD)	High Job-Satisfaction (>7)
35-44	7.072 (1.918)	49.29
45-54	6.946 (1.968)	46.92
55-64	6.988 (1.982)	48.17

Source: SOEP, 2000-2008, own calculations

### Differentiating between Occupational Groups of Workers

The last chapter has opened the door for a discussion about the future challenges created by having “new” groups of older workers in the labour force, such as women, low qualified and blue-collar workers due to policy change. The analysis pointed out to the importance of training in raising their chances to integrate in the labour force. The current analysis aims to extend this discussion by pointing to possible problems associated with the level of job satisfaction of under-represented groups of workers, and eventually to propose a solution. For this purpose, a differentiation is done between three occupational groups of older workers: Blue-collars, white-collars and civil servants<sup>256</sup>. As mentioned in Chapter 6, early withdrawal from the labour force is found to be more acceptable among blue-collar than white-collar workers (Schreurs *et al.* 2010) and in Germany they have the highest chance to get out of the labour force early (OECD, 2005a, 2006)<sup>257</sup>. Considering studies pointing to a higher likelihood for early retirement among low-satisfied workers, mentioned above (Clark *et al.* 1996), a low job satisfaction can be assumed especially among older blue-collar workers.

Tables 24a, 24b and 24c below present the mean job satisfaction and percentages reporting high job satisfaction by occupational group, separately for each age group. Table 24a presents the results for workers aged 55-64. As shown, mean job satisfaction and percentages reporting high job satisfaction are the highest among civil servants and the *lowest* among blue-collar workers. Similar differences are seen with respect to the younger age

<sup>256</sup> Differentiating between occupational groups of older workers is also useful against potential critic according to which older workers are a heterogeneous group (Brusch & Büsch, 2013).

<sup>257</sup> The methodological chapter discusses the problems of sample limitations which guide a considerable part of the decisions concerning the current analysis. Some would say, for instance, that differentiating between blue-collars, white-collars and civil servants is rather a *rough* differentiation since each occupational group could also be a heterogeneous one. In this regard, differentiating within each occupational group could have been useful for gaining additional information on the distribution of job satisfaction among older workers, but it was not possible with the current data due to a low number of older blue-collar workers.

groups<sup>258</sup> (tables 24b and 24c). Looking at each occupational group separately, mean job satisfaction and percentages reporting high satisfaction among blue-collar workers decreases with age, while mean job satisfaction of white-collar workers first decreases with age but then increases again for workers aged 55-64. Interestingly, the job satisfaction of civil servants *increases* with age. As discussed in Chapter 4, variation in the overall job satisfaction of older workers from different occupational groups may reflect dissimilar conceptualizations of aspects of their job which is due to different work experiences (Hu *et al.* 2010). This explanation could be also used to decipher the findings in table 24a.

*Table 24a:* Mean and percentage of reported job satisfaction by occupational group: aged 55-64

	Mean Job-Satisfaction (SD)	High Job-Satisfaction (>7)
Blue-collar	6.663 (2.073)	40.13
White-collar	7.058 (1.935)	50.11
Civil servant	7.315 (1.907)	55.51

Source: SOEP, 2000-2008, own calculations

*Table 24b:* Mean and percentage of reported job satisfaction by occupational group: aged 45-54

	Mean Job-Satisfaction (SD)	High Job-Satisfaction (>7)
Blue-collar	6.698 (2.044)	40.64
White-collar	7.027 (1.938)	48.63
Civil servant	7.200 (1.844)	55.10

Source: SOEP, 2000-2008, own calculations

*Table 24c:* Mean and percentage of reported job satisfaction by occupational group: aged 35-44

	Mean Job-Satisfaction (SD)	High Job-Satisfaction (>7)
Blue-collar	6.847 (2.018)	43.97
White-collar	7.189 (1.857)	52.12
Civil servant	7.161 (1.844)	50.79

Source: SOEP, 2000-2008, own calculations

<sup>258</sup> For determining whether these differences are statistically significant, a *t-test* was conducted. If the p-value associated with the t-test is smaller than 0.05 ( $p < 0.05$ ), there is evidence that the mean is significantly different from the hypothesized value. In contrast, if the p-value is greater than 0.05 ( $p > 0.05$ ), then the null hypothesis is *not* rejected, meaning the mean is not different from the hypothesized value. The first test examined whether the means job satisfaction of blue-collars and civil servants aged 55-64 are different from each other (the alternate hypothesis -  $H_a$ ). The findings indicate a two-tailed *p*-value of 0.0001 which means that the alternate hypothesis ( $H_a$ ) is accepted. The second test examines whether the means of blue-collars and white-collars aged 55-64 are different from each other. The findings indicate, similar to the results of the first test, a two-tailed *p*-value of 0.0001, therefore the alternate hypothesis ( $H_a$ ), can be accepted. The findings confirm that the differences between the occupational groups of older workers are statistically significant at the 1 percent level.



Given the low level of job satisfaction among older blue-collar workers compared to the other occupational groups (table 24a), two possible scenarios are assumed. The first concerns their level of productivity. Chapter 6 pointed out to the possible economic implications resulted from the low level of skills of older blue-collar workers and which could be eventually improved by additional training. However, low job satisfaction level could negatively affect the productivity of older blue-collar workers, as studies indicate a strong correlation between job satisfaction and productivity (Clark *et al.* 1996; Appelbaum *et al.* 2005). Furthermore, reduced early retirement opportunities could lower their level of job satisfaction to a greater extent, thus reducing their productivity level as well. The second assumed scenario regards the labour force participation of these workers. Following studies indicate a strong correlation between level of job satisfaction and employment (Clark, *et al.* 1998), unsatisfied blue-collar workers would still wish to retire early. Unfortunately, according to the latest report of the OECD concerning Germany (2012a), the scenario in which people choose early retirement over work, is still highly realistic (see Chapter 2: summary). In this regard, does the complete abolishment of early retirement through the creation of new policies, as also suggested by the OECD report (2012a), means that the ageing labour force would happily work longer? From the point of view of this research the answer is *no*. When aiming to prolong the working lives of older workers who are unsatisfied in their job, such as blue-collar workers, the factors underlying their intention to retire early, or in contrast, influencing their decision to work, need to be considered. Taken together, it should be asked: What could raise the level of job satisfaction of older workers, and blue-collar workers in particular? Asking this question means acknowledging the significance of job satisfaction in determining the behavior of *older* workers in the labour force.

## **7.2 Training – A New Determinant of Job Satisfaction?**

The inclusion of training as a determinant of job satisfaction is new in the scientific literature. Very few studies have looked at the correlation between these two factors, and even fewer have focused on this relation with respect to older workers (Leppel *et al.* 2012). This however might be changing as the participation of older German workers in training has been increasing in recent years (Riphahn & Trübswetter, 2007), and job satisfaction might get more attention given the longer employment period.

The definition of Kalleberg and Griffin (1978) regarding the term job satisfaction, which is discussed in Chapter 4, argues that the attitude of people towards their job, namely their job satisfaction, is the result of two characteristics: job rewards and work values. While

the first refers to benefits and utilities, the second refers to the *importance* given to these rewards by individuals<sup>259</sup>. Following this, the *job characteristics model*, discussed in Chapter 4, could be used to illustrate why the job satisfaction of older workers may be improved through training (Leppel *et al.* 2012). Furthermore, since older workers in general have a *low* training participation rate (Warwick Report, 2006; Schmidt, 2007; Schleife, 2008; Tippelt *et al.* 2009; D' Addio *et al.*, 2010; Maximiano, 2011)<sup>260</sup>, it might be possible that participation in training and its *returns*, respectively, will be highly appreciated by them and will therefore influence their level of job satisfaction. This leads to arguing the following research hypothesis:

**H<sub>2</sub>:** *Participation in training has a positive effect on the job satisfaction of older workers*

In order to better understand the nature of the relationship between training and job satisfaction of older workers, the younger age groups are also addressed. As discussed in Chapter 4, changes in workers' needs with age may generate new attitudes towards various aspects of work. For example, extrinsic rewards (e.g. pay) which are quite important for younger workers, are less appreciated by older ones, while intrinsic rewards (e.g. feeling useful and valued) are found to be highly important for older workers and less for younger ones (Valentine *et al.* 1998). This can be supported by studies indicating stronger perceived non-monetary aspects of training among older workers than younger ones (e.g. perceived job security; OECD, 2004b; Bassanini, 2006; Lang, 2012). Such differences could lead to different level of job satisfaction among older and younger training participants. Furthermore, when considering the well-known gap in training frequencies between younger and older workers (OECD, 2003; OECD, 2005a), differences in job satisfaction can be also expected to occur. Taken together, the research' *sub*-hypothesis argues that:

**Sub-H<sub>2</sub>:** *Participation in training has a stronger positive effect on job satisfaction for older than for younger workers*

Focusing on older workers, an occupational-based differentiation is conducted in order to examine the relationship between training and job satisfaction. This is especially relevant due to the expected rise in the heterogeneity of the ageing labour force mentioned above (section 7.1). As discussed in Chapter 4, studies point to the existence of occupation-based differences

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<sup>259</sup> For more information on the definitions of job satisfaction see Chapter 4.

in workers' *perceived* job aspects (extrinsic and intrinsic), which is mainly due to different job characteristics, and which eventually affect their level of job satisfaction (Ronen & Sadan, 1984). Building upon this finding, the job satisfaction of older training participants is expected to *vary* between blue-collar, white-collar and civil servants<sup>261</sup>. Furthermore, as discussed in Chapter 3 and confirmed by the last analysis (Chapter 6), training is not evenly distributed between occupational groups of workers. More specifically, while civil servants often take part in training, blue-collar workers hardly receive training (Pischcke, 2000; Riphahn & Trübswetter, 2007). Such differences are also seen among older workers<sup>262</sup>. Using the line of argument mentioned above, according to which training may be differently appreciated by workers depending on their training incidence, the *third* hypothesis argues:

**H<sub>3</sub>:** *Participation in professional training courses has a stronger positive effect on the level of job satisfaction for older blue-collar than for older white-collar workers and civil servants*

This hypothesis implies that the *rate* of training may play a role in determining the level of job satisfaction among older participants from different occupational groups, by assuming the strongest positive effect of training on the job satisfaction of older workers belonging to a group with the lowest training incidence.

In order to provide evidence for the existence of a relationship between training and job satisfaction, mean job satisfaction and percentages<sup>263</sup> reporting high job satisfaction among respondents were calculated. The results are displayed in table 25. As shown, mean job satisfaction and percentages are higher among training participants than non-participants. These differences are examined using a t-test<sup>264</sup> and turned out to be highly significant. In this respect, these findings offer a first indication to the existence of a relationship between training and job satisfaction, which is also supported by other studies (Gazioglu & Tansel, 2002; Georgellis & Lange, 2007; see Chapter 4).

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<sup>261</sup> In other words, the effect of training on the job satisfaction of older workers varies between occupational groups.

<sup>262</sup> See Chapter 6, section 6.2.

<sup>263</sup> The analysis refers to *all* workers aged 35 to 64.

<sup>264</sup> This test was conducted using the original ordinal variable of job satisfaction (0-10). It examines the *null* hypothesis ( $H_1$ ) that there are no differences in mean job satisfaction between training participants and non-participants, against the *alternative* hypothesis ( $H_a$ ) that the means of job satisfaction are different from each other, namely the differences are statistically significant. With the help of STATA, a two group mean comparison t-test of independence was conducted. The results indicate a two-tailed *p*-value of 0.00001, which leads to the conclusion that the means job satisfaction of training participants and non-participants are significantly different from each other.

