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Determinants of Training Participation

A Literature Review and Empirical Support from
Personal-, Job-, Employer- and Health related
Factors in Germany

Determinants of training participation:
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job-, employer- and health related factors in Germany

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1. Introduction

The main purpose of this paper is twofold. The first part serves as a literature overview for determinants of participation in work-related formal training. The second part of this paper will analyze these determinants and look for significant others using German panel data.

The literature overview combines the different approaches by researchers in order to create a list of determinants of training participation. This list contains person related determinants, job related determinants, and employer related determinants as well as other determinants that cannot be allocated to these three groups. This summary of the literature serves to facilitate further investigations of determinants of training.

For this analysis the 2008 wave of the German Socio-Economic Panel (SOEP) is used. OLS and probit-regressions will be run in order to discover if the determinants and correlations found in literature are valid for Germany. This investigation of determinants from German panel data focuses on work-related and employer-related training. Only participants who are employed and not retired will be considered for the analysis. For the purpose of this work, self-employed individuals and those who are not trainees at the moment of the survey will be excluded.

Furthermore, this paper includes health related determinants and their influence on the participation in training. The relationship between health and training has not been investigated thoroughly in past research and will be another contribution of this paper. Differences between the traditional determinants with and without controlling for health will be compared. To conclude, the findings from this paper will be compared with findings from the literature in order to see differences and similarities.

This paper is set out in the following way. Section 2 will explain the broader meaning of training within the life course. Section 3 will show the different studies and the results reported by prior academic literature in a clear list. In Section 4 the listed determinants will be described in a more detailed way. Section 5 then will analyze the influence of person related determinants, job related determinants and employer related determinants as well as controlling for health. A final conclusion will compare findings from the literature with the findings from this paper and suggest further ideas for research.

2. The role of training in the life course

The idea of further training during an individual's life course has its roots in the works of Becker (1962) and Ben-Porath(1967), both of which express the need for rational tailored human resource development through training. With the issue of training increasing in importance, human resource departments have identified the need for this critical issue to be understood. It also has been recognized that in order to achieve the best possible training outcome, there is a need for cooperation between employers and the individual employee or worker. In Western knowledge societies large amounts of money are invested in continuous training programs. One of the goals of human resource development plans is to enhance workers performance and raise their productivity. In order to achieve this goal of increased productivity companies aim to increase skills and knowledge of existing workers in order to maintain a company's competitiveness (Watanabe, 2010). However, before these highly specific development plans could be established, theories and models on the behavior of workers concerning training activities were created.

An important academic work concerning human capital theory is the explanation of Becker (1962). His theory of human capital suggests that the effort invested in training has to be translated into increased earnings. Furthermore, the investment in human capital results in an increase of the stock of human capital. This leads inevitably to a superior performance of the trainee (Acemoglu and Pischke, 1998). To apply human capital theory it can be said that younger workers receive more benefits from job-related training than older workers; thus the profitability of further developmental actions decreases with age.

Furthermore, Becker differentiates between two different types of training, general and specific training. While the general training aims to teach skills and knowledge that can be easily transferred to other institutions or companies, specific training includes knowledge that is only useful for a limited number of occupations or companies. According to Becker (1962) companies should not invest in general training, due to the danger of "poaching" competitors, which could simply offer the employee, after a successful general training, a higher paid contract and reap the benefits of the training without paying for it (Becker, 1962). Specific training makes it more difficult for competitors to use the knowledge received through the training and decreases the likelihood for the employee to change jobs shortly after the training. Because of this Becker suggests that the more specific the training becomes, the greater the share of costs for the company should become.

Based on Becker's theory Ben-Porath (1967) created a model for the life cycle of a worker's earnings, predicting the investment in human capital in different stages of the worker's career and age. This investment in human capital happens through training, which can be according to Becker (1962) either general or specific. One of the findings of Ben-Porath is that people tend to invest the majority of their time in human capital while they are still young. This behavior can be explained through the relatively low opportunity costs at the beginning of an individual's career. Additionally, the larger the amount of human capital accumulated; the higher the wages will be in the worker's future career. The most important reason for this investment according to Ben-Porath (1967) is that a younger worker has more time to receive the returns of their investment in human capital. By including a production function into the determination of the optimal path of educational investment, Ben-Porath explains how training affects the life cycle of earnings. The supply function is defined through cost condition or the supply and determines the allocation of time for the individual worker.

In his model Ben-Porath assumes a fixed amount of time which can be allocated by the worker either to training or the production of earnings. This means that the worker has to decide how to allocate the available time most effectively between these two options. Such that, in the earlier stage of a career individuals tend to invest a greater amount of time into on-the-job training, and that in the second half employees tend to consume their investment (Ben-Porath, 1967). This means that individuals reduce their investment in training as their age increases. Ben-Porath suggests that this behavior could be influenced by a continually decreasing marginal utility of further investment in human capital combined with higher opportunity costs.

Another important differentiation between types of training consists in the way the training is performed. Literature differentiates between formal training and informal training as well as intermediate versions combining formal and informal training (Loewenstein and Spletzer, 1999). In terms of expenses for formal training both direct and indirect costs have to be taken into account, while for informal learning only indirect costs for the investment in the form of opportunity costs can be accounted (Nelen, 2012). Although the majority of learning on-the-job is informal (Malcolm et al., 2003), there are difficulties in the definition and reporting of informal training. The further parts of this paper will therefore only concentrate on formal job-related training.

3. Differences in training participation amongst individual groups

In recent years many different researchers have investigated the behavior of employees in terms of training and training participation. Since each experiment and study has a different framework, this section compares the different approaches and provides an improved overview of existing findings from different countries and in different groups of the population or sample group. The individual studies and their findings can be observed in Table 1.

Table 1 shows the findings from different papers with determinants ordered according to their relation. Person related determinants can be observed as well as job related, employer related and other determinants outside these categories. Personal determinants include age, gender, education and family responsibilities. The hierarchical position of an individual as well as the organizational tenure and the employment status are job related and therefore grouped together. The company size is the only employer related determinant listed in this table and is also less often tested or reported for in the literature. Furthermore, the table provides information about the data source each paper uses to base their observations and findings on.

When observing the findings regarding age as a determinant for training participation in the literature, a mixed effect can be observed. Most papers that include age in the analysis report a negative influence on training participation which is significant (Booth, 1991; Greenhalgh and Stewart, 1987; Leuven et al., 2005; Maximiano and Oosterbeek, 2007; Oosterbeek, 1998; Renaud et al., 2004 and Tharenou, 2001). Other papers report significant age effects only for one gender. Arulampalam et al. (2004) found only a significant influence of age for men in the EU, which influenced their training participation negatively. Similar findings can be observed in Green (1993). Further papers also find different correlations of age with training participation for individual age groups. Cloutier et al. (2008) found age had a significant positive influence in the group of 30-49 year olds on training. Similar, but not significant findings were reported for the age groups of 16-35 year old workers (Leuven and Oosterbeek, 1999) and for employees younger than 37 years (Thangavelu et al., 2011). None of the studies listed found a significant and positive correlation between age and training participation for the whole labor force.

TABLE 1: LITERATURE OVERVIEW

Study	Person related			Job related			Employer rel.	Others	Data Source	
	Age	Gender (female)	Education	Family Responsib.	Hierarch. Position	Organizational Tenure	Employment Status			Company Size
Albert et al. (2010):	/	-*	+	/	/	-*(> 4 years)	+(D, ESP)	+(>20) +(>100, D)	Sectors More detailed training	ECHP 1995-2001 (European Community Household Panel)
Altonji and Spletzer (1991):	/	-	+	/	/	/	/	/		Nati.Longitudinal Survey of the High School Class of 1972
Arulampalam et al. (2004):	0 (w.) -*(m)	-	+	/	+	Left out	0	/	Countries EU	ECHP 1994 Six waves
Booth (1991):	-*	-*	+	-(child. Women)	/	/	-(part-time, women)	+(women)	Difference men/women	British Social Attitudes Survey of 1987
Cloutier et al. (2008):	+(30-49 yrs.)	+	+	+(spouse) -(child. <5 years)	/	-	/	/	Voluntary vocational training for managers	Workplace and Employee Survey
Cully et al. (2000):	-	Contr.	Contr.	/	/	Contr.	/	/	Focus: old people/barriers	Australian Bureau of Statistics 1989, 1993, 1997
Fouarge et al. (2010):	/	/	+	/	/	/	/	/	Personality traits(Big 5)	Various *1
Friebel (2008):	-	mixed	+	/	/	/	/	/	Inter-generational educ.	Hamburg Life-Course Panel 1980-2006

Note: + : positive correlation, - negative correlation, *: significant, /: not reported, 0: no correlation

Study	Person related			Job related				Employer rel.	Others	Data Source
	Age	Gender (female)	Education	Family Responsib.	Hierarch.. Position	Organizational Tenure	Employment Status	Company Size		
Green (1993):	-(men)	/	+*	-(women)	+*	-	/	+* (on the job)	On the job off the job	General Household Survey 1987
Greenhalgh and Stewart (1987):	-*	-*	+	-(women)	+*	/	+	/		National Training Survey 1976
Krueger and Rouse (1998):	+	+	+*(manf.) +(service)	+(spouse)	/	+	/	+	Focus und manufacturi ng	Manufacturing and Service company
Leuven and Oosterbeek (1999)	+(16-35) -*(>46)	-*	-(low) +*(high)	/	/	+ (< 1 yrs.)	+* (full-time)	/	CAN, N, CH, US	International Adult Literacy Survey
Leuven et al. (2005):	-*	-	-(low) +*(high)	+(child.)	/	/	/	/	Focus worker, reciprocity	NIPO Post-initial Schooling Survey 2001
Maximiano and Oosterbeek (2007):	-*	-	+*	+(worker) -*(firm) (child.)	/	/	-(part-time)	+*	Worker0fir m view	Dutch, Monitor Post-initial Education, 2005
Montizaan et al. (2010):	/	/	+*(low)	/	/	/	/	+*	Retirement behavior	Matched survey data for male employees in the public sector
Noe and Wilk (1993):	Influence of self efficacy and environment perception, motivation to learn									Health maintenance organization
Note: + : positive correlation, -: negative correlation, *: significant, /: not reported , 0: no correlation										

Study	Person related			Job related			Employer rel.	Others	Data Source	
	Age	Gender	Education	Family Responsib.	Hierarch. Position	Organizational Tenure	Employment Status			Company Size
Oosterbeek (1998):	-*	+	+*	/	- (low) +(high)	/	+*	/	Workers' willingness	Dutch (IALS) 1995
Parent (2002):	/	/	+*	+	/	+	/	/		Follow-Up to the School Leavers Survey (Canada)
Renaud et al. (2004):	-*	+*	-*	+ (spouse) - (child.)	+*	+*(< 21 years) -*(> 21 years)	+	/	non-mandatory training	large Canadian financial services organization
Thangavelu et al. (2011):	+(<37yrs) -(>37yrs)	+	+*	+*(single)	-* (mng.) +*(emplo yees)	+ (<20 yrs) - (>20yrs)	+ (part-time)	/	Singapore	Singapore Labour Force Survey 2004
Tharenou (2001):	-*	+	+	- (child.)	+*	-	/	*	Training motivation through expectation	Data from: Australian Commonwealth Public Service
van der Heijden (2002):	-	/	/	/	Higher level	/	/	/	Higher level employees	Dutch higher level management
Veum (1993):	+ (young workers)	-	+	/	/	/	/	/	Young workers, control for race	National Longitudinal Survey of Youth (NLSY79) 1986-91
Watanabe (2010):	Younger workers	+	-* (low) + (high)	+	/	+	/	-* (less than 99)	Younger workers in economic downturns	National Longitudinal Survey of Youth (NLSY79) 1988-91

Note: + : positive correlation, - : negative correlation, *: significant, /: not reported, 0: no correlation

Investigating the impact of the participants' gender on the likelihood to engage in training the literature provides mixed results as well. Many papers report a positive and significant effect of age on training participation only for men (Booth, 1991) and but are limited to certain countries such as Italy and France (Albert et al., 2010). Other papers report a positive and significant influence on training participation for women, but not for men (Cloutier et al., 2008 and Renaud et al., 2004). In contrast, other studies report a significant negative influence of being female on the participation in training activities (Greenhalgh and Stewart, 1987; Leuven and Oosterbeek, 1999). A possible explanation for this controversy can be found in the fact that papers reporting a significant positive effect of being female investigated the participation in non-mandatory training (Renaud et al., 2004) and voluntary vocational training (Cloutier et al., 2008).

