

# Training Access and Retirement Expectations

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## Abstract

This paper investigates whether training access of firms can be successful in stimulating their employees to postpone their retirement to a later age. For this purpose, we use unique matched employer-employee surveys for the Dutch public sector that include detailed information on a wide range of HR-practices applied by employers, as well as individual's expected retirement age. We find that organizations' training policies, as reported by the employers, are significantly positively related to their employees' expected retirement age, even when we control for the actual training participation of individual employees. We test several alternative explanations for this positive relationship, and show that it is driven by employees' positive reciprocal inclinations, indicating that the provision of training may be used as a tool for motivating older employees. We furthermore perform several robustness analyses which indicate that the relationship between training policies and expected retirement behavior is unlikely to be driven by reverse causality, self-selection, or the presence of other organizational characteristics.

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## **1. Introduction**

Population ageing will tend to lower labor-force participation in the majority of industrialized countries in the next decades, while skill-biased technical change and the profound global shifts in production processes enhance the role of human capital as a major determinant of firm competitiveness and economic growth (see, e.g., Katz and Autor, 1999). These major trends provide a major challenge for the ability of employers to manage the human capital in their organizations, and will increase the urgency to encourage employees to remain employable. The increasing focus on employability requires a strengthened emphasis of employees to maintain their physical and mental health, commitment to work, and competencies during their life cycle. This especially holds for older generations of employees whose pension rights are strongly retrenched due to major recent pension reforms in the majority of industrialized countries, and therefore have continue working to a later age (see e.g. De Grip et al. (2013) for an overview). Although employees are generally expected to be responsible for their own employability, it is likely that their employer can benefit from facilitating this, by e.g. providing adequate HR-tools that are directly targeted at retaining competencies and productivity. This raises the question which HR-practices can facilitate employees' changing retirement preferences, and may stimulate employees to continue working in a productive way.

Human capital theory predicts that human capital investments in older employees, that provide them with necessary updates of their skills and competencies, can be a useful instrument to delay retirement (Becker, 1962). Several empirical studies found that training participation is instrumental in compensating skills depreciation and maintaining employability (Bishop, 1997; Groot and Maassen van den Brink, 2000; De Grip and Van Loo, 2002; Picchio and Van Ours, 2013). Moreover, numerous empirical studies have shown that training participation stimulates productivity (Bartel, 1994; Barret and O'Connel, 2001; Conti, 2005; Zwick, 2006), while other studies found a positive effect of training

on productivity, as well as wages (Bartel, 1995; Dearden et al., 2006; Fersterer et al. 2008; Konings and Vanormelingen, 2009).<sup>2, 3</sup>

There are only a few empirical studies, however, that have directly analysed the relationship between training and retirement (e.g., Herrbach et al., 2009; Stenberg et al., 2012; Picchio and Van Ours, 2013). These studies found mixed results, which is partly due to the focus on different training types, and the fact that they deal differently with the potential endogeneity of the actual training participation of individual employees. Stenberg et al. (2012) used Swedish transcript data and propensity matching techniques to examine the effects of participation in external adult education on employees' retirement age, and found no relationship. Picchio and Van Ours (2013) used data from the European Community Household Survey for the Netherlands and a discrete response unobserved effects panel data model to disentangle the effects of training incidence on the employability of older employees from the spurious effects caused by unobserved individual heterogeneity. Contrary to Stenberg et al. (2012), they found that firm-provided training significantly increases the future employment prospects of older workers, and conclude that training can be an important instrument to retain older workers. A commonality of these studies, however, is that they exclusively measure the effects of actual training participation of individual employees on their retirement behavior. The

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<sup>2</sup> However, human capital theory also predicts that employers have less incentives to invest in older employees, because the period in which the benefits of training can be reaped decreases with age (Ben Porath, 1967; Neumann and Weis, 1995). Older workers may also endure higher psychological costs of training due to a lower capacity to learn new skills. These lower investments in human capital can therefore decrease employees' retirement age (Green, 1993).

<sup>3</sup> De Grip and Loo (2002) and Bassanini et al. (2005) show that training incidence decreases with age. This is partially due to the fact that the period in which employers and employees can reap the benefits of human capital investments is shorter for older employees. This is indirectly confirmed by Fouarge and Schils (2009) and Bassanini et al. (2005) who investigated the relationship between the generosity and flexibility of pension systems and the training participation of older workers across different European countries. Both studies found that the training participation of older workers is lower in countries with more generous early pension systems. Montizaan et al. (2010), however, also showed that the retrenchment of pension rights, due to pension reforms in the Netherlands, lead to a higher training participation among older workers, although exclusively for those who are employed in large organizations.

results of these respective studies therefore do not provide insight into the relationship between organizational training access and retirement preferences, in particular for the employees who did not yet participate in training. An important exception is the study of Herrbach et al. (2009) who used survey data on the availability of particular types of training from a sample of late-career managers to estimate the effect of training availability on the timing of retirement. Consistent with the results of Picchio and Van Ours (2013), they found that training access significantly increases the retirement age. However, their training measure is based on a survey question which asks managers in their late-career to rate the availability of training opportunities adapted to their present needs, implying that this measure may still be confounded by present individual employee skill needs. In case managers report to have no training opportunities that are relevant to their current needs, it is impossible to determine whether there are no training opportunities that meet their (future) skill demands, or whether they do not have any training needs.

In this study, we investigate whether training access in organizations, as reported by employers, is related to the expected retirement age of their employees. In contrast to the above cited literature, we draw on new representative matched employer-employee data which include employer provided measures on the provision of training opportunities in organizations that are unconfounded by individual skill needs. We build on two linked employer-employee surveys conducted in April 2012 in the Dutch public and privatized sector.<sup>4</sup> The employer survey is specifically designed to collect detailed information on organizations' HR-practices targeted at older workers, and includes several measures of the extent to which the employer stimulates training investments.<sup>5</sup> The employee survey elicits individual's expected age at retirement, and contains several questions on the willingness to train, as well as the actual training participation, and the type of training employees

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<sup>4</sup> Although the dataset, because of its cross-sectional nature, does not allow us to fully control for biases due to unobserved heterogeneity on the individual level, the use of linked data at least reduces the likelihood of reverse causality in the relationship between training policies and the expected retirement. It is unlikely that retirement preferences of individual employees will affect the presence of training policies within their organization.

<sup>5</sup> Note that this captures a characteristic of the firm, and does not necessarily mean that workers in the firm actually participate in training.

participated in. Furthermore, the employee survey includes detailed questions on employees' job tasks and personality traits.

Our empirical results show that employees of organizations with a more extensive training policy expect to retire at a significantly higher age. A one standard deviation increase in the provision of training access is associated with an approximately 1.1 to 3.0 months higher expected retirement age. When we compare the size of this correlation to the impact of major pension reforms on the expected retirement age, it becomes clear that it is of great economic importance. For example, De Grip et al (2013) found that an announced increase in the Dutch statutory retirement age with one year increased the expected retirement age by only 3.9 months. Robustness analyses further indicate that the relationship between training access and expected retirement behaviour is unlikely to be driven by reverse causality, self-selection, or the presence of other organizations characteristics.

This study goes beyond the existing literature in several ways. First, we complement previous retirement studies by integrating unique employee and employer data on employers' training access and employee retirement expectations into one framework, instead of analysing the effects of actual training participation on retirement behaviour. Second, our indicator of the extent to which training investments are stimulated by employers is based on answers to questions in the employer survey, which are less likely to be confounded by employee characteristics and individual skill needs than in the previous studies. Third, the richness of our data allows us to show that our findings are robust to alternative model specifications (such as the inclusion of firm-specific random effects), as well as the inclusion of additional control variables to capture the impact of potential self-selection of highly motivated workers into organizations with ample training facilities, differences in productivity growth, differences in the financial conditions of firms, and the role of other HR-practices in training firms.

Moreover, our study pushes the analysis of the relationship between training access and retirement behavior one step further by giving more insight in the mechanisms that drive the positive correlation between training access and the individual expected retirement age. We first consider whether firm's training access stimulate later retirement through elevated wage levels due to a better general maintenance of human capital within firms which provide training access to all older

employees, and then consider whether the relationship between training access and retirement expectations remains after we control for actual individual training participation. In accordance with our expectations, we find that employees in organizations with full developed training access indeed more often participate in training, and expect to retire slightly later. However, our results also show that the positive relationship between training access and the expected retirement age remains when we control for workers' actual wage and training participation. This indicates that access to training may have positive effects on the timing of retirement, even if employees do not actually participate in training or have elevated wage levels due to past investments in their human capital.