**Table 25:** Reported job satisfaction of training participants and non-participants

	Training Participants	Non- Participants
Mean of Job-Satisfaction (SD)	7.128 (1.884)	6.967 (1.971)
High Job-Satisfaction (>7)	51.27%	47.12%

Source: SOEP, 2000-2008, own calculations

### 7.2.1 Older vs. Younger Workers: Variations in the Effect of Training on Job Satisfaction

Table 26 below presents the mean job satisfaction and percentages reporting high job satisfaction among training participants and non-participants, separately for each age group. As shown, mean job satisfaction is higher among training participants aged 55-64 than their non-participants counterparts while a t-test<sup>265</sup> indicates that these differences are statistically significant at the 1 percent level (table 27). These findings provide the initial evidence for the relation between training and the level of job satisfaction of *older* workers. Similar results are found for the younger groups. The resulting p-values from the separate t-tests for workers aged 35-44 and 45-54 (table 27) indicate statistical significant differences ( $p < 0.05$ ,  $p < 0.01$ , respectively).

**Table 26:** Reported job satisfaction of training participants and non-participants by age group

	Training Participants		Non-Participants	
	Mean (SD)	High-Job Satisfaction (%)	Mean (SD)	High-Job Satisfaction (%)
35-44	7.161 (1.890)	52.63	7.040 (1.927)	48.08
45-54	7.053 (1.872)	48.54	6.907 (2.000)	46.34
55-64	7.225 (1.888)	54.27	6.926 (2.002)	46.55

Source: SOEP, 2000-2008, own calculations

Table 26 indicates another interesting finding; among the training participants, older workers have on average a higher job satisfaction than younger workers. Looking at the significant differences in means job satisfaction between training participants and non-participants for each age group (table 27), it is noticeable that the difference is bigger for workers aged 55-64 (0.28) than for the younger age groups. This might indicate the *strongest* positive effect of

<sup>265</sup> A t-test was performed for examining whether the differences between the mean job satisfaction of training participants and non-participants aged 55-65, are statistically significant ( $H_a$ ) or not ( $H_1$ ).

training on the overall job satisfaction of older workers, therefore supporting the research sub-hypothesis (Sub-H<sub>2</sub>).

*Table 27:* Age differences in mean of job satisfaction of training Participants and Non-Participants

	Difference Mean Job Satisfaction	p-value
35-44	0.14*	0.013
45-54	0.13**	0.006
55-64	0.28***	0.000

Note: This table presents the results of a two group mean comparison t-test for the differences between mean job satisfaction of training participants and non-participants by age group.

Number of training participants: 2,088 aged 35-44; 1,821 aged 45-54; 702 aged 55-64. Number of non-participants: 5,751 aged 35-44; 5,149 aged 45-54; 2,640 aged 55-64

Source: SOEP, 2000-2008, own calculations, \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

A further examination was conducted via correlations<sup>266</sup> in order to determine the strength of the relationship between training and job satisfaction separately by age group. For this analysis, the binary variable job satisfaction is used<sup>267</sup>. The results are displayed in table 28<sup>268</sup>. As shown, no correlation is found between training and job satisfaction for workers aged 35-44 and 45-55, but statistically significant weak correlation is observed for workers aged 55-64. This indicates that training has an effect, though weak, on the likelihood of job satisfaction of older workers only, therefore supporting the findings of the bivariate analysis (table 26), and providing first evidence for the research hypothesis.

*Table 28:* Correlation analysis of job satisfaction with training separately by age group

	Age 35-44	Age 45-54	Age 55-54
Cramer's V Value	.040***	.019	.062***
N	7,839	6,970	3,342

Source: SOEP, 2000-2008, own calculations, \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

A likely explanation for the differences between the age groups, as suggested earlier, might lie in changes in workers' preferences with age generating different attitudes towards aspects

<sup>266</sup> As it is thoroughly explained in Chapter 6, the level of a variable (e.g. nominal, ordinal) determines the types of correlations, which needs to be carried out. In this regard, for the examination of the association between three (2x3; e.g. occupational group) a *Cramer's V* test was carried out.

<sup>267</sup> Since this variable was used in the multivariate analysis (section 7.3), it was used in the correlation analysis. For more information on the way this variable was constructed, see Chapter 5.

<sup>268</sup> A chi-squared test of independence was also conducted, separately for each age group), for examining whether the differences between the level of job satisfaction of training participants and non-participants are significant (H<sub>a</sub>) or not (H<sub>1</sub>).

of work (extrinsic and intrinsic). In other words, some returns to training might be highly valued by older workers than by younger ones. Furthermore, these differences could be enhanced following the training gap. This implies that older workers might highly appreciate the returns to training as a result of their relative low training participation. This argument is further explained in section 7.4.

### 7.2.2 Occupation-based Differentiation

Occupation-based differentiation in job satisfaction, shown in tables 24a, 24b and 24c, indicates significant differences in the level of job satisfaction among older workers. In the following section the relation between participation in professional training courses and job satisfaction among blue-collar, white-collar and civil servants is examined. Focusing on older workers, I ask, to what degree the level of job satisfaction of each occupational group *changes* when participation in training is taken into account.

Tables 29a, 29b and 29c below present the reported mean job satisfaction and percentages of high job satisfaction by occupational group and training, separately by age group. Although the current analysis focuses on workers aged 55-64 ( $H_3$ ), the results for the other age groups are also presented for comparison matters. The findings for the sample of workers aged 55-64 are displayed in table 29a. Looking at the column of non-participants, blue-collar workers are the *least* satisfied and civil servants are the most satisfied (6.6 and 7.4, respectively). These findings correspond with the findings shown in table 24a above. Furthermore, the level of job satisfaction of each occupational group *changes* when considering respondents' participation in professional training courses. Two important findings can be drawn from table 29a. First, the average job satisfaction and percentages reporting high job satisfaction are higher among blue-collar and white-collar training participants than their non-participants counterparts, while civil servant training participants have a lower average job satisfaction than non-participants. In other words, training seems to have a positive effect on the job satisfaction of blue and white-collar workers, but a negative effect for civil servants. According to a t-test (table 30)<sup>269</sup>, these differences are statistically significant at the 1 percent level for blue-collar workers, but are not statistically significant for white-collar workers and civil servants. Second, among the training participants, blue-collar workers are the *most* satisfied while white-collar workers are the least satisfied. In other words, when training is considered, the *reversed* trend is observed, with blue-collar workers in the top of the job

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<sup>269</sup> Each t-test examined whether the differences in average job satisfaction between training participants and non-participants are statistically significant ( $H_a$ ) or not ( $H_1$ ).

satisfaction scale. These findings might suggest the strongest positive effect of training on the job satisfaction of blue-collar workers.

*Table 29a:* Reported job satisfaction of training participants and non-participants by occupational group: aged 55-64

	Training Participants		Non-Participants	
	Mean (SD)	High-Job Satisfaction (%)	Mean (SD)	High-Job Satisfaction (%)
Blue-collar workers	7.5 (1.864)	65	6.605 (2.076)	38.42
White-collar workers	7.183 (1.867)	53.54	7.052 (1.956)	49.11
Civil servants	7.216 (1.962)	52.75	7.410 (1.896)	57.47

Source: SOEP, 2000-2008, own calculations

*Table 29b:* Reported job satisfaction of training participants and non-participants by occupational group: aged 45-54

	Training Participants		Non-Participants	
	Mean (SD)	High-Job Satisfaction (%)	Mean (SD)	High-Job Satisfaction (%)
Blue-collar workers	6.938 (1.879)	43.59	6.674 (2.058)	40.35
White-collar workers	7.025 (1.882)	47.55	7.055 (1.955)	49.10
Civil servants	7.181 (1.837)	54	7.227 (1.870)	56.17

Source: SOEP, 2000-2008, own calculations.

*Table 29c:* Reported job satisfaction of training participants and non-participants by occupational group: aged 35-44

	Training Participants		Non-Participants	
	Mean (SD)	High-Job Satisfaction (%)	Mean (SD)	High-Job Satisfaction (%)
Blue-collar workers	6.974 (1.876)	52.59	6.832 (2.027)	42.98
White-collar workers	7.181 (1.898)	52.96	7.161 (1.854)	51.70
Civil servants	7.218 (1.870)	50.75	7.154 (1.891)	50.83

Source: SOEP, 2000-2008, own calculations

Comparing to the other age groups, the level of job satisfaction among blue-collar training participants aged 45-54 (table 29b) and 35-44 (table 29c) is higher than their non-participants counterparts, similar to the results seen for older workers. Nevertheless, blue-collar workers are still the *least* satisfied even if they participate in training compared to their white-collar workers and civil servants counterparts. This is true for both age groups. Furthermore, average job satisfaction

is higher among white-collar and civil-servant training participants between the ages 35 and 44 than their non-participants counterparts, but this is not observed for workers aged 44-54. In accordance, mean job satisfaction is lower for white-collars and civil-servants training participants 45-54 than their non-participants counterparts.

*Table 30:* Occupational-group differences in mean of job satisfaction of training Participants and Non-Participants aged 55-64

	Difference Mean Job Satisfaction	p-value
Blue-collars	0.89***	0.001
White-collars	0.13	0.130
Civil servants	-0.19	0.383

Note: This table presents the results of a two group mean comparison t-test for the differences between mean job satisfaction of training participants and non-participants by occupational group of workers aged 55-64.

Number of training participants: 60 blue-collars; 424 white-collars; 218 civil servants. Number of non-participants: 872 blue-collars; 1,460 white-collars; 308 civil servants

Source: SOEP, 2000-2008, own calculations, \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

To further investigate the relation between training and job satisfaction among older workers separately by occupational group, correlations were performed. The results are presented in table 31. As shown, moderate statistically significant relationship is detected between training and job satisfaction for blue-collar workers which supports the descriptive findings (table 29a), in which a meaningful difference is seen between average job satisfaction of blue-collar training participants and non-participants. The resulting coefficients of the other occupational groups indicate *no* correlation between training and job satisfaction. These initial findings provide an evidence for the third research hypothesis in which a strong positive association between training and job satisfaction is expected for older blue-collar workers.

*Table 31:* Correlations of job satisfaction and training by occupational group aged 55-64

	Blue-collar	White-collar	Civil-servant
Cramer's V Value	.133***	.030	-.046
N	932	1,884	526

Source: SOEP, 2000-2008, own calculations; \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ <sup>270</sup>

<sup>270</sup> A chi-squared test of independence was conducted in order to examine the relation between training and job satisfaction for each occupational group. The of  $X^2$  is 16.1 and one degrees of freedom (df) for the group of blue-collar workers.



### *Summary*

The bivariate analysis performed in this section yielded the following findings. Firstly, differences in the level of job satisfaction are found between the age groups. Focusing on older workers, the level of job satisfaction varies between occupational groups. In particular, blue-collar workers are the least satisfied while civil servants are the most satisfied. These initial findings may support the argument mentioned in the introduction of this chapter, in which expected increase in the labour force participation of older workers with the most likelihood to retire early (e.g. blue-collar) will reduce the average job satisfaction of the labour force in the future. Secondly, participation in professional training courses seems to positively affect the job satisfaction of older workers. Compared to their younger counterparts, they have the highest job satisfaction when training is taken into account. Finally, the bivariate analysis indicates that the level of job satisfaction of *older* workers from different occupational groups changes when participation in training is taken into account. Specifically, blue-collar training participants report the highest level of job satisfaction.