In addition, the literature shows an unambiguous positive influence of education on the participation in further training. The majority of research reports a significant positive influence of education in general (Albert et al., 2010; Altonji and Spletzer, 1991; Arulampalam et al., 2004; Cloutier et al., 2008; Fouarge et al., 2010; Friebel, 2008; Green, 1993; Maximiano and Oosterbeek, 2007; Oosterbeek, 1998; Parent, 2002 and Thangavelu et al., 2011) or more specific, a significant positive influence of high levels of education (Leuven and Oosterbeek, 1999; Leuven et al., 2005) combined with a significant negative influence of low levels of education on training participation (Leuven and Oosterbeek, 1999; Leuven et al., 2005 and Watanabe, 2010). In opposition to this finding a strong positive influence of education on training was found for lower educated workers combined with retirement behavior and the changes of the retirement age (Montizaan et al., 2010). In terms of sector specific influences of education on training participation a significant positive influence of education was found in the manufacturing sector (Krueger and Rouse, 1998). The only found paper reporting a negative influence of education on training participation investigated the participation in non-mandatory training (Renaud et al., 2004) leading to the observation that employees with high levels of education engaged less in non mandatory training.

The research about the influence of family responsibility on training participation is not as clear cut as it is for education. Some studies report a significant negative influence of gender on training participation, such that women with family responsibilities are less likely to engage in training, but the same is not true for their husbands, or more general men (Green, 1993; Greenhalgh and Stewart, 1987). Additional papers have investigated the different

effects between having a spouse and having children on training participation. These papers have reported a significant negative influence of younger children on the training participation (Booth, 1991; Cloutier et al., 2008). These gender differences may be explained by the role women play in the household and childrearing. Women tend to carry the majority of the burden and responsibilities of having children and therefore may be affected negatively in terms of training participation (Booth, 1991). From the perspective of the company, an employee with children has been found to be less likely to receive training than those without children (Maximiano and Oosterbeek, 2007), but also be confronted with a higher demand of training from the employee's view.

Less frequently than personal related determinants, job related factors have been investigated in past literature. Starting with the hierarchical position of a worker within the company, many of the papers investigating this relationship report a positive and significant influence of a higher hierarchical position on training participation (Arumlampalam et al., 2003; Green, 1993; Greenhalgh and Stewart, 1987; Renaud et al., 2004 and Tharenou, 2001). One paper that investigated the determinants of training participation in Singapore reports a significant negative influence of the managerial level on training participation, whereas for employees a positive influence of their hierarchical status on training participation was observed (Thangavelu et al., 2011).

An additional, little investigated factor is the influence of organizational tenure on the probability of receiving training. Those which include tenure in their models report different findings. Two papers identified a turning point where the training behavior changes based on the years of company tenure, being positive for employees who worked less than 21 years (Renaud et al., 2004) or less than 20 years (Thangavelu et al., 2011) for the same company. For employees with longer tenure this influence becomes negative, but only significant in one case (Renaud et al., 2004). In a study based on the European Community Household Panel a significant negative effect was found for people working longer than four years for the same company (Albert et al., 2010). Further research reports a positive influence of tenure on training participation (Krueger and Rouse, 1998; Parent, 2002 and Watanabe, 2010) and is especially true for new employees with less than one year tenure (Leuven and Oosterbeek, 1999). However, none of these papers found a significant impact for organizational tenure on training participation.

Another job related determinant that is not often investigated in literature is employment status. The general expectation would be that motivation to engage in training for fulltime

employed workers is higher than part time employees. The reviewed literature reports a positive and significant influence of being a fulltime employee on training participation in general (Leuven and Oosterbeek, 1999; Maximiano and Oosterbeek, 2007 and Oosterbeek, 1998) and in specific countries such as Germany and Spain (Albert et al., 2010). Differentiating between genders in one study resulted in the finding that part-time employment affects women differently than men. This research found that working part time had a significant negative effect on women's participation in training (Booth, 1991).

The only employer related determinant included is company size. This determinant is not often used as a predictor for training participation. Although not very often used, the few papers using it report a positive significant influence of company size on training participation (Albert at al., 2010; Maximiano and Oosterbeek, 2007; Montizaan et al., 2010; Tharenou, 2001 and Watanabe, 2010). This means the more employees the company employs; the more likely it is for the employees to participate in training. This effect was found to be especially important for on the job training (Green, 1993) and for women in larger companies (Booth, 1991). None of the reviewed literature reports a negative correlation between large companies and training participation, resulting in a clear perception of the influence of company size.

4. Predicting participation in training based on certain determinants

In this subsection, the individual determinants will be sorted into three different groups according to their characteristics. The three groups are person related determinants, job related determinants and employer related determinants. Furthermore, a fourth group will serve as a group for additional determinants that cannot be matched with any of the aforementioned groups.

4.1 Person related determinants

4.1.1 Age

The age of the individual potential trainee seems to be of significant importance in predicting training participation. Ben-Porath (1967) explained the decrease in training participation of older workers with a reduced need for further education. Furthermore, the longer an employee has worked, the more human capital should have been acquired, leading to a decrease in the marginal utility of further training. In addition, the older employees become, the less time they have available to reap the benefits from additional training, making the costs for training exceed the benefits. This explanation receives support from the human capital theory by

Becker (1962), implying that profitability of training decreases sharply with age. According to Becker this can be explained by the fewer years older workers have to amortize their investment in further training.

Cully et al. (2000) found that the access to job related training varies between different age groups within society. They found strong evidence that older workers are less likely to be trained or even gain access to training when compared to younger workers. This may be a sign that training needs to be specifically tailored to older workers. Cully et al (2000) found that age can be a barrier to training, such that people often maintain the stereotyped view that older workers are less productive than younger workers. According to Cully et al. (2000), and studies undertaken by Steinberg et al. (1996, in Cully et al., 2000) show significant proportions of employers describing their older workers as 'hard to train'. This study receives support through findings in Colquitt, LePine and Noe (2000), where a significant negative correlation was found between age and motivation to learn for job-related mandatory training. This finding suggests that the motivation to participate in training is higher for young workers and may decrease with age.

Another viewpoint describing employer attitude towards age is that many managers believe that it is more difficult for older workers to acquire new skills which makes training more cost and time consuming. However, it is not only the employee's view that is the cause for differences in the participation of older workers in training. An additional barrier is the worker attitude, such that older workers may see no reason for further training. This finding is consistent with the findings of Guthrie and Schwoerer (1996) that employees who are in late career stages indicate more often to not have the need for further training. This finding also matches with the traditional model of the human life cycle of earning by Ben-Porath (1967).

This viewpoint of less effective training depending on a certain age group is also addressed in Tharenou (2001). He investigates how training motivation is influenced by the participants' expected value of the training. In this sample the training motivation was higher for younger staff rather than for older employees. This motivation difference was caused by expectations about training. This finding is congruent with the findings of Montizaan et al. (2010) who investigated the assumption that according to human capital theory older workers are less likely to receive further training. This disparity in workers receiving training is because of the lower present value of returns in human capital investment, leading to a preference of younger trainees rather than older workers.

Green (1993) found that for males training participation declines significantly with age. Older employees tend to prefer to invest less time in further training and more time in working, especially when the training is classified as on-the-job training. Greenhalgh and Steward (1987) found in the National Training Survey in Great Britain that the probability for employees to receive training declines sharply with age, referring again to the prediction of human capital theory. In their study the probability of receiving training decreased by 6% for both genders due to marginal effects of further training.

4.1.2 Gender

While in early theories such as Ben-Porath and Becker the influence of gender on training was not taken into account, it has become an important factor for the prediction of training participation. With an increasing proportion of women in the workforce following the early works of economists on training, the gender aspect has to be taken into consideration. Green (1993) defines the different treatment of workers caused by their sex as 'market discrimination'. This kind of discrimination occurs when male and female employees have an unequal chance to access training, keeping all other influences constant. This also refers to the same level of existing human capital through prior training and education.

In addition to Green (1993), empirical results from Veum (1993) show that in general males tend to engage in further training activities much more frequently than women. Renaud et al. (2004) explained the observation of this gender effect by the segmentation market theory. This theory predicts that women 'would be confined to occupations and industries where technological change is not very significant'. Men would therefore rather be concentrated in occupations that require a higher ability to adapt to changes and also require more knowledge (Renaud et al., 2004). Even though the proportion of women in senior management positions is increasing, the majority of these positions are occupied by men. In addition, more service-related jobs are traditionally occupied by women. The latter have generally less significant training content than the first, which are occupied by men. This observation supports the theory of sorting into occupations by gender.

The observation that men are more likely to engage in training can also be explained by the fact, that women have a higher probability of experiencing career interruptions due to pregnancies (Oosterbeek, 1998). This higher chance of career interruptions makes it more risky for firms to invest money in the training of women compared to men.

According to Arulampalam et al. (2004) similarities in the overall training frequency of men and women hides opposing effects of men and women in regards of characteristics and expected returns. On the one hand gender gaps in the probability of receiving training might be caused by different characteristics of men and women. On the other hand this variance might be due to differing returns to very similar characteristics. It is suggested that women have a higher probability of experiencing effects such as lifelong learning during their entire career and not only partial learning patterns at the beginning of their job (Arulampalam et al., 2004).

Regarding the gender of the potential trainee, it is less the viewpoint of the employee that is pivotal for the decision to engage in further training, but the employer's perspective. For example, Booth (1991) found the existence of a number of differences in the provision of training depending on gender. In this study Booth found that men are more prone to have a lower chance to be offered further training than women after they experience months of being unemployed. While being unemployed had a significant negative impact on the training probability for men, this influence was not significant for women (Booth, 1991).

Greenhalgh and Steward (1987) found in the National Training Survey in Great Britain that women received significantly less full-time training than men do. This happens as well when women first enter the labor market.