We show, however, that the remaining relationship between training access and the expected retirement age is driven by employees' positively reciprocal inclinations. Hereby, we contribute to the growing literature that predicts that reciprocity is a key driver of human motivation and labor market outcomes (Bowles, 2008; Akerlof, 1982). Numerous empirical studies have used a gift-exchange framework to stress the importance of reciprocity, and found that positively reciprocal employees increase their efforts above the required level when treated generously (in most studies realized by a higher wage payment) by their employers (e.g., Fehr et al., 1993; Fehr et al., 1998; Cohn et al., 2009; Brown et al., 2004; Bellemare and Shearer, 2009; Kube et al., 2012). The role of reciprocal behavior of employees in return to human capital investments of their employer, however, is a relatively unexplored topic. A notable exception is the study of Leuven et al. (2005) who applied a gift-exchange framework to explain why employers are willing to provide both firm-specific and general training to their employees. Their argument is similar to that of the efficiency-wage literature, which predicts that higher effort levels can be achieved when employers pay wages above the market-clearing wage (Akerlof, 1982). Training will improve employees' individual knowledge, skills, and productivity, and when their employers are willing to offer opportunities and to pay for general and firm-specific training, employees may perceive this offer as a kindness to which they positively reciprocate the kind behaviour of their employer by providing higher efforts, a higher level of commitment, or by postponing retirement. After all, it is likely that perceived kindness of employers is positively related to job satisfaction and engagement. Our finding therefore shows that the provision of training access

does not only improve the skills and productivity of employees, but may also have major positive behavioural consequences on the willingness to continue working.

The remainder of the paper is organized as follows. Section 2 describes the data collection, provides descriptive statistics, and information on the representativeness of the estimation sample. Section 3 presents the results and Section 4 concludes.

## **2. Data**

### **2.1 Data description**

We use matched employer-employee survey data of Dutch public and privatized sector (the *ROA Public Sector Survey 2012*) collected in April 2012 to examine the relationship between the provision of organizational training access reported by employers and the expected retirement age of their employees. The survey data are matched to administrative data from the Dutch pension fund for public sector employees (ABP) and contain information on the number of contribution years to the pension fund, the number of working hours, and the specific sector in which the respondents are employed: public administration, education sector, or privatized organizations (such as public transport companies and exploration companies of oil and gas).

The employee survey data were collected in two stages. In the first stage, a representative randomly selected sample of 57,350 public sector employees who were born between 1946 and 1975 were approached by the pension fund by regular post. They were asked to provide their e-mail address. In the second stage, in the first week of April 2012, we sent an e-mail containing the link to our web-based survey to the 12,600 employees who had provided their e-mail address. This employee survey contained detailed questions on retirement expectations, alternative sources of income after retirement, personality and job characteristics. The sample of respondents working in the public sector who completed the questionnaire consists of 6,179 individuals.

For the employer survey, we sent an e-mail in April 2012 to all 2,500 employers in the public sector with a link to the web-based survey. This employer survey included detailed questions on

training and HR-practices. The e-mail addresses were provided by ABP which has detailed contact information of each employer due to its role as the public sector's pension fund. The e-mail addresses belong to HR-advisors, HR-managers, and managing directors who are responsible for the HR-policies and all retirement related issues within their organization. The survey was answered by 783 employers.

We were able to match the employee survey data to the administrative data of the pension fund through the use of an employee specific identifier, and subsequently matched this combined dataset to the employer survey data through an employer specific identifier which was available in both datasets. In total, we were able to match the survey data of 1,337 employees to the answers of approximately 363 employers. Due to some additional item non-response to the questions that are relevant for our analyses, we will base our analyses on the answers of 845 employees which are matched to the answers of 284 employers. We discuss the representativeness of the data in Section 2.2.

Our main interest lies in investigating how employee's retirement expectations are related to the training access provided by their employer. The role of expectation formation is crucial for savings and investment decisions related to retirement. Moreover, based on the results of earlier studies that have used survey questions to directly measure expectations, we are confident that this measure may be a good predictor for individual retirement preferences and actual retirement behavior (Keane and Runkle, 1990; Das et al., 1999; Dominitz, 2001; Stephens Jr., 2004; Hurd, 2009).<sup>6</sup> Retirement expectations are measured by the question "*When do you expect to retire?*" to which respondents could reply in full years.<sup>7</sup>

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<sup>6</sup> Only a small number of studies have focused on retirement and pension expectations. These studies show that expectations are strongly related to retirement decisions, but also provide mixed evidence on rationality of the expectations on the timing of retirement and the pension benefit (Duflo and Saez, 2003; Benitez-Silva and Dwyer, 2005; Chan and Stevens, 2008; Alessie et al., 2011; Liebman and Luttmer, 2011; Van Rooij et al., 2011, 2012). Montizaan et al. (2010) provide evidence for that Dutch public sector employees, however, are well informed about their pension rights and the implications of the changes in the pension system in the past decades for their pension benefits and timing of their retirement.

<sup>7</sup> To our knowledge, there exists no dataset that provides information on training access, actual training behavior, as well as actual retirement behavior.



Our measure of organizational training access is derived from a factor analysis on employers' answers to a set of 17 questions on HR-policies focused on older workers. The question was phrased as *"To what extent does your organization apply the following HR-instruments that are specifically targeted towards older employees?"* Employees could give their answers on a five-point Likert scale ranging from 1 *"Not applied to any older employee"* to 5 *"Applied to all older employees"*.<sup>8</sup> The factor analysis shows that, based on these questions, we can identify five factors related to the following HR-policies: 1) *Training access*; 2) *Task adaptation*; 3) *Financial incentives*; 4) *Working hours policies* and 5) *Retirement policies*.<sup>9</sup> Subsequently, we have standardized the value of the factor measuring the extent to which the employer applies a training policy. This will be the key explanatory variable in our analyses, as well as the standardized values of the other HR-policies that will serve as control variables measuring the impact of additional HR-policies targeted towards older employees.

In addition to the questions on organizational training access and individual retirement expectations, we gathered detailed information in the employee survey on willingness to train, actual individual training participation, personal and personality traits, and the main job tasks and job engagement of employees, which we use as control variables in our analyses. Four training variables are available; one to measure the incidence of training, one to measure the number of training courses in which an employee participated, and two to measure whether the last training course in which employees participated generated general or firm-specific skills, and whether the employer initiated this training.

The first two variables are based on the following survey questions: *"Did you participate in the past year or are you currently participating in a training course? Please disregard hobby training courses."* and *"In how many training courses did you participate in the past year (including those in which you currently participate)?"*. The third and fourth training variables are based on two survey

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<sup>8</sup> The 17 items belonging to this survey question are presented in Table A1 in Appendix A.

<sup>9</sup> We derived the Cronbach Alpha's to test whether the factors are internally consistent. Reassuringly, the Cronbach variable of the factor that is related to the training policies is 0.64, which is higher than the critical value of 0.60 for an acceptable internal consistency.

questions: “*To what extent do you agree with the following proposition about the last training course you concluded: The knowledge received during this training is transferable to organizations outside the branch in which you are currently occupied*” where employees could answer on a five-point Likert scale ranging from 1 “*strongly disagree*” to 5 “*strongly agree*”, and “*Who took the initiative for the last training course you concluded*” where employees could answer 1) “*I took the initiative myself*”; 2) “*My employer took the initiative*”; 3) “*We both took the initiative*”; and 4) “*Other*”.

Employees’ willingness to train is measured by the extent to which they agree with three propositions about their willingness to participate in 1) a course aimed at improving their skills for their current job, even when they have to sacrifice leisure time for this training; 2) a course aimed at improving skills needed to climb up in position in their organization; and 3) a training course aimed at learning skills needed for a new job. Employees could answer these questions on a five-point Likert scale ranging from 1 “*strongly disagree*” to 5 “*strongly agree*”.

The survey questions on personal characteristics and personality measure, among others, educational level, marital status, job engagement and the “Big Five” personality traits: *openness, conscientiousness, extraversion, agreeableness, and neuroticism*.<sup>10</sup> These Big Five personality traits are assumed to account for the basic traits in personality without overlap between these traits. The traits are derived from the abbreviated 15-item Big Five validated by McManus and Furnham (2006) and Furnham et al. (2003) which includes three items for each personality trait. We have constructed the Big Five personality traits by taking the average score of the items belonging to each personality trait. Job engagement measures the extent to which employees are fully involved in, and enthusiastic about their job, and is based on the short form of the Utrecht Work Engagement Scale (UWES) that has been extensively used and validated (see e.g., Schaufeli et al., 2002). Finally, we identify the various job tasks performed by employees by 18 questions from the Princeton Data Improvement Initiative (PDII) that have also been used by Autor and Handel (2013).