## **7.3 The Likelihood of Job Satisfaction of Older Workers: Multivariate Analysis**

A further investigation of the relationship between job satisfaction and training was done by carrying out multiple regressions. This procedure takes into consideration other factors that might affect the level of job satisfaction of employees and might be correlated with training. The main interest to be examined is whether the results of the descriptive analysis that support the current research hypotheses are still valid when other variables are controlled. In the following, two methods of analysis are carried out. The first is a pooled logistic regression and the second is a panel regression called random-effects logistic regression<sup>271</sup>. The resulting model (which is applied for all age groups and in both kinds of regressions) includes the following control variables: gender, educational degree, health, employment status, occupational group, income, industry sector and year. The independent variable of interest, participation in professional training courses (taken during the last twelve months), is also interacted with the variable occupational group. The interpretation of the coefficients in this

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<sup>271</sup> As it is thoroughly discussed in the methodological chapter, sample limitations associated mainly with the *low* number of older blue-collar training participants stand behind the decision to choose both methodological approaches for analysing the data.

section will take the same form as in the last analysis (Chapter 6), namely it is based on Average Marginal Effects (AME)<sup>272</sup>.

### **Pooled Cross-Sectional Analysis: Logistic Regression**

For determining whether the chosen model describes the observed outcome in the data adequately, Hosmer-Lemeshow Goodness-of Fit Test is applied. This test is considered to be a better measure of fit of a logistic regression model<sup>273</sup> (Kuss, 2002). The test indicates that the model fits the data well<sup>274</sup>. The estimated results from the logistic regressions for the likelihood of obtaining a high (overall) job satisfaction separately for each age group are presented in table 32. The Average Marginal Effects, the resulted *p*-values and the standard errors are displayed. As shown, the estimates for the control variables confirm some of the findings in the literature (see Chapter 4)<sup>275</sup>. Looking at the column of workers aged 55-64 it is noticeable that while holding all the other variables constant, women have a higher job satisfaction than men, but this finding is not significant. Furthermore, no significant effect of educational degree is found. Nevertheless, two findings are worthwhile to mention. On the one hand, workers with a vocational educational degree have a lower job satisfaction than workers with a general elementary education (the reference group), and workers with a higher educational degree have even lower job satisfaction than workers of the reference group. Despite the non-significant results, these findings correspond to other studies pointing to a *negative* insignificant effect of education on job satisfaction (e.g. Clark & Oswald, 1996; Jones *et al.* 2009; Leppel *et al.* 2012). On the other hand, workers with middle vocational degree (also refers to upper secondary education<sup>276</sup>) have higher job satisfaction than their counterparts with general elementary education. This finding is also not statistically significant.

The estimates marginal effects of health indicate a statistical significant negative effect on overall job satisfaction. Workers who declared bad health are 51 percentage points less likely to have high overall job satisfaction than people with a very good health condition, the

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<sup>272</sup> The problems associated with interpreting the results from a logistic regression are discussed in the methodological chapter with regard to the first analysis.

<sup>273</sup> This test uses a 'grouping' method in which a number of quintiles is specified to be used to group the data (the option '10' is usually used). As mentioned in the last chapter, the test was not applied, despite the use of logistic regression, since the model includes only categorical variables.

<sup>274</sup> The test was first applied for the sample of workers aged 55-64, the main sample. The resulting *p*-value was not significant ( $p=0.74$ ) and the  $X^2$  value of 5.11 on 8 degrees of freedom is not too large, therefore it is concluded that the model fits the data well.

<sup>275</sup> Table 6 in the Supplements presents the relation between each of the control variables and overall job satisfaction via percentages.

<sup>276</sup> For more information on the educational variable see Chapter 4.

reference group. Supported by other studies (Clark, 1996; Gazioglu & Tansel, 2002a; Georgellis & Lange, 2007; Leppel *et al.* 2012), this finding might be in part explained using the suggestion by Clark (1996), according to which workers with poor health might work only in jobs which are less satisfying or that these workers in general have the tendency to report low job satisfaction. Furthermore, the coefficient for workers on part-time job, namely working less than 30 hours per week (but more than 15) points to a positive direction, but these findings are not statistically significant. As for occupational group, white-collar workers have a higher job satisfaction than blue-collar workers, the reference group, but this finding is not significant. Civil servants, however, have even higher likelihood to report high job satisfaction than blue-collar workers, and this findings is significant ( $p < 0.005$ ). More specifically, on a 5 percent significant level, civil servants have 7.8 percentage points higher likelihood to have high job satisfaction than blue-collar workers. In addition, no significant effects of industry sectors were found.

Earnings have a highly significant positive effect ( $p < 0.001$ ) on the overall job satisfaction of older workers. As shown in table 32, with each increase in the hourly wage, the average overall job satisfaction of older workers increases by 9.4 percentage points. These findings are supported by previous studies (Georgellis & Lange, 2007; Leppel *et al.* 2012). The estimates of the year dummies indicate a negative effect on the overall job satisfaction of older workers which gets stronger over the years, however only the effect in 2008 is statistically significant. Workers aged 55-64 are 2.4 percentage points less likely to be highly satisfied with their job in 2004 compared to 2000 (the reference group), and 5.2 percentage points less satisfied in 2008 than in 2000. This means that the overall job satisfaction of older workers significantly decreased over the years. The data of Jürges (2003), which indicate that the general job satisfaction of workers in Germany is following a downward trend, may support this finding. Furthermore, increased labour force participation of older workers with low level of job satisfaction, as discussed earlier, may partly explain this development.

Comparing to the two other age groups, the average marginal effects of the control variables indicate similar patterns for all the variables but differences are apparent in the magnitude of the effect. Holding all other variables at their mean, it is noticeable that part-time employment has a positive effect on the job satisfaction of younger workers, however these findings are only significant for workers aged 35-44. The estimates of education for both younger age groups point to the same trend shown for older workers, with the highest job satisfaction for workers with middle vocational degree. Despite the non-significant results these finding is interesting. One possible explanation may lie in the structure of the

educational attainment in Germany, which is characterized by low rates of tertiary attainment, on the one hand, and *high* rates of upper secondary attainment, on the other hand (OECD, 2012b). In this respect, people with middle vocational education in Germany might work in quality jobs with good conditions which contribute to a higher job satisfaction.

Health has a significant negative effect for both younger age groups, similar to the results found for older workers. Specifically, workers who declared on bad health are less likely to be satisfied than workers with a very good health condition. It is noticeable however that the negative effect of health is significantly stronger for the oldest group compared to the younger groups, as shown by the coefficients size. This could be in part due to the age factor in which feelings may be intensified with age. The estimates of the year dummies for workers aged 45-54 are both negative and highly significant, pointing to a decrease in the level of job satisfaction among workers between 2000 and 2008. This could also be supported by the findings of Jürges (2003). The estimates for workers aged 35-44 also point to a downward trend in job satisfaction, however, this data is not significant.

#### *The Probability of Job Satisfaction Conditioned on Participation in Training*

Turning to the main variable of interest (table 32), participation in professional training courses, the estimated coefficient indicates that, while controlling for the effect of the other variables, training has a positive significant effect on the job satisfaction of older workers. More specifically, at a 1 percent significant level, older workers who participate in professional training courses are 6.9 percentage points more likely to report high job satisfaction than older workers who did not participate in training. As shown in table 32, the results hold even when controlling for the effect of earnings. This finding confirms the bivariate analysis (table 30), which means that the second research hypothesis (H<sub>2</sub>), according to which training has a positive effect on the level of job satisfaction of older workers, can be accepted. This finding is very important as it might imply for additional role of training for older workers.

*Table 32:* Pooled logistic regression for the likelihood of high job satisfaction separately for each age group

	35-44	45-54	55-64
<b>Training Participation</b>			
No	Ref.	Ref.	Ref.
Yes	.038 (.014)**	.021 (.035)	.069 (.024)**
<b>Gender</b>			
Male	Ref.	Ref.	Ref.
Female	-.008 (.013)	.004 (.014)	.000 (.020)
<b>Educational Degree (ISCED)</b>			
General Elementary	Ref.	Ref.	Ref.
Middle vocational	.005 (.019)	.008 (.019)	.029 (.027)
Higher vocational	-.013 (.025)	-.031 (.026)	-.034 (.038)
Higher education	-.029 (.022)	-.049 (.023)*	-.038 (.032)
<b>Health</b>			
Very Good	Ref.	Ref.	Ref.
Good	-.162 (.017)***	-.197 (.026)***	-.212 (.034)***
Satisfactory	-.343 (.018)***	-.368 (.025)***	-.382 (.034)***
Bad	-.418 (.023)***	-.475 (.028)***	-.512 (.037)***
<b>Employment Status</b>			
Full-time	Ref.	Ref.	Ref.
Part-time	.034 (.017)*	.030 (.018)	.006 (.026)
<b>Occupational group</b>			
Blue-collar worker	Ref.	Ref.	Ref.
White collar worker	.057 (.015)***	.051 (.017)**	.035 (.024)
Civil-servant worker	.026 (.030)	.081 (.031)**	.078 (.040)*
<b>Industry Sector (NACE)</b>			
Manufacturing	Ref.	Ref.	Ref.
Construction	.011 (.022)	-.013 (.026)	-.000 (.039)
Wholesale and retail	-.027 (.019)	-.039 (.022)	-.052 (.032)
Transport	-.025 (.025)	-.033 (.025)	-.068 (.040)
Finance	-.101 (.026)***	.014 (.029)	-.034 (.043)
Real estate	-.011 (.022)	-.033 (.025)	.002 (.036)
Public administration	-.008 (.024)	.022 (.023)	-.000 (.032)
Education	.047 (.026)	.058 (.025)*	-.010 (.035)
Health and social work	-.029 (.020)	.023 (.021)	-.007 (.032)
Other	-.027 (.033)	.047 (.034)	.115 (.049)
<b>Log(earnings)</b>	.061 (.014)***	.071 (.014)***	.094 (.019)***
<b>Years</b>			
2000	Ref.	Ref.	Ref.
2004	-.012 (.012)	-.067 (.014)***	-.024 (.020)
2008	-.019 (.013)	-.082 (.014)***	-.052 (.020)**
<b>Log-likelihood null model</b>	-5425.0966	-4810.8889	-2313.5401
<b>Log-likelihood end model</b>	-5128.0641	-4494.6035	-2134.3931
<b>Likelihood Ratio Test Chi2</b>	594.07***	632.57***	358.29***
<b>N</b>	7,839	6,970	3,342

Source: SOEP, 2000-2008, own calculations, \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , standard errors in parentheses, coefficients are based on Average Marginal Effects (AME)

Note: The results of the interaction term are presented separately in table 33

As discussed in Chapter 4, the job characteristic model<sup>277</sup> could be used to explain the positive relationship between training and job satisfaction (Leppel *et al.* 2012). According to this model, job characteristics generate certain psychological states which affect one's job satisfaction (Kulik *et al.* 1987)<sup>278</sup>. In accordance, older workers might see their work as worthwhile, valuable or important after participating in training, which may lead to a higher job satisfaction. As mentioned earlier, these intrinsic aspects are found to be highly important for older workers (Valentine *et al.* 1998). Similarly, training may also affect the autonomy of older workers. Having additional skills to cope with their job may raise their freedom in determining the way their work should be carried out. According to the model, this leads to a feeling of responsibility concerning work outcomes and therefore to a higher job satisfaction. Another aspect to consider is the low training incidence of older workers which may also play a role in the degree of which training affects their job satisfaction. This argument is thoroughly discussed later.

Concerning the other age groups, the estimated coefficients indicate that training has a significant positive effect on the level of job satisfaction of workers aged 35-44 ( $p < 0.01$ ). More specifically, workers aged 35-44 who participated in professional training courses are significantly 3.8 percentage points more likely to report high job satisfaction than their counterparts with no training. A positive correlation between training and the job satisfaction of workers aged 44-55 is also found, but this finding is not significant. Comparing between the age groups<sup>279</sup>, the strongest positive effect of training on job satisfaction is found for the oldest group. These findings confirm the descriptive results presented above (table 26), which means that the sub-research hypothesis in which training has a stronger effect on job satisfaction for older workers than for younger ones (Sub-H<sub>2</sub>), can also be accepted. These results can be in part supported by previous ones. The few studies on this field of research found a statistical significant relation between training and job satisfaction either in general (Gazioglu & Tansel, 2002) or through gender differentiation (Georgellis & Lange, 2007; Burgard & Görlitz, 2011). The study of Leppel *et al.* (2012), as discussed in Chapter 4, found higher job satisfaction among older workers whose workplaces offer training programs which are targeted on older workers. The current analysis offers additional information by comparing between age groups. Such a comparison better illustrates the strength of the

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<sup>277</sup> Kulik *et al.* (1987).