4.1.3 Educational Level

However, individual unchangeable factors, such as gender and age are not the sole influence on the probability that employees will engage in further development activities. According to Becker's human capital model (1962) the theory should predict that employees with lower levels of education benefit more from further training than those with a higher level of initial education. These higher marginal benefits are caused by the assumption that the increase of output and performance is higher for less educated workers than for higher.

Contrary to this observation the studies of Green (1993), Baker and Wooden (1992) and Belzil and Hansen (2002) found that the more educated the employees are, the more they participate in further training. A traditional and theoretical explanation by Mincer (1994) is that employees with a higher initial level of education have already shown their aptitude and willingness to participate successfully in further training. Since training is directly related to costs for both employee and employer, only a successful training program provides both parties with benefits. Because less educated employees may not have shown initiative to

undergo further training procedures, training these employees yields a higher risk for the employer. Therefore this reasoning leads organizations to offer more training to employees with high education than to lower educated employees (Renaud et al., 2004).

Renaud et al. (2004) introduce interesting differentiation between the types of training offered by the employer. By differentiating between mandatory training and non-mandatory training, Renaud et al. (2004) found two different relationships between the level of education and training participation depending on the kind of training. While they based the prediction of the participation in non-mandatory training on Becker's human capital theory, they also showed that this prediction does not hold for the participation in mandatory training. When looking at the participation in non-mandatory training activities, the findings in Renaud et al. (2004) suggest that the more an employee is already trained, the less profitable the investment in non-mandatory training is from the employer's viewpoint. However, in the case of mandatory training, generally the employees with high education receive more training and have better access to further development than those with low education.

The strong positive correlation between level of education and probability to receive training is further described in the literature (Asplund, 2005). According to Asplund the positive association between acquired formal training and further related training receives strong support from individual-level analyses as well as employer-level data. Bartel and Sicherman (1998) argue in their study that this effect could receive improvement through simplification of learning processes. This would increase the value of training for less educated, by improving the efficiency of time spent on education.

Although the later argument is relatively convincing, some researchers (Oosterbeek, 1998) argue that the observed effect could be related to sorting issues. The positive correlation could be caused by self-selection problems within the individual analyses. Oosterbeek (1998) argues that better-educated employees generally have a higher return on their investment in training and therefore tend to have a higher motivation to engage in further training than lower-educated employees. According to Asplund (2005) the level of education is irrelevant from the company's perspective, which is supported by findings from the Organization for Economic Co-operation and Development in 2003. This would make the influence of the education level a demand-driven determinant rather than a supply-driven. In other words, the importance of the educational level is only based on the employees' viewpoint. While the supply of training by the employers does not vary with the level of education, the demand for further training is much lower for less-educated workers (Asplund, 2005). Furthermore,

employees in positions with high skill requirements already signaled their better learning capacities and qualify more for training from the employers' perspective than lower qualified workers (Brunello, 2001), creating potentially a "virtuous cycle" in human capital investment where better educated workers receive more training and the gap between worker increases (Lynch and Black, 1998; Frazis et al., 2000)

Fouarge et al. (2010) analyzed why low-educated workers invested less time and money in further career development by using data from Dutch workers and the Lifelong Learning Survey of the Research Centre for Education and the Labour Market (ROA), including information about the workers' preferences with respect to training. This paper found that the economic returns workers derive from participation in training does not differ between education groups. In addition, workers' willingness to participate in further training is influenced by economic preferences such as future orientation as well as by personality traits, for example economic locus of control or openness to experience.

4.1.4 Family Responsibilities

Based on the theories that each individual has to allocate the available time to different activities, the influence of additional family responsibilities can potentially impact the allocation of time to other activities such as training. The need to allocate the optimal share of time to both job and family might result in stress and a conflict of the different roles of an individual (Mark, 1977). Being stressed about allocating time between these two roles might inhibit the individual's willingness to participate in training, which would mean to increase the share of non-family time. This conflict between job and family can be even increased with the existence of children (Lorech et al., 1989).

The existence of children affects men and women differently in theory. Due to traditional role models, women tend to be more likely to have a bigger share of family responsibility than men (Aryee, 1992), decreasing the time available to invest into further education and job progression. Supporting this approach Tharenou (1997) explains the lower number of women participating in training by the observation that in a partnership women are much more committed to family-caring responsibilities than to paid labor. This observation might explain why women participate less in training activities when they are married and have younger children to care for, but it does not provide a general framework for the impact of spouses or children on both genders in general.

4.2 Job-related determinants

4.2.1 Hierarchical Position

A direct correlation can be seen between the educational level of an employee and the hierarchical position within the company. Higher positions within a company's hierarchical structure require the existence of certain qualifications. These qualifications are expressed in the level of education. One explanation for this relationship could be that training provides the employee with a position-related advantage over other employees at the same job level. This advantage becomes increasingly important when moving up the hierarchy of positions within a company (Renaud et al., 2004). Generally the intensity of training and the importance for job-related development increases with higher positions. Based on this relationship it becomes more important for employees with higher hierarchical positions to engage in training and also be provided with training opportunities.

Technological change can be a factor influencing the need for formal job-related training depending on the hierarchical position maintained by the potential trainee. In a study with young males working in the manufacturing industry in the US, Bartel and Sicherman (1998) found significant differences in the amount of training received between low and high hierarchical workers. While for low level workers the technological change did not have a strong impact on their output and performance, high level craftsmen in the same industry required more formal training in order to remain productive (Bartel and Sicherman, 1998).

In a study which compares the differences in received training between employees in management and non-management positions, Keys and Wolfe (1988) found evidence supporting the theory that higher hierarchical level workers are more frequently trained than their lower coworkers. In revising the literature on managerial training they found indicators that non-managers are less often trained than managers (Keys and Wolfe, 1988). Support and an explanation for this higher training can be found in Wexley and Baldwin (1986), who described the high need for specifically trained managers. Because managers have to be much more specialized, have more responsibilities, skills and occupations, this training cannot be undertaken by a general educational institution but has to be performed on the firm level. This would ensure the managers can be specifically trained for the appropriate purpose and the needs for the position.

4.2.2 Organizational Tenure

In order to understand the influence of organizational tenure on the participation behavior of employees the human capital theory posits that more recently employed workers tend to have a higher motivation to be trained. This perspective suggests that workers with lower organizational tenure are motivated by the prospect of achieving higher positions by increasing their stock of human capital (Maurer et al., 2002). This steep learning curve within the first year of employment observed in a firm operating mainly in the service sector (Shaw and Lazear, 2008) shows that training participation is relatively high in the beginning of an individual's career within the same company.

This high motivation to participate in training can decrease with more work experience within the same company. Models based on this behavior predict a negative influence of organizational tenure on training participation at a certain point (Albert et al., 2010 and Tgangelu et al., 2011), where the participant's job does not require additional training, resembling a saturation similar to Ben-Porath's human capital model. At this point of saturation the employee is more likely to maintain his human capital and reap the benefits from past training than to engage in new training involving opportunity costs. Based on this behavior a non-linear relationship between the training probability and organizational tenure can be expected (Renaud et al., 2004).

4.2.3 Employment Status

According to human capital theory the likelihood of an employee to invest in further training depends on the expected benefits of the training. Part-time workers invest less in additional training because of lower expected benefit from the activity. Simultaneously employers invest less in employees that would just partially benefit from the new skills acquired due to less working hours per week in part time employment (Nelen, 2012).

In a study by Greenhalgh and Mavrotas (1996) no differences regarding gender could be found, both men and women who were employed part time had a significantly lower participation rate than their fulltime counterparts. For part time workers the probability of engaging in training increases when their specific contractual hours increase (Maximiano and Oosterbeek, 2007). This reduces the gap between fulltime and part time workers in terms of working hours and increases the willingness to invest in further development for both the employee and the firm.

Another theory providing an explanation is that many part time workers have time constraints. If these existing time constraints motivate an employee to choose a part time job rather than a full time job (Greenhaus et al., 1989), it is very likely that due to this time constraint the available time for further training is also limited. This limitation would lead to a lower probability for part time workers to participate in off the job and voluntary training. Confirming this assumption a significant and negative correlation between time constraints and learning motivation for employees was found (Birdi et al., 1997).

Furthermore, when observing the discount rate suggested by Becker (1964) it becomes apparent that individuals with lower discount rates invest less in potential future increases in income. Transferring this behavior to the employment status it can be supposed that part time workers invest less in their future because it would be less beneficial for them caused by less working time to begin with. It is important to differentiate between voluntary part time workers and those who work involuntarily part time. This differentiation performed by the OECD (2003) reports that employees working involuntarily part time have a similar demand and preference of training than full time workers.

4.3 Employer related determinants

Generally, a larger firm size is associated with more training opportunities and wider development possibilities. This assumption was confirmed by investigating the influence of the size of the company on training participation which resulted in an observed positive effect of the company size in general (Asplund, 2005) and especially for women (Booth, 1991). Furthermore, bigger companies tend to have a much higher demand for individually specified employees and more means to accomplish the higher costs of training (Knoke and Kallenberg, 1994). Different approaches to explain why larger firms provide more training are that larger companies have a more formalized job structure and internal labor markets as well as these companies operate in environments that encourage and demand investment in training (Knoke and Kallenberg, 1994).

Available results from the literature suggest a positive relation between the size of a company and the frequency training is offered to the employees (Barron et al., 1989). A different approach is to suggest a curvilinear relationship between size and training, which means that the smallest and largest companies provide the majority of the training to their employees (Brown, 1990).

An increase in company size coincides with an increase in the costs of training and capital investment in the employees as well as greater cost of monitoring employees (Barron et al., 1989). These higher costs for larger companies tend to be equalized by a more efficient use of human capital development activities. In order to make up for the high costs of monitoring and selecting new employees, these new workers are better and more often trained to increase their performance and output, which benefits both the company as well as the employee (Barron et al., 1989).

4.4 Other determinants

A different approach to analyze employee's motivation was undertaken by Bartel (1995). By analyzing the relationship between on-the-job training and worker productivity, Bartel (1995) found that the relative status of the employee can be used as a predictor for the probability of receiving training. The relative status of employees was measured by the relative ratio of their salary in comparison to others performing the same job. One of the findings from this paper is that employees with a high relative salary are much more likely to receive training within a year than those with lower relative income (Bartel, 1995). Furthermore, training showed to have a significant influence on wage gains within a year after receiving training, increasing the wage of the participant even further. In addition to this employer support can be seen as a strong predictor for workers' motivation to engage in training and therefore directly linked to their participation in further training (Tharenou, 2001).

In order to gain understanding of the employee's decision to engage in training instead of the employer's perspective, Hicks and Klimoski (1987) investigated what factors could affect potential trainees in their decision to participate in training. By using data from a large not-for-profit research and development organization in Ohio, USA, the authors analyzed the training participation of managers and supervisors. In their experiment Hicks and Klimoski (1987) manipulated the prior information received by employees before the training in order to find significant influences. Though not significant, the results showed a trend that the degree of choice influences the perceived efficiency and the transferability of the training program. This study showed that not only personal aspects of the trainee enter into the decision process to receive training, but also determinants such as perceived benefit and provided information.

An often used approach is to determine the influence of training on an individual's health in order to analyze the impact of physical activity on the well-being of the person. Interestingly very little is known about how health related determinants might influence the participation in

work related training. With the assumption that a person who's health is in a bad condition feels less energized and motivated, these health determinants could influence the decision to engage in training. In order to sustain a healthy and productive workforce, many Human Resource Departments use special plans within the framework of Health Management. Having a healthy workforce might increase productivity, but the impact of health management and the health status of individuals have not been investigated much in economic literature. The following analysis will therefore include health related determinants to provide information that could help to close this gap.

5. Determinants of training participation in Germany using SOEP data

5.1 Data

For the empirical part of this paper the SOEP is used which is a representative panel survey of the adult population that is resident in Germany. Beginning with the first wave in 1984 this annually conducted survey includes a representative sample of around 4,500 households. Similarly created after the US Panel Study of Income Dynamics, the SOEP includes extensive information on household composition and demographics. Further information and measures included are labor market information, income, health information and a variety of questions regarding individuals' attitudes (Wagner et al., 2007). Consisting of a fixed set of questions from the core questionnaire, different topics of interest are measured each year by special modules of questions on these topics. For this analysis the wave of 2008 is used, providing the information from the module on continuous training. The majority of the interviews for the SOEP are conducted in March and April of each year.¹

These training questions were raised to all participants aged 18 until 65, irrespective of their status of employment. For the purpose of this paper, only measuring job-related employer organized training, those participants who were unemployed, self-employed, trainees or fulfilling mandatory military or civil service duty were excluded from the sample. The reason for leaving out the unemployed is based on the potential sponsoring of training by the German unemployment insurance institution. In the 2008 wave participants were asked to respond to the question "Think back on the last three years. Have you in that time period done any of the following to further your professional education?" with the option to state "Participated in professionally oriented courses, including those which are still in progress". This question

¹ Additional details can be found at <http://www.diw.de/english/soep/> (last seen 22 July 2012).

creates the basis for any further analysis of determinants of training participation within the sample.

Furthermore, the SOEP wave of 2008 included several questions about the participants' health. Responses from this module will be used in the analysis to control for health related determinants in training behavior, an analysis that has not been done in literature before.

5.2 Research Questions

The reviewed literature predicts certain determinants to have a positive or negative influence on the probability that an employee receives company-paid training. Based on these predictions the situation in the Germany labor force is analyzed by using representative panel data.

Person related determinants

The research question for the personal determinants focuses on age, gender, education and family responsibilities including marital status and children. Based on the reviewed literature age is expected to have a negative influence on the training probability and higher education a positive influence. For gender the reviewed literature (f.e. Booth, 1991; Albert et al., 2010 and Renaud et al., 2004) suggests a mixed influence but tends to predict that male employees participate more in training than their female coworkers do. In the following analysis we will investigate the influence of these determinants on training participation.

Job related determinants

The determinants mentioned in the literature review as being job related are analyzed and additional determinants are added to improve the model. A higher hierarchical position is expected to have a positive influence on the probability of receiving further training. According to past research (Parent, 2002; Krueger and Rouse, 1998; and Watanabe, 2010) organizational tenure is expected to have a positive influence for a certain amount of years (Renaud et al., 2004 and Thangavelu et al., 2011) and after these years to have a negative influence on the chance to receive training. Since the present analysis does not differentiate between two possible phases the influence of organizational tenure is expected to be positive since the majority of workers have not reached the changing point of 21 years mentioned in Renaud et al. (2004).

In terms of employment status an employee who works fulltime is expected to be more likely to receive training. In addition to these determinants, the analysis includes the income, the

income per hour and the working hours per week of the individual. A higher income is expected to increase the willingness of employees to be trained since wage-gains are higher. A higher income per hour would increase the opportunity costs of time spent in training and is therefore expected to have a negative influence on training participation. The same expectations hold for working hours per week. On the one hand a high amount of hours worked per week might make the employee value free time higher than the benefits that could be reached through off-the job training. On the other hand a higher amount of working hours might be connected with higher income and therefore increase the wage-gains and the willingness to engage in training.

Employer related determinants

In terms of employer related determinants only two different factors enter the model. Because bigger companies might tend to have the capacities to train and also the need for more high trained employees, the effect of company size on training participation is expected to be positive. Furthermore, location within Germany is expected to have an influence on the participation in further training. Since the industry of Germany is more concentrated in the western part of Germany, part of the old federal states of Germany, the companies' demand for continuous training of their employees is expected to be higher.

Health related determinants

In the group of health related determinants many different factors enter the model. Self reported health is expected to have a positive influence on training participation since individuals who do not feel well might have a reduced willingness to engage in training. Additionally, the model differentiates between physical health problems and mental health problems, for which both the predominant expectation is to have a negative influence on training participation. Physical health problems could also have a positive influence on training participation, because individuals suffering from physical health problems might feel the need to increase their human capital stock to get promoted and work at less physical demanding jobs. The same motivation yields for the companies' drive to train employees who suffer from physical health problems.

With increasing absence from work, employees might tend to be rather focused on achieving their working goal and therefore spend less time in additional further training activities. Based on this reasoning a higher number of sick days is expected to have a negative influence on the training participation of the worker.

Individuals who lack sleep are expected to participate less in training activities because of exhaustion effects, which makes them prefer leisure time over additional time at work. Lack of sleep is therefore expected to have a negative influence on the participation in training.

Perceived health also depends on an individual's diet and on other health related customs and behaviors such as smoking and the regular consumption of alcohol. Individuals who are concerned about their diet and therefore consume rather healthy food might feel more energetic and have more mental and physical strength to engage in further training and development activities. Therefore, following a health conscious diet is expected to have a positive influence on training participation. In addition to a health conscious diet, being overweight or obese might influence the wellbeing of the individual and therefore the willingness to participate in training. A higher Body Mass Index (BMI) is therefore expected to have a negative influence on training participation. The regular consumption of alcohol and cigarettes is expected to have a negative influence on the training behavior, since both harm the potential participant's health.

Furthermore, the more often an individual has to visit a doctor and the more days a person spends at the hospital are also expected to influence the willingness to engage in training. Both determinants are expected to have a negative influence, because a person with a higher number of days spent at a hospital might not feel motivated to train and rather focus on accomplishing the original job related workload.

5.3 Description of the determinants and variables used

5.3.1 Person related determinants:

Age

The variable age is derived by simply subtracting the year of birth from the year of the survey, which in this case is 2008. The variable age is a continuous variable with the minimum of 18 years due to the setup of the SOEP panel, asking only individuals who are adults. Furthermore, the variable age squared is included to analyze the influence of age as a non linear relation to training participation.

Gender

To express the gender variable, a dummy is used. This dummy variable has the value 1 if the individual is female and the value 0 if the individuals' gender is male, creating a dichotomous variable.

Marital Status

For the marital status a dummy variable is used which helps to differentiate if the individual is in a serious relationship or not. The main reason to introduce this variable is to determine whether the individual is responsible for more than one person in their household or if the individual is only responsible for himself. Being not only responsible for themselves, individuals with spouses or serious relationships might have a different attitude towards risk, which could be influential for participating in training. This variable equals 0 if the individual stated to not have a partner, to have probably a partner or a spouse, or to have a partner whose id is unknown. These cases do not fulfill the character of a serious relationship combined with responsibility of a combined household. In contrast, if the individual stated to be in a serious relationship or married with a spouse the variable for marital status equals 1.

Children

Similar to the marital status variable the variable for children differentiates between individuals with children and those without any children. The existence of children of the individual could go along with an increased responsibility and less flexibility. On the one hand having children to care for might increase the importance of the career to earn more money in order to be able to afford a good life for the family. On the other hand individuals with children might be less flexible in terms of working hours or working place, which could influence their willingness to engage in training. This variable is a dichotomous dummy variable where 1 indicates the existence of at least on child and 0 the absence of any children, for whom the individual is responsible.

Education

The variable for education is a continuous variable based on the qualification obtained by the individual. Starting with the minimum amount of 7 years spent in education, the number of years increases the higher the individual's qualification are. For no degree this variable equals 7 years of education, for a lower school degree 9 years, an intermediary school degree has the value of 10 years, a degree from a professional college values 12 years and a high school

degree 13 years of education. In addition to these school degrees, education increases for individuals who completed an apprenticeship by 1.5 years, for a technical school by 2 years, for a higher technical college by 3 years and for a university degree by 5 years. If the individual is still involved in the education process, two years get deducted from the full amount of years. The maximum of this variable is therefore 18 years of education, while the minimum is 7 years. A higher level of education could signal the employee that the individual is capable of acquiring new skills and knowledge in a successful and efficient manner and therefore increase the chance of a successful training participation. This increase of the chance to improve the human capital and output might on the one hand encourage the employee to offer more training to individuals with higher levels of education. On the other hand the already high stock of human capital could make it less attractive for the employee to engage in training because of decreasing marginal benefit from additional training on wages.

5.3.2 Job related determinants

Income

To enter the variable for income three kinds of different income are considered. The first type of income entering this variable comes from wages or salaries as employee, including wages for training and sick time. Secondly, income from additional employment or second jobs is added to the income variable. Since the SOEP questionnaire asks about the income from the previous year, the wave of 2008 includes only the income from 2007. This procedure allows deriving a more detailed impression of the individual's income, avoiding misinterpretations through seasonal work. The individual stated the number of months where he received the specific type of income as well as the gross amount per month in Euros. In order to maintain a comparable value, the average income per month is derived by multiplying the gross amount per month with the number of months worked. The resulting amount is divided by twelve to have the average income per month. This procedure takes place for each of the three types of income. Finally, the three values for each income category add up and enter the model as the continuous variable income.

Income per hour

In order to estimate the opportunity costs for one hour of training, the income per hours was estimated. This continuous variable takes the income per month divided by the average number of weeks in a month which equals 4.33. Deriving the income per month allows dividing this income by the average number of hours worked per week. This results in the

income per hour for the individual which can be used to express the personal opportunity costs for the individual. With higher opportunity costs the individual might be less willing to engage in training because it is costly. On the other side, a high income per hour could be increased through further training, motivating the individual to participate in training in order to increase wages.

Working hours per week

The variable of hours worked per week can be derived by looking at the annual data on actual weekly working hours. This amount of hours includes overtime for all persons employed at the time the survey was performed but excludes those who are self-employed or trainees. Participants were asked how many hours they worked on average per week. Additionally, implausible answers such as weekly worked hours that exceed 80 were excluded from the data. Although participants had the chance to report their working hours as three digit numbers, the hours used for the variable are rounded off. A high number of working hours per week could decrease the willingness of individuals to participate in off-the-job training, especially when family responsibilities collide with an already high share of time spend at work. Individuals with such a position might have an increased motivation to participate in on-the-job training.

Organizational tenure

The variable for organizational tenure shows the length of time the individual is employed at the current position. It is designed to show how long all employed persons are at the same company at the point of the interview. In case of a job change within the company this continuous variable is continued since the individual is still employed by the same company. The reason for including this variable is that previous literature shows mixed effects for this particular variable. On the one hand employees who work for a company for a certain time might have earned the trust and therefore the privilege to be trained by the company. On the other hand it could be possible that with increasing organizational tenure the employee could have already acquired a sufficient amount of general and specific training, decreasing the marginal effect of additional training.

Employment status

The variable employment status is generated based on the question in the SOEP data that asks about the current labor market participation, which filters the participants into employed and

non-employed individuals. A dummy variable is used to describe if the individual is employed fulltime or part-time. The variable equals 1 only if the individual answered with “full-employment”. For the other options “regular part-time employment”, “vocational training”, “marginal, irregular part-time employment”, “not employed” and “sheltered workshop” the variable equals 0, since no full time employment can be accounted. The employment status could be important in the individuals’ decision to participate in training and the employer’s willingness to train these individuals. This unwillingness might be caused by less commitment by the part-time workers and less efficiency in terms of cost-benefit-ratio for the company.

Hierarchical Position

In order to measure the hierarchical position the individual maintains within the company three dummy variables were created. The information is based on one specific question from the SOEP data asking about the job performed by the participant and excludes self-employed workers. In the case of more than one job, only the main job was reported. The first dummy variable, worker, equals 1 if the individual is on a worker level, including untrained workers, semi trained workers, fully trained workers, team leaders and foremen. The second dummy variable, employee, equals 1 if the respondent stated to be a foreman in a salaried position, a employee with simple duties, a trained employee, a employee with qualified duties, a high qualified employee or in a management position. The third dummy variable stands for civil servants and equals 1 if the respondent is any level of civil servant, including judges and professional soldiers.

5.3.3 Employer related determinants

Company size

The variable company size is based on the question of how many people are employed at the individual’s company. The original question has seven different options, ranging from 0 to more than 2,000 employees, but two of these options get combined for this analysis. Based on this six different dummy variables state the firm size of the company the individual is employed at the time of the survey. The dummy variables equal 1 for each of the cases (less than 5 employees, 5-20 employees, 20-100 employees, 100-200, 200-2000 and more than 2000 employees). Bigger companies could increase the likelihood of training offered because of a higher demand for qualified workers and in-company recruiting.

Part of Germany

In order to determine if the participant's place of work is in the western part of Germany or in the eastern part, a dummy variable is introduced. This variable equals 1 if the place of work is either in one of the old federal states of Germany or in the west of Berlin. If the working place is located in the new federal states (former GDR) or in the east of Berlin, the variable equals 0. This variable is included because most of the economic power of Germany is located in the old federal states and if more productive companies are located in this part, the demand for training could be higher. On the other side, it could be possible that the marginal effect of training workers in the new federal states is higher and therefore a better investment from the companies' perspective.

5.3.4 Health related determinants

Self reported health (good=1)

In order to measure if a participant perceives his own state of health as positive the answer to the question "How would you describe your current health" is used to create a dummy variable. This dummy variable equals 1 if the individual stated to be in very good, good or satisfactory health, expressing no concern about his health. If the response to the question was either poor or bad, the dummy variable equals 0 and the individual's self reported health is perceived as negative. Including self-reported health allows getting an insight in the well-being of the individual. While individuals who report a good health might be more motivated and energetic, for individuals with a poor health it could be the opposite. This level of energy and motivation might have a direct influence on the willingness to participate in training.

Physical health problem (yes=1)

In order to differentiate between problems concerning physical and mental health problems the following two dummy variables are introduced. If the individuals responded to the question if they achieved less at work or were limited in some form at work during the four weeks prior to the survey if either always, often or sometimes, the dummy variable physical health problem equals 1. If the answer in both categories was either almost or never, the participant does not report physical health problems that affect him in his working performance the dummy variable equals 0. Individuals with physical health problems could be so focused on their health problems that the preparedness to engage in training is minimized. Alternatively physical health problems could increase the willingness to engage in training, allowing the individual to perform a job that includes more mental and less physical work.

This change of job could be facilitated through a training program leading to a promotion for the individual.

Mental Health problem (yes=1)

In line with the prior dummy variable the participants were asked if due to mental health or emotional problems they were affected in their work performance. If an individual answered with always, often or sometimes in at least one of the two categories the dummy variable equals 1. If this is not the case the person does not perceive or report mental health problems, resulting in a dummy variable equals 0. Including a variable for mental health problems provides a measurement which is capable of differentiating between physical and mental health problems. A physical health problem can become a mental health problem over time and may have an impact on the individual's willingness to engage in training which may lead to potentially more stress.

Number of Sick days

The variable for the number of sick days is a continuous variable that is directly derived from the question how many days the individual was not able to work in 2007 because of illness. The individual was asked to state all sick days and not just those with an official note from a doctor. Including the number of sick days allows a have another measurement for a person's health. A high number of sick days with self reported good health might be interpreted as a person who perceives his health from a different reference point. The number of sick days could help to differentiate between perceived health and actual health.

Lack of sleep (yes=1)

The variable for lack of sleep is a dummy variable derived by comparing the hours of sleep on weekdays with those on weekends. The first condition is that the individual sleeps less than 8 hours on workdays. In order to filter out individuals who need less sleep because of a more active lifestyle or a different working metabolism the number of hours slept on workdays was compared with those on weekends. Therefore, the second condition is that the difference between the two kinds of sleep exceeds two hours. For example if the person sleeps on average six hours during the workdays and eight or more hours during the weekends, this would show a lack of sleep during the workdays. In this case the dummy variable lack of sleep equals 1. If the individual receives sufficient sleep during workdays or the variance between the sleep on workdays and weekends is minimal the variable equals 0.

Health conscious diet (yes =1)

The variable for a health conscious diet is a dummy variable directly derived from the question in the SOEP survey. If individual stated the extent of following a health conscious diet either as very much or as much, this dummy variable equals 1. In the case the response is not so much, or not at all the variable equals 0. Following a health conscious diet could be interpreted as a measurement for risk-preference. Individuals who are rather risk-avoiding would prefer to consume rather healthy food in order to decrease the risk of heart attacks and other diet related illnesses. Also individuals with a high level of stress and many working hours could simply not have the time to follow a health conscious diet, since an office might not provide ideal circumstance for such a diet.

Body Mass Index

The variable for the Body Mass Index is derived by dividing the participant's current weight of the by his the squared height. This continuous variable is used as a heuristic proxy for the body fat content of the individual based on accessible and self-reported measurements of weight and height. Including the BMI in the model provides more information regarding diet and health conscious life style. Although the BMI may not be the best indicator for some groups of people, such as professional bodybuilders, using the BMI as a proxy increases information about the individual's health.

Smoking (yes=1)

The variable for smoking is a dummy variable which measures if the participant smoked cigarettes, pipes or cigars at the time of the survey. This variable equals 1 if the individual stated any average number of smoke ware consumed on a normal day exceeding zero, identifying this person as a smoker. If the person stated to not smoke any of the aforementioned the variable equals 0. Including the variable smoking provides an improved insight in the individuals risk attitude. Smoking might be seen as a sign for risk-seeking behavior since it directly influences future health in a potentially negative way. Furthermore, smoking can be seen as an indicator of the individual's discount factor, preferring the short-term pleasure from smoking over the long term benefit of a potentially healthier life.

Alcohol (yes=1)

Analogous to smoking behavior a dummy variable for alcohol consumption was established to enter the model of health related determinants. In the SOEP participants were asked to state

how often they consume alcoholic beverages such as beer, wine or champagne, spirits or mixed drinks including cocktails. If participants stated to consume one of these four categories on a regular basis, the dummy variable for alcohol equals 1. In the case of occasional, seldom, or no consumption of alcohol, the dummy variable equals 0. Including alcohol consumption as a variable serves a similar purpose as including the variable smoking.

Doctor visits

In order to estimate the number of visits at a doctor's office during the three month prior to the moment of the survey this variable was established. In the SOEP the individuals had to state how often they went to a doctor in the last three month and this self reported number is used for the continuous variable of doctor visits. An individual with a high number of doctor visits might either be chronically ill or very concerned about his own health. A person who is very concerned about health and has many doctor visits might be rather risk-averse and this could also enter the decision of engaging in training or not.

Days spent in hospital (2007)

The variable of days spent in a hospital in 2007 is directly derived from the participants' answers to the question in the SOEP survey. This response creates the continuous variable of days spent in a hospital in 2007. Including the number of days spent at the hospital gives evidence about the absenteeism of an individual. Since staying at a hospital excludes working at the job, this variable could help to get a better insight of the probability to receive training from the firm's perspective. An individual that spent many days at the hospital might have a lower priority to receive training than other employees who worked for more days.

All the used variables for this paper can be observed in Table 2, including their mean, standard deviation, median and correlation with training participation.

TABLE 2: DESCRIPTIVE STATISTICS OF DETERMINANTS USED

Determinants	Mean	Stan. Dev.	Median (dummy: % of 1)	Correlation with training (p - value)
Training (yes =1)	.3329	.4713	33,3%	1
<u>Personal</u>				
Age	42.8140	12.0382	44	-0.0141 (0.1739)
Age squared	1977.947	1032.2	1926	-0.0248*(0.0166)
Gender (female=1)	.4797	.4996	52,5%	0.0147(0.1562)
Marital status (spouse=1)	.7376	.4399	73,8%	0.0210*(0.0429)
Children (>0=1)	.3620	.4806	36,2%	0.0123(0.2368)
Education (years)	12.7457	2.7528	11,5	0.2532*(0.0000)
<u>Job related</u>				
Income	1874.664	1902.15	1600	0.1586*(0.0000)
Income per hour	14.9734	12.9043	12.933	0.1348*(0.0000)
Working hours per week	37.9736	13.3124	40	0.1196*(0.0000)
Organizational tenure	10.9665	10.2973	7,8	0.0597*(0.0000)
Employment status (full-time=1)	.6810	.4661	68,1%	0.0851*(0.0000)
<u>Hierarchical position</u>				
Worker	.2670	.4424	26,7%	-0.2528*(0.0000)
Employee	.5034	.5000	50,3%	0.1395*(0.0000)
Civil servant	.0548	.2277	5,5%	0.1503*(0.0000)
<u>Employer related</u>				
<u>Company Size</u>				
0-5	.0988	.2984	9,9%	-0.0389*(0.0002)
5-20	.1574	.3642	15,7%	-0.0668*(0.0000)
20-100	.1740	.3791	17,4%	-0.0329*(0.0015)
100-200	.0828	.2756	8,3%	-0.0171(0.0981)
200-2000	.1838	.3874	18,4%	0.0274*(0.0082)
2000+	.1984	.3988	19,8%	0.1189*(0.0000)
Part of Germany (west=1)	.8970	.3039	89,7%	-0.0169(0.1030)
<u>Health related</u>				
Self reported health (good=1)	.8904	.3124	89%	0.0140(0.1767)
Physical health problem (yes=1)	.2840	.4510	28,4%	-0.0084(0.4169)
Mental Health problem (yes=1)	.1904	.3927	19%	0.0043(0.6790)
Number of Sick days	7.416	21.2781	1	-0.0066(0.5261)
Lack of sleep (yes=1)	.3360	.4724	33,6%	0.0214*(0.0392)
Health conscious diet (yes =1)	.4679	.4990	46,7%	0.0728*(0.0000)
Body Mass Index	25.7259	4.7819	25.14	-0.0316*(0.0023)
Smoking (yes=1)	.3217	.4671	32,2%	-0.0746*(0.0000)
Alcohol (yes=1)	.2359	.4246	23,6%	0.0185(0.0741)
Doctor visits	1.943	3.2328	1	0.0277*(0.0076)
Days spent in hospital (2007)	1.924	.2653	2	0.0026 (0.814)

Source: SOEP (2008).

Note: Dummy variables are gender, marital status, children employment status, all hierarchical positions, all company sizes, part of Germany; self reported health, physical and mental health problems, lack of sleep, health conscious diet, smoking and alcohol.

* shows significance at the 5% level (p<0.05)

5.4 Results and Discussion

The results for the OLS regression of the model of person related determinants can be seen in Table 3. The probit is more suitable measure because many of the variables included in the models are dummy variables. Since the differences between the results of the OLS regressions and the probit model are minimal the probit analysis with its results can be found in Table 6 (Appendix).

5.4.1 Traditional Determinants

Person related

Age has a positive impact on training participation ($p < 0.01$), whereas age squared has a negative significant impact ($p < 0.01$). Therefore according to this analysis the participation in training increases with age, up to a certain point where the probability of participating in training starts to decrease again. The statistically significant positive coefficient of age and the statistically negative coefficient for age squared would indicate an inverted U-shaped pattern of the age depending on participation in training. This impact of age on training participation remains significant even when controlling for job related and employer related determinants in the complete model. The results from the probit model show the same level of significance and therefore coincide with the findings from the OLS-analysis. This result confirms the observation by Leuven and Oosterbeek (1999) and others (Thangavelu et al., 2011 and Cloutier et al., 2008), who found a positive influence of age on training participation up to the age of 46 years. Furthermore, the result from this paper coincides with the theory of Ben-Porath (1967) that at a certain age of the employee saturation for training occurs. Because of this saturation the share of time invested in training decreases.

The determinant of gender has a positive influence on training participation in the OLS-regression but is not significant. This means that being female could increase the likelihood of participation in further development activities. When controlling for all the other determinants in the complete model this influence becomes positively significant ($p < 0.01$). The same change can be observed in the probit analysis. This means that women have a 4.1% higher probability to receive training than men do according to the OLS regression. This finding corresponds with the findings from the literature (Cloutier et al., 2008; Renaud et al., 2004 and Tharenou, 2001), who found that women are more likely to participate in training. However, in contrast to these aforementioned papers, the analysis in this study does not differentiate between voluntary and mandatory training. It appears that in general women are

significantly more likely to participate in training than men when controlling for personal, job and firm related determinants.

The marital status of an individual has a positive influence on training participation but is not significant even when controlling for other determinants in the complete model. This means that being in a serious relationship could increase the probability of engaging in further training but this potential relationship is not significant.

Having children has a negative impact on training participation for both models, with no significance for the OLS-regression or the probit. Having children therefore does not seem to influence the probability of training.

The variable for education has a significant positive influence on training participation for the OLS-regression and the probit. The positive influence is significant ($p < 0.01$) and remains this way even when controlling for other determinants in the complete model. Therefore having more years of education increases the participation in training significantly. This confirms the findings from the majority of literature on the relationship between education and training. Renaud et al. (2004) found a negative impact of education on training participation for non-mandatory training. Since the analysis in this paper shows a significant positive relationship, most of the training may have been mandatory for the individuals who are included in the dataset for this paper.

Within the person related determinants only age, gender and education showed a significant influence on training participation. Family responsibilities such as being in a serious relationship or having children did not influence the individual's decision to engage in training significantly. With 73.8% of the individuals within this analysis being in a serious relationship and 36.2% having at least one child, it can be observed that self-related determinants are more important than family responsibilities.

Job related

For the job related determinant income, a positive influence was found in the OLS-regression. This influence was significant for both the job model and the complete model ($p < 0.01$). This means that with higher income the probability of participation in further training increases. The probit model confirms these results only with a change of the significance level for the complete model from the $p < 0.01$ level to the $p < 0.05$.

Both determinants income per hour and hours worked per week have a positive and significant influence on training participation for the personal model and the complete model ($p < 0.01$). The probit model confirms this relationship, which means that with increasing income per hour and longer hours worked per week, the training participation of employees and workers increases.

For the OLS-regression and the probit organizational tenure has a negative influence on training, but is not significant in the job model. When controlling for other variables in the complete model the influence of tenure becomes positively significant ($p < 0.01$). This means that the longer an employee has worked for the same company, the higher the chance of receiving training becomes.

Being a fulltime employee has a negative effect on the participation in training activities for the OLS-regression in both job and complete model. In both cases the OLS-regression shows no significance for the coefficient. Being employed fulltime has therefore no significant influence on the individual's probability of receiving training. With 68% of the individuals in fulltime employment this result contrasts with the observation in literature, stating that fulltime has a significant positive effect on training (Albert et al., 2010; Leuven and Oosterbeek, 1999 and Oosterbeek, 1998).

In terms of hierarchical position the OLS-regression indicates a negative impact of being a worker on training, but a positive impact for being a civil servant. Both coefficients show to be significant ($p < 0.01$) in both the job and complete model. The probit model confirms these results. This means that being a worker decreases the probability for further training while being a civil servant makes it more likely to participate in training.

Employer related

In terms of company size the OLS-regression produces only significant results for companies with 200-2000 or more than 2000 employees. The influence of these two dummy variables is positive and significant ($p < 0.01$) for the firm model as well as for the complete model. The probit model confirms these findings throughout. This means that being employed by larger companies increases the participation in training. This holds true especially for big companies with more than 200 employees. This result lends support to the theory that larger firms have a much higher demand for individually specified employees and more means to accept the higher costs of training (Knoke and Kallenberg, 1994). Although insignificant the coefficient for very small companies with less than five employees is positive which could possibly go

along with the explanation of Brown (1990) that the relation of size is curvilinear. However, the standard error for companies with less than five employees provides no support for this explanation.

The location of the workplace in Germany is significant ($p < 0.01$) for the firm model and the complete model in the OLS-regression. Being employed in one of the old federal states of Germany or in the western part of Berlin has a negative impact on the participation in training. The probit model confirms this relationship between location of employment and training participation. The fact that 89.7% of individuals are employed in the old federal states of Germany, the negative coefficient of the variable for workplace can be interpreted as a very high demand for training in the eastern part of Germany. It might be the case that the individuals working in the new federal states of Germany are employed by companies that specialize in certain products or processes and require more specific training. The concentration of industry in the western part of Germany could make the knowledge and skills acquired through training easily transferable to different companies. This easier transferability could make training less necessary, leading to less training in total in the old federal states of Germany.

5.4.2 Health related determinants

The results for controlling for the influence of health related determinants on training participation can be seen in Table 4 for the OLS-regression and in Table 7 (Appendix) for the probit model.

When controlling for health related determinants the changes in significant levels are only minimal. In the OLS-regression for example, gender becomes less significant ($p < 0.05$ instead of $p < 0.01$). Similarly, working for a company with 200-2000 employees and being employed in the old federal states of Germany becomes less significant when controlling for health related determinants. The only big change is regarding income in the probit regression. While income is significant ($p < 0.05$) without controlling for health, it becomes insignificant when including the health related determinants.

The only significant influence out of all health related determinant on training participation in the complete model is the variable for following a health conscious diet. The coefficient is positive and significant ($p < 0.01$), which means that following a health conscious diet increases the chances of participating in training by 3%. The probit regression confirms this observation.

Although the majority of health related determinants show to be non-significant, a Wald test or F-test for joint significance provides the information that including health determinants is significantly more predictive of training participation ($p < 0.035$) than not including them. This is also valid for each of the individual models, where personal, job, and employer related determinants are controlled for with health ($p < 0.01$).

When controlling for health in the complete model some variables change while others remain very close to the model without controlling for health. The coefficient for gender decreases by 25% from 0.0409 to 0.0298 when controlling for health. The job related determinants and employer related determinants remain more or less unaffected from the health determinants. This means that when including health determinants the explanatory power of the gender variable decreases. In different words, with health included in the model women only have a 3% higher chance of receiving training than men, while they have a 4% higher probability without controlling for health.

TABLE 3: RESULTS FOR OLS REGRESSION

Determinants	Personal Model		Job Model		Firm Model		Complete Model	
	Coeff.	St.Er.	Coeff.	St.Er.	Coeff.	St.Er.	Coeff.	St.Er.
<u>Personal</u>								
Age	.0171**	.0030					.0183**	.0031
Age squared	-.0002**	.00004					-.0003**	.00003
Gender (female=1)	.0115	.0089					.0409**	.0109
Marital status (spouse=1)	.0144	.0115					.0097	.0115
Children (if children = 1)	-.0168	.0104					-.0103	.0106
Education (years)	.0427**	.0016					.0206**	.0020
<u>Job related</u>								
Income			.00002**	3.19e-06			8.79e-06**	3.36e-06
Income per hour			.0020**	.0004			.0016**	.0004
Working hours per week			.0028**	.0005			.0029**	.0005
Organizational tenure			-.0006	.0005			.0018**	.0006
Employment status (full-time=1)			.0131	.0145			.0029	.0152
Hierarchical position								
Worker			-.2072**	.0153			-.1904**	.0173
Employee			.0255	.0145			-.0156	.0161
Civil servant			.2258**	.0234			.1321**	.0249
<u>Employer related</u>								
Company Size								
0-5					-.0014	.0205	.0006	.0210
5-20					-.0132	.0183	-.0049	.0193
20-100					.0296	.0180	.0189	.0192
100-200					.0312	.0212	.0122	.0223
200-2000					.0876**	.0178	.0521**	.0194
2000+					.1704**	.0175	.1015**	.0193
Part of Germany (west=1)					-.0383**	.0148	-.0396**	.0146
R-squared	0.068		0.097		0.020		0.125	
Number of observations	10491		10526		10793		10067	

Source: SOEP 2008 , Author calculations. ** Significant at the 1 percent level. * Significant at the 5 percent level.

TABLE 4: RESULTS FOR THE OLS REGRESSION INCLUDING HEALTH RELATED DETERMINANTS

Determinants	Health Model		Personal Model		Job Model		Firm Model		Complete Model	
	Coeff.	St.Er.	Coeff.	St.Er.	Coeff.	St.Er.	Coeff.	St.Er.	Coeff.	St.Er.
<u>Personal</u>										
Age			.0163**	.0032					.0171**	.0033
Age squared			-.0002**	.00004					-.0003**	.00003
Gender (female=1)			-.0009	.0101					.0298*	.0119
Marital status (spouse=1)			.0112	.0121					.0076	.0121
Children (if children = 1)			-.0167	.0109					-.0093	.0111
Education (years)			.0415**	.0018					.0210**	.0021
<u>Job related</u>										
Income					.00002**	3.35e-06			7.69e-06*	3.52e-06
Income per hour					.0022**	.0004			.0016**	.0005
Working hours per week					.0031**	.0006			.0030**	.0006
Organizational tenure					-.0007	.0005			.0019**	.0006
Employment status (full-time=1)					.0157	.0152			.0014	.0160
Hierarchical position										
Worker					-.2000**	.0164			-.1822**	.0183
Employee					.0271	.0154			-.0065	.0169
Civil servant					.2128**	.0244			.1304**	.0259
<u>Employer related</u>										
Company Size										
0-5							-.0051	.0217	.0013	.0223
5-20							-.0176	.0195	-.0058	.0206
20-100							.0190	.0191	.0100	.0205
100-200							.0282	.0224	.0121	.0235
200-2000							.0784**	.0189	.0456*	.0206
2000+							.1619**	.0187	.0951**	.0205
Part of Germany (west=1)							-.0335*	.0155	-.0342*	.0153
<u>Health related</u>										
Self reported health (good=1)	.0273	.0171	.0158	.0169	.0176	.0167	.0238	.0170	.0063	.0168
Physical health problem (yes=1)	-.0097	.0122	.0071	.0121	.0151	.0120	-.0057	.0122	.0201	.0121
Mental Health problem (yes=1)	.0104	.0133	-.0006	.0131	.0033	.0129	.0158	.0132	.0002	.0131
Number of Sick days	-.0003	.0003	.0001	.0002	-1.63e-06	.0003	-.0005	.0003	.00003	.0003
Lack of sleep (yes=1)	.0330**	.0100	.0304**	.0100	.0231*	.0097	.0238*	.0099	.0136	.0100
Health conscious diet (yes =1)	.0586**	.0097	.0376**	.0100	.0345**	.0096	.0621**	.0097	.0298**	.0099
Body Mass Index	-.0023*	.0010	-.0002	.0010	-.0015	.0010	-.0025*	.0010	.0003	.0010
Smoking (yes=1)	-.0684**	.0103	-.0279**	.0104	-.0294**	.0101	-.0620**	.0102	-.0146	.0104
Alcohol (yes=1)	.0274*	.0120	-.0004	.0123	-.0160	.0118	.0246*	.0119	-.0082	.0122
Doctor visits(last three month)	.0052**	.0017	.0043**	.0016	.0024	.0017	.0045**	.0017	.0020	.0016
Days spent in hospital (2007)	.0034	.0196	.0093	.0194	.0092	.0191	.0075	.0195	.0080	.0193
N	10024		9670		9720		9936		9322	
R-squared	0.013		0.073		0.101		0.032		0.1279	

Source: SOEP 2008 , Author calculations. ** Significant at the 1 percent level. * Significant at the 5 percent level.

TABLE 5: COMPARISON OF FINDINGS FROM LITERATURE AND REGRESSIONS

Determinant	Literature	OLS/probit	Controlling for Health
Age	-* / mixed	+* (age2 -*)	+* (age2 -*)
Gender (female=1)	Mixed	+*	+*
Education	+*	+*	+*
Spouse	+ / mixed	+	+
Children	- / mixed	-	-
Hierarchical Position	+*	-* (worker) +* (civil servant)	-* (worker) +* (civil servant)
Organizational Tenure	Mixed	+*	+*
Employment Status	+* fulltime -* part time	+(fulltime)	+
Company Size	+*	+* (>200)	+* (>200)

Source: Author calculations, Table 1

6. Conclusion

The main goal of this paper was to provide an overview of the literature on training participation and to add to the understanding of those who participate in training in Germany using SOEP data. The determinants from the literature were divided into four groups: person related determinants, job related determinants, employer related determinants and other determinants.

First it was examined if the literature, based on the three main groups of the determinants, was consistent with the findings from the SOEP data. A visual comparison between finding from the literature and this paper can be seen in Table 5. While the literature suggested a significant negative influence of age on the probability of participating in training, the OLS-regression in this paper indicated an inverted U-shaped pattern of the age depending participation in training. This U-shaped pattern shows an increase in the probability of engaging in training up to a certain age, from which it decreases afterwards. This result confirms the observation by Leuven and Oosterbeek (1999) and others (Thangavelu et al., 2011 and Cloutier et al., 2008), who found a positive influence of age on training participation up to a certain age, followed by a negative influence.

The influence of the gender on the likelihood to engage in training was reported as mixed in the literature. In this study a positive and significant influence of being female on training participation was found when including all determinants. This finding coincides with those papers in the analysis that investigated training behavior for voluntary training. The coefficient of gender was also the only one that was affected by the control for health. When controlling for health the increased likelihood to participate in training for women decreased from 4% to 3%, losing explanatory influence to the health determinants.

The level of education, as well as family responsibilities, such as being in a serious relationship or having children, was found to be consistent in the literature and the reported regression results. Higher levels of education are significantly and positively correlated with higher training participation. For family responsibilities no significant influence could be found in this paper.

While the literature suggests that higher hierarchical level workers are more frequently trained than their lower coworkers, the analysis in this paper showed only significant findings for workers and civil servants. While being a worker had a negative impact on training participation, those individuals who reported being civil servants had an increased probability to engage in training. The employee level did not produce significant results, making it difficult to create a linear relationship between hierarchical position and training participation.

In terms of organizational tenure a positive and significant influence on training participation was found. The literature reported mixed results. However, the analysis in this paper cannot confirm the assumption that high motivation to participate in training decreases with more work experience within the same company.

Fulltime employment was found to be positively, but not significantly related to training participation. This differs from the past literature, where significant negative effects for part-time workers and significant positive effects for fulltime workers were reported (Leuven and Oosterbeek, 1999 and Maximiano and Oosterbeek, 2007). An explanation for the current non-significant results could be that for part time workers the probability of engaging in training increases when their specific contractual hours increase (Maximiano and Oosterbeek, 2007).

As the last of the traditional determinants, company size was found to be significant and have a positive impact on training behavior for companies that employ more than 200 employees. This finding supports the findings from the literature which found that larger companies have a higher probability for training. This higher amount of training may be due to a more

formalized job structure and internal labor market. In addition, these companies may operate in environments that encourage and demand investment in training and therefore employee training participation is higher (Knoke and Kallenberg, 1994).

In addition to the traditional determinants outlined in the literature this analysis investigated how these determinants explanatory value is changed when controlling for health related determinants. The only significant item from the group of health determinants was if individuals follow a health conscious diet. The analysis revealed that health conscious diet had a significant positive effect on the probability to engage in training. Although the majority of health related determinants show to be non-significant, a Wald test or F-test for joint significance proved to show that including health determinants was significantly better at explaining participation in training ($p < 0.035$) than not including them.

The findings from this paper add to the literature in three ways. Firstly, the current work provides an overview of studies investigating determinants. Secondly, this paper added to the existing literature on training participation by confirming results from many past studies and bringing additional studies results in to question. Thirdly, the current paper helps to close this gap in economic literature by going beyond the traditional determinants and providing information about the influence of health determinants on training participation.

References

- ACEMOGLU, D. and J. S. PISCHKE (1998): "Why do firms train? Theory and evidence.," *Quarterly Journal of Economics*, 113, 79–119.
- ALBERT, C., C. GARCIA-SERRANO and V. HERNANZ (2010): "On-the-job training in Europe: Determinants and wage returns," *International Labour Review*, 149 (3), 315–341.
- ALTONJI, J. G., and J.R. SPLETZER (1991): "Worker Characteristics, Job Characteristics, and the Receipt of On-the-Job Training," *Industrial and Labor Relations Review*, 45, 58-79.
- ARULAMPALAM, W., A. L. BOOTH and M. L. BRYAN (2004): "Training in Europe," *Journal of the European Economic Association*, 2(2-3), 346-360.
- ARYEE, S. (1992): "Antecedents and Outcomes of Work-Family Conflict among Married Professional Women: Evidence from Singapore," *Human Relations*, 45(8), 813–837.
- ASPLUND, R. (2005): "The Provision and Effects of Company Training: A Brief Review of the Literature," *Nordic Journal of Political Economy*, 31, 47-73.
- BAKER, M., and M. WOODEN (1992): "Immigration and its Impact on the Incidence of Training in Australia," *The Australian Economic Review*, Vol. 98, 39–53.
- BARRON, J. M., D. A. BLACK and M. A. LOEWENSTEIN (1989): "Job Matching and On-the-Job Training", *Journal of Labor Economics*, 7(1), 1-19.
- BARTEL, A. P. (1995): "Training, Wage Growth and Job Performance: Evidence From a Company Database," *Journal of Labor Economics*, 13(3), 401-425.
- BARTEL, A. P. and N. SICHERMAN (1998): "Technological Change and the Skill Acquisition of Young Workers," *Journal of Labor Economics*, 16(4), 718-755.
- BECKER, G. (1962): "Investment in Human Capital: A Theoretical Analysis," *Journal of Political Economy*, 70, 9–49.
- BELZIL, C., and J. HANSEN (2002): "Unobserved Ability and the Return to Schooling," *Econometrica*, 70, 2075–2096.
- BEN-PORATH, Y. (1967): "The Production of Human Capital and the Life Cycle of Earnings," *Journal of Political Economy*, 75(4), 352-365.
- BIRDI, K., C. ALLAN, and P. WARR (1997): "Correlates and Perceived Outcomes of 4 Types of Employees Development Activity," *Journal of Applied Psychology*, 82, 845–857.
- BOOTH, A. L. (1991): "JOB-RELATED FORMAL TRAINING: WHO RECEIVES IT AND WHAT IS IT WORTH?," *Oxford Bulletin of Economics and Statistics*, 53(3), 281-294.
- BROWN, C. (1990): "Empirical Evidence on Private Training," *Research in Labor Economics*, 11, 97–113.

- BRUNELLO, G. (2001): "On the Complementarity between education and training in Europe," IZA Discussion Paper No. 309. Bonn.
- CLOUTIER, J., S. RENAUD and L. MORIN (2008): "Predictors of Participation in Voluntary Vocational Training: An Empirical Study among Canadian Female and Male Managers," *Relations industrielles / Industrial Relations*, 63(2), 268-289.
- COLQUITT, J., J. LEPINE and R. NOE (2000): "Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research," *Journal of Applied Psychology*, 85(5), 678-707.
- CULLY, M., A. VANDENHEUVEL and M. WOODEN (2000): "Participation in, and Barriers to, Training: The Experience of Older Adults," *Australasian Journal on Ageing*, 19(4), 172-179.
- FOUARGE, D., T. SCHILS and A. DE GRIP (2010): "Why Do Low-Educated Workers Invest Less in Further Training?," IZA Discussion Paper No. 5180, Bonn.
- FRAZIS, H., M. GITTLEMAN and M. JOYCE (2000): "Correlates of training: An analysis using both employer and employee characteristics," *Industrial and Labor Relations Review*, 53(3), 443-462.
- FRIEBEL, H. (2008): "The children of the educational expansion era in Germany: education and further training participation in the life-course," *British Journal of Sociology of Education*, 29(5), 479-492.
- GREEN, F. (1993): "THE DETERMINANTS OF TRAINING OF MALE AND FEMALE EMPLOYEES IN BRITAIN." *Oxford Bulletin of Economics and Statistics*, 55(1), 103-122.
- GREENHALGH, C., and G. MAVROTAS (1996): "Job Training, New Technology and Labour Turnover," *British Journal of Industrial Relations*, 34(1), 131-150.
- GREENHALGH, C., and M. STEWART (1987): "The Effects and Determinants of Training," *Oxford Bulletin of Economics and Statistics*, 49(2), 171-190.
- GREENHAUS, J., S. PARASURAMAN, C. GRANROSE, S. RABINOWITZ, and N. BEUTELL (1989): "Sources of Work-Family Conflict among Two-Career Couples," *Journal of Vocational Behavior*, 34, 133-153.
- GUTHRIE, J. P. and C. E. SCHWOERER (1996): "Older dogs and new tricks: career stage and self-assessed need for training," *Public Personnel Management*, 25, 59-72.
- HICKS, W. D., and R. J. KLIMOSKI (1987): "Entry into Training Programs and its Effect on Training Outcomes: A Field Experiment." *Academy of Management Journal*, 30, 542-552.
- KEYS, B., and J. WOLFE (1988): "Management Education and Development: Current Issues and Emerging Trends." *Journal of Management*, 14, 205-229.
- KNOKE, D. and A. L. KALLENBERG (1994): "Job training in U.S. organizations," *American Sociological Review*, 59(4), 537-546.
- KRUEGER, A. and C. ROUSE (1998): "The Effect of Workplace Education on Earnings, Turnover, and Job Performance," *Journal of Labor Economics*, 16(1), 61-94.

- LEUVEN, E. and H. OOSTERBEEK (1999): "Demand and supply of work-related training: Evidence from four countries," *Research in Labor Economics*, 18, 303–330.
- LEUVEN, E., H. OOSTERBEEK, R. SLOOF and C. VAN KLAVEREN (2005): "Worker Reciprocity and Employer Investment in Training," *Economica*, 72(285), 137-149.
- LOEWENSTEIN, M. A. and J. R. SPLETZER (1999): "Formal and Informal Training: Evidence from the NLSY," *Research in labor economics*, 18, 403-438.
- LORECH, K., J. RUSSEL, and M. RUSH (1989): "The Relationships Among Family Domain Variables and Work-Family Conflict for Men and Women," *Journal of Vocational Behavior*, 35, 288–308.
- LYNCH, L. and S. BLACK (1998): "Beyond the incidence of employer-provided training," *Industrial and Labor Relations Review*, 52, 64–81.
- MALCOLM, J., P. HODKINSON and H. COLLEY (2003): "The interrelationships between informal and formal learning," *Journal of Workplace Learning*, 15 (7/8), 313 – 318.
- MARK, S. (1977): "Multiple Roles and Role Strain: Some Notes and Human Energy, Time and Commitment," *American Sociological Review*, 42, 921–936.
- MAURER, T. J., H. R. PIERCE, and L. M. SHORE (2002): "Perceived Beneficiary of Employee Development Activity: A Three-Dimensional Social Exchange Model," *Academy of Management Review*, 27, 432–444.
- MAXIMIANO, S. and H. OOSTERBEEK (2007): "On the determinants of workers' and firms' willingness to train," *Conference paper, European Association of Labour Economists (EALE)*, Oslo, 2007.
- MINCER, J. (1994): "Human Capital: A Review." *Labor Economics and Industrial Relations: Markets and Institutions. Mass.: Harvard University Press*, 109–141.
- MONTIZAAN, R., F. CÖRVERS and A. DE GRIP (2010): "The effects of pension rights and retirement age on training participation: Evidence from a natural experiment," *Labour Economics*, 17(1), 240-247.
- NELEN, A. C. (2012): "Part-Time Employment and Human Capital Development," Chapter 2. *ROA*, Maastricht.
- NOE, R. and S. WILK (1993): "Investigation of the factors that influence employees' participation in development activities," *Journal of Applied Psychology*, 78(2), 291-302.
- OECD (2003): "Upgrading worker's skills and competencies," Chapter 5. *Employment Outlook*. Paris.
- OOSTERBEEK, H. (1998): "Unravelling supply and demand factors in work-related training," *Oxford Economic Papers*, (50), 266–283.
- PARENT, D. (2002): "Employer-supported training in Canada and its impact on mobility and wages," *Empirical Economics*, 28(3), 431-459.

- RENAUD, S., M. LAKHDARI and L. MORIN (2004): "The Determinants of Participation in Non-Mandatory Training," *Relations Industrielles/Industrial Relations*, 59(4), 724-743.
- SHAW, K. and E. P. LAZEAR (2008): "Tenure and output," *Labour Economics*, 15(4), 704-723.
- THANGAVELU, S. M., L. HAOMING, P. CHEOLSUNG, A. B. HENG and J. WONG (2011): "The determinants of training participation in Singapore," *Applied Economics*, 43(29), 4641-4649.
- THARENOU, P. (1997) "Determinants of Participation in Training and Development," *Journal of Organizational Behavior*, 15-27.
- THARENOU, P. (2001): "The relationship of training motivation to participation in training and development," *Journal of Occupational and Organizational Psychology*, 74(5), 599-621.
- VAN DER HEIJDEN, B. I. J. M. (2002): "Individual career initiatives and their influence upon professional expertise development throughout the career," *International Journal of Training and Development*, 6(2), 54-79.
- VEUM, J. R. (1993): "Training Among Young Adults: Who, What Kind, and for How Long?," *Monthly Labor Review*, 116, 27-32.
- WAGNER, G. G., J. R. FRICK and J. SCHUPP (2007): "The German Socio-Economic Panel Study (SOEP) - Scope, Evolution and Enhancements," *Schmollers Jahrbuch (Journal of Applied Social Science Studies)*, 127(1), 139-169.
- WATANABE, S. P. (2010): "Determinants of Employer-sponsored Training Participation for Young Workers during Economic Downturns: Evidence from the Past," *Journal of Industrial Relations*, 52(4), 491-505.
- WEXLEY, K. N., and T. T. BALDWIN (1986): "Management Development," *Yearly Review of Management*, 12(2), 277-294.

Appendix

TABLE 6: RESULTS FOR PROBIT REGRESSION AT THE MARGINAL LEVEL WITH TRAINING PARTICIPATION

Determinants	Personal Model		Job Model		Firm Model		Complete Model	
	Coeff.	St.Er.	Coeff.	St.Er.	Coeff.	St.Er.	Coeff.	St.Er.
<u>Personal</u>								
Age	.0189**	.0033					.0204**	.0035
Age squared	-.0003**	.00003					-.0003**	.00004
Gender (female=1)	.0112	.0094					.0404**	.0118
Marital status (spouse=1)	.0148	.0120					.0118	.0124
Children (if children = 1)	-.0182	.0108					-.0111	.0115
Education (years)	.0427**	.0017					.0207**	.0021
<u>Job related</u>								
Income			.00001**	3.24e-06			7.15e-06*	3.48e-06
Income per hour			.00216**	.0004			.0017**	.0005
Working hours per week			.0032**	.0006			.0034**	.0006
Organizational tenure			-.0005	.0005			.0024**	.0006
Employment status (full-time=1)			.0181	.0152			.0060	.0163
Hierarchical position								
Worker			-.2221**	.0135			-.2132**	.0155
Employee			.0265	.0150			-.0163	.0170
Civil servant			.2230**	.0265			.1222**	.0286
<u>Employer related</u>								
Company Size								
0-5					-.0017	.0212	.0005	.0233
5-20					-.0143	.0189	-.0052	.0214
20-100					.0317	.0189	.0224	.0217
100-200					.0334	.0225	.0168	.0250
200-2000					.0917**	.0191	.0600**	.0221
2000+					.1740**	.0191	.1106**	.0223
Part of Germany (west=1)					-.0390**	.0152	-.0448**	.0164
Log likelihood	-6343.5		-6177.7		-6761.8		-5776.2	
N	10491		10526		10793		10067	

Source: SOEP 2008 , Author calculations. ** Significant at the 1 percent level. * Significant at the 5 percent level.

TABLE 7: RESULTS FOR THE PROBIT REGRESSION WITH TRAINING PARTICIPATION INCLUDING HEALTH RELATED DETERMINANTS

Determinants	Health Model		Personal Model		Job Model		Firm Model		Complete Model	
	Coeff.	St. Er.	Coeff.	St. Er.	Coeff.	St. Er.	Coeff.	St. Er.	Coeff.	St. Er.
<u>Personal</u>										
Age			.0180**	.0034					.0190**	.0037
Age squared			-.0002**	.00004					-.0003**	.00004
Gender (female=1)			-.0022	.0107					.0278*	.0130
Marital status (spouse=1)			.0116	.0127					.0095	.0131
Children (if children = 1)			-.0181	.0114					-.0095	.0121
Education (years)			.0417**	.0019					.0212**	.0023
<u>Job related</u>										
Income					.00001**	3.41e-06			6.10e-06	3.67e-06
Income per hour					.0022**	.0008			.0017**	.0005
Working hours per week					.0035**	.0006			.0035**	.0006
Organizational tenure					-.0005	.0005			.0026**	.0007
Employment status (full-time=1)					.0210	.0160			.0050	.0173
Hierarchical position										
Worker					-.2169**	.0146			-.2071**	.0167
Employee					.0285	.0159			-.0062	.0180
Civil servant					.2101**	.0275			.1226**	.0297
<u>Employer related</u>										
Company Size										
0-5							-.0056	.0225	.0014	.0247
5-20							-.0196	.0201	-.0069	.0227
20-100							.0207	.0201	.0112	.0229
100-200							.0303	.0238	.0160	.0264
200-2000							.0826**	.0203	.0521*	.0233
2000+							.1660**	.0203	.1028**	.0235
Part of Germany (west=1)							-.0341*	.0161	-.0393*	.0172
<u>Health related</u>										
Self reported health (good=1)	.0272	.0169	.0171	.0177	.0198	.0177	.0244	.0171	.0079	.0185
Physical health problem (yes=1)	-.0098	.0123	.0066	.0128	.0159	.0130	-.0056	.0124	.0219	.0134
Mental Health problem (yes=1)	.0106	.0134	-.0008	.0138	.0026	.0139	.0162	.0136	-.0003	.0142
Number of Sick days	-.0003	.0003	.0001	.0003	.00003	.0003	-.0005	.0007	.0001	.0003
Lack of sleep (yes=1)	.0334**	.0101	.0322**	.0106	.0255*	.0105	.0243*	.0102	.0153	.0109
Health conscious diet (yes =1)	.0586**	.0098	.0403**	.0104	.0368**	.0103	.0631**	.0099	.0338**	.0108
Body Mass Index	-.0025*	.0011	-.0002	.0011	-.0017	.0011	-.0028**	.0011	.0002	.0011
Smoking (yes=1)	-.0688**	.0101	-.0299**	.0109	-.0309**	.0108	-.0630**	.0103	-.0157	.0114
Alcohol (yes=1)	.0280*	.0122	.0001	.0128	-.0156	.0125	.0254*	.0123	-.0072	.0132
Doctor visits	.0051**	.0016	.0044**	.0017	.0023	.0017	.0045**	.0017	.0020	.0017
Days spent in hospital (2007)	.0024	.0198	.0098	.0204	.0112	.0205	.0067	.0199	.0102	.0211
N	10024		9670		9720		9936		9322	
Log likelihood	-6368.6		-5873.1		-5737.6		-6220.0		-5384.7	

Source: SOEP 2008 Author calculations. ** Significant at the 1 percent level. * Significant at the 5 percent level.