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<sup>10</sup> The Big Five personality traits are five broad domains or dimensions of personality that are used in psychology to provide a comprehensive description of human personality and are based on the Five factor model (Goldberg, 1992).

## 2.2 Descriptive statistics

Table B1 in Appendix B displays information on the distribution of employees over sectors in the representative sample (Columns 1 and 2), the response rates to the employee survey (Column 3), the distribution of workers over subsectors in the employee survey (Columns 4 and 5) and the distribution of workers over sectors in the matched employer-employee data (Columns 6 and 7). The largest sectors in the representative sample of public sector employees are Primary and Secondary Education (25.8%), Municipalities (19.8%) and the National Government (13.4%). More importantly, the table shows that the response rates to the employee survey are very similar across sectors, with response rates around 11%. The smallest response rate is found for academic hospitals (8.2%) while the largest response rate is found for workers in the sector intermediate vocational education (12.8%; Column 3). All in all, both before and after the match with the employer survey, the distribution of workers across the different sectors look rather similar to that in the representative sample of workers.

The representativeness of the estimation sample is further explored in Table B2 in Appendix B which presents the observable characteristics of employees with and without a match to their employer in Columns 1 and 2 respectively. Column 3 presents the t-statistic for the tests of the hypothesis that the employee characteristics are the same between employees with or without a match to their employers. We find that the between-group differences are small. There are only weakly significant differences (at the 10%-level) in the number of 45-55 year-olds and highly educated, and in the job engagement. Therefore, we can reasonably conclude that employees who can be matched to their employer are similar to those for whom no match is available.<sup>11</sup>

Employees in our estimation sample expect, on average, to retire at the age of 65 and two months. Figure 1, however, shows that there are strong peaks in the retirement expectations that

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<sup>11</sup> T-statistics for the differences in organization characteristics between the employers with and without a match to their employees are presented in Table B3 in the Appendix B. The table shows that most differences in the variables means between both groups are statistically insignificant. Employers whose answers can be matched to the answers of their employee, however, have a higher percentage of highly educated workers than those without a match. Furthermore, they report more often that their organization is financially sound, but do also report a higher likelihood that their organization has to cut down expenses in the coming five years.

concentrate around the eligibility ages for the state old age pension.<sup>12</sup> Approximately 28% expects to retire at age 65, 13% at age 66 and 26% at age 67. There is also a sizable group (28%) of employees who expect to retire well before age 65. Conversely, the group of workers who expect to continue working after the eligibility age for the state old age pension is relatively small (5%).

Table B2 furthermore shows that employees are most willing to train to improve their skills for their current job, while they are relatively unwilling to participate in a course aimed at improving their skills to climb up in position in their organization. Finally, 61% of the employees in our sample have participated in a training course in the past year. They, on average, participated in 1.41 training courses. Finally the table shows that 62% of our estimation sample is male, 84% is married, 23% is aged between 45 and 54 years, 69% is between 55 and 64 years old, and that 72% of the employees are highly educated (higher vocational education or university degree), which can be explained by the fact that these workers are overrepresented in the public sector.<sup>13</sup>

## 2.3 Empirical strategy

Our primary goal is to identify and quantify the relationship between organizational training access and the expected retirement age. In our main analysis, we will use ordered probit regressions that take the following form:

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<sup>12</sup> The Dutch pension system consists of three pillars. The first pillar consists of a flat-rate public scheme (AOW) to which all residents are entitled as of the age between 65 and 67 years, depending on their birth date, regardless of whether they had been an employee, self-employed or had never participated in the labor market. This statutory old-age pension provides Dutch residents with a pension benefit that in principle guarantees 70% of the net minimum wage for a single household and 50% for each partner in a couple (either married or officially living together). The eligibility age is stepwise increased from age 65 to 66 in 2018, and further to 67 years in 2021. The second pillar is the supplementary earnings-related pension. This is a defined-benefit type of pension for employees organized at the sector or firm level which can also be used to retire early before the eligibility age for the state pension. The third pillar includes all voluntarily built-up savings that are in addition to the first two pillars. Due to the well-established first two pillars of the Dutch pension system, the third pillar is less developed in the Netherlands than in other countries.

<sup>13</sup> Reassuringly, the fraction of highly educated workers in our sample is consistent with that in other datasets such as the Dutch Labor Supply Panel.

$$Y_{ij} = \alpha + \beta_1 TP_j + \delta' \mathbf{X}_{ij} + e_{ij} \quad (1)$$

Here  $Y_{ij}$  stands for the expected retirement age of individual  $i$  in firm  $j$ ,  $TP_j$  represents the organizational training access,  $\mathbf{X}_{ij}$  is a vector of control variables, and  $e_i$  is the error term.  $\mathbf{X}_{ij}$  includes four indicators that measure the extent to which other HR-policies focused on older workers are applied by employers, age, education level,<sup>14</sup> sector dummies, contractual working hours, tenure, gender, marital status, personality characteristics, and the job tasks of the individual employees.

We use ordered probit regressions to deal with the fact that the retirement expectations are concentrated at specific ages. Because there are multiple employee observations for a large number of organizations, we use a clustered sandwich estimator that specifies that the standard errors allow for intragroup correlation on the organizational level (Rogers, 1993; Wooldridge, 2002). In control analyses, we will estimate a hierarchical linear model with an additional random effect to account for unobserved heterogeneity on the organizational level.

### 3. Results

#### 3.1 Main results

We start our analysis by presenting ordered probit estimation results in Column 1 of Table 1 of a base specification in which we relate the extent to which training access are applied within organizations to employees' retirement expectations and control for personal characteristics and other HR-policies targeted towards older workers. The estimation results show that firms' provided training access are positively related to employees' retirement age: a one standard deviation increase in the degree that training access is applied is associated with a 1.1 months higher expected retirement age.<sup>15</sup> This correlation may appear small in first instance, but it is rather sizable when compared with the marginal

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<sup>14</sup> One education dummy that measures whether employees completed an education on a lower level, and one education dummy that indicates whether employees completed higher vocational education or achieved a university degree.

<sup>15</sup> This effect is especially large among high-educated employees. The marginal effect for the interaction between the firm's training policy and the dummy for high education equals 0.203 (not shown in table).

effects of working hours, tenure, or marital status. The marginal effect of a one standard deviation increase in the training access indicator is equivalent to the effects of a 14% increase in contractual working hours or a reduction in tenure with 11 years.

Table 1 further presents the results of analyses in which we subsequently add the Big Five personality traits (Column 2), and 18 job tasks indicators (Column 3) to account for the potential confounding effects of personality and job tasks that are performed by employees on the relationship between training access and retirement expectations.<sup>16</sup> The marginal effect of our training access indicator on the expected retirement age barely changes and remains statistically significant. Consistent with the results of Hurd et al. (2012) who found that conscientiousness has a significant positive effect on economic preparation for retirement, we find that conscientiousness is negatively related to the expected retirement age. We further observe that neuroticism is negatively correlated to the expected retirement age.

### **3.2 Why is there a positive impact of training policies on the expected retirement age?**

The previous results showed that employees of organizations with more training access expect to retire later than those who work in organizations which do not provide access. The main question that remains is what the underlying mechanisms are behind this relationship. One such mechanism could be that training access directly affects worker's participation in training, and that the investments in human skills in turn influence labor productivity and wages, thereby increasing the costs of early retirement. It is therefore important to disentangle the role of training access from the influence of

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<sup>16</sup> Previous studies have found a strong direct relationship between job characteristics such as intense physical demands, repetitive working conditions, and early retirement (Filer and Petri, 1988). By controlling for the main job tasks, we reduce the likelihood that job characteristics, such as the time that employees perform tasks in their job from which they can learn, which is likely to be positively correlated to the extent that training policies are applied, as well as the expected retirement age, confound our results. Consistent with the hypothesis that retirement expectations of employees with routine tasks are less affected by access to training courses, we find a statistically significant negative interaction effect (marginal effect of -0.038; not reported in the table).

individual training participation and potential influence of previous human capital investments on the wage level.