<sup>278</sup> For detailed information on the job characteristics model See Chapter 4, section 4.3.

<sup>279</sup> As discussed in Chapter 5, the comparison of two models with the same variables (e.g. between the age groups) is less appropriate using OR and LnOR (Karlson *et al.* 2012; Mood, 2010). Such a comparison can be done by using average marginal effect which helps to overcome the problems of unobserved heterogeneity (Best & Wolf, 2012).

relationship for older workers. In other words, revealing the strongest effect of training for the oldest group could imply the different meanings attributed to training by older and younger workers. Using the explanation proposed in section 7.2, with age, people may develop different needs which result in new attitudes towards various aspects of work. As such, older workers might have for example higher perceived job security<sup>280</sup> after participating in training than younger workers (OECD, 2004b; Bassanini, 2006; Lang, 2012) as training raises their value in the labour force (OECD, 2004b). Similarly, participation in training may raise the self-security of workers by feeling useful and valued by their employers (extrinsic rewards), whereas these aspects are found to be highly important for older workers and less for younger ones (Valentine *et al.*, 1998).

Considering the training gap between older and younger workers, with an advantage for the latter (see Chapter 6), differences in the effect of training on job satisfaction between younger and older workers could also be enhanced by differences in the incidence of training. In other words, *irregular* training participation among older workers means not gaining the positive returns of training. As a result, various feelings such as worries about losing the job or not being valuable might get stronger due to the lack of training. Thus, participation in training may be highly appreciated by them and will lead to a higher job satisfaction. This could be supported by the findings of Lang (2012), in which a higher perceived job security was found among older workers with *irregular* training participation compared to workers with higher frequency of training. This idea is further developed to a theoretical model and is thoroughly discussed in section 7.4.

For examining the third research hypothesis (H<sub>3</sub>), an *interaction term* between training and occupational group was calculated, while controlling for the effect of the other independent variables presented in table 32. As described, the interaction effect tells how much the effect of training on job satisfaction *differs* between blue-collars, white-collars and civil servants. Before turning to the estimation results, it should be noted that the computation and interpretation of an interaction term in nonlinear models (e.g. logistic model) are different compared to linear models (Norton *et al.* 2004)<sup>281</sup>. In a logistic regression, the sign of the coefficient and the statistical significance of the interaction effect should be separately

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<sup>280</sup> Job security considers as non-monetary return of training (Bassanini, 2006; Lang, 2012).

<sup>281</sup> In linear models, the interpretation of the coefficient of an interaction of two variables is directly. This means that the coefficient of the interaction and the statistical significance resulting from the regression output can be immediately interpreted (e.g. a single t-test can test the significance level of the interaction effect; Norton *et al.* 2004).

computed<sup>282</sup>. In this respect, the cross-partial derivative<sup>283</sup> of the expected value of the dependent variable should be computed in order to achieve the magnitude of the interaction effect and for calculating the statistical significance of the interaction effect (Ai & Norton, 2003; Norton *et al.* 2004). Several methods have been proposed to correctly compute and interpret interaction terms in nonlinear models (Norton *et al.* 2004)<sup>284</sup>. For the current analysis, the method proposed by Karaca-Mandic *et al.* (2012)<sup>285</sup> to compute (separately) the average marginal effects of the interaction term is first used.

The first three rows (1) in table 33 present the estimated coefficients indicating how training affects the level of job satisfaction in each occupational group. The other three rows (2) show the *difference* in the AME of training on job satisfaction<sup>283</sup> between older blue-collar, white-collar and civil servants, namely the interaction effect. Earlier (table 32), the estimated coefficient of training indicated 6.9 percentage points higher probability to have high job satisfaction for training participants compared to non-participants. The results in table 33 (1) indicate that the effect of training *differs* greatly by occupational groups of older workers. Being an older blue-collar worker significantly raises the job satisfaction by 23 percentage points with training compared to no training. However, the other estimated coefficients indicate a positive but non-significant effect for white-collar and a negative non-significant effect for civil servants. These findings support the bivariate analysis. The same trend can be seen for the younger age groups, but the positive effect of training on the job satisfaction of blue-collar workers is statistically significant only for workers aged 35-34. Yet, the strongest effect is observed for the group of older blue-collar.

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<sup>282</sup> The STATA command “margins” does not estimate the marginal effect of the interaction term since it is only able to compute the derivative of a single variable, meaning only the marginal effect of the component terms Karaca-Mandic *et al.* (2012).

<sup>283</sup> A cross-partial derivative is “an approximation of how much the derivative of E(y) with respect to x1 changes for a unit change in x2” (Buis, 2010).

<sup>284</sup> Odds ratios are also not appropriate to use when having a model with an interaction term (Norton *et al.* 2004).

<sup>285</sup> Based on the recommendation of Karaca-Mandic *et al.* (2012) I calculate the *cross-partial derivative* of training at the different level of the variable occupational group (using the *margins* command in STATA). In other words, as an interaction effect is the *difference* in the marginal effect of training on the job satisfaction between blue-collar, white-collar and civil servants, a computation of the marginal effect of training for each occupation group was first done followed by a calculation of the difference. Furthermore, the standard error and the significant level for each coefficient were also calculated using the formula in the Supplements. For more information on the methodological approaches for dealing with interaction terms in non-linear models, see Karaca-Mandic *et al.* (2012).



**Table 33:** The effect of training on job satisfaction by occupational group

	35-44	45-54	55-64
1) Blue-collar	.021 (.035)**	.090 (.030)	.228 (.062)***
White-collar	-.025 (.016)	.013 (.015)	.023 (.026)
Civil servant	-.012 (.033)	.004 (.040)	-.052 (.042)
2) Training * blue-collar	Ref.	Ref.	Ref.
Training * white-collar	-.077 (.038)*	-.047 (.034)	-.205 (.067)**
Training * civil servant	-.085 (.048)	-.033 (.050)	-.281 (.075)***

Note: Coefficients are based on Average Marginal Effects (AME).

Source: SOEP, 2000-2008, \* $p < 0.05$ ; \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , standard errors in parentheses

As also shown in table 33, the estimates of the interaction term for the oldest group support the trend found by the descriptive analysis (29a). At a 1 percent significant level, white-collar workers who participate in professional training courses are 20.5 percentage points *less* likely to report high job satisfaction than older blue-collar training participants (the reference group), and civil servant training participants are 28 percentage points less likely to report high job satisfaction than their blue-collar counterparts. This is also valid for the younger age groups, but the interaction effect is statistically significant only for workers aged 35-44<sup>286</sup>.

As argued by Buis (2010), “as there is more than one way in which we can define an effect in non-linear model, there must also be more than one way in which we can define an interaction effect”. Given the discussion concerning the appropriate way of interpreting the results of interaction term, Buis (2010) proposed to present the results in terms of multiplicative effects (e.g. odds ratio). Therefore, for comparison matters, odds ratios were also used. Accordingly, table 34 presents the coefficient of training and the interaction in terms of the *odds-ratio*<sup>287</sup>. As shown, the odds ratio for training participants aged 55-64 to have a high job satisfaction are 2.78 times the odds ratio for non-participants and this finding is highly significant. The effect of training for older white-collar workers is 0.398 times less the effect of training for older blue-collars, and for older civil servants it is 0.285 times less the effect of training for older blue-collar workers. In this respect, it can be concluded that the third research hypothesis, according to which the effect of training varies between

<sup>286</sup> Interestingly, opposite to the descriptive findings, according to which blue-collar training participants aged 35-44 have the lowest high job satisfaction (table 33c) the interaction term indicates the highest likelihood for these workers, similar to the results for the oldest group. Furthermore, despite the non-significant results for workers aged 45-54, it is noticeable that the positive effect of training on the job satisfaction of blue-collars increases with age, similar to the results of the bivariate analysis.

<sup>287</sup> The odds ratios in this case are the expected number of people with a high job satisfaction for every person with a low job satisfaction.

occupational groups of *older* workers with blue-collar workers experiencing the strongest positive effect (H<sub>3</sub>), is *true* and can therefore be accepted<sup>288</sup>.

*Table 34:* The results of the interaction term are based on Odds Ratio

	35-44	45-54	55-64
Non-participation	Ref.	Ref.	Ref.
Training participation	1.488 (.198)**	1.099 (.173)	2.781 (.821)***
Training * blue-collar	Ref.	Ref.	Ref.
Training * white-collar	.717 (.106)*	.811 (.140)	.398 (.126)***
Training * civil-servant	.690 (.151)	.861 (.186)	.285 (.099)***

Source: SOEP, 2000-2008, \* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , standard errors in parentheses

The findings of the interaction term indicate the importance of an occupation-based differentiation for a better understanding of the nature of the relationship between training and job satisfaction for older workers. For deciphering these findings, a theoretical model is proposed and discussed in section 7.4, which emphasizes the *frequency* of training as another aspect to consider.

### Panel Data Analysis: Random-Effects Logistic Regression

The methodological chapter discusses the potential bias associated with the estimated coefficients of the pooled logistic regression presented above which is due to individual heterogeneity. In order to account for this consideration the panel nature of the SOEP dataset was taken into consideration by running a panel regression model, which is called *random effects logistic regression*. This kind of methodological procedure can also handle an unbalanced panel<sup>289</sup>, as in the case of the current analysis. The model includes the same control variables as in the last analysis and is applied *only* for workers aged 55-64. As discussed in the methodological chapter, the interpretation of the panel coefficients is based on odds ratios. In other words, the interpretation suggested by Buis (2010) is used since average marginal effects are not possible to be obtained with this method of analysis<sup>290</sup>. In this respect, the purpose of this analysis is to check if the results from the pooled analysis are obtained after running a panel regression and the *only* focus is the sign and the significance level of the coefficients.

<sup>288</sup> Again, although the results for the younger age groups are also presented, the third hypothesis refers only to the effect seen for older workers from different occupational groups.

<sup>289</sup> See Chapter 5 for more information on the panel structure.

<sup>290</sup> Mandic *et al.* (2012).

**Table 35:** Random-effects logistic regression of the likelihood to have high job satisfaction among workers aged 55-64 (Odds ratio)

<b>55-64</b>	
<b>Training Participation</b>	
No	Ref.
Yes	.5.42 (2.56)***
<b>Gender</b>	
Male	Ref.
Female	1.106 (.173)***
<b>Educational Degree (ISCED)</b>	
General Elementary	Ref.
Middle vocational	1.261 (.265)
Higher vocational	.830 (.240)
Higher education	.707 (.175)
<b>Health</b>	
Very Good	Ref.
Good	.191 (.063)***
Satisfactory	.066 (.023)***
Bad	.027 (.010)***
<b>Employment Status</b>	
Full-time	Ref.
Part-time	1.286
<b>Occupational status</b>	
Blue-collar worker	Ref.
White collar worker	1.612 (.288)**
Civil-servant worker	2.680 (.833)***
<b>Interaction Effect</b>	
Training * blue-collar	Ref.
Training * white-collar	.215 (.108)**
Training * civil-servant	.138 (.077)***
<b>Industry Sector (NACE)</b>	
Manufacturing	Ref.
Construction	1.014 (.285)
Wholesale and retail	.683 (.162)
Transport	.581 (.176)
Finance	.774 (.251)
Real estate	1.026 (.273)
Public administration	1.021 (.243)
Education	1.001 (.262)
Health and social work	.994 (.235)
Other	2.377 (1.134)
<b>Earnings</b>	1.023 (.004)***
<b>Years</b>	
2000	Ref.
2004	.864 (.116)
2008	.703 (.099)***
<b>N</b>	3342

Source: SOEP, 2000-2008, \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , standard errors in parentheses

Table 35 reports the re-estimated coefficients on table 32 using a random-effects logistic regression model. The estimations are based on 2637 respondents and 3342 observations. The results of the regression model indicate similar effects in terms of the direction and

significance level for all the control variables as in the analysis above (table 32)<sup>291</sup>. Turning to the estimated coefficient of training, a positive significant relationship is found between training and the job satisfaction of older workers. Specifically, on a 1 percent significant level, the odds for training participants to have a high job satisfaction are 5.42 times the odds for non-participants. Furthermore, the interaction effect is highly significant ( $p < 0.001$ ). As shown, the effect of training for white-collar workers is 0.215 times less the effect of training for blue-collar workers. The effect of training for civil servant workers is 0.138 times less the effect of training for blue-collar workers<sup>292</sup>. Taken together, the findings of the current analysis indicate similar effects for training and the interaction term, as found by the pooled-cross sections regression analysis<sup>293</sup>.