Table 2 shows the results a multinomial logistic regression where we relate the intensity of the firm's training policy towards older workers to employees' actual participation in training. The dependent variable is based on the survey questions on who took the initiative for the actual training participation of employees and the transferability of the skills acquired during the training, and is coded 0 when employees did not participate in any training; 1 when employees received a firm-specific training course (employees replied with a score of 3 or below to the question on whether the knowledge is transferable) without that their employer took any initiative; 2 when they participated in a firm-specific training course with support of their employer (either they report that their employer took the initiative or that both took the initiative to train); 3 when they received a general training course without the support of their employer (employees replied with a score of 4 or 5 to the question on whether the knowledge is transferable); and 4 when they received a general training course with support of their employer. The table shows that employees of organizations with strongly developed training policies indeed more often participate in general training courses with support of their employer, while firms' training policies are not significantly related to firm-specific training. A one standard deviation increase in the training policies indicator is associated with a 3.6 percent higher likelihood to participate in a general training with support of the employer. Hence, it is possible that the positive relationship between training policies and the expected retirement age runs through the elevated levels of (general) training participation.

In a next step, we have re-estimated the specification in Column 3 of Table 1 in which we control for the training participation, the number of training courses of the individual employees in our estimation sample, and the wage level. From Table 2, we observe that the correlation between our training policies indicator and the expected retirement age is robust to the inclusion of individual

training participation and the wage level.<sup>17</sup> Actual individual training incidence is not significantly related to the timing of retirement, which can be explained by the fact that the training decision is highly endogenous with respect to the motivation, as well as the skill needs of the individual employees. The correlation between the number of training courses and the expected retirement age is small but statistically significant. One additional training course leads to a 0.7 months higher expected retirement age. The wage coefficient is statistically significant and negative, implying that employees with higher wages expect to retire earlier. This result is consistent with previous studies (e.g., De Grip et al., 2012; Post et al., 2013) and indicates a dominating wealth effect of income on retirement behavior.

The results thus suggest that availability and access to training within organizations may have positive effects on later retirement, over and beyond workers' actual training participation. A possible explanation for this finding could be that the positive correlation between the organization's training policies and the individual expected retirement age is driven by employees' positive reciprocal inclinations. This conjecture is based on abundant evidence provided by experimentalists and psychologists who showed that reciprocity is a key driver of human motivation and labor market outcomes (see e.g. Bowles, 2008; Akerlof, 1982). In particular, Leuven et al. (2005) showed that positive reciprocal inclinations of employees are crucial in explaining why employers are willing to provide firm-specific as well as general training to their employees.<sup>18</sup> Their argument is that training positively affects the knowledge, skills and productivity of individual employees, who may therefore perceive the willingness of their employer to offer training opportunities and to pay for general and firm-specific training as a kindness or a gift to which they should positively reciprocate. Positive behavior of employers may increase the job motivation and engagement of positive reciprocal

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<sup>17</sup> We also estimated the model including dummy variables indicating the specific type of individual training participation (general or firm-specific with or without support of their employer). The results are robust to using these alternative measures.

<sup>18</sup> Among others, Pischke (2001) showed that, opposed to what can be expected based on the standard human capital theory, workplace training is often of a general nature and is provided by employers at no direct costs.



employees who then can reciprocate the favour of their employer, by, for example, increasing their effort, and investing in their relationship with the employer by postponing their retirement.

We test whether the positive correlation between organizations' training policies and the expected retirement age of their employees is driven by employees' positive reciprocal inclinations. Therefore we use a measure of reciprocity that is based on the reciprocity scale developed and validated by Perugini et al. (2003). The latter performed comprehensive validation tests and assessed the predictive power of their reciprocity scale for the behavior of participants in ultimatum games in laboratory experiments conducted in the United Kingdom and Italy. The three items that have the highest loadings on the principal components for positive reciprocity are included in our dataset.<sup>19</sup> Respondents had to indicate on a five point Likert scale (1 means "*does not apply to me at all*" and 5 means "*applies perfectly to me*") how well they identified themselves with each of the following three statements: 1) "*If someone does me a favor, I am prepared to return it*"; 2) "*I go out of my way to help somebody who has been kind to me before*"; 3) "*I am ready to undergo personal costs to help somebody who helped me before*". We construct our measures of positive reciprocity by first taking the arithmetic average of a respondent's answers to these three questions. Subsequently, we recode our measure to a dummy indicator which indicates whether employees are positive reciprocal: employees who have a score above the median on the arithmetic average of a respondent's answers to the three reciprocity questions are considered to positive reciprocal.<sup>20</sup>

Table 4 shows the estimation results of an ordered probit regression with the interaction terms between the positive reciprocity indicator and training access. It shows a statistically significant positive interaction effect between positive reciprocity and training access. Positive reciprocal employees within organizations with unlimited training access expect to retire approximately 14 months year later than employees of organizations with unlimited access who are not positively

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<sup>19</sup> These items were also included in the 2005 SOEP wave. The behavioral validity of these items was further investigated and confirmed by Dohmen et al., (2009) and Montizaan et al. (2012).

<sup>20</sup> We also performed interaction analyses with the arithmetic average of a respondent's answers to the three reciprocity questions and find similar results.

reciprocal, and expect to retire 12 months later than positive reciprocal employees who work in an organization with no training access. This suggests that the positive relationship between training access and the expected retirement age is indeed stronger for employees with strongly positive reciprocal inclinations.

### **3.3 Robustness**

While the results in Tables 1-4 highlight the importance of organizational training access as a potential motivating stimulus for later retirement, this finding may be limited by the fact that training policies are endogenous. The estimations which are presented in Table 5 aims to deal with this problem. First, the estimation results presented in Tables 1-4 could be driven by self-selection of highly educated and motivated employees into particular organizations with strong HR-policies, leading to both a higher average retirement age and prevalence of training policies within these organizations. Column 1 of Table 5 shows ordered probit estimation results of the specification used in Column 3 of Table 1 in which several variables are added that control for the education level and motivation of the employees in the estimation sample worker's firm.<sup>21</sup> We include the percentage of highly educated employees in the organization as reported by the employer, the individual willingness to train, and job engagement of individual employees which measures the extent to which employees are involved in and motivated for their work (Schaufeli et al., 2002). The inclusion of these control variables slightly reduces the marginal effect of the firm's training policies indicator, but it remains statistically significant. As expected, we find that both employees' willingness to train for the current job and their willingness to train for a new job are positively related to the expected retirement age. The percentage of highly educated employees and the willingness to train to climb up in the organization, however, are not statistically significantly correlated with the timing of retirement.

Second, one could conjecture that training policies and individual retirement expectations may be simultaneously influenced by the productivity of the workforce within an organization. Bartel and

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<sup>21</sup> All additional control analyses 5 were also performed on the model with the interaction term between positive reciprocity and training access. The significant interaction effect on the expected retirement age remains when we include all the additional control variables which have been added in Table 5.

Sicherman (1993) show that the expected retirement age and on-the-job training are positively correlated to the exposition to gradual technical change and productivity growth. In the estimation in Column 2 of Table 5, we control for the self-assessed productivity growth as reported by each individual employee. This variable is based on the following question in the employee survey: *“Suppose your productivity equaled 100 one year ago. How would you then assess your productivity at this moment? Smaller than 100 means less productive and greater than 100 means more productive.”* Furthermore, since bad health often detracts from productivity, reduces earnings, and increases the likelihood of early retirement, we also include a self-assessed measure of employees’ health and the number of sick days in the past year. The negative correlation between firms’ training policies and the expected retirement age of their employees remains unaffected when we include these individual productivity growth and health indicators.

Third, it could be the case that organizations that adopt training policies may also be structurally better in retaining their employees due to better financial conditions, the presence of a more active personnel department, or other organizational characteristics that are unobserved. To deal with these issues, we added several variables that measure the financial condition of the organization and provide information on the HR practices of the organizations. The financial condition is measured by two questions in the employer survey: *“How would you describe the financial condition of your organization”* with answer categories ranging from 1 *“Very bad”* to 5 *“Very good”*; and *“Has there been any reduction in the organizational workforce in the past year.”* The characteristics of the HR practices are extensively measured by 11 indicators derived from a factor analysis on employers’ answers to a list of 48 questions on the extent to which various HR-tools are applied within the organization.<sup>22</sup> Furthermore, we estimated a hierarchical linear model with a random effect which accounts for unobserved heterogeneity at the organizational level. Columns 3-5 show that our results are robust to the inclusion of these controls for the financial condition, HR practices, and other time invariant unobserved characteristics of the organizations. The size of the marginal effect increases

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<sup>22</sup> Table B3 in Appendix B describes and shows descriptive statistics for these 11 HR-indicators.

slightly to 0.134 when we control for all other HR practices applied by the employer and to 0.249 when an organization random effect is included, which suggests that organizations with training policies actually have unobserved characteristics that induce early retirement and lead to an underestimation of the correlation between training policies and the expected retirement age.

Finally, we should question whether our results could be due to reverse causality. It is unlikely that this problem would play an important role in the previous estimations due to the fact that we link the training policies reported by employers to the individual retirement expectations of the employees in our estimation sample. After all, we would not expect that the retirement expectations and preferences of individual employees have a great impact on the personnel policies applied within an organization. Nevertheless, it could be the case that the individual expected retirement age is higher due to the fact that employees in certain organizations on average retire later than in other organizations. In turn, we could then expect that organizations with an average late retirement age are more willing to design training policies for their older employees. We therefore conducted two tests to establish whether reverse causality could bias our previous results. For the first test, we use administrative data on actual retirement behavior of male public sector workers born in 1949 or 1950.<sup>23</sup> The data were collected from the Dutch pension fund in 2013 for all public sector employees in these two respective birth cohorts, with the advantage that the great majority of the men in this dataset are already retired or is currently retiring. For our purposes, we calculate for each organization the percentage of employees who were born in 1950, the percentage of employees born within 1949 and 1950 who are currently retired, and the average retirement age. We subsequently matched these organization indicators on the actual retirement behavior to our original dataset and added them as additional control variables in our estimations. In case of reverse causality we would expect that the inclusion of the organizational average retirement age of these cohorts should diminish the marginal effect of the training policies indicator. In the second test, we included the average expected retirement

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<sup>23</sup> These data are part of a panel database which have been used by other studies to measure the effects of a major pension reform in the Dutch public sector which occurred in 2006 (e.g., Montizaan et al., 2010; De Grip et al., 2012; Montizaan et al., 2012; and Montizaan and Vendrik, 2014). Because of privacy reasons, we do not have administrative information on actual retirement behavior for other birth cohorts.

age of colleagues within the same organization as an additional control variable in our model. In total, 738 employees work in an organization in which more than one employee responded to the employee survey. These employees have a median number of four colleagues for whom we observe an expected retirement age. Again, in case of reverse causality we would expect that the inclusion of the average expected retirement age of colleagues should diminish the marginal effect of the training policies indicator. The estimation results in Table 6 show that the coefficients of the organizational percentage of employees born within 1949 and 1950 who have currently retired and the average organizational retirement age of these two cohorts have the right sign, but are statistically insignificantly related to the individual retirement expectations. The individual expected retirement age is also not affected by the retirement expectations of their colleagues. More important, however, is that the marginal effect of the training access indicator is not significantly affected by the inclusion of the actual retirement behavior patterns of the 1949 / 1950 cohorts or the inclusion of the average expected retirement of employees' colleagues. This result thus buttresses the argumentation in favor of a causal relationship from training access towards the expected timing of retirement.<sup>24</sup>

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<sup>24</sup> We also conducted an instrumental variables approach in which the existence of bonus payment schemes is used to instrument for the firm's training policy (results available on request). The use of this instrument is based on the prediction from human capital theory that employees can signal their increased productivity after a general training course to other organizations and are therefore able to capture all returns to their general training investments in competitive labor markets with perfect information (Becker, 1964). Organizations in which the individual productivity of employees can be easily measured should therefore have little incentive to pay for investments in general skills. On the other hand, firm-specific training investments are not directly affected by the measurability of productivity due to the lack of transferability of firm-specific skills. Since previous research has found that the presence of bonus payment schemes strongly depends on the availability of performance measures within organizations (Gibbs et al., 2009), it is conceivable that the presence of bonus payment schemes are negatively correlated with the existence of (general) training policies. Correlational evidence on our data shows, that the percentage of employees per organization that receive firm-specific training is indeed not significantly related to bonus payments (marginal effect of -2.38 with a s.e. of 1.93), while we do observe a strong significant negative correlation between bonus payments and the percentage of workers who received general training (marginal effect of -5.17 with a s.e. of 1.91). The first stage of the IV-estimation subsequently showed that the extent that bonus payments are applied in organizations is significantly negatively related to the degree that training policies are applied. In the second stage, we observed that training policies still have a

## 4. Conclusion

This paper investigated whether training policies of firms can be successful in stimulating the employability and labor market attachment of older workers. For this purpose, we used a unique new representative matched employer-employee data set that allowed us to investigate whether the provision of organizational training policies targeted at older workers reported by employers is related to the expected retirement age of their employees. The data set builds on linked employer-employee surveys conducted in April 2012 in the Dutch public and privatized sector: an employer survey which is specifically designed to collect detailed information on organizations' HR-practices, and includes several measures of the extent to which training investments are stimulated by employers; and an employee survey which elicits expected retirement age and contains several questions on the willingness to train as well as the actual training participation and the type of training in which employees participated.

We found that training policies as reported by the employers are significantly positively related to the expected retirement age of their employees. A one standard deviation increase in the degree to which employers offer training policies is associated with an approximately 1.1 to 3.0 months higher expected retirement age. We showed that this relationship is not likely to be driven by reverse causality, self-selection of highly educated and motivated employees in organizations with extensive training policies, labor productivity, the financial situation of organizations, and other specific characteristics of the overall personnel management. Moreover, the positive correlation between training policies and the expected retirement age is robust to controls for actual training participation, indicating that access to training may have positive effects on the timing of retirement over and beyond workers' actual training participation. We showed that the positive correlation between training policies and the expected retirement age of individual employees is strongly driven by employees' positive reciprocal inclinations. The most positively reciprocal employees within

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significant positive effect on the expected retirement age. These results further suggest that training policies may have a causal impact on retirement expectations.

organizations with a strongly developed training policy expect to retire approximately one year later than employees of organizations with training policies who are not positively reciprocal. This shows that the provision of training access may not only improve the skills and productivity of employees, but also have major positive behavioural consequences.

By confirming that advanced organizational training policies can contribute to later retirement of specific groups of employees, these findings have great relevance for public policies that aim to retain older workers in the labor market. Our results strongly suggest that behavioural factors play a crucial role in this relationship. We therefore argue that this underscores the need for further research on the complex relationship between organizational training policies and employees' retirement behavior.

## **Literature**

- Akerlof, G.A. (1982). "Labor contracts as partial gift exchange." *Quarterly Journal of Economics*, Vol. 97, 543–569.
- Alessie, R.J.M., Van Rooij, M.C.J., and A. Lusardi. (2011). "Financial Literacy, Retirement Preparation and Pension Expectations in the Netherlands", NBER Working Papers 17109, National Bureau of Economic Research, Inc.
- Autor, D., and M.J. Handel (2013): *Putting Tasks to the Test: Human Capital, Job Tasks, and Wages*, *Journal of Labor Economics*, Vol. 31, S59-S96.
- Barret, A., and P.J. O'Connel (2001). "Does training generally work? The returns to in-company training", *Industrial and Labor Relations Review*, Vol. 54 , 647-662.
- Bartel, A.P. (1994). "Productivity gains from the implementation of employee training programs", *Industrial Relations*, Vol. 33, 411-425.
- Bartel, A.P. (1995). "Training, wage growth, and job performance: evidence from a company database", *Journal of Labor Economics*, Vol. 13, 401-425.
- Bartel, A.P and N. Sicherman (1993). "Technological Change and Retirement Decisions of Older Workers," *Journal of Labor Economics*, Vol. 11, 162-83.

- Bassanini A., Booth, A., Brunello, G., De Paola, M., and E. Leuven (2005): “Workplace training in Europe, IZA working paper 1640,” Bonn.
- Becker, G. (1962). “Investment in human capital: a theoretical analysis”, *Journal of Political Economy*, Vol. 70: 9-49.
- Bellemare, C., and B. Shearer (2009). “Gift giving and worker productivity: evidence from a firm-level experiment.” *Games and Economic Behavior*, Vol. 67, 233–244.
- Benitez-Silva, H., and D.S. Dwyer. (2005). “The rationality of retirement expectations and the role of new information”, *The Review of Economics and Statistics*, Vol. 87, 587-592
- Ben Porath, Y., “The production of human capital and the life cycle of earnings”, *Journal of Political Economy*, Vol. 75, 352-365.
- Bishop, J. (1996), “What we know about employer-provided training: A review of the literature”, *Research in Labor Economics*, Vol. 16, 19-87.
- Bowles, S. (2008). “Policies designed for self-interested citizens may undermine the moral sentiments”, *Science*, Vol 320, 1605–1609.
- Brown, M., Falk, A., and E. Fehr (2004). “Relational contracts and the nature of market interactions.” *Econometrica*, Vol. 72, 747–780.
- Chan, C., and A.H. Stevens (2008). “What can’t help you: Pension knowledge and retirement decision-making”, *The Review of Economics and Statistics*, Vol. 90, 253–266.
- Cohn, A., Fehr, E., and L. Goette (2009). “Fairness and effort: Evidence from a field experiment”, Unpublished
- Conti, G., (2005). “Training, productivity, and wages in Italy”, *Labour Economics*, Vol 12., 557-576.
- Das, M., Dominitz, J., and A. van Soest. (1999). “Comparing predictions and outcomes: theory and application to income changes. *Journal of the American Statistical Association*”, Vol. 94, 75-85.
- Dearden, L., Reed, H., and J. van Reenen (2006). “The impact of training on productivity and wages: Evidence from British panel data”; *Oxford Bulletin of Economics and Statistics*, Vol. 68, 397-421.