#### 7.4 The Training Frequency Model: Deciphering the Relation between Training and Job Satisfaction among Older Workers

The analyses conducted in the previous section indicated that the research hypotheses are true. In the following section a theoretical model is *proposed* which could be useful for understanding the research findings. Figure 16 (left) describes the proportions reporting participation in professional training courses and reported high job satisfaction among the training participants (according to table 33a), separately for each occupational group of *older* workers. This way of descriptive presentation of the findings better illustrates the nature of the relationship between training and job satisfaction for blue-collar, white-collar and civil servants. As shown, out of 6.4 percent older blue-collar workers who declared participation in professional training courses, 65 percent have reported high job satisfaction. In contrast, out of 93.5 percent non-participants blue-collar workers, only 38.4 percent have reported high job satisfaction (fig. 16 right). As for white-collar workers, out of 22.5 percent training participants, 53.5 percent have reported high job satisfaction, while only 49.1 percent of non-participant white-collar workers (77.5 percent of total) have reported high job satisfaction. Finally, out of 41.4 percent civil servant workers who declared on participation in training, only 52.7

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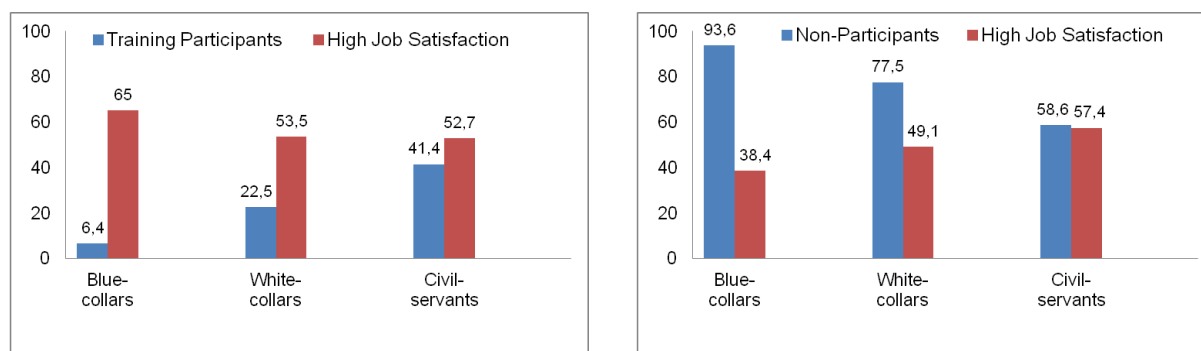
<sup>291</sup> The intra-class correlation (*rho*) tells the degree to which the observations within a person are correlated (Rodriguez, & Elo, 2003). The coefficient of 0.527 indicates a high correlation between an older worker's likelihood to report high job satisfaction in different years, after controlling for all the other independent variables.

<sup>292</sup> Comparing the results to that obtained by the pooled regression (table 41), the likelihood of older training participants to report high satisfaction is higher in the panel regression than in the pooled regression. Furthermore, bigger differences in the likelihood of blue-collar, white-collar and civil servant training participants are obtained by panel regression analysis.

<sup>293</sup> One important note is that these findings do *not* imply a *causal effect* between training and job satisfaction, but rather indicate the existent of a strong positive significant relationship. Therefore, the interpretation of the findings is taken with a lot of caution.

percent have reported high job satisfaction, while only 57.4 percent of non-participant civil servants (58.6 percent of total) have reported high job satisfaction.

*Figure 16:* The proportions reporting high job satisfaction among training participants and non-participants



*Figure 16 (left):* The proportions reporting high job satisfaction among training participants aged 55-64 separately for blue-collar, white-collar and civil servants (%)

*Figure 16 (right):* The proportions reporting high job satisfaction among non-participants aged 55-64 separately for blue-collar, white-collar and civil servants (%)

Source: SOEP, own calculations

Supported by the multivariate analyses in the previous sections and the analysis in Chapter 6<sup>294</sup>, the trend described in figure 16 indicates that older training participants belonging to an occupational group with the lowest likelihood to participate in training, namely blue-collar (see Chapter 6), are more likely to report high level of job satisfaction than training participants belonging to a group with higher likelihood of training, such as white-collar and civil servants. The Training Frequency Model below may offer an explanation for these findings.

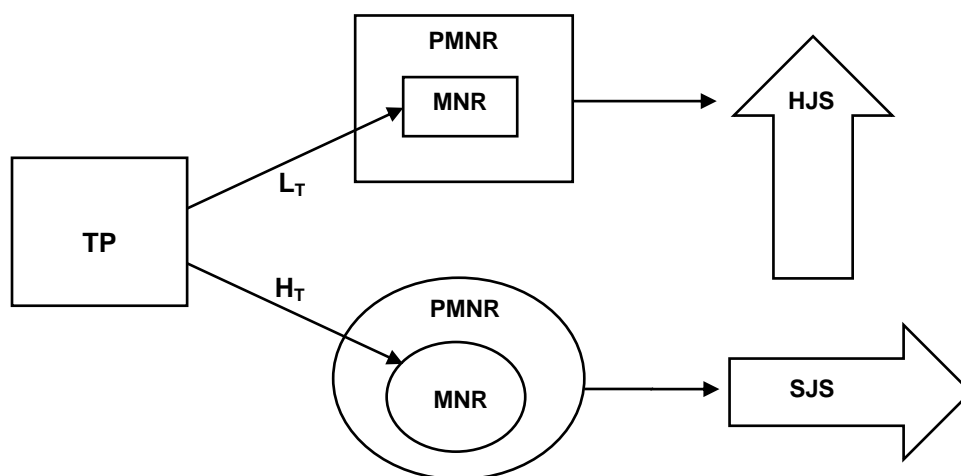
### The Training Frequency Model

According to this model (fig.17), the relationship between training and job satisfaction of older workers is mediated by monetary and non-monetary returns (MNR) to training. In this regard, the model implies an indirect effect of training on job satisfaction of older workers with different likelihood to participate in professional training courses. Training of workers belonging to a group with a low likelihood to participate in training ( $L_T$ ) leads to increased job satisfaction (HJS), while training of workers belonging to a group with high likelihood of

<sup>294</sup> The multivariate analysis in Chapter 6 indicated that blue-collar workers are the least likely to participate in professional training courses. On a descriptive level, the analysis also revealed the lowest training incidence among blue-collar older workers.

training participation ( $H_T$ ) do not raise the level of job satisfaction (SJS; the horizontal arrow implies that no effect of training on job satisfaction is expected). This implies that MNR are interpreted and perceived differently by workers, depending on their likelihood to participate in training, therefore leading to different level of job satisfaction.

Figure 17: Schematic illustration of The Training Frequency Model



Note: Training participation (TP) of workers with both low likelihood ( $L_T$ ) and high likelihood ( $H_T$ ) to participate in training, leads to monetary and non-monetary returns (MNR; e.g. higher wage and higher job security). When the likelihood is low (e.g. blue-collar job), perceived MNR (PMNR) leads to an *increase* in job satisfaction, and when the likelihood is high, PMNR do not lead to an increase in job satisfaction<sup>295</sup>

Abbreviations:

TP= Training participation

$L_T$ = Low likelihood to participate in training

$H_T$ = High likelihood to participate in training

MNR= Monetary and non-monetary returns of training

PMNR=Perceived monetary and non-monetary returns of training

HJS = High job satisfaction

SJS = Stable job satisfaction

The difference in perceived monetary and non-monetary returns of training (PMNR), as suggested by this model, lies in the frequency of training. This could be explained as follows; Different job characteristics may induce different job perceptions, which eventually affect the level of job satisfaction (Ronen & Sadan, 1984). As such, training participation, which could also be defined as “job characteristic”, may induce for example a *constant* feeling of job security, (a non-monetary return of training) when it is frequently given. On the other hand,

<sup>295</sup> The latter might also lead to a decreased level of job satisfaction, but the principle to be emphasized is that it does not lead to an increase in job satisfaction.

when rarely given, such feeling would probably not occur. As already mentioned above, this line of argument can be supported by the recent study of Lang (2012), pointing to a higher perceived job security after participation in training among older workers with *irregular* training participation than among older workers who are regularly trained. This means that workers who are less likely to participate in training may perceive the returns of training greatly when they do participate than workers who regularly receive training. The latter implies that in certain stage (e.g. higher training frequency) training might no longer be a determinant of job satisfaction. It should be noted that the TFM was designed based on the research findings in order to decipher the relationship between training and job satisfaction among *older* workers only. Nevertheless, it could be generally applied to all groups of older workers, which significantly differ by their likelihood to participate in training. This is especially relevant given the expected increase in the heterogeneity of the ageing labour force, which is assumed to result in increased share of low-satisfied older workers.

The findings of the interaction term could be explained by the Training Frequency Model (TFM), as following: The positive effect of training over job satisfaction of older workers (H<sub>2</sub>) is found only for those groups with irregular training incidence, namely blue-collar workers, while the more frequently participating workers, as white-collar workers and civil servants, have lower likelihood to be satisfied (H<sub>3</sub>). According to Lang (2012), since older workers do not participate often in training they are more concerned with their future employment. Building upon this argument, it is possible that older blue-collar workers are very concerned about their job following their low training incidence. Therefore, older blue-collar workers tend to highly perceive the returns of training. Following previous studies which have indicated that blue-collar workers are interested in both extrinsic and intrinsic aspects of their job (Berger, 1986), additional training could be perceived as a way of increasing their income or reducing job security. In contrast, older white-collar workers have better work conditions, in terms of extrinsic rewards and therefore, are more interested in gaining intrinsic rewards such as challenge and interest (Berger, 1986). As such, additional training might not be highly appreciated since they do not lack opportunities for gaining such returns and as a result, the level of job their satisfaction would not necessarily be affected. This is also true for older civil servants<sup>296</sup>, who are most likely to participate in training (Pischke, 2000; Riphahn & Trübswetter, 2007). However, as they have very good working conditions, their chances to resign or to be dismissed by their employers are much lower (Brenke & Zimmerman, 2011).

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<sup>296</sup> As already mentioned, most studies which refer to blue-collar workers, white-collar workers or civil servants, do not focus on older workers.

Accordingly, the multivariate analysis confirmed that they share the highest likelihood to be satisfied with their job, regardless of training, as expected and predicted by the model.

## 7.5 Summary

This chapter investigates the relationship between participation in professional training courses and the overall job satisfaction of older workers, while differentiating between occupational groups. The rationale behind this analysis lies in recent policy developments, aiming to raise the labour force participation of older workers in Germany. As argued in Chapter 6, the employment rate of under-represented groups of older workers e.g. blue-collar workers is also expected to increase following policy changes. While these workers are the least satisfied in their jobs and are more likely to retire earlier than white-collar workers and civil servants, their ability and willingness to be actively engaged in the labour force for longer periods should both be considered.

The findings of the current analysis support the research hypotheses. First, a highly significant positive association is found between participation in professional training courses and overall job satisfaction of workers aged 55-64, confirming the second research hypothesis (H<sub>2</sub>). This effect is found to be significantly stronger for older workers than for workers aged 45-54 and 35-44, strengthening the sub-hypothesis (Sub-H<sub>2</sub>). Second, the effect of training on the job satisfaction of older workers varies between different occupational groups. As such, blue-collar workers are more likely to report high job satisfaction when they take part in training than white-collar workers and civil servants, validating the third research hypothesis (H<sub>3</sub>). Based on the latter findings, a theoretical model, called the Training Frequency Model (TFM), was proposed to decipher the relationship between training and job satisfaction among older workers. According to this model, the frequency of training is the starting point for understanding the nature of this relationship for each occupational group of older workers. Accordingly, the positive effect of training on job satisfaction found for older workers is realized only for workers with *irregular* training incidence, namely blue-collar workers, while workers with frequent training participation, namely white-collar workers and civil servants, have a lower likelihood to gain higher job satisfaction. It is suggested that training serves as a helpful element in their personal and occupational development, hereby raising their job satisfaction level. As for the other occupational groups of older workers, training could be less effective in raising their level of job satisfaction due to the regular training participation they undergo.

The positive strong effect of training on the job satisfaction of older blue-collar workers is the most relevant and appealing finding of the current analysis. This finding may suggest a



*dual* role of training for this group. First, participation in training improves their skills and raises their employability, which is highly important for their future adaptation to the requirements of the labour force, especially in light of rapid technological changes. Second, training *seems* to contribute to their job satisfaction. The latter is highly relevant given the positive effect of job satisfaction on productivity and labour force participation (see Chapter 4). These two aspects are crucial nowadays for ensuring the economic growth of the ageing labour force and even more important for ensuring the contribution of older blue-collar workers who lack the required skills and the willingness to work longer. Improving these two aspects is of great interest for the society, because it could be beneficial for both older blue-collar workers as individuals and the ageing labour force as a whole.

## **8 Summary and Discussion: Further Training for Older Workers - A Solution for an Ageing Labour Force?**

This chapter summarizes and discusses the empirical findings obtained in the two previous chapters. An account is given to the economic implications of the research findings in terms of the projected behavior of older workers in the labour market. Furthermore, it relates to the limitations associated with this study which put into perspective some of the findings and raise the awareness about the changes needed for future research. Finally, the significance of this research for policy decisions is discussed.

### **8.1 The Training Participation of Older German Workers**

The first part of this study examined developments in the training incidence of older workers in Germany. Given the extension of employment period which has led to the exposure of an increased number of older workers to the on-going advanced changes in technology, the need for higher qualified ageing labour force has been expedited. Fulfilling this requirement is one of the conditions for achieving a successful ageing labour force capable of contributing to economic growth. As mentioned in the introductory chapter, extended employment period nowadays should raise the returns to training of older workers, thus making the training investment in older workers worthwhile. Building upon this argument, this research hypothesized that the participation of older workers in professional training courses has been increasing in recent years.

For examining developments in the participation of older workers in professional training courses, the analysis was first concentrated on changes in the age structure of the sample over time using the German Socio Economic Panel dataset (SOEP) for the years 2000, 2004 and 2008. This was aimed to identify correspondence with other German datasets, all of which pointing to a positive trend in the labour force participation of older workers, and eventually to explain part of the findings in this study. As showed in Chapter 6, the labour force participation of workers aged 55 and older was increased during the years, corresponding with other datasets. Following that, a further investigation was conducted to identify changes in the characteristics of older workers in the sample over the years. Three indicators were examined; gender, educational level and occupational group, all of which are expected to change among older workers over the years due to institutional and policy developments. This preliminary cross-sectional analysis was aimed to gain a deeper insight at

the dynamics behind the increased share of older workers in the labour force. Developments in these particular characteristics might shed light on the alterations in the training incidence of older workers. Based on the SOEP, the analysis revealed a general improvement in the labour force participation of older women and high-qualified older workers, which is in line with the findings from other German datasets. Developments in the labour force participation of workers aged 55 and older from different occupational groups were also found, with a slight increase in the share of blue-collar workers in the sample. As discussed in Chapter 6, these initial findings are highly important as they may reflect a rise in the *heterogeneity* of the ageing German labour force. As argued by this study, following recent institutional and policy developments, the participation of under-represented groups of older workers (such as women, low-skilled and blue-collar) is expected to increase, which in turn, will lead to a heterogeneous labour force. In this regard, the level of skills of such workers will gain more importance and thus they should receive intensive training.

In the second step, a descriptive investigation was conducted in order to identify developments in the training incidence of older workers. Based on the SOEP, the findings indicated that the share of workers of all age groups taking part in professional training courses was increased over the years, and in particular, among workers aged 55 and older, providing a first support for the research hypothesis. Following this observation, a similar descriptive analysis was conducted in order to identify trends in the training incidence of older workers by the three indicators used in the analysis discussed above (i.e. changes in the characteristics of older workers). The results indicated a decreased training gap between the various age groups, for both men and women, which may consequence from the strong relative growth of training among older workers compared to the younger age groups. Moreover, reduced training gap between men and women aged 55-59 was observed, which was mainly attributed to the rise in the training incidence of women of this age group, between 2004 and 2008. Improvements in the share of men and women aged 60-64 in training were also found, however the training gap remained with an advantage tends towards men. As for qualification level, the training incidence of high- and low-qualified older workers was increased meaningfully over time and resulted in reduced training gap between the various age groups. Despite a higher share of high-qualified older workers in training in all years measured, their low-qualified counterparts experienced the strongest relative growth of training between 2004 and 2008. That was resulted in reduced training gap between low and high-qualified workers aged 55-59 and 60-64. Finally, an increased training incidence was seen among older workers from all occupational groups. Of particular interest is the steady

relative increase in the share of blue-collar workers aged 55-59 which may indicate that they benefited greatly from increased investments in training over the years of the SOEP survey. Nevertheless, significant differences in the training incidence among the various occupational groups of older workers were still visible in 2008.

In the third step, I further investigated the findings obtained by the bivariate analysis using multivariate methods. Since the aim of this study is to compare the training incidence of older workers over the years, a cross-sectional method of analysis was used. Therefore, in order to model the likelihood of training, a logistic regression model was conducted separately for each survey year. As expected, older workers had the lowest likelihood to participate in professional training courses in years examined, supporting findings of previous studies. Nevertheless, examination via significant test of the differences in the participation of older workers in training over the years indicated a statistically significant increase in the training participation of workers aged 55-59 between the years 2004 and 2008. As argued in Chapter 6, changes in the age structure of the labour force may partly explain such increase. In this regard, the rise in the share of workers aged 55-59 observed in the SOEP dataset between the years 2004 and 2008, could suggest that their training participation was partly affected by such structural change. Nevertheless, using the argument suggested by Riphahn and Trübswetter (2007), a rise in the labour force participation of older workers would not have resulted in increased training probabilities if not for a *change* in employers' behavior towards their older workers. In this respect, increased time-left in the labour force as a result of institutional and policy changes should create enough time to gain the returns on training, thus raises the profitability of employers to invest in training of older workers. At the same time, the willingness of older workers to take part in professional training courses might also have changed due to extension of employment period. As pointed out in Chapter 3, older workers are often reluctant to take part in training, given a short payback period in the labour force which makes the training investment less worthwhile. Yet, as opposed to the results obtained by the descriptive analysis, the likelihood to participate in training of workers aged 60-64 was not increased over the years. This could be explained by the time left for workers of this age group in the labour force, which is relatively short, despite recent institutional and policy developments. In this regard, employers may have not found it worthwhile to invest in their training, given the expected low returns. Similarly, older employees may also find it unworthy to participate in training. Such explanation reflects the classical perspective of the human capital theory with regard to the training of older workers (Becker, 1963).

Finally, using stepwise regression procedures in each year, the effect of qualification level, occupational group and gender on the training likelihood of older workers, was separately examined. As mentioned in Chapter 6, this kind of analysis aimed to reveal the *existence* of an effect of these variables on the training probability of older workers. The results indicated that the training participation of older workers was strongly influenced by their qualification level in the surveyed years, and that the effect of qualification level changed over the years, which is in line with the findings of the bivariate analysis. More specifically, the likelihood of training of workers aged 60-64 (which is conditioned to the level of education) was less affected by the level of education in 2008 compared to 2004, which is likely to result from the increased training participation of low-qualified older workers found in the descriptive analysis. The results however for workers aged 55-59 were not significant. Similarly, the likelihood of training of workers aged 55-64 was strongly affected by occupational group; however, its effect has been decreasing over time implying reduced training gap between the occupational groups of older workers. Also, the multivariate analysis indicated that the training probability of older workers varied between men and women only in 2004. As was argued in Chapter 6, these initial findings may imply for a change in the training participation pattern of under-represented groups of older workers in the labour force which are the *least* likely to take part in training.

## **8.2 The Job Satisfaction of Older Workers and its Relation to Training**

The second topic of this research was dealing with the job satisfaction of older workers and whether it is affected by participation in professional training courses. The rationale behind the decision to study this novel topic emerged following the predicted rise in the heterogeneity of the ageing labour force due to the recent institutional and policy changes. As discussed in Chapter 7, the growing number of older workers raises questions regarding their abilities to play a central role in the development of the German labour market. Improving the level of education and increasing training participation among older cohorts should reduce some of the concerns regarding the function of an ageing labour force. However, given that numerous studies have indicated a high implementation of early retirement schemes by unsatisfied older workers (Schulte, 2005), the consequence reduced early retirement opportunities therefore means increased labour force participation of under-represented groups of older workers with low job satisfaction, as argued by this study. Considering that studies have indicated a strong association between job satisfaction and productivity level, a low-satisfied ageing labour force might be less productive one. Building upon this argument,

this study was aimed to connect between two aspects - training and job satisfaction - both are essential for ensuring a high productivity level among workers. For that purpose, two additional hypotheses were tested; the first argued that participation of older workers in professional training courses has a stronger positive effect on their overall job satisfaction than of younger workers. In addition, following assumptions concerning changes in the employment of different *occupational* groups of older workers (particularly, the participation of older blue-collar workers), a rise in the heterogeneity of the labour force is projected to occur. Accordingly, the second hypothesis argues that the effect of participation in professional training courses on job satisfaction *varies* between different occupational groups of older workers (e.g. blue-collar, white-collar and civil-servant), while blue-collar training participants having the highest job satisfaction. Consequently, training is expected to be much more prominent for older blue-collar workers than other occupational groups and therefore lead to higher overall job satisfaction in that group.

In order to investigate the relationship between participation in professional training courses and job satisfaction, the three sample years used in the first analysis were combined into three pooled cross-sectional datasets, one for each age group. As was thoroughly discussed in the methodological chapter, the main obstacle faced in this study involved sample size limitations. Focusing on occupational-based differentiation in professional training courses among older workers has yielded lower numbers of participants among blue-collar workers aged 55 and older in each survey year. This led to the construction of a pooled *cross-sectional* dataset of workers aged 55-64. For further confirmation of the findings obtained by this dataset, a longitudinal analysis was also conducted. In that way, I gained the advantage to account for changes and developments on the individual level over the examined years which cannot be observed using pooled cross-sectional strategies.

For the descriptive analysis of the relationship between training and job satisfaction, presented in Chapter 7, I first examined the overall job satisfaction of different age groups, followed by an occupational-based differentiation among older workers. The findings have indicated significant differences in the average job satisfaction of older workers from different occupational groups, with the lowest among older blue-collar workers. Such findings support the proposed future scenario stating that increased share of older blue-collar workers will negatively affect the average job satisfaction of the ageing labour force. Consequently, analysing the impact of training on the job satisfaction through an occupation-based differentiation gained more focus. Further descriptive investigation revealed a higher average of job satisfaction among older workers that participated in professional training courses than

their non-participants counterparts. That pattern was seen also for workers in the ages of 45-54 and 35-44, however, to a lesser extent, as hypothesized. Following these findings, an occupation-based differentiation was conducted. As expected, the average overall job satisfaction varied between occupational groups of older workers who participated in training. In particular, the highest average job satisfaction was found among older blue-collar training participants.

To model the likelihood of job satisfaction among workers aged 55-65 in the pooled cross-sectional dataset, a logistic regression model was used. Findings indicated a higher likelihood of job satisfaction among training participants than in non-participants, supporting the descriptive findings. A similar analysis was conducted separately in the pooled cross-sectional datasets of workers aged 45-54 and 35-44, and led to the conclusion that the strongest effect of training on job satisfaction is among older workers. Furthermore, the interaction between training participation and occupational group included in the regression model confirmed the second hypothesis, according to which the highest likelihood for job satisfaction was found for blue-collar training participants. These findings were confirmed by the longitudinal analysis conducted by a random effects logistic regression.

The findings of this study have provided the platform for hypothesizing a theoretical model called The Training Frequency Model (TFM). This model emphasizes the frequency of participation in training as the basis for deciphering the nature of the relationship between training and job satisfaction among *older* workers. The model postulates that the relationship between training and job satisfaction is governed by the monetary and non-monetary returns to training. As such, it suggests that the job satisfaction level of workers is indirectly affected by training. The analysis in Chapter 6 indicated that the lowest participation in professional training courses is among older blue-collar workers while the highest is among older civil servants. Following this observation and considering the findings in Chapter 7 (described above), training of workers with low likelihood to participate in training (blue-collar workers) led to a higher job satisfaction, while training of workers with high likelihood of training (civil servants) did not affect the level of job satisfaction. This implies that monetary and non-monetary returns (MNR) are interpreted and perceived differently by workers, depending on their likelihood to participate in training, therefore leading to different level of job satisfaction.

The suggested correlation between the frequency of training and different perceptions of MNR relies on studies which have indicated on differences in workers' perceptions of their job, due to various job characteristics, which eventually lead to varied levels of job

satisfaction. In this regard, training could also be regarded as “job characteristic” and as such, they may be positively perceived when frequently given (i.e. leading to the feeling of job security). Following this argument, returns to training are more appreciated by workers with less likelihood to participate than workers who routinely receive training. Accordingly, older blue-collar workers may highly appreciate the potential contribution of training for their job (MNR) as they rarely participate; therefore have a very high job satisfaction. In contrast, older civil servants or white-collar workers which constantly participate in training may be less depended on such returns and therefore their job satisfaction was not affected by training.

### **8.3 The Implications and Limitations of the Current Study**

The positive trend found in the training incidence of older workers by the SOEP dataset is a novel development which reflects a change in training participation pattern. Supported by previous studies, the well-established perception of the Human Capital Theory in which older workers are the least likely to participate in training due to low returns, seems less relevant in an era of a growing ageing labour force. Becoming a meaningful segment of the labour force, raising investments in the human capital of older workers is therefore *inevitable*. Furthermore, the projected rise in the heterogeneity of the ageing labour force, as assumed by this study, might alter patterns of training participation of older workers even to a greater extent. In other words, increased employment rate of under-represented groups of older workers, due to reduced opportunities for early retirement, should raise the importance of investing in their human capital. Based on studies which point to a strong correlation between low skills and early retirement, investing in human capital is even more crucial as these workers, on average, are less skilled and therefore are also the least likely to participate in training. As discussed in the introduction, encouraging employers to promote older workers is challenging, especially when it concerns to under-represented groups of older workers i.e. blue-collar workers. The preliminary findings of this study, according to which a positive trend was also found in the training participation levels of under-represented groups of older workers such as women, low-skilled and blue-collars (at least in the descriptive level), may imply on a growing awareness of employers towards the importance of increasing the skills of these workers as well.

As discussed in Chapter 3, increased training participation of older workers should improve their productivity level. Considering the rapid changes in technology, having flexible workers who are able to cope with competitiveness in the labour market is a key factor for ensuring successful economic growth. Furthermore, higher training incidence will raise the



chances of older workers to be properly integrated into the labour force through improved employability. Since low skills reduce the likelihood of older workers to stay employed (Dietz & Walwei, 2011), engaging in further training might raise their chances to prolong their employment or to find new jobs (Dietz & Walwei, 2011). This is especially relevant for low-skilled and industrial older workers, while the latter might be strongly affected also by the shift from industrial to a service economy. The rising skill demands emerging from the transition to services accelerate the demands for human capital investments, especially among these workers. Finally, increased training will have preventive effects as it fosters a healthier behaviour, increases well-being and promotes political and social engagements (Tippelt, 2010).

The findings of the second analysis suggested an additional *role* for training. Apart from its various contributions mentioned above, it has a positive impact on job satisfaction. Focusing on older workers, this finding implies that companies could benefit greatly from investing in the training of older workers. As discussed in Chapter 7, high job satisfaction may have two important implications on the behavior of older workers. The first is a positive effect on productivity (Clark, 1996; Gazioglu & Tansel, 2002) which is especially relevant for blue-collar older workers who have, on average, the lowest job satisfaction as shown by this study. Since that, improving their skills through additional training should increase their job satisfaction and thus, might lead to enhanced productivity of these workers.

Another important implication of job satisfaction relates to its positive effect on the decision of employees to prolong their employment (Clark *et al.* 1998; Gazioglu & Tansel, 2002). This suggests that raising the labour force participation of older workers through the limitations obtained by the new regulations of retirement exit, may not be enough as low satisfied workers would keep on looking for breaches in order to retire early. Following this, a satisfied ageing labour force will therefore be motivated to work longer, which is highly important nowadays. Accordingly, raising the job satisfaction of older blue-collar workers through training will also reduce their willingness to retire early. Finally, as argued in the literature chapter, higher level of job satisfaction is associated with lower costs (Mirvis & Lawler, 1977) which in turn, could push the firms to recognize the profitability associated with satisfied workers.

Several important limitations have been associated with this study most of which are the result of sample size and questionnaire design. The first concerns the time frame of this study, which was determined by the frequency of the training question. Since this question was not available in the SOEP questionnaire beyond the year of 2008, at least not in the same

form, the two analyses were limited up to this time point. In this respect, given the relevancy of this topic, in terms of expected rise in the training incidence of older workers, information on participation in professional training courses in the SOEP would be useful for further research.

Second, this study relies on an occupational-based differentiation in both analyses in order to deliver two important messages concerning the implications of increased heterogeneity in the ageing labour force. Yet, such differentiation (blue-collar workers, white-collar workers and civil servants) could have been conducted differently if not for sample size limitations. In other words, differentiating between several types of blue-collar older workers, for example, would have supplied with additional information about variations in training participation (first analysis) as well as on job satisfaction among training participants (second analysis). This however was not possible as a result of low number of older training participants. The latter also determined the way in which training was operationalized. As was thoroughly discussed in Chapter 5, a much comprehensive definition of training should be considered as the research did not relate to different types of training, as often done. Taken together, such limitations require the enlargement of the sample of older training participants in the SOEP dataset.

Third, the current study focused on *overall* job satisfaction. As such, it is based on similar perceptions of job satisfaction facets. However, studies emphasize the importance of looking at the relation between several job facets and level of job satisfaction. Although this could yield more essential information regarding the link between training and job satisfaction of older workers, such data is not available by the SOEP dataset which supply information on overall job satisfaction only. Accordingly, since the job satisfaction of older workers will gain more importance in the near future, as suggested by this study, referring to job satisfaction facets by the SOEP would greatly promote the research in the field.

#### **8.4 Future Policy Aspects**

The findings of this study imply that policy change has indirectly raised the training incidence of workers aged 55-59 in recent years, however not of workers aged 60-64. This may indicate that so far, such policies have not been successful enough in changing the behaviour of both employers and older employees towards investing in training. This should encourage policy makers to promote training, especially among these workers. This is highly important since this age group will soon be extend when the cohort of workers aged 55-59 will get older and their employment period will become longer due to the stepwise rise in the official retirement

age (to 67). Although the latter should in theory encourage higher investments in training due to the expected higher returns to training, as argued by the human capital theory (Becker, 1975), in practice, it might not be simple. As discussed in Chapter 3, the training participation of older workers is determined mainly by the attitudes and perceptions of employers towards their abilities (Tippelt, 2010). Therefore, policy should also be targeted at changing the negative perceptions of employers towards their *oldest* employees in order to ensure that their skills will be enhanced.

Owing to the novel topic of a heterogeneous ageing labour force, this research illustrates two important developments which policy makers should consider. The first, concerns the training participation of under-represented groups of older workers which, according to the *initial* findings of this study, was increased. Although these findings should be carefully interpreted due to its descriptive characteristic and the associated limitations mentioned above (section 8.3), they offer novel point of view that policy makers should consider. This is highly relevant considering the reduced option for early retirement which should raise the share of such groups in the labour force in the near future. Accordingly, policy should first, encourage a further research on the training participation of under-represented groups of older workers and second, act towards enhancing the skills of these workers as well in order to improve their employment chances. The second development regards the expected increase in the labour force participation of less-satisfied older workers. As argued in the introduction, the lack of public debate of job satisfaction in the context of an ageing labour force in Germany implies that job satisfaction is not considered an important component among policy makers. Therefore, raising the awareness of such topic may create additional alternatives which could be promoted by policy makers. Yet, the positive effect of training on job satisfaction of particularly older blue-collar workers, should supply policy makers with novel ideas regarding the way in which training could be promoted and utilized. Finally, the growing heterogeneous ageing labour force also implies on having various groups of older workers with different needs in the near future. Accordingly, when aiming to raise the training participation of *all* older workers, the various needs must be thoroughly considered by policy makers.

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## Supplements

*Table 1:* The incidence of training courses by occupation and age group (%)

	35-44	45-54	55-64
Blue-Collar Workers	12.93 (270)	10.71 (195)	8,55 (60)
White-Collar Workers	74.33 (1552)	67.33 (1,226)	60.40 (424)
Civil-Servants	12.74 (266)	21.97 (400)	31.05 (218)
Total	100 (2088)	100 (1,821)	100 (702)

Note: Absolute numbers of training participants in parentheses. This data refer to the second analysis.  
Source: SOEP, 2000-2008, own calculations

*Table 2a:* The percentage of women in part-time work by educational degree and age group in 2000

Qualification level	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
General elementary	17.24	14	20.99	10.77	30.51	35.29
Middle vocational	59.77	60	53.09	72.31	50.85	58.82
Higher vocational	13.79	11	6.17	6.15	5.08	5.88
Higher education	9.20	15	19.75	10.77	13.56	0
	100	100	100	100	100	100

Source: SOEP, own calculations

*Table 2b:* The percentage of women in part-time work by educational degree by age group in 2004

Qualification level	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
General elementary	10.47	12.44	16.59	11.51	14.95	17.74
Middle vocational	63.37	62.69	59.51	58.99	54.21	45.16
Higher vocational	10.47	6.74	7.32	7.19	8.41	6.45
Higher education	15.70	18.13	16.59	22.30	22.43	30.65
	100	100	100	100	100	100

Source: SOEP, own calculations

*Table 2c:* The percentage of women in part-time work by educational degree by age group in 2008

Qualification level	Age group					
	35-39	40-44	45-49	50-54	55-59	60-64
General elementary	13.14	10.28	11.73	12.50	12.38	11.94
Middle vocational	57.66	61.68	59.18	56.55	60.95	52.24
Higher vocational	11.66	12.15	8.67	7.74	6.67	8.96
Higher education	17.52	15.89	20.41	23.21	20	26.87
	100	100	100	100	100	100

Source: SOEP, own calculations

*Table 3:* The incidence of professional training courses by age group and year (%)

	2000	2004	2008
35-39	23.03 (196)	26.48 (336)	29.63 (288)
40-44	25.71 (209)	26.57 (367)	31.99 (413)
45-49	23.98 (165)	26.78 (362)	28.14 (367)
50-54	22.18 (130)	23.91 (264)	29.09 (334)
55-59	14.32 (68)	19.90 (166)	27.68 (253)
60-64	12.79 (28)	15.34 (73)	18.30 (82)

Source: SOEP, own calculations, absolutes number in parentheses

*Table 4:* Chi-square test of independence for training and each one of the independent Variables

	2000	2004	2008
Gender	Not significant	$X^2(1)=5.28$ $p<.05$	Not significant
Educational Degree	$X^2(3)=170.90$ $p<.001$	$X^2(3)=256.17$ $p<.001$	$X^2(3)=275.10$ $p<.001$
Employment Status	Not significant	$X^2(1)=16.64$ $p<.001$	$X^2(1)=13.31$ $p<.001$
Occupational Status	$X^2(2)=288.11$ $p<.001$	$X^2(2)=374.45$ $p<.001$	$X^2(2)=403.72$ $p<.001$
Sector of Industry	$X^2(6)=135.45$ $p<.001$	$X^2(6)=188.04$ $p<.001$	$X^2(6)=166.08$ $p<.001$
Size of the Firm	$X^2(2)=61.46$ $p<.001$	$X^2(2)=63.20$ $p<.001$	$X^2(2)=67.14$ $p<.001$
Work Duration	$X^2(1)=10.05$ $p<.01$	$X^2(1)=8.16$ $p<.01$	$X^2(1)=9.76$ $p<.01$

Source: SOEP, own calculations, degrees of freedom in brackets

*Table 5a:* The incidence of professional training courses among full-time workers by age group and year, separately for men and women (%)

Age Group	Women			Men		
	2000	2004	2008	2000	2004	2008
35-39	25.75	25.62	34.01	21.97	29.13	30.51
40-44	26.05	27.34	33.68	27.07	26.17	33.19
45-49	28.03	28.34	35.90	22.89	27.79	24.48
50-54	20.20	25	31.50	23.90	25.81	27.50
55-59	17.99	15.08	32.23	11.76	24.79	28.02
60-64	14.29	21.14	16.98	14.29	13.50	20.60

Source: SOEP, own calculations

*Table 5b:* The incidence of professional training courses among part-time workers by age group and year, separately for men and women (%)

Age Group	Women			Men		
	2000	2004	2008	2000	2004	2008
35-39	21.84	17.44	16.79	33.33	23.08	30
40-44	18	25.91	25.70	40	36.36	23.08
45-49	17.28	20.49	23.98	0	12.50	22.22
50-54	16.92	14.39	29.76	60	0	11.11
55-59	15.25	11.21	14.29	40	0	16.67
60-64	0	11.29	10.45	0	17.65	25

Source: SOEP, own calculations

*Table 6:* The proportions of workers reporting high job satisfaction by several indicators, separately by age group (%)

	35-44	45-54	55-64
<b>Training Participation</b>			
No	47.12	46.34	46.55
Yes	51.27	48.54	54.27
<b>Gender</b>			
Male	49.24	46.44	49.43
Female	48.45	47.47	46.29
<b>Educational Degree (ISCED)</b>			
General Elementary	43.36	44.07	41.75
Middle vocational	48.23	46.27	47.80
Higher vocational	49.41	45.19	46.55
Higher education	52.39	49.77	51.34
<b>Health</b>			
Very Good	71.88	76.20	82.10
Good	54.77	55.98	60
Satisfactory	36.23	37.43	41.44
Bad	28.51	27.42	28.26

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<b>Employment Status</b>			
Full-time	48.68	46.41	48.55
Part-time	50.08	50.11	45.72
<b>Occupational Group</b>			
Blue-collar worker	43.62	40.64	40.13
White collar worker	51.59	48.63	50.11
Civil-servant worker	51.36	55.10	55.51
<b>Industry Sector (NACE)</b>			
Manufacturing	49.98	45.45	47.34
Construction	48.26	42.89	46.11
Wholesale and retail	47.01	41.51	40.42
Transport	45.68	41.65	40.94
Finance	44.88	51.75	50.35
Real estate	52.33	44.15	50.86
Public administration	49.86	51	51.97
Education	56.51	55.06	52.09
Health and social work	48.54	47.31	45.53
Other	45.87	50	60.40
<b>Years</b>			
2000	50.29	51.47	49.51
2004	48.98	45.74	49.42
2008	48.32	43.72	45.82

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Source: SOEP, own calculations

*Figure 1:* Formula of a t-test

$$\frac{(b1 - b2)}{\sqrt{(se\ b1^2 + se\ b2^2)}}$$

Notes: This formula was used for examining if differences in observed changes in the training probability of older workers over the years are significant.

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## List of Abbreviations

AARP	American Association of Retired Persons
ADEA	Age Discrimination in Employment Act
BMBF	Bundesministerium für Bildung und Forschung
BSW	Berichtssystem Weiterbildung
DRV	Deutsche Rentenversicherung
EC	European Commission
ECHP	European Community Household Panel
EPL	Employment Protection Legislation
EU	European Union
GRV	Gesetzliche Rentenversicherung
IAB	Institut für Arbeitsmarkt- und Berufsforschung der Bundesagentur für Arbeit
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
IW	Institut der deutschen Wirtschaft Köln
JCM	Job Characteristics Model
LFS	Labour Force Survey
OECD	Organisation for Economic Cooperation and Development
PADA	Protection Against Dismissal Act
SOEP	Socio-Economic Panel
UC	Unemployment Compensation

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## Appendix

### Zusammenfassung

Aufgrund von arbeitsmarktpolitischen Reformen hat sich in Deutschland die Erwerbsbeteiligung älterer Beschäftigter erhöht. Angesichts eines möglichen Erhalts des Qualifikationsniveaus, der Beschäftigungsfähigkeit und des wirtschaftlichen Potentials älterer Arbeitnehmer muss der beruflichen Weiterbildung zunehmend Bedeutung beigemessen werden.

Darüber hinaus scheint die Notwendigkeit einer verlängerten Lebensarbeitszeit mit einem Anstieg von jenen älteren Erwerbstätigen einherzugehen, die nur eine *geringe* Arbeitszufriedenheit aufweisen und infolgedessen wesentlich häufiger dazu neigen, Frühverrentungsoptionen in Anspruch zu nehmen. Da empirischen Studien zufolge ein enger Zusammenhang zwischen der Arbeitszufriedenheit und dem individuellen Arbeitsmarktverhalten besteht, sollten in der Arbeitsmarktforschung die Einflussfaktoren auf die Arbeitszufriedenheit älterer Beschäftigter, wie es beispielsweise die Weiterbildungsbeteiligung sein könnte, stärker berücksichtigt und analysiert werden.

Dementsprechend setzt sich die vorliegende Studie mit folgenden Forschungsfragen auseinander. Erstens soll allgemein untersucht werden, ob in den letzten Jahren ein Anstieg der beruflichen Weiterbildungsbeteiligung älterer Beschäftigter festgestellt werden kann. Zweitens wird analysiert, welchen Einfluss die Weiterbildungsbeteiligung auf deren Arbeitszufriedenheit hat und welche Unterschiede hierbei zwischen der beruflichen Stellung älterer Arbeitnehmer ausgemacht werden können. Zur Bearbeitung dieser zwei Forschungsfragen werden die Daten des Sozioökonomischen Panels (SOEP) der Jahre 2000, 2004 und 2008 ausgewertet. Zunächst wird in einer Querschnitt-Trendanalyse geprüft und nachgezeichnet, wie sich die Weiterbildungsbeteiligung von Arbeitnehmern im Alter von 55 bis 64 Jahren entwickelt hat. Anschließend wird der Zusammenhang zwischen Weiterbildungsbeteiligung und Arbeitszufriedenheit älterer Beschäftigter im Quer- und Längsschnitt untersucht, wofür sowohl ein gepoolter Datensatz als auch das Paneldesign des SOEP genutzt wird.

Zum einen deuten die Ergebnisse der empirischen Analysen darauf hin, dass sich die Weiterbildungsbeteiligung älterer Beschäftigter im Zeitverlauf erhöht hat. Dieser stetige Trend zeigt, dass betriebliche Investitionen in das Humankapital älterer Arbeitnehmer als wachsendes Beschäftigungssegment auf dem Arbeitsmarkt zunehmend wichtiger werden.

Zum anderen wurde ein positiver Zusammenhang zwischen der Weiterbildungsbeteiligung und der Arbeitszufriedenheit von älteren Erwerbstätigen und insbesondere von gewerblichen Arbeitern gefunden. Unter Berücksichtigung ökonomischer Implikationen, die mit der durch Weiterbildung erhöhten Arbeitszufriedenheit älterer Beschäftigter verbunden sind, könnten aus diesem Befund entsprechende bildungs- und arbeitsmarktpolitische Maßnahmen abgeleitet werden.

## Abstract

The participation of older workers in the German labour force has increased in the recent decade mainly due to institutional and policy developments. This raises the importance of maintaining the skill level of older workers through further training as a mean to strengthen their contribution to economic growth. Furthermore, the requirement of longer employment may also raise the rate of under-represented groups of older workers with low job-satisfaction since unsatisfied workers often tend to exploit early retirement schemes. Building upon studies pointing to a strong association between job satisfaction and labour market behavior, it is therefore essential to examine also the means by which the job satisfaction of these workers can be improved. One such way is by associating between the rates of training to the level of job satisfaction.

Accordingly, this research deals with two major questions: The first is whether we recognize an increase in the training participation of older workers over the years, whereas the second, is whether the overall job satisfaction of older workers is affected by participation in training, and in particular, by an occupational-based manner.

Using data from the German Socio-Economic Panel (SOEP) for the years 2000, 2004 and 2008, a trend analysis is performed in order to identify developments in the training participation of workers aged 55-64 over the years, followed by a pooled cross-sectional and longitudinal analysis in order to explore the relationship between training and job satisfaction of older workers.

Accordingly, the main findings of this research indicate, first, an increase of training participation of workers aged 55-59 over the years, and second, a positive relation between job satisfaction and training of older workers, particularly of blue-collar workers.

The positive trend found in the training participation of older workers is a novel development which reflects a change in the training participation pattern. As older workers become a meaningful segment of the labour force, raising investments in their human capital is therefore inevitable. Furthermore, having high job-satisfied older (blue-collar) workers achieved through additional training may have considerable economic implications.

## **Lebenslauf**

Der Lebenslauf ist in der Online-Version aus Gründen des Datenschutzes nicht enthalten.



## **Statistiksoftware**

Für die Analyse der SOEP Daten wurde Stata 11 verwendet. Alle Analysen wurden eigenständig durchgeführt.

## **Erklärung**

Hiermit versichere ich, die Dissertationsarbeit „Further Training for Older Workers: A Solution for an Ageing Labour Force?“ selbstständig angefertigt zu haben. Sämtliche Hilfsmittel, die ich verwendet habe, sind angegeben. Die Dissertation ist in keinem früheren Promotionsverfahren angenommen oder abgelehnt worden.

Berlin im Juli 2014