- De Grip, A., Fouarge, D., and R. Montizaan (2013). How sensitive are individual retirement expectations to raising the retirement age? *De Economist*, Vol. 161, 225-251.
- De Grip, A., Lindeboom, M., and R. Montizaan (2012). "Shattered Dreams: The Effects of Changing the Pension System Late in the Game," *Economic Journal*, Vol. 122, 1-25.
- De Grip, A., and J. van Loo (2002). "The economics of skills obsolescence: A review", in: A. de Grip, J. van Loo, and K. Mayhew (eds.), *The economics of skills obsolescence: Theoretical innovations and empirical applications*, Vol. 21, Amsterdam: Elsevier-North Holland, 1-26.
- Dohmen, T., Falk, A., Huffman, D., and U. Sunde (2009). 'Homo reciprocans: Survey evidence on behavioral outcomes', *The Economic Journal* 119, 592–612.
- Dominitz J. (2001). "Estimation of income expectations models using expectations and realizations data", *Journal of Econometrics*, Vol. 102, 165-195.
- Duflo, E., and E. Saez (2003). "The Role of Information and Social Interactions in Retirement Plan Decisions: Evidence from a Randomized Experiment", *Quarterly Journal of Economics*, Vol. 118, 815–842.
- Fehr, E., Kirchsteiger, G., and A. Riedl (1993). "Does fairness prevent market clearing? an experimental investigation", *Quarterly Journal of Economics*, Vol. 108, 437–460.
- Fehr, E., Kirchsteiger, G., and A. Riedl (1998). "Gift exchange and reciprocity in competitive experimental markets", *European Economic Review*, Vol. 42, 1–34.
- Fersterer, J., Pischke, J., and R. Winter-Ebmer (2008). "Returns to apprenticeship training in Austria: Evidence from failed firms", *Scandinavian Journal of Economics*, Vol. 110, 733-753.
- Filer, R.K., and P.A. Petri (1988). "A Job-Characteristics Theory of Retirement", *The Review of Economics and Statistics*, Vol. 70, 123-128.
- Fouarge, D., and T. Schills (2009), "The effect of early retirement incentives on the training participation of older workers", *Labour*, Vol. 23, 85-109.
- Furnham, A., McManus, I.C., and D. Scott (2003). "Personality, empathy and attitudes to animal welfare", *Anthrozoös*, Vol. 16, 135-146.

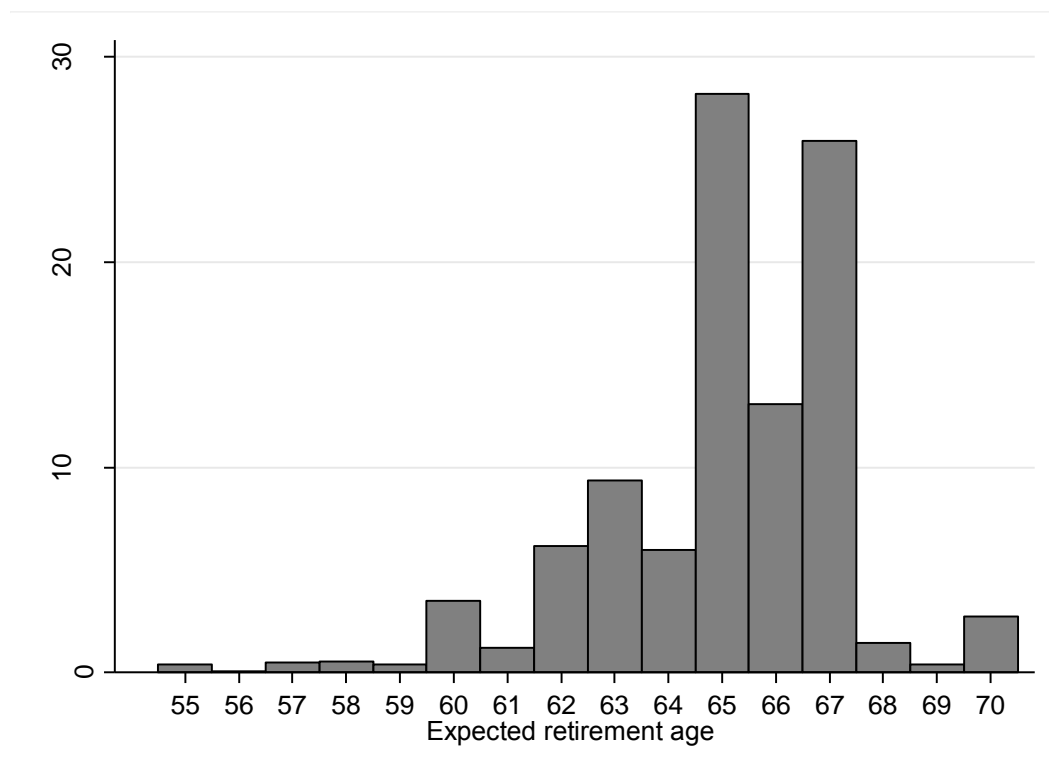
- Gibbs, M., Merchant, K., Van der Stede, W., and M. Vargus (2009). "Performance Measure Properties and Incentive System Design", *Industrial Relations*, Vol. 48, 237-264
- Green, F. (1993). "The determinants of training of male and female employees in Britain", *Oxford Bulletin of Economics and Statistics*, Vol. 55, 103-122.
- Goldberg, L. (1992) "The development of markers for the Big-Five factor structure", *Psychological Assessment*, Vol. 4, 26-42.
- Groot, W., and H. Maassen van den Brink (2000). "Education, training and employability", *Applied Economics*, Vol. 32, 573-581.
- Herrbach, O., Mignonac, K., Vandenberghe, C., and A. Negrini (2009). "Perceived HRM practices, organizational commitment and voluntary early retirement among late-career managers", *Human Resource Management*, Vol 48, 895-915.
- Hurd, M.D. (2009). "Subjective probabilities in household surveys, *Annual Review of Economics*", Vol. 1, 543-564.
- Hurd, M.d., Duckworth, A., Rohwedder, S., and D. Weir (2012) "Personality Traits and Economic Preparation for Retirement", *Michigan Retirement Research Center*, WP 2012-279.
- Katz, L.F., and D. H. Autor (1999). "Changes in the wage Structure and wage inequality", in: O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics* Vol. 3A, Amsterdam: Elsevier-North Holland, 1463-1555.
- Keane, M., and D. Runkle (1990). "Testing the rationality of price forecasters: new evidence from panel data", *American Economic Review*, Vol. 80, 714-734.
- Konings, J., and S. Vanormelingen (2009). "The impact of training on productivity and wages: Firm level evidence ", *CEPR Discussion paper* 7473, London.
- Kube, S., Marchal, M., and C. Puppe (2012). "The currency of reciprocity-gift-exchange in the workplace", *American Economic Review*, Vol. 102, 1644-1662.
- Leuven, E., Oosterbeek, H., Sloof, R., and C. Van Klaveren (2005). "Worker reciprocity and employer investment in training" *Economica*, Vol. 72, 137-149.

- Liebman, J.B. and E.F.P. Luttmer (2011). "Would people behave differently if they better understood social security? Evidence From a Field Experiment", NBER Working Paper No. 17287.
- McManus, I. C., and A. Furnham (2006) "Aesthetic activities and aesthetic attitudes: influences of education, background and personality on interest and involvement in the arts", *British Journal of Psychology*, Vol. 97, 555-587.
- Montizaan, R., Cörvers, F., and A. de Grip (2010). "The effects of pension rights and retirement age on training participation: Evidence from a natural experiment", *Labour Economics*, Vol. 17, 240-247.
- Montizaan, R., Cörvers, F., De Grip, A. and T. Dohmen, Thomas (2012). "Negative Reciprocity and Retrenched Pension Rights," *IZA Discussion Papers* 6955.
- Montizaan, R., and M. Vendrik (2014). "Misery Loves Company: Exogenous shocks in retirement expectations and social comparison effects on subjective well-being," *Journal of Economic Behavior & Organization*, Vol. 97, 1-26.
- Neuman, S. and A. Weiss (1995). "On the effects of schooling vintage on experience-earnings profiles: theory and evidence", *European Economic Review*, Vol. 39, 943-955.
- Piscke, J. (2001). "Continuous Training in Germany", *Journal of Population Economics*, Vol. 14, 523-548.
- Perugini, M., Gallucci, M., Presaghi, F., and A.P. Ercolani (2003). 'The personal norm of reciprocity.' *European Journal of Personality* 17, 251–283
- Picchio, M., and J. Van Ours (2013). "Retaining through training, even for older workers ", *Economics of Education Review*, Vol. 32, 29-48.
- Post, C., Schneer, J., Reitman, F., and D. Ogilvie (2013) 'Pathways to retirement: A career stage analysis of retirement age expectations', *Human Relations*, Vol. 66, 88-112.
- Rogers, W. H. (1993). "Regression standard errors in clustered samples", *Stata Technical Bullitin*, Vol. 13, 19–23.

- Schaufeli, W.B., Salanova, M., Gonzalez-Roma, V., and A.B. Bakker (2002). "The measurement of engagement and burnout: A confirmative approach", *Journal of Happiness Studies*, Vol. 3, 71-92.
- Stenberg, A., De Luna, X. and O. Westerlund (2012), "Can adult education delay retirement from the labour market?", *Journal of Population Economics*, Vol. 25, 677-696.
- Stephens Jr., M. (2004). "Job loss expectations, realizations and household consumption behaviour", *The Review of Economics and Statistics*, Vol. 86, 253-269.
- Van Rooij, M.C.J., Lusardi, A. and R.J.M. Alessie. (2011). "Financial literacy and retirement planning in the Netherlands", *Journal of Economic Psychology*, Vol. 32, 593-608.
- Van Rooij, M.C.J., Lusardi, A., and R.J.M. Alessie (2012). "Financial Literacy, Retirement Planning and Household Wealth, *Economic Journal*, Vol. 122, 449-478.
- Wooldridge, J. M. (2002). "Econometric Analysis of Cross Section and Panel Data" Cambridge, MA: MIT Press.
- Zwick, T. (2006). "The impact of training intensity on establishment productivity", *Industrial Relations*, Vol. 45, 26-46.

**Figure 1**

**Retirement expectations**



**Table 1****Employer provided training access and the expected retirement age**

Dependent variable: expected retirement age	(1)	(2)	(3)
<b><i>HR-policies focused on older workers</i></b>			
Training access	0.090** (0.043)	0.088** (0.041)	0.090** (0.043)
Task adaptation	-0.061 (0.045)	-0.070 (0.044)	-0.068 (0.046)
Financial incentives	-0.019 (0.028)	-0.016 (0.028)	-0.010 (0.029)
Working hours policies	0.008 (0.056)	0.007 (0.055)	-0.014 (0.055)
Retirement policies	0.003 (0.049)	0.005 (0.049)	-0.004 (0.050)
<b><i>Personal characteristics</i></b>			
Age 45-54 (age 35-44 is ref)	-0.149 (0.163)	-0.165 (0.160)	-0.148 (0.162)
Age 55-64	-0.503*** (0.147)	-0.513*** (0.144)	-0.496*** (0.139)
Low education (intermediate level of education is ref)	-0.101 (0.161)	-0.127 (0.161)	-0.037 (0.180)
High education	0.045 (0.084)	0.012 (0.090)	-0.039 (0.110)
Government sector	0.090 (0.111)	0.070 (0.106)	0.098 (0.118)
Education sector	0.263** (0.127)	0.248** (0.120)	0.237* (0.130)
Contractual working hours	0.619** (0.272)	0.642** (0.273)	0.715** (0.290)
Tenure	-0.009*** (0.003)	-0.010*** (0.003)	-0.009*** (0.003)
Male	-0.003 (0.090)	-0.018 (0.092)	-0.040 (0.093)
Married	-0.300*** (0.084)	-0.291*** (0.087)	-0.278*** (0.090)
<b><i>Personality traits</i></b>			
Neuroticism		-0.098*** (0.037)	-0.105*** (0.040)
Extraversion		0.037 (0.058)	0.030 (0.054)
Openness		0.083 (0.060)	0.075 (0.060)
Agreeableness		-0.051 (0.039)	-0.032 (0.038)
Conscientiousness		-0.074* (0.039)	-0.085** (0.039)
<b><i>Job tasks</i></b>			
	No	No	Yes
Observations	845	845	845

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) corrected for clustering on organization level. The table shows ordered probit estimates. The HR-policies measures are derived from a factor analysis on employers' answers to 17 questions on HR practices focused on older workers. The Big Five personality traits are derived from the abbreviated 15-item Big Five validated by McManus and Furnham (2006) and Furnham et al. (2003). We use 18 variables to identify the job tasks performed by employees. They are based on 18 questions from the Princeton Data Improvement Initiative (PDII) Survey. The relevancy of these job task measures have been validated by Autor and Handels (2013).

**Table 2**  
**Employers provided training access and employee training participation**

	No training	Specific training without support	Specific training with support	General training without support	General training with support
	(1)	(2)	(3)	(4)	(5)
<i>Training access</i>	-0.010 (0.022)	0.000 (0.006)	-0.017 (0.019)	-0.001 (0.012)	0.026** (0.012)
<i>Personal characteristics</i>	Yes	Yes	Yes	Yes	Yes
<i>Personality traits</i>	Yes	Yes	Yes	Yes	Yes
<i>Job tasks</i>	Yes	Yes	Yes	Yes	Yes
Observations	861	861	861	861	861

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) corrected for clustering on organization level. The table shows marginal effects of a multinomial logit on different types of training participation of individual employees with and without support by the employer, including all control variables of the specification presented in Column 3 of Table 1.

**Table 3**  
**Employer provided training access, wage, actual training participation, and the expected retirement age**

<b>Dependent variable: Expected retirement age</b>	<b>(1)</b>	<b>(2)</b>
Training access	0.092** (0.042)	0.085** (0.043)
Wage (ln)	-0.359** (0.147)	-0.362** (0.150)
<i><b>Human capital investments</b></i>		
Training participation		-0.063 (0.081)
Number of training courses		0.057** (0.027)
<i><b>HR-policies focused on older workers</b></i>	Yes	Yes
<i><b>Personal characteristics</b></i>	Yes	Yes
<i><b>Personality traits</b></i>	Yes	Yes
<i><b>Job tasks</b></i>	Yes	Yes
Observations	845	844

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) corrected for clustering on organization level. The table shows ordered probit estimates, including all control variables of the specification presented in Column 3 of Table 1.



**Table 4****Training access and the expected retirement age: positive reciprocity**

<b>Dependent variable: Expected retirement age</b>	<b>(1)</b>
<i>HR-policies focused on older workers</i>	
Training access	0.021 (0.053)
Positive reciprocity	-0.120 (0.100)
Training access x positive reciprocity	0.243** (0.100)
<i>HR-policies focused on older workers</i>	Yes
<i>Personal characteristics</i>	Yes
<i>Personality traits</i>	Yes
<i>Job tasks</i>	Yes
<i>Wage (ln)</i>	Yes
<i>Human capital investments</i>	Yes
Observations	834

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) corrected for clustering on organization level. Column 1 of the table shows ordered probit estimates which include the same control variables as in Column 2 of Table 3.

**Table 5****Alternative explanations: selection, productivity, financial condition of the organization and other HR-policies**

Dependent variable: Expected retirement age	(1)	(2)	(3)	(4)	(5)
<i>Training access</i>	0.083** (0.040)	0.095** (0.040)	0.090** (0.041)	0.127** (0.053)	0.236** (0.105)
<i>Characteristics of workforce</i>					
Percentage of highly educated workers	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.006 (0.005)
Prepared to participate in a course aimed at improving skills for the current job	0.095** (0.044)	0.105** (0.044)	0.107** (0.044)	0.079* (0.046)	0.151 (0.097)
Prepared to participate in a course aimed at improving skills needed to climb up in the organization	0.057 (0.043)	0.040 (0.046)	0.042 (0.046)	0.061 (0.048)	0.106 (0.102)
Prepared to participate in a course aimed at learning skills needed for a new job	0.100** (0.050)	0.105** (0.053)	0.104* (0.053)	0.051 (0.058)	0.057 (0.118)
Job engagement	0.040 (0.031)	0.034 (0.033)	0.033 (0.033)	0.016 (0.038)	0.013 (0.079)
<i>Productivity indicators</i>					
Increase of productivity (self-assessed)		-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Bad health (self-assessed)		-0.073 (0.066)	-0.077 (0.066)	-0.121* (0.071)	-0.219 (0.149)
Number of sick days (self-assessed)		-0.001 (0.002)	-0.001 (0.002)	0.000 (0.002)	-0.001 (0.005)
<i>Financial condition of organization</i>					
Financial condition			0.040 (0.050)	0.084 (0.064)	0.187 (0.128)
Likelihood that the organization has to cut down expenses in the coming five years			0.046 (0.054)	0.047 (0.066)	0.127 (0.133)
<i>Personal characteristics</i>	Yes	Yes	Yes	Yes	Yes
<i>Personality traits</i>	Yes	Yes	Yes	Yes	Yes
<i>Job tasks</i>	Yes	Yes	Yes	Yes	Yes
<i>Wage (ln)</i>	Yes	Yes	Yes	Yes	Yes
<i>Human capital investments</i>	Yes	Yes	Yes	Yes	Yes
<i>Overall personnel management</i>	No	No	No	Yes	Yes
<i>Organization random effects</i>	No	No	No	No	Yes
Observations	838	807	807	677	677

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) corrected for clustering on organization level. Columns 1-4 of the table show ordered probit estimates with the same control variables as in Column 2 of Table 3. Column 5 shows the results of an hierarchical linear model with random effects. The HR-policies measures are derived from a factor analysis on employers' answers to 17 questions on the use of HR practices that are focused on older workers. The Big Five personality traits are derived from the abbreviated 15-item Big Five validated by McManus and Furnham (2006) and Furnham et al. (2003). Job tasks are measured using 18 questions from the Princeton Data Improvement Initiative (PDII) Survey. The relevancy of these Job task measures have been validated by Autor and Handels (2013). Overall personnel management is measured by 11 indicators that are derived from a factor analysis on employers' answers to 48 questions on the extend that HR-instruments are applied within the firm.

**Table 6**  
**Training access and the expected retirement age: controlled for organizational retirement patterns**

<b>Dependent variable: Expected retirement age</b>	<b>(1)</b>	<b>(2)</b>
<i>Training access</i>	0.126*** (0.043)	0.096** (0.046)
<i>Mean organizational retirement age of 1949/1950 cohorts</i>	0.038 (0.048)	
<i>Organizational percentage of retirees of 1949/1950 cohorts</i>	-0.094 (0.226)	
<i>Organizational percentage of employees born in 1950</i>	0.022 (0.239)	
<i>Mean expected retirement age of colleagues</i>		-0.016 (0.042)
<i>HR-policies focused on older workers</i>	Yes	Yes
<i>Personal characteristics</i>	Yes	Yes
<i>Personality traits</i>	Yes	Yes
<i>Job tasks</i>	No	Yes
<i>Wage (ln)</i>	No	Yes
<i>Human capital investments</i>	No	Yes
Observations	759	738

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors (in parentheses) corrected for clustering on organization level. Columns 1 and 2 of the table show ordered probit estimates which include the same control variables as Column 2 of Table 3.

## Appendix A

**Table A1**

**Employer survey questions on HR-policies focused on older workers**

Employer survey questions on HR practices focused on older workers	Scale
<p><i>To what extent does your organization apply the following HR-instruments that are specifically targeted towards older employees?</i></p> <ol style="list-style-type: none"> <li>1) <i>Adaptation of the workplace</i></li> <li>2) <i>Giving tasks in which they perform relatively well</i></li> <li>3) <i>Task relief</i></li> <li>4) <i>Extra education or training participation</i></li> <li>5) <i>Training aimed at rethinking retirement and the professional career</i></li> <li>6) <i>Mentor function for older employees</i></li> <li>7) <i>Old age holiday days</i></li> <li>8) <i>Senior leave</i></li> <li>9) <i>Demotion</i></li> <li>10) <i>Wage decrease</i></li> <li>11) <i>Promotion</i></li> <li>12) <i>Shortening of labor hours</i></li> <li>13) <i>Part-time retirement</i></li> <li>14) <i>Extra investment in life course savings plans</i></li> <li>15) <i>Allowing employees to continue working after age 65</i></li> <li>16) <i>Wage guarantee</i></li> <li>17) <i>Departure schemes</i></li> </ol>	<p><i>Five-point Likert scale ranging from 1 “Applied to no older employee” to 5 “Applied to all older employees”.</i></p>

## Appendix B

**Table B1**  
**Employee response rates by sector**

Sector	Representative sample		Response rate employee survey	Distribution of workers in employee survey		Distribution of workers in employee survey after match with employer data	
	Total	Percentage		Total	Percentage	Total	Percentage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
National Government	7,699	13.4	11.8	911	14.7	314	23.5
Defense (civilian personnel)	2,322	4.1	10.3	240	3.9	NA	NA
Provinces and District water boards	1,923	3.4	10.8	208	3.4	25	1.9
Municipalities	11,340	19.8	10.2	1157	18.7	297	22.2
Police	2,903	5.1	10.8	313	5.1	31	2.3
Primary and secondary education	14,772	25.8	10.9	1610	26.1	374	28
Intermediate vocational education	3,331	5.8	12.8	428	6.9	50	3.7
Higher vocational education	2,259	3.9	11.8	267	4.3	71	5.3
Universities	2,695	4.7	10.5	282	4.6	75	5.6
Academic hospitals	2,723	4.8	8.2	223	3.6	NA	NA
Water, energy and public utilities	2,442	4.3	10.7	261	4.2	26	1.9
Voluntary members	1,992	3.5	9.7	194	3.1	46	3.4
Other	949	1.7	9.0	85	1.4	28	2
	57,350	100	10.8	6,179	100	1,337	100

**Table B2**  
**Employee characteristics with and without a match to the employer**

	Averages employees with a match	Averages employees without a match	T-stat Difference
Expected retirement age	65.13	65.01	1.45
Age 45-54 (age 35-44 is ref )	0.23	0.21	1.69*
Age 55-64	0.69	0.71	1.17
Low education	0.05	0.04	0.34
High education	0.72	0.70	1.90*
Wage (ln)	10.9	10.9	0.52
Contractual working hours	0.89	0.89	1.28
Tenure	12.9	13.2	0.82
Male	0.62	0.62	0.23
Married	0.84	0.83	0.69
Training participation	0.61	0.60	0.94
Number of training courses	1.41	1.32	1.32
Prepared to participate in a course aimed at improving skills for the present job	3.70	3.67	1.17
Prepared to participate in a course aimed at improving skills needed to climb up in position in their organization	3.00	3.01	0.32
Prepared to participate in a course aimed at learning skills needed for a new job	3.43	3.44	0.18
Job engagement	3.03	3.18	1.85*
Increase of productivity (self-assessed)	110.9	103.3	1.10
Bad health (self-assessed)	1.92	1.95	0.96
Number of sick days (self-assessed)	6.3	6.7	0.56

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We also performed the same test on the 18 job task indicators that are used in Table 3 and found no significant differences in the job tasks of employees with and without a match to the employer data

**Table B3**  
**Organization characteristics with and without a match to the employee**

	T-stat difference in means
<b><i>HR-policies focused on older workers (standardized)</i></b>	
Training policy	0.77
Task adaptation	0.99
Financial incentives	0.58
Working hours policies	0.05
Retirement policies	0.87
<b><i>Other organization characteristics</i></b>	
Percentage of highly educated workers	16.11***
Financial condition	12.7***
Likelihood that the organization has to cut down expenses in the coming five years	10.2***
<b><i>Overall personnel management (standardized)</i></b>	
Overwork and shift work	1.54
Flexible work hours	1.42
Lifestyle and health investments	0.83
Career advice and coaching	1.46
Stimulating competences and working as an independent	1.08
Vitality and working conditions	0.81
Demotion and promotion	0.28
Communication and assessment	0.83
Internal and external mobility	0.52
Bonus payments and gratifications	0.16
Sabbatical leave and employee saving schemes	0.05

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .