

The selection process and benefits of job training

*An empirical analysis on the selection process into job training and three main determinants
for organizational training benefits*

Master Thesis
Economics of Markets and Organizations
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September 22, 2019



Abstract

Continuously investing in the development of the skills of employees has become increasingly important due to the current changes in the labor market. Skills can be improved through job training. Studies have shown that training has a positive impact on productivity and organizational performance. In this study, a cross-sectional dataset from the European Working Conditions Survey in 2015 has been used. This study examines three different models. The first model tests what type of organizations offer training and to which employees. The second model examines the selection process of employees into self-financed training. Finally, the third model analyzes the influence of various determinants for organizational training benefits.

Model (1) finds that organizational size and unionization have a positive effect on employer-financed training. Given organizations are unionized, size negatively affects training. Working fulltime, a worker's highest obtained education level and his/her age are positively related to employer-financed training. Finally, women who work fulltime are equally likely to receive employer-financed training compared to men who are fulltime employed.

Model (2) shows that education level positively influences the likelihood employees undergo self-financed job training.

Model (3) finds that the number of days training and if training is employer- versus self-financed has a positive effect on the organizational training benefits. The (subjective) skills of employees are negatively related to the benefits meaning that under skilled employees benefit more from training compared to over skilled employees.

Acknowledgements

I am extremely thankful for the adequate, constructive and valuable feedback and help of my supervisor A. Boring. Furthermore, I am grateful for the UK Data Archive who provided the European Working Conditions Survey (EWCS) data.

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1. Introduction

Everyone acquires human capital through (personal) experiences and social adaptation in their daily life and by education. This learning continues to develop in the workplace. According to Mincer (1962), schooling is not an absolute and sufficient way to train the workforce. Mincer believes that schooling is a preparative stage and that after graduation the real learning process begins in which skills pertaining to work are obtained. How this learning occurs and how development progresses is however still managed as a black box. This paper seeks to enlighten this box.

Heckman et al. (1998) state that most of a person's human capital is acquired by post-school investments by organizations. This occurs in two distinct manners. Human capital is accumulated by (on-the-) job training or through learning-by-doing (Almeida & Carneiro, 2009). This (on-the-) job training is less understood and therefore the topic studied in this paper. It can take on many different forms, ranging from formal and informal, to self- and employer-financed training, to general and specific training programs.

This study analyzes two main things. First, the employer and employee selection process into employer-financed and self-financed job training is examined. Second, it discusses three main determinants for organizational training benefits: (1) skills possessed by employees (a subjective measure¹), (2) the number of days training the employee has undergone and (3) differences regarding training provided and paid for by the employer versus training paid by employees. The main research question is:

What constitutes the employer and employee selection process into training and how do skills, the number of days training and who pays for the training influence the training benefits?

This question is answered by examining three distinct models. The first model tests how organizational and employee characteristics influence the selection process into employer-financed training. The second model analyzes what types of employees undergo self-paid training. From these first two models, conclusions are drawn on what organizations offer training and to whom. Finally, the third model regresses the three determinants mentioned above on the organizational benefits derived from training. In total, eight different hypotheses are tested.

¹ The variable *skills* is based on the self-perception of employees. They can either indicate that they are under skilled, correctly skilled or over skilled. This is relative to one's own position in the organization and is not an absolute measure of skills.

Data from the European Working Conditions Survey (EWCS) 2015 is used to test for correlational relations. This is a cross-sectional dataset that includes responses from employees over 35 different countries. All respondents considered in the sample were employed during the time of the survey. Public training programs provided and/or funded by the government are left out. Self-employed respondents are dropped as they are both their own employer and employee at the same time. As a consequence, a difference cannot be made regarding self- and employer-financed training. Finally, only respondents who filled in the question whether they have undergone training (either self- or employer-financed) in the last year are studied. This leaves a final sample size of more than 35,000 employees.

Training can be defined as “the systematic acquisition of knowledge, skills and attitudes that together lead to improved performance in a specific environment” (Salas et al., 2006). Throughout this study, ‘training’ should be interpreted as job training.

This study identifies two different types of training: training provided or paid for by the employer and training paid by the employee. For simplicity, I assume that the party who pays for the training is also the party that selects the training and decides on its content, duration and intensity. This assumption is logical because in most real-life situations people can decide on what they want to buy. A tradeoff exists between the preferences of employees regarding the content of the training versus the willingness to invest in training. If training is offered by the organization, it might be the case that the training content does not match the preferences of employees regarding which skills they want to improve. If employees attach high value to enhance specific skills, they may be willing to invest their own money in training. If employees finance training themselves, they can decide on the type of training. The different forms of training that are distinguished in this paper are based on the European Working Conditions Survey (EWCS) from 2015, which will be used as the dataset in this research. Training paid by the employee will be referred to as ‘self-financed training’, whereas training paid and provided by the employer will be denoted as ‘employer-financed training’.

Organizational benefits are defined based on the survey question “Do you agree or disagree with the following statements on the training received: The training has helped me improve the way I work.” Answers range from strongly disagree to strongly agree. This measure of organizational benefits is chosen because, among others, Dearden et al. (2000) show that training has a large effect especially on productivity. An improvement in the way of working can be interpreted as an improvement in productivity.

This paper finds that large and unionized organizations are more likely to offer employer-financed training to employees. If organizations are unionized, size is negatively

related to providing training. Furthermore, if people are employed fulltime and the higher the level of education they have obtained, the more likely that they receive employer-financed training. Age is also positively related to receiving training from your employer, but at a decreasing rate. Women who work fulltime are equally likely to receive employer-financed training compared to fulltime employed males. Part-time employed women are however more likely to receive employer-financed training compared to men working part-time. For self-financed training, the only significant effect is for education level which is positively related the likelihood employees undergo training they pay themselves. Finally, the number of days spent on training and if the training is employer-financed both positively influence the organizational training benefits whereas the employees' self-perception regarding his/her skills negatively influences the benefits.

These results add to the literature by discussing and clarifying the so-called black box of job training: what employees should receive training (i.e. selection process) and whether the employer or employee should pay for the training. It confirms the general recognition in literature that learning is now even more important than in the past.

Prasad & Tran (2013) state that regardless of differences between organizations and industries, in general (continuous) skill development has become more important over the years. There are two main reasons why learning became more important.

First, nowadays, discussions are held about life-long learning to protect employees from becoming obsolete in a fast changing (technical) environment. Important developments in the management of employment have been occurring (Hudson, 1989). For example, through digitalization, which forces employees to adjust and renew their way of working and may even lead to a completely new job. Other advancements in the management of employment are robotization and automation of work, which could lead to functions being taken over by machines or software. Bassanini et al. (2005) address the importance of investing in human capital in order to sustain high degrees of competitiveness, especially with these quickly changing functional possibilities technology offers and the corresponding skill needs. They argue that if the labor force does not continually augment and adjust their (existing) skills to conform to these changing needs, it becomes challenging to collect all the possible gains from technological progress (Bassanini et al., 2005). Finally, Meshcheriakova & Vermeulen (2017) phrase that it is critical for employees to continuously maintain and improve their skills because of the increased emphasis on a well-trained labor force due to skill-biased technological advances.

Second, learning became more important due to its effect on organizational performance through productivity improvements. This is another reason why organizations are interested in investing in the human capital and competencies of their employees. Rowden (2002) discusses that investing in human resources of an organization plays a significant role in enhancing productivity in order for the employees to keep up with future needs and skills. Altonji et al. (1991) also mention the importance of (employer-financed) training for employees for success and productivity improvements of the organization. Both these findings are confirmed a few years later by Crook et al. (2011) who show that human capital is strongly related to the success of an organization.

The reasons why learning is important are clear. Learning can be achieved through training. Knoke & Kalleberg (1994) and Maranto & Rodgers (1984) discuss that (on-the-) job training is a method to deal with the changes caused by (technological) innovation and labor market competition. Lee & Bruvold (2003) mention that (technological) changes come together with changing desires and requirements for skills of workers. In order to cope with these changing needs, organizations provide job training to their employees. This (in many of most cases) employer-financed training contributes to the organization's human capital stock (Greenhalgh & Mavrotas, 1996).

The European Union (EU) emphasizes the growing awareness of the importance of work-related training in order to generate lifelong learning across the EU. However, not much is currently known regarding who in Europe receives training and the benefits derived. As concluded by Arulampalam et al. (2004), empirical research mainly focuses on job training practices in the US. Studies regarding European countries are less common, particularly with recent data. Altonji et al. (1991) point out that research on the determinants of workplace training lags behind, especially due to data availability. Most of the research available regards public training programs funded by the government to train unskilled young workers or to reduce unemployment. Much research has also been done on the effect of training on wages, for example whether employees accept lower starting wages and thereby indirectly pay for their training. The current literature focuses on training provided by the employer and is becoming outdated. Especially empirical research on the effect of training on organizational level is rare (Tharenou et al., 2007). Finally, studies regarding self- and company-financed job training, for instance Sieben (2007) and Zweimüller & Winter-Ebmer (2000), often examine the relation between training and job search.

This research also adds to the literature by examining job training specifically within Europe. This is the first study to examine the benefits derived from job training based on

analysis of the EWCS 2015 data. This is a cross-sectional dataset, so only one year (2015) will be studied.

This paper is organized in six sections. It starts with the introduction. Second, a literature review will be given regarding the theory and change in structure of the labor market, the various types of job training and reasons why organizations invest in the development of their employees. The third section provides a theoretical framework and substantiates the hypotheses. Section four continues with data and methodology, including variable descriptions. The fifth section discusses the results. The paper concludes with section six containing the main findings, limitations of the research and possibilities for future research.

2. Literature Review

2.1 Labor market

Outcomes in the labor market are achieved by the corresponding demand and supply for labor. Workers decide which opportunities to apply for based on available vacancies and employers choose to hire or not hire them based on their personal characteristics and (work) experience (Fine, 1998).

In the 1960s, Becker (1964) presented a theory on job training that argues that ‘when labor markets are perfectly competitive, only the worker will invest in general training, since she is the only agent who can reap the benefits from the investment.’ He makes a distinction between general and specific training. General training focuses on improving skills which are applicable at (almost) any organization, increasing the worker’s general human capital, whereas specific training denotes improving firm-specific skills and only increases the employee’s productivity within his/her current job. Organizations tend to only invest in specific job training because it improves the skills of employees that are directly applicable to their current tasks. Organizations cannot guarantee the employee will stay at the organization so investing in general skills could easily lead to sunk costs. Even more because the employee’s attractiveness to the labor market increases. For specific training the costs and benefits of the investment are sometimes shared between employer and employee due to contractual issues (enforcement for example) (Hashimoto, 1981). Training paid by the employee is usually associated with improving more general skills and therefore also relevant in other types of occupations (Becker, 1964).

According to the standard human capital model, when the labor market is in perfect competition, general training will not be provided by the employer resulting in a hold-up problem. This suggests that in order for organizations to invest in general job training to improve the skills of its employees, the labor market must be out of balance or some imperfection must exist (Acemoglu, 1998). In this case, wages are compressed relative to productivity level (Booth and Zoega, 1999). Chang & Wang (1996) created a model that shows that when information is asymmetric, the incentive to invest in training is smaller when it regards general human capital than when training is firm-specific.

Workers might be encouraged to improve their skills anyway, since it functions as a competitive advantage in the market. If they would like to be generally trained, they will have to finance it themselves or accept lower wages during the training period. The increase in productivity derived from training is shown in their higher post-training wages.

Becker concludes that as long as employees are able to finance their own training, by either directly paying for it or by accepting lower starting wages, they will be incentivized to take the required amount of training, so markets need to be out of balance (Acemoglu & Pischke, 1999).

Over the years, there have been quite some changes in the structure of the labor market. First, Acemoglu & Pischke (1999) discussed an increase in returns to education, experienced in some OECD (Organization for Economic Cooperation and Development) countries, which contributes to the necessity to keep up with skills. Long (2010) still mentions this increase in returns to higher education and the quality of education a few years later. Second, in developed countries, technology (mainly regarding digitalization and automation, as mentioned before) is being used increasingly at the expense of low-skilled and routine jobs (Goos et al., 2009). This leads to some jobs disappearing, whereas others are created. These two effects also reinforce each other in the sense that lower-educated people often bear the burden of automation. According to Arntz et al. (2016) it is the low-educated people that need to pay for further training in order to be able to cope with these adjustments in the labor market.

It is safe to conclude that job training is a way to deal with these structural changes.

2.2 The different types of job training

Job training contains many different attributes. The content, the number of days of training, the purpose and the composition of the group can vary significantly. One thing all training has in common is that it aims to educate and learn someone something. As explained in the previous paragraph, a distinction can be made between general and specific training.

Moreover, from another viewpoint, Watkins and Marsick (1992) distinguish three main types of learning through training; informal, formal and incidental. Informal learning is usually not very structured. It might have an individual or organizational aim, which could be expressed beforehand, but this does not necessarily have to be the case. If, for example, one employee explains a small matter to another employee this is defined as informal learning. It does not have to be a general explanation in front of a classroom, which is often the case in formal learning. Elnaga & Imran (2013) describe that training can for instance be done through instructing, mentoring or through teamwork. Formal learning (training) is done through giving instructions to people regarding the topic. It contains explaining how things work, how to act and to react. Formal training is often planned, well-prepared and (partly) financed by institutions. Finally, Marsick (1992) describes incidental learning, which is very close related to informal learning. It is characterized as an 'unintended by-product of some other activity'. It

occurs when someone tries to finalize a certain assignment or task and when process is accompanied by the acquisition of skills, knowledge or understanding. It often happens while people are unaware, they are learning. The main difference between incidental and formal and informal learning is that the first is unintentional whereas the latter two are intentional. It is a combination of all various ways of learning that ultimately result in the highest individual/organizational improvement.

Unfortunately, the EWCS survey used in this study does not provide detailed information on the type of training respondents have undergone. Examining differences in results for every type of training would be interesting for future research.

2.3 Reasons why organizations invest in job training

There are numerous reasons why organizations invest in training of their employees, four of which are summed up below. First, an important aspect for organizations is to make sure they are superior to their competitors. By regularly educating their employees, organizations invest in staying competitive (Khan et al., 2011). A report of McKinsey (2006) discusses that a vital part of gaining competitive advantage concerns skills and human capital of the organization's workforce. If training is effective it can increase productivity, motivation and commitment, enhance the quality of work for example by decreasing the number of mistakes made and encourage teamwork which all contributes to gaining a competitive advantage (Salas et al., 2006).

Second, job training affects organizational performance. Human resource is a vital part of every organization. Organizations invest in human resource capital because it concerns the performance of their employees, which will automatically affect the success of the organization overall. Colarelli & Montei (1996) state that effective training results in an exceptional return of investment. Training their workforce simply leads to better results. Almeida & Carneiro (2009) evaluate the returns of training investment by organizations and conclude they are significantly large. They conclude that the returns are so high that they can be compared to returns from investment in schooling or physical capital. In addition, Eck (1993) finds evidence that job training, whether formal or informal, provides more employees with skills they need in their current position than any other kind of training (except for schooling programs of four years or more). Gunderson (1973), Maranto & Rodgers (1984) and Barron et al. (1989) find that training is significantly and positively related to productivity by achieving substantial skill improvements. Training plays a role in the process of organizational change through increasing the employee's abilities to perform (Valle et al., 2000). It is concluded that

training is the primary factor in improving an employee's abilities (Khan et al., 2011). A concept closely related to organizational performance is operational excellence. Bigelow (2002) addresses the importance of employee training programs in order to achieve operational excellence. Another reason for organizations that investing in improving the skills of their employees is important.

The third reason to invest in training is given by Rowden & Conine (2005), who discuss that job training also contributes to increasing job satisfaction through appreciation received by the management when the employee performs better. It also contributes to attaining high levels of employee retention by decreasing job rotation of workers (Jones and Wright, 1992; Shaw et al., 1998). Offering training also proves that the organization cares about its employees and is willing to invest in them for the long-term, which has a positive effect on the motivation of employees (Pfeffer, 1994). All these things together raise worker productivity and thereby increase overall organizational performance.

Fourth, besides all investment incentives regarding productivity and performance improvements, the decision to provide training also has a non-monetary motive. Namely to create incentives and keep workers motivated. Greenhalgh & Mavrotas (1996) discuss that individuals are incentivized to invest in their personal development early on in their life to make sure they can enjoy the benefits over the longest period. Next to that, training can also work as a signal, from employer to employee, to let the employee know he/she is valued and the organization cares about them and is willing to spend resources in order to increase one's abilities. Finally, job training might be used to reward workers as a sign of appreciation.

3. Theoretical Framework and Hypotheses

3.1 Employee- versus employer-paid job training

Training is costly and therefore organizations do not finance it for every employee. Often characteristics of employees, like age, education level and more, might influence these decisions. The general difference between self-financed and employer-financed training arises due to the fact that the period of expected return for the organization is uncertain, whereas for the employee it is not. This could negatively influence the willingness for an organization to invest in training. From the side of the employee this concerns investing in increasing organizational-specific knowledge and skills and from the employer's side investments into general training. This could ultimately lead to a hold-up problem: underinvestment in the human capital of workers.

3.1.1 Organizations that provide and finance job training for their employees

What type of organizations provide and finance job training for their employees? Organizations in the public sector offer job training more often than organizations in the private sector (Knoke and Kalleberg, 1994). Booth (1991) shows that men in private sector workplaces are less likely to be trained when compared to the public sector. This can be due to various reasons. Employees in the public sector tend to be more intrinsically motivated compared to employees in the private sector. They may be more eager to learn so organizations in the public sector are more likely to offer job training. Furthermore, some organizations in the public sector receive a training budget. Finally, employees in the public sector usually stay longer at an organization (the probability they switch jobs is smaller) so there is less risk of sunk costs due to employees leaving and therefore the investment in training is more secure. Based on the above, the first hypothesis is formed.

H1: Organizations in the public sector are more likely to offer job training to employees

Large organizations provide more job training to employees than smaller organizations (Black et al., 1999). There are a few possible explanations for this: large organizations are more unionized, their job structures are more formalized and their (competitive) environment often stimulates investment in training (Knoke & Kalleberg, 1994). They have higher costs of obtaining information regarding employee's performance compared to smaller organizations (Lazear 1981; Oi 1983). Based on principal-agent theory, this makes monitoring more difficult and therefore employees in large organizations are trained more. Large organizations have more resources than smaller ones which makes it more likely that they provide training to their

employees, for instance because back up for employees that are on training might be easily available. Finally, cost advantages in the form of economies of scale could arise in large organizations as many employees are trained at concurrently. Following these reasonings, the second hypothesis is formed.

H2: Large organizations are more likely to offer job training to their employees

Unions operate as mediators between employers and employees. They look after and promote the interests of employees. Veum (1997) finds that training and union status are positively related to each other. If organizations are unionized, the returns to job training, and more types of human capital, increase (Maranto, 1985). Therefore, the likelihood of the provision of training increases. This might be explained by the fact that unions often encourage training and negotiate about good training possibilities. Moreover, organizations that are unionized have lower quitting rates (Knoke & Kalleberg, 1994). This encourages the employer to invest more in company-specific skills to increase productivity of its employees. I therefore expect that unionized organizations are more likely to offer employer-financed training.

H3: Unionized organizations are more likely to offer job training to their employees

As previously explained, I expect both large as well as unionized organizations to be more likely to offer job training (H2 and H3). Often large organizations are unionized. If they are, the probability that there are formal training programs in place is higher (Knoke & Kalleberg, 1994).. Therefore, hypothesis 3a states that the probability that organizations offer job training to employees increases even more in size if the organization is unionized as both these characteristics reinforce each other in the likelihood of the provision of job training.

H3.a: If organizations are unionized, the probability that they offer job training to their employees increases even more in relation to the size of the organization

3.1.2 Selection process employer-financed training

Which employees receive job training from their employer? So, in which cases does the organization invest in the human capital of their workers?

I expect that the older employees become, the less training they receive. At some point in time the costs from investing in training do not weigh up to the benefits derived from training, for example in terms of productivity improvements. If employees almost reach the retirement age it does not make sense to still invest good money in their personal development as they will predictably leave the organization quite soon. In addition, the period over which the improved

skills can be applied decreases with age. Bassanini et al. (2005) find the same result, namely that training in Europe is negatively related to age. Booth (1991) concludes the same, that the likelihood to receiving training is negatively related to the age of the employee. This leads to the fourth hypothesis.

H4a: The age of the employee is negatively related to the probability they receive employer-financed training

Full-time employees are expected to be more likely to receive training than part-time employees, as they can apply the skills they have learned in more working hours compared to part-time workers. Bassanini et al. (2005), Booth (1991) and Harris (1999) show that part-time employees are less likely to and receive less training than fulltime employees. Employees who work part-time have a 5% lower chance of receiving (on-the-job) training from their employer (Orrje, 2000).

H4b: Fulltime employees are more likely to receive employer-financed training

Duncan and Hoffman (1979); Boston (1990) and Lynch (1991) find evidence that men receive more formal and informal training than women. Furthermore, Barron et al. (1993) show that in the first three months of their job, men and women receive an equal amount of training but that often women fulfill functions that provide less days of training and that makes use of less capital when compared to positions filled by men. Bassanini et al. (2005) discusses that women are usually more hindered in their career compared to men for instance because of children and undergo less employer-financed training. To conclude, Aisa et al. (2016) confirms that men receive and take part more in training courses financed by organizations than women. This leads to the following hypothesis.

H4c: Women are less likely to receive employer-financed training

From the data I observe that more men than women work fulltime². Based on the line of reasoning above, that fulltime employees receive more employer-financed training than part-time employees, I expect that the effect of whether an employee works part-time or fulltime on the probability to receive employer-financed training is reinforced when it concerns women. The following hypothesis therefore expects that the probability to receive training from your employer if you work part-time is even lower if you are female.

² See table V in the Appendix

H4d: Women who work part-time are even less likely to receive employer-financed training

The effect of education on job training is ambiguous. One could either argue that highly educated people are more likely to receive job training as they often fulfill important positions in the organization. They have large responsibilities and the skills and knowledge they possess and use to make decisions can have a significant impact on the organization's performance. On the other hand, it could be argued that low-educated people need, and therefore receive, more training as they simply possess less skills. The difference might arise in who pays for the training. Previous literature expects that highly educated people are more likely to undergo training. This holds for both self-financed and employer-financed job training.

Veum (1997) shows that the level of education obtained positively influences the likelihood to receive company training. Booth (1991) shows that higher levels of education are positively related to the amount of training received. The same result is shown by Ben-Porath (1967) who states that people who received better schooling or people with greater abilities participate more in job training. The same results are found by the European Commission and the OECD who conclude that highly skilled people are far more likely to engage in training and/or learning activities than low-skilled people (OECD and European Commission, 2013). Finally, this effect seems to work in two ways. Barron et al. (1989) argue that organizations also tend to look for employees with high ability for positions that require (a lot of) training. In turn, those high ability employees often search for positions where they receive more training. This results in the last sub-hypothesis on the selection process for employer-financed training.

H4e: The higher educated employees are, the more likely they receive employer-financed training

Hypotheses H1 up until H4e are tested in regression model I.

3.1.3 Selection process employee-financed training

If the organization does not invest in training, which employees decide to pay for training themselves?

Chapman et al. (2003) find that young people tend to participate in self-financed training more often compared to assisted training. They state that with self-financed training, training decreases even more with age than general training provision. This is in line with human capital theory, since younger employees have a longer career path ahead of them in which they have time to extract training investments, they are more likely to invest in training compared to older employees (Chapman et al., 2003). The above reasoning results in hypothesis 5a.

H5a: Younger employees are more likely to participate in self-financed training

According to Aisa et al. (2016) employees who are higher educated are more likely to finance their own training than to undergo employer-financed training. Complementary, Chapman et al. (2003) find that workers who have obtained higher formal education are more likely to participate in self-financed training and Ben-Porath (1967) shows that the investment in job training is higher for employees with better schooling or who possess higher abilities. Because of these previous findings, the following hypothesis will be tested.

H5b: The higher educated employees are, the more likely they undergo training paid by themselves

Hui & Smith (2002) show that employees who work fulltime are more likely to participate in overall trainings, regardless who finances it. This is in line with earlier discussed theories that fulltime employees simply have more time to reap the benefits derived from the training investment.

H5c: Fulltime employees are more likely to undergo training paid by themselves

Bassanini et al. (2005) find that women are more prone to invest in training than men, which results in a higher overall prevalence of women in self-financed training. This result is supported by Aisa et al. (2016) who mention the slightly higher rates of self-financed training participation by women. Finally, Pischke (2000) confirms women are more willing to pay for their training.

H5d: Females are more likely to pay for their own training

Hypotheses H5a up until H5d are tested in regression model II.

3.1.4 How benefits are affected by who pays for the training

The characteristics that influence the selection process of which employees receive employer-financed training and which ones decide to invest in training themselves are described above. An interesting question now, is how are benefits derived from training affected by who pays for the training?

As mentioned before, this study focuses on benefits for the organization and assumes that the party who pays for the training is also the party that decides on the content. Based on intuition, I therefore expect that training paid and provided by the employer will yield higher

organizational benefits compared to training paid and selected by the employee. The employer will (always) have superior knowledge regarding what contributes most to the performance of the organization and what skills need to be enhanced in order to improve this. If employees have undergone self-paid training, they either really need it, their organization does not provide it, or they are (extremely) motivated to improve their skills. Again, I assume that if employees invest in their own training, they personally pick the type of training. Therefore, the training perfectly fits their personal preferences and might not be necessarily in line with what would be best to maximize organizational performance. The organizational benefits derived from self-paid training are thus expected to be lower.

This line of reasoning is supported by a study of Hansson (2009) which describes that the returns to employer-financed training are considerably higher than the returns from self-financed training. More than that, very little evidence exists in support of any gains derived from self-financed training. The explanation for this is that the organization always has the best view on how to improve the productivity of its workers. Loewenstein and Spletzer (1998) as well as Booth and Bryan (2002) show in their studies that training increases wages through an increase in productivity. However, they show that training which is not provided and paid for by the organization has no (positive) impact on wages. This constitutes the sixth hypothesis.

H6: If the training is paid and provided by the employer, the organizational benefits derived will be higher than if the training is paid by the employee

3.2 The number of days of training

Another important determinant that should be considered when discussing the organizational benefits derived from training, is the duration of training that employees undergo. This determinant is based on the survey question: “Over the past 12 months/since you started your main paid job, how many days in total did you spend in training paid for or provided by your employer?”

According to Groot (1999), the amount of training received is positively related to the increase of productivity (in this study defined as organizational benefits). Colombo & Stanca (2014) describe accordingly that an increase in training participation, results in an increase of value added by the subsequent worker. Based on this literature, the seventh hypothesis is constructed.

H7: The number of days spent on training is positively related to organizational benefits

3.3 Skills

The final determinant discussed regarding the organizational benefits derived from training is the level of skills possessed by the employee. The skills variable is based on the following survey question: “Which of the following statements would best describe your skills in your own work?”.

Employees who believe that their skills correspond well with their duties or who even have the skills to cope with more demanding duties are likely to not be (very) motivated to undergo training and put a lot of effort in it. It can be demotivating to either learn what you already know or to work below your abilities. Therefore, I expect that the benefits derived from training are low for employees with relative high skills. On the other hand, employees who feel they ‘lay behind’ with their skills are incentivized to enhance them in order to ease their daily work. They might feel pressure if they believe they are not as good as their peers, which encourages them to undergo training in order to improve their skills. Under skilled employees can relatively learn more from training than over skilled employees and thus experience higher benefits afterwards. This reasoning leads to the final hypothesis, which expects a positive relation between training benefits derived and skills possessed.

H8: The (current) skills possessed by the employee are positively related to the benefits derived from training

Hypotheses H6 up until H8 are tested in regression model III.

4. Data and Research Methodology

This section describes the dataset, the variables and the empirical methodology to test the hypotheses.

4.1 Data collection

Data from the European Working Conditions Survey 2015 is used. This is a cross-sectional dataset. This data is collected by the European Foundation for the Improvement of Living and Working Conditions (Eurofound). It provides a wide view of working people in Europe throughout various countries, professions, industries and age groups. The results of the survey are, next to academic purposes, used for raising awareness for policy actors to help addressing the current challenges for Europe. The 2015 edition is the sixth wave of this survey. When comparing previous waves of this survey, the percentage of workers who indicate they have undergone employer-financed training rose from 26% in 2005 to 38% in 2015 (Eurofound, 2016). This increasing access to training over time emphasizes the need for research on this topic.

Finally, of all 14,043 employees who filled in the question regarding the benefits derived from training (self-employed not taken into account), an extremely large part indicates they (strongly) agree with the statement that the training has helped them improve the way they work. This can be seen in the frequency distribution below.

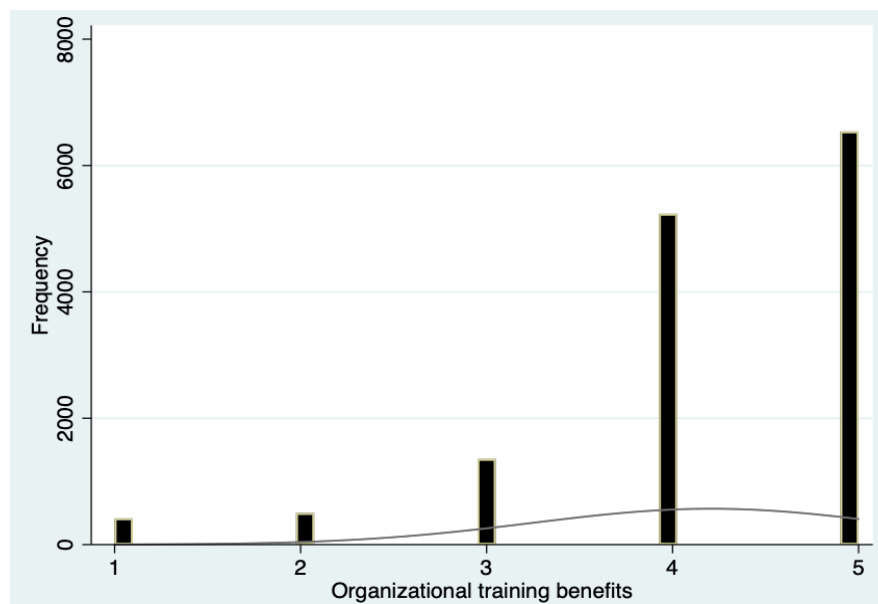


Figure I: Frequency plot of organizational training benefits

Responses from 35 different countries were collected, among which 28 EU Member States and Albania, Montenegro, Turkey, Switzerland, Norway, the former Yugoslav Republic of Macedonia and Montenegro. The sample includes individuals of 15 years and older (in Bulgaria, Norway, Spain and the UK 16 years and over) who were employed at the time of filling in the survey (European Foundation for the Improvement of Living and Working Conditions, 2017).

Respondents are randomly selected per country, representing a cross-section of society and varying between 1,000 to 3,300 responses per country (based on the size and country regulations). They all undergo a (face-to-face) interview during which the extensive list of questions is filled in. All responses are strictly confidential and anonymous (European Foundation for the Improvement of Living and Working Conditions, 2017).

The UK Data Service Centre (university of Essex, Colchester) control and provide the EWCS data. After creating an account and authorizing being a student at the Erasmus University, the Data Centre gave access to the dataset. The questionnaire could immediately be downloaded in Stata format. The questionnaire can be found using the following link:

https://www.eurofound.europa.eu/sites/default/files/page/field_ef_documents/6th_ewcs_2015_final_source_master_questionnaire.pdf

The questionnaire contains a few questions regarding the skills and training of employees. Figure II, displayed below, gives a clear idea of the questions included as well as the order in which they are asked. This is important because not all questions are asked to all respondents.

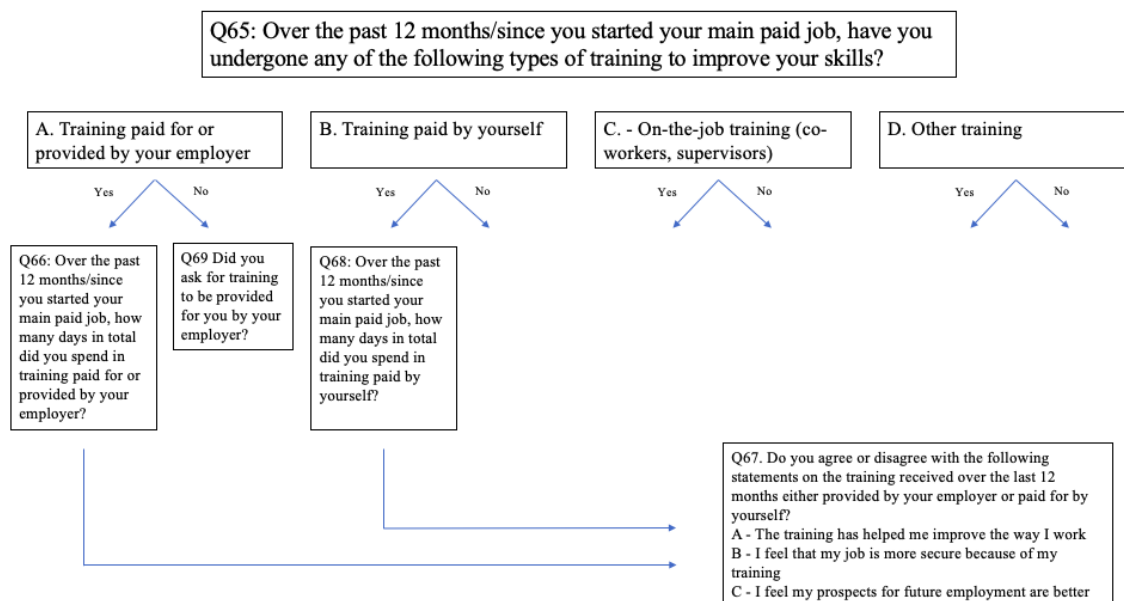


Figure II: Structure EWCS 2015 survey questions regarding job training

The figure below provides an overview of the access to employer-financed training per country based on the dataset used in this study. This figure shows that the amount of employer-financed training substantially varies per country. These differences might arise due to the fact that some countries have regulations in place which oblige training for particular jobs (for instance vocational training in France). This makes it very important to include country fixed effects in all three models tested.

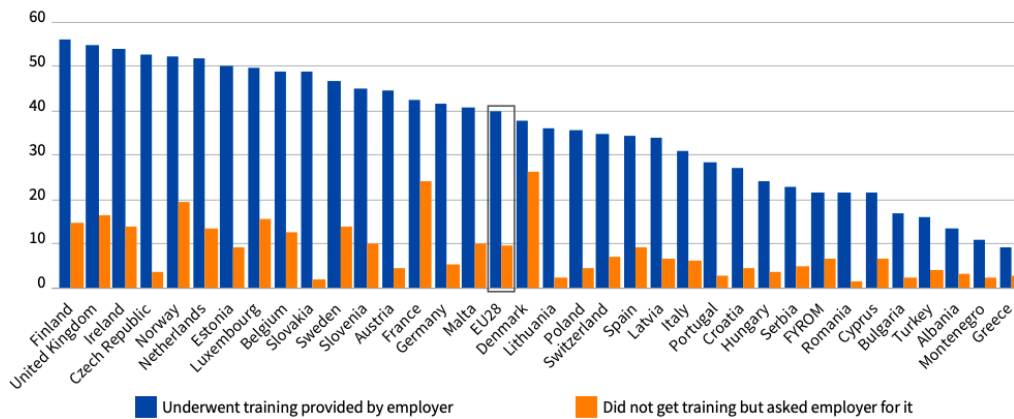


Figure III: Access to employer-provided training (per country in % of employees) (Eurofound, 2016).

Industry fixed effects are also included in all models as on the right-hand side of figure IV it can be seen that the provision and duration of training varies a lot between industries.

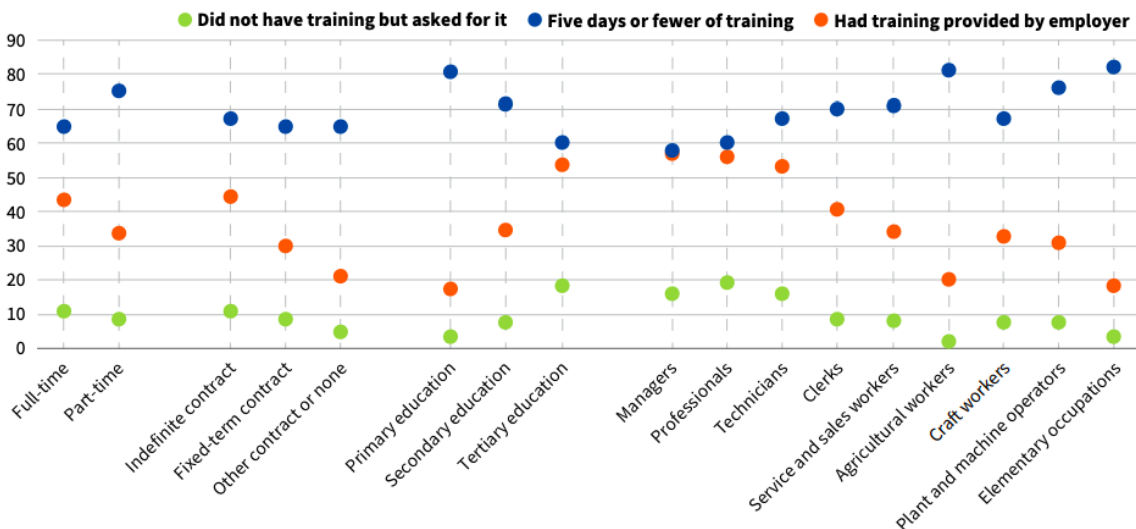


Figure IV: Access to training by type of contract, education level and occupation – employees, EU28(%) (Eurofound, 2016).

4.2 Descriptive statistics

The number of observations, the mean value, the standard deviation and the minimum and maximum value of all variables used in this study are listed in table I below.

Table I: Descriptive Statistics

VARIABLES	(1) N	(2) Mean	(3) Sd	(4) Min	(5) Max
age	35,719	42.28	12.33	15	89
firmsize	34,022	3.047	0.817	1	4
skills	35,406	2.154	0.627	1	3
organizationalbenefit	14,043	4.209	0.963	1	5
educationlevel	35,722	4.908	1.718	1	9
sector	35,857	0.278	0.448	0	1
logyearsatfirm	30,638	1.964	0.992	0	4.248
agesq	35,719	1,940	1,067	225	7,921
female	35,857	0.519	0.500	0	1
fulltime	35,857	0.765	0.424	0	1
daystraining	12,675	3.058	1.545	1	6
employerprovidestraining	35,857	0.361	0.480	0	1
trainingpaidyourself	35,857	0.0670	0.250	0	1
unionized	35,857	0.450	0.498	0	1
learnnewthings	35,857	0.696	0.460	0	1

4.3 Variables of interest

This study consists of eight different hypotheses which are tested by making use of three different regression specifications. Below, the different dependent, independent (explanatory) and control variables are described. All references made to minimum, maximum or median values are derived from table I. The regressions are specified as follows:

Model I (H1 – H4e):

$$\text{employerprovidestraining} = \alpha + \beta_1(\text{firmsize}) + \beta_2(\text{unionized}) + \beta_3(\text{size} * \text{unionized}) + \beta_4(\text{sector}) + \beta_5(\text{age}) + \beta_6(\text{agesq}) + \beta_7(\text{educationlevel}) + \beta_8(\text{fulltime}) + \beta_9(\text{female}) + \beta_{10}(\text{female} * \text{fulltime}) + \beta_{11}(\text{logyearsatfirm}) + \beta_{12}(\text{learnnewthings}) + \gamma_c + \gamma_i + \varepsilon$$

Model II (H5a – H5d)

$$\text{trainingpaidyourself} = \alpha + \beta_1(\text{age}) + \beta_2(\text{agesq}) + \beta_3(\text{educationlevel}) + \beta_4(\text{fulltime}) + \beta_5(\text{female}) + \beta_6(\text{learnnewthings}) + \beta_7(\text{logyearsatfirm}) + \gamma_c + \gamma_i + \varepsilon$$

Model IIIa3 (H6 – H8)

$$\text{organizationalbenefit} = \alpha + \beta_1(\text{daystraining}) + \beta_2(\text{skills}) + \beta_3(\text{employerprovidestraining}) + \beta_4(\text{bothstraining}) + \beta_5(\text{age}) + \beta_6(\text{agesq}) + \beta_7(\text{female}) + \beta_8(\text{logyearsatfirm}) + \beta_9(\text{learnnewthings}) + \beta_{10}(\text{sector}) + \beta_{11}(\text{firmsize}) + \gamma_c + \gamma_i + \varepsilon$$

i: individual level / respondent *i*

γ_c : country fixed effects

γ_i : industry fixed effects

³ For model IIIb, the reference category, see appendix table VII.

4.3.1 Dependent variables

The dependent variable studied in model I in this paper is *employerprovidestraining*. It is based on the question “Over the past 12 months or since you started your main paid job, have you undergone any of the following types of training to improve your skills?” The first sub-question asks about ‘training paid for or provided by your employer’. Respondents can either fill in yes, no, don’t know or refuse to answer. This variable is created as a dummy variable taking on a value of 1 if the answer is ‘yes’ and value 0 if the answer is ‘no’. As can be seen in table I, approximately 36,1% of the sample has received training provided by their employer.

The second model examines what factors influence whether employees undergone training paid themselves. This dependent variable is called *trainingpaidyourself*. It is based on the same question as the previous dependent variable but concerns the second sub question ‘training paid by yourself’. It is a dummy variable that equals 1 if respondents have undergone self-paid training and 0 if they have not done so. Table I shows that only 6,7% of the sample answered ‘yes’.

The third and final dependent variable studied is *organizationalbenefit*. This is the dependent variable of model III and is a categorical variable constructed from the survey question “Do you agree or disagree with the following statements on the training received (paid for and provided by your employer, paid by yourself or either one of the latter two) over the last 12 months?: The training has helped me improve the way I work”. Answers range on a scale from 1-5 and include ‘strongly disagree’, ‘tend to disagree’, ‘neither agree nor disagree’, ‘tend to agree’, ‘strongly agree’. The mean value is 4.2, which denotes that employees training overall helps employees improve the way they work (which can also be seen in figure I). To avoid misinterpretation and for intuitive purposes, this variable is recoded. Originally, a value of 1 corresponded to ‘strongly agree’, that is a high derivation of benefits from the training and a value of 5 (‘strongly disagree’) denoted that the training did not help in improving the way the employee works. By recoding, these categories were switch around so that the higher the value of *organizationalbenefit*, the more valuable the training has been.

4.3.2 Independent variables

This study contains 15 independent variables. They will all be discussed below.

4.3.2.1 Model I & II

The first four explanatory variables regard organizational characteristics and are included in Model I. The variable *sector* is based on the question “Are you working in...?”. Respondents can fill in five different answers: the private sector, the public sector, a joint

private-public organization or company, the not-for-profit sector or an NGO or other. Since for the purposes of this research only the distinction between private and public sector is studied, a dummy is created taking on a value of 1 if the employee works in the public sector and a value of 0 if he/she is employed in the private sector. Noticeable is that only 27,8% of the total sample is employed in the public sector.

firmsize contains the number of employees in total that work at the respondent's company/organization/business. Four different categories are distinguished: one employee (interviewee works alone), 2-9, 10-249 and 250+ employees.

unionized denotes whether a trade union, works council or a similar committee representing employees exists at the employees' organization. This is a dummy variable with value 1 if (one of) the latter things are in place and a value of 0 otherwise.

sizeunionized is an interaction variable between *firmsize* and *unionized* as I expect that these variables reinforce each other.

The following five independent variables concern employee characteristics and are included in model I and II. First, *age* describes how old respondents are. The minimum age is 15 and the maximum 99. On average, respondents are about 42 years old.

Second, the squared version of *age* is added to check for non-linear relationships: *agesq*.

Third, respondents are asked what the highest level of education or training is that they have successfully completed. This is captured in the variable *educationlevel*. The education categories are defined according to an international education classification system, the ISCED, and range from ISCED 0 (early childhood education) up until ISCED 6 (a doctorate or equivalent). The mean of this variable is 4.9 which denotes a high average education level.

Fourth, a distinction is made between workers who work fulltime and part-time. The dummy variable *fulltime* takes on a value of 1 if the employee has a fulltime job and 0 if he/she works part-time. The survey states that the respondent self-defines part-time and fulltime and uses as the basis their own contractual working arrangements. In total, 76,5% of the sample are fulltime employees.

Fifth, the gender of the respondent is used as an explanatory variable: *female*. This dummy variable equals 1 if the respondent is a woman and 0 if the respondent is male. The sample is quite evenly divided, 52% are women.

Finally, an interaction variable between *female* and *fulltime* is created: *femalefulltime* and added to model I.

4.3.2.2 Model III

There are three determinants for organizational benefits tested: (1) who pays for the training, (2) the number of days spent on training and (3) current skills of the employee.

To analyze the effect of who pays for the training on the benefits derived, *bothtraining* and either *employerprovidestraining* or *trainingpaidyourself* (the omitted variable is the reference category) are included in the regression. The first variable *bothtraining* is a dummy variable created that contains respondents who received employer-financed training and who also underwent self-financed training. This is only 0.8% of the total sample. The final two variables are explained in section 4.3.1.

daystraining denotes the number of days respondents have spent in training, divided over six categories: 1 day or less, 2-3 days, 4-5 days, 6-9 days, 10-19 days or 20 days or more. The mean is 3.058 which denotes that on average, respondents have received 4-5 days of training over the last year. As the questionnaire asks about the number of days training separately for respondents who have undergone self- and employer-financed training, first two separate variables were created per type of training. Then these two variables were merged into one (*daystraining*) in order to test the number of days spent on training regardless of whether the training was provided by the employer or not.

Finally, the variable *skills* is extracted from the question: "Which of the following statements would best describe your skills in your own work?" The three possible responses are: I need further training to cope well with my duties (1), my present skills correspond well with my duties (2), I have the skills to cope with more demanding duties (3). These categories respectively refer to as employees being under skilled, correctly skilled and over skilled.

4.3.3 Control variables

This study makes use of seven different control variables. The two most important control variables, included in all three models, are *logyearsatfirm* and *learnnewthings*. These two variables are the only control variables for model I and II.

First, the number of years the employee works at the organization is important to control for. Bartel (1995) shows that the likelihood of receiving training is highest for employees who are just hired. It is based on the survey question: "How many years have you been in your company or organization?". Respondents could fill in a number of years and 00 if they were at their organization for less than a year. This variable is recoded because less than a year initially took on a value of 999, which biased the results upwards. After the recoding, the variable now

takes on a value of 0 if the employee works at the organization less than a year. Furthermore, this variable is restructured to a log form as it is non-linear.

Second, *learnnewthings* is based on the survey question: “Generally, does your main paid job involve learning new things?” It takes on a value of 1 if the respondent answered ‘yes’ and 0 if the respondent answered ‘no’. This variable is chosen as a control variable for two reasons. First, if the respondent’s job involves learning regularly, the probability that he/she receives training from the employer or is eager to invest in its own skills is higher. Therefore, this control is added in all the models. Second, if the respondent’s job consists of so much learning, one would expect the employee is familiar with training, which could bias the benefits derived.

Model III includes the above-mentioned control variables *logyearsatfirm* and *learnnewthings* and five additional controls: *sector*, *firmsize*, *age*, *agesq* and *female*. As Barrett & O’Connell (2001) point out, when studying (productivity) benefits derived from training, it is important to control for organizational factors. Therefore, *sector* and *firmsize* are added.

age, *agesq* and *female* are included as control variables in model III as well, since these employee characteristics influence selectivity into training, and could therefore bias results when studying organizational benefits.

4.4 Methodology

This study examines a cross-sectional dataset. The total sample size is 178,905. The sample is narrowed down so that only respondents who work at an organization are included and only respondents who filled in the question whether they have undergone training (either employer-financed or self-financed) in the last year. Eliminating the responses from self-employed workers is done based by using the question “Are you working as an employee or are you self-employed?”. All 27,898 (approximately 16% of the total sample) ‘self-employed’ responses are eliminated, which leaves a sample size of 151,007⁴. Then the respondents who did not fill in the question regarding training are dropped (115,150 in total) which leaves a final sample size of 35,857 people.

This research aims to identify correlations by running ordinary least squares (OLS) regressions (model III) and logistic regressions (model I and II) since the first two models contain a binary dependent variable. Causality cannot be tested due to selection effects into

⁴ See Table VI in the Appendix

training. These selection effects are however acknowledged and examined in this paper. In all models, the necessary control variables are added.

By clustering the standard errors, unobserved codependence among the members of a particular group is tolerated. That is, the possibility that respondents from the same industry have correlated errors is allowed. However, when comparing the regression results with and without clustered standard errors on industry, they (practically) do not change.

Robust standard errors are used in all models. Those are standard errors that allow for heteroskedasticity and serial correlation of the error terms. The results do not change when using robust standard errors.

Clustering on industry level can only be done if there are enough distinct industries in the dataset. This dataset only includes eleven different industries (which is regarded as ‘too few industries’). I therefore decided to not cluster on industry level as this dataset does not allow it. Robust standard errors are used in every regression model.

I did a robustness check for model III by creating two separate models: IIIa and IIIb. The regression results for model IIIb are included in the appendix in table VII, in which the reference category (*trainingpaidyourself*) is included in the regression specification and *employerprovidestraining* is omitted.

The self-employed responses are dropped. It doesn’t make sense to include them in the sample as they are their own employer and employee at the same time. Therefore, there is no difference between self- and company-financed job training so these self-employed respondents could bias the results. Because the same sample is used throughout the whole study, the self-employed respondents are not taken into account in any of the models tested. By dropping them, 17.16% of the total sample is eliminated, which means 134,691 respondents are left.

To make sure the results are not influenced by differences between countries and industries, industry and country fixed effects are included. A control is generated, in which the industry and country variables are grouped and this control is absorbed in all regression specifications.

To make sure the control variables and the independent variables are not highly correlated with each other, intercorrelation between them has been measured⁵. The interaction terms are obviously highly correlated so there are not taken into account. Then in model (1), the correlation of greatest magnitude is 0.52 between *logyearsatfirm* and *age*, which makes sense as the age of respondents and the number of years they work at the organization are both

⁵ Table VIII in the Appendix

'year variables'. They increase gradually over time. The older people become, the longer they are at the organization. In model (2), apart from age and age squared, the correlation of greatest magnitude is also between *logyearsatfirm* and *age* and has a value of 0.51. Finally, in model IIIa and IIIb, also apart from age and age squared, the correlation of greatest magnitude is between *logyearsatfirm* and *age* and has a value of 0.55.

Another check for multicollinearity is done by running a VIF (variance inflation factor) test. Montgomery & Peck (1982) explain that 'the VIF is used as a measurement for the combined effect of the dependencies among the regressors on the variance of that term, for all terms in the model. One or more large (excess of a value of 5 or 10) large VIF's indicate multicollinearity which leads to a poor estimation of the regression coefficients.' The results for these tests can be found in the Appendix⁶. The only high values that come out are the ones of the interaction terms (*femalefulltime* and *sizeunionized*) and for *age* and *agesq*, which can be ignored.

⁶ Tables IX in the Appendix

5. Results and Analysis

5.1 Model I

Table II: Regression results model I

Dependent variable: employerprovidetraining	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
firmsize	0.160*** (0.00281)	0.117*** (0.00331)	0.128*** (0.00375)	0.123*** (0.00379)	0.122*** (0.00380)	0.120*** (0.00381)	0.110*** (0.00380)	0.109*** (0.00384)	0.109*** (0.00385)	0.109*** (0.00385)	0.0964*** (0.00431)	0.0792*** (0.00457)
unionized		0.147*** (0.00598)	0.258*** (0.0247)	0.219*** (0.0248)	0.219*** (0.0248)	0.213*** (0.0248)	0.188*** (0.0245)	0.184*** (0.0246)	0.184*** (0.0246)	0.185*** (0.0246)	0.162*** (0.0258)	0.177*** (0.0259)
sizeunionized			-0.0346*** (0.00746)	-0.0288*** (0.00746)	-0.0274*** (0.00746)	-0.0266*** (0.00746)	-0.0222*** (0.00737)	-0.0212*** (0.00739)	-0.0212*** (0.00739)	-0.0215*** (0.00739)	-0.0204*** (0.00779)	-0.0292*** (0.00784)
sector				0.0713*** (0.00635)	0.0758*** (0.00638)	0.0752*** (0.00638)	0.0408*** (0.00641)	0.0408*** (0.00641)	0.0397*** (0.00644)	0.0408*** (0.00645)	0.0349*** (0.00673)	-0.000563 (0.00812)
age					-0.00157*** (0.000199)	0.00826*** (0.00120)	0.00690*** (0.00120)	0.00626*** (0.00123)	0.00611*** (0.00124)	0.00547*** (0.00124)	0.00386*** (0.00149)	0.00302** (0.00151)
agesq						-0.000115*** (1.38e-05)	-9.26e-05*** (1.38e-05)	-8.50e-05*** (1.42e-05)	-8.32e-05*** (1.42e-05)	-7.58e-05*** (1.43e-05)	-6.37e-05*** (1.67e-05)	-6.50e-05*** (1.69e-05)
educationlevel							0.0440*** (0.00154)	0.0439*** (0.00154)	0.0437*** (0.00155)	0.0438*** (0.00154)	0.0345*** (0.00170)	0.0304*** (0.00178)
fulltime								0.0146** (0.00596)	0.0166*** (0.00608)	0.0532*** (0.00966)	0.0446*** (0.0113)	0.0808*** (0.0116)
female									0.00785 (0.00508)	0.0521*** (0.0104)	0.0630*** (0.0122)	0.0242* (0.0125)
femalefulltime										-0.0552*** (0.0119)	-0.0652*** (0.0136)	-0.0434*** (0.0137)
logyearsatfirm											0.0139*** (0.00325)	0.0155*** (0.00326)
learnnewthings											0.203*** (0.00569)	0.169*** (0.00587)
Constant	-0.120*** (0.00839)	-0.0569*** (0.00877)	-0.0880*** (0.00968)	-0.0823*** (0.00970)	-0.0148 (0.0133)	-0.201*** (0.0259)	-0.360*** (0.0263)	-0.355*** (0.0264)	-0.357*** (0.0264)	-0.376*** (0.0267)	-0.394*** (0.0327)	-0.260*** (0.0340)
Observations	34,022	34,022	34,022	34,022	33,901	33,901	33,803	33,803	33,803	33,803	29,265	28,914
R-squared	0.073	0.091	0.092	0.095	0.097	0.098	0.121	0.121	0.121	0.122	0.151	0.214

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table II shows the regression results for the first model in which various organizational and employee characteristics are regressed on the probability the respondent received employer-financed training.

5.1.1 Model I – Organizational characteristics

Characteristics of the organization on the probability they provide employer-financed training are analyzed. The coefficient for *sector* is positive and highly significant in column (4) up until (11), which suggests that organizations in the public sector are more likely to provide employer-financed training compared to organizations in the private sector. This is in line with the first hypothesis. However, this effect becomes insignificant once country and industry fixed effects are included thus H1 is rejected.

The coefficients on *unionized* and *firmsize* are both significant at a 1% level. Conform expectations, they both denote a positive relationship which means that if organizations are unionized, and the larger the organization is, the more likely they offer and pay for job training. Hypotheses 2 and 3 are not rejected.

Hypothesis 3a predicted an increase in the effect of the size of the organization given they are unionized, which turns out not to be the case as the coefficient on the interaction term between the size of the organization and unionization is negative and highly significant. Given organizations are unionized, a larger organization is less likely to provide and finance job training to their employees than smaller organizations. Hypothesis 3a is thus rejected. A

possible explanation could be that large organizations already have a solid infrastructure and are often motivated to provide training to employees. They might have employee development programs in place, for instance traineeships, so these organizations have a limited incentive to organize themselves through unions.

5.1.2 Model I – Employee characteristics

The organizational selection process of employees into employer-financed training is discussed. The coefficients on *age* and *agesq* are highly significant. They show that the age of employees positively influences the probability they receive employer-financed training, but at a decreasing rate. This is contrary to hypothesis H4a which is thus rejected as it predicted age would be negatively related to employer-financed training. A possible explanation could be that organizations are more likely to offer training to employees who are more experienced, as those are often the ones that fulfill the more important positions within the organization, including more responsibility in decision-making.

The coefficients on *fulltime* and *educationlevel* are both highly significant and positive. This is in line with the predictions of hypotheses H4b and H4e and thus these hypotheses are not rejected. Fulltime employees are more likely to receive employer-financed training compared to part-time employees and the higher the education level obtained by the employee, the more likely he/she is to receive training from the organization.

The coefficient on *female* in column (9) is not significant. I can therefore not conclude that women are significantly less likely to receive employer-financed training. Hypothesis 4c is rejected.

Furthermore, the interaction term between fulltime workers and their gender is negative and significant at a 1% level. For women who are employed fulltime, the coefficients in column (9) and (10) balance themselves out. Women who work fulltime have the same probability of receiving training as men who work fulltime. Women who are employed part-time are more likely to receive training compared to men who work part-time. Hypothesis 4d is rejected.

Finally, both control variables used in this model, *logyearsatfirm* and *learnnewthings* are significant at a 1% level.

5.2 Model II

Table III: Regression results model II

Dependent variable: trainingpaidyourself	(1)	(2)	(3)	(4)	(5)	(6)	(7)
age	-0.000861*** (0.000102)	0.00166*** (0.000604)	0.000319 (0.000583)	0.000684 (0.000608)	0.000571 (0.000611)	-0.000343 (0.000774)	-5.31e-06 (0.000794)
agesq		-2.96e-05*** (6.83e-06)	-1.16e-05* (6.57e-06)	-1.59e-05** (6.88e-06)	-1.47e-05** (6.91e-06)	-3.99e-06 (8.46e-06)	-7.05e-06 (8.73e-06)
educationlevel			0.0250*** (0.000896)	0.0252*** (0.000901)	0.0250*** (0.000900)	0.0240*** (0.000990)	0.0224*** (0.00105)
fulltime				-0.00770** (0.00318)	-0.00614* (0.00327)	-0.00703* (0.00379)	-0.00359 (0.00397)
female					0.00606** (0.00267)	0.00730** (0.00294)	-0.00176 (0.00320)
logyearsatfirm						-0.00167 (0.00167)	-0.00224 (0.00174)
learnnewthings						0.0307*** (0.00265)	0.0341*** (0.00293)
Country fe	NO	NO	NO	NO	NO	NO	YES
Industry fe	NO	NO	NO	NO	NO	NO	YES
Constant	0.103*** (0.00471)	0.0541*** (0.0127)	-0.0467*** (0.0129)	-0.0486*** (0.0129)	-0.0497*** (0.0129)	-0.0438*** (0.0164)	-0.0439*** (0.0169)
Observations	35,719	35,719	35,598	35,598	35,598	30,510	30,138
R-squared	0.002	0.002	0.032	0.032	0.032	0.037	0.067

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The second model explains what types of employees choose to finance their own training as can be seen in table III above. The coefficients for age and agesq are not strong throughout the model as they both become insignificant when adding control variables, country and fixed effects. Hypothesis 5a is therefore rejected.

The variable *educationlevel* has a positive coefficient that remains significant at a 1% level. This means the likelihood that employees pay for their own training increases the higher the completed level of education they have obtained. This is in line with hypotheses 5b, which is not rejected.

It seems like part-time employees and females are more likely to finance their own job training, however these results do not hold and become insignificant when the country and industry fixed effects are included in the model. Hypotheses 5c and 5d are rejected.

Finally, only the control variable regarding the inclusion of learning in the employee's job is significant.

Model I and II show that the level of education obtained by the employee and the probability they have undergone any type of training is positive. Thus, overall higher educated people undergo more training. Pischke (2001) gives two possible explanations for this finding. First, it might be explained by the fact that people who completed more levels of (higher) education can more easily learn or are more used to improving their skills. Second, for higher

educated workers the training is more quickly beneficial. Both these explanations suggest that training investments for higher educated people is more likely.

5.3 Model III

Table IV: Regression results model IIIa

Dependent variable: organizationalbenefit	(1)	(2)	(3)	(4)	(5)	(6)
daystraining	0.111*** (0.00571)	0.110*** (0.00571)	0.112*** (0.00571)	0.112*** (0.00571)	0.110*** (0.00648)	0.109*** (0.00669)
skills		-0.104*** (0.0125)	-0.103*** (0.0125)	-0.104*** (0.0125)	-0.0925*** (0.0135)	-0.108*** (0.0142)
employerprovidestraining			0.0817** (0.0343)	0.0799** (0.0343)	0.127*** (0.0390)	0.191*** (0.0407)
bothtraining				0.292*** (0.0843)	0.219** (0.0925)	0.143 (0.101)
age					-0.00348 (0.00599)	0.00313 (0.00620)
agesq					-7.22e-06 (6.81e-05)	-6.17e-05 (7.04e-05)
female					0.0362* (0.0187)	0.0208 (0.0204)
logyearsatfirm					-0.0209* (0.0115)	-0.0263** (0.0120)
learnnewthings					0.190*** (0.0297)	0.244*** (0.0304)
sector					0.0170 (0.0195)	-0.00955 (0.0259)
firmsize					-0.121*** (0.0137)	-0.0714*** (0.0149)
Country fe	NO	NO	NO	NO	NO	YES
Industry fe	NO	NO	NO	NO	NO	YES
Constant	3.852*** (0.0205)	4.070*** (0.0326)	3.985*** (0.0471)	3.986*** (0.0471)	4.324*** (0.136)	3.945*** (0.144)
Observations	12,638	12,595	12,595	12,595	10,956	10,853
R-squared	0.031	0.036	0.037	0.037	0.051	0.118

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Finally, model IIIa (table IV above) and IIIb⁷ examine how the three determinants: the number of days training, employees' skills and who finances the training affect the organizational benefits derived from training.

The coefficient on *daystraining* is positive and significant at a 1% level. The number of days positively influences the organizational training benefits. The seventh hypothesis is not rejected. I expect that there is a turning point for which an additional day of training does not increase marginal benefits anymore. However, the organization will not provide those additional training days as they do not match the costs of investment, so therefore the relationship is positive.

⁷ See appendix table VII

The variable *skills* is negatively related to organizational training benefits (significance level of 1%) so hypothesis 8 is rejected. This denotes that the higher the respondents indicated the self-perception of their current skills to be, the lower the benefits they have derived from training. Intuitively, this does not make sense as the benefits in this case are defined as productivity improvements, and the more you improve your way of working, the higher you would expect someone's skills to be. A possible economic explanation of this phenomenon is that training is probably provided to or undertaken by employees who (feel like they) lack skills to perform their duties at work. If these employees have undergone training, it is not necessarily the case that their skills are immediately rectified to the desired level. Therefore, even if they have undergone training, they still might still believe that they 'lack' skills or qualifications.

To determine the effect of which party pays for the training on the organizational benefits, the coefficients of *employerprovidetraining* and *trainingpaidyourself* are studied. Column (3) shows a positive coefficient on *employerprovidetraining*, which is significant at a 5% level. This denotes that if training is provided and paid for by the employer, the organizational benefits will be higher compared to self-financed training. This is confirmed by the negative coefficient of the reference category *trainingpaidyourself* in model IIIb in appendix table VII, denoting that employees who financed their own training indicate lower organizational benefits compared to employees who received employer-financed training. Therefore, hypothesis 6 is not rejected.

Furthermore, column (4) shows that employees who underwent both types of training tend to report higher benefits. The coefficient on *bothtraining* becomes insignificant when country and industry fixed effects are included (column (6)). This can be explained by cultural or sector differences, for example in France where it is uncommon to pay for your own training.

The control variables *logyearsatfirm*, *learnnewthings* and *firmsize* are all significant.

6. Conclusion

This paper firstly studies the selection process of which employees receive employer-financed training and which ones choose to undergo self-financed training. Second it examines how skills, the number of days training and who pays for the training influence the benefits of training. All these three determinants have a significant impact on the productivity improvement of employees.

First, a distinction is made between self-financed and employer-financed job training. To get an idea of the differences between the two, this paper analyzes what types of organizations provide training, the organizational selection process regarding which employees are eligible for training and the employee selection process into self-financed training.

Model (1) shows that unionization and the size of the organization positively affect the likelihood for organizations to provide employer-financed training. Given organizations are unionized, the larger they are the lower the provision of training. Furthermore, working fulltime and being highly educated both contribute to the likelihood of receiving employer-financed training. Age is also positively related to employer-financed training, but at a decreasing rate. Women who work fulltime are equally likely to receive employer-financed training compared to men who are fulltime employed. Women who are employed part-time are more likely to receive training compared to men who work part-time.

Model (2) shows that employees who have obtained a high level of education are not only more likely to receive employer-financed training, but they also tend to have a higher willingness to invest in their own training.

Finally, in model (3) three main conclusions are derived. First, it can be seen that in line with the predictions, the number of days spent on training positively influences the benefits derived. This might be the case because organizations will offer the optimal amount of training days and will not invest more money and resources if the expected benefits derived are negative. Second, the (self-perceived) skills possessed by the employee are negatively related to the benefits they have derived from training. This result is in contrast with my expectations, as one would expect that if training benefits are high, this means skills have also improved. A possible explanation for this phenomenon is that since employees who receive training are the ones who already lack behind, their skills can simply not be enhanced to the desired level within a few training days. Third, if the training is provided and financed by the employer the organizational benefits are higher compared to training financed by the employee.

These three models together answer the main research question: *What constitutes the employer and employee selection process into training and how do skills, the number of days training and who pays for the training influence the training benefits?*

This study has some (serious) limitations. The seven main limitations will be discussed. First, the survey data is subjective. It is difficult to examine whether individuals respond truthfully to the questions asked. Second, it might also be hard for respondents to remember everything correct. They are for instance questioned about the number of days they have spent on training the last year. If they do not remember this (well), this could lead to biases. Third, the questions are asked by means of face-to-face interviews, which are less anonymous compared to interviews on the phone or online (Greenfield et al., 2000). Fourth, as these interviews are taken in various countries, differences in culture and the interpretation of questions could affect individual's replies (Bacq, Hartog and Hoogendoorn, 2013). Fifth, Bertrand & Mullainathan (2001) state that factors like which words are used, or the sequences in which the questions are asked can be very important for the outcome derived. Sixth, the survey does not distinguish between different types of training, apart from who finances it and on-the-job training (which is not discussed in this study). According to Barron et al. (1997) this could lead to an over- or under-estimation of the effect of training as some individuals might interpret training as only formal training whereas others also take into account informal training. Finally, as Altonji et al. (1991) have pointed out: training is an impervious concept as there are various ways to measure and define it. This makes it difficult to compare studies and make the results found widely applicable. The variables included in this study are limited. There are many other factors that influence organizational benefits derived from training. Due to data limitation and based on what is, in my opinion, most interesting three determinants have been chosen.

Further research on the determinants of the benefits derived from job training is needed. It would be especially valuable to examine differences in the types of training (content wise), as discussed in section two. Moreover, a lot of variation might also exist between countries and industries. For instance, in which countries is job training prevalent? Is this because of regulations which force organizations into continuously educating their employees or does it have to do with the type of industry inhabitants mostly work in? These are all questions that remain for other researchers to explore.

References

- Acemoglu, D., & Pischke, J. S. (1998). Why do firms train? Theory and evidence. *The Quarterly Journal of Economics*, 113(1), 79-119.
- Acemoglu, D., & Pischke, J. S. (1999). Beyond Becker: Training in imperfect labour markets. *The economic journal*, 109(453), 112-142.
- Aisa, R., Gonzalez-Alvarez, M. A., & Larramona, G. (2016). The role of gender in further training for spanish workers: are employers making a difference?. *Feminist Economics*, 22(3), 154-182.
- Almeida, R., & Carneiro, P. (2009). The return to firm investments in human capital. *Labour economics*, 16(1), 97-106.
- Altonji, J. G., & Spletzer, J. R. (1991). Worker characteristics, job characteristics, and the receipt of on-the-job training. *ILR Review*, 45(1), 58-79.
- Arntz, M., Gregory, T., & Zierahn, U. (2016). The risk of automation for jobs in OECD countries.
- Arulampalam, W., Booth, A. L., & Bryan, M. L. (2004). Training in europe. *Journal of the European Economic Association*, 2(2-3), 346-360.
- Bacq, S., Hartog, C., and Hoogendoorn, B. (2013). A quantitative comparison of social and commercial entrepreneurship: Toward a more nuanced understanding of social entrepreneurship organizations in context. *Journal of Social Entrepreneurship*, 4(1), 40-68.
- Barrett, A., & O'Connell, P. J. (2001). Does training generally work? The returns to in-company training. *ILR Review*, 54(3), 647-662.
- Barron, J. M., Berger, M. C., & Black, D. A. (1997). How well do we measure training?. *Journal of Labor Economics*, 15(3), 507-528.
- Barron, J. M., Black, D. A., & Loewenstein, M. A. (1993). Gender differences in training, capital, and wages. *Journal of human Resources*, 343-364.
- Barron, J. M., Black, D. A., & Loewenstein, M. A. (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.
- Bassanini, A., Booth, A. L., Brunello, G., De Paola, M., & Leuven, E. (2005). Workplace training in Europe.
- Ben-Porath, Y. (1967). The production of human capital and the life cycle of earnings. *Journal of political economy*, 75(4, Part 1), 352-365.
https://www.jstor.org/stable/pdf/2535400.pdf?ab_segments=0%2Fdefault-2%2Fcontrol

- Bertrand, M., and Mullainathan, S. (2001). Do people mean what they say? Implications for subjective survey data. *The American Economic Review*, 91(2), 67-72
- Bigelow, M. (2002). How to achieve operational excellence. *Quality Progress*, 35(10), 70.
- Black, D. A., Noel, B. J., & Wang, Z. (1999). On-the-job training, establishment size, and firm size: Evidence for economies of scale in the production of human capital. *Southern Economic Journal*, 82-100.
- 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.
- Booth, A. and M. Bryan (2002), "Who Pays for General Training?: New Evidence for British Men and Women", IZA Discussion Paper, No. 486.
- Booth, A. L., & Zoega, G. (1999). Do quits cause under-training?. *Oxford Economic Papers*, 51(2), 374-386.
- Boston, T. D. (1990). Segmented labor markets: New evidence from a study of four race-gender groups. *ILR Review*, 44(1), 99-115.
- Chang, C., & Wang, Y. (1996). Human capital investment under asymmetric information: The Pigovian conjecture revisited. *Journal of labor Economics*, 14(3), 505-519.
- Chapman, B., Crossley, T., & Kim, T. (2003). Credit constraints and training after job loss.
- Colarelli, S. M., & Montei, M. S. (1996). Some contextual influences on training utilization. *The Journal of Applied Behavioral Science*, 32(3): 306-322.
- Colombo, E., & Stanca, L. (2014). The impact of training on productivity: evidence from a panel of Italian firms. *International Journal of Manpower*, 35(8), 1140-1158.
- Crook TR, Todd SY, Combs JG, Woehr DJ, Ketchen DJ Jr. (2011). Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. *J. Appl. Psychol.* 96:443–56
- Dearden, L., H. Reed, and J. van Reenen (2000), "Who Gains when Workers Train? Training and Corporate Productivity in a Panel of British Industries", The Institute for Fiscal Studies, Working Paper 00/04, UK.
- Duncan, G. J., & Hoffman, S. (1979). On-the-job training and earnings differences by race and sex. *The Review of Economics and Statistics*, 594-603.
- Eck, A. (1993). Job-related education and training: Their impact on earnings. *Monthly Lab. Rev.*, 116, 21.
- Elnaga, A., & Imran, A. (2013). The effect of training on employee performance. *European Journal of Business and Management*, 5(4), 137-147.

Eurofound (2016), Sixth European Working Conditions Survey – Overview report, Cornell University ILR School

European Foundation for the Improvement of Living and Working Conditions. (2017). *European Working Conditions Survey, 2015*. [data collection]. 4th Edition. UK Data Service. SN: 8098, <http://doi.org/10.5255/UKDA-SN-8098-4>

Fine, Ben J. (1998): *Labour Market Theory. A Constructive Reassessment*. London: Routledge.

Greenhalgh, C., & Mavrotas, G. (1996). Job training, new technology and labour turnover. *British Journal of Industrial Relations*, 34(1), 131-150.

Groot, W. (1999). Productivity effects of enterprise-related training. *Applied Economics Letters*, 6(6), 369-371.

Gunderson, M. (1973). Determinants of Individual Success in On-the-Job Training. *Journal of Human Resources*, 472-484.

Hansson, B. (2009). Job-related training and benefits for individuals: A review of evidence and explanations.

Harris, R. I. (1999). The determinants of work-related training in Britain in 1995 and the implications of employer size. *Applied Economics*, 31(4), 451-463.

Hidalgo, D., Oosterbeek, H., & Webbink, D. (2014). The impact of training vouchers on low-skilled workers. *Labour Economics*, 31, 117-128.

Hudson, R. (1989). Labour-market changes and new forms of work in old industrial regions: maybe flexibility for some but not flexible accumulation. *Environment and Planning D: Society and Space*, 7(1), 5-30.

Hui, T. S. W., & Smith, J. A. (2002). The determinants of participation in adult education and training in Canada.

Lazear, E. P. (1981). Agency, earnings profiles, productivity, and hours restrictions. *The American Economic Review*, 71(4), 606-620.

Lee, C. H., & Bruvold, N. T. (2003). Creating value for employees: investment in employee development. *The International Journal of Human Resource Management*, 14(6), 981-1000.

Long, M. C. (2010). Changes in the returns to education and college quality. *Economics of Education review*, 29(3), 338-347.

Khan, R. A. G., Khan, F. A., & Khan, M. A. (2011). Impact of training and development on organizational performance. *Global Journal of Management and Business Research*, 11(7).

Knoke, D., & Kalleberg, A. L. (1994). Job training in US organizations. *American sociological review*, 59(4), 537.

Loewenstein, M.A. and J.R. Spletzer (1998), "Dividing the Cost and Returns to General Training", *Journal of Labor Economics*, Vol. 16, pp. 142–171.

- Lynch, L. M. (1991). The role of off-the-job vs. on-the-job training for the mobility of women workers. *The American Economic Review*, 81(2), 151-156.
- Maranto, C. L. (1985). Union Effects on Human Capital Investments and Returns. *The Journal of Human Resources*, 20(3), 453-462.
- Maranto, C. L., & Rodgers, R. C. (1984). Does work experience increase productivity? A test of the on-the-job training hypothesis. *Journal of human resources*, 341-357.
- McKinsey Quarterly (2006), "An executive take on the top business trends", a McKinsey Global Survey.
- Meshcheriakova, O., & Vermeulen, S. (2017). On-the-job-training as a signal: Why low-educated workers invest less in further training.
- Mincer, J. (1962). On-the-job training: Costs, returns, and some implications. *Journal of political Economy*, 70(5, Part 2), 50-79.
- Montgomery, D. C., and L. A. Peck (1982). Introduction to Linear Regression Analysis. John Wiley and Sons, New York. Vinod, H. D.
- OECD & European Commission (2013). "The Survey of Adult Skills (PIAAC): Implications for education and training policies in Europe." Paris and Brussels: OECD Publishing and European Commission, Directorate-General for Education and Culture
- Oi, W. Y. (1983). Heterogeneous firms and the organization of production. *Economic Inquiry*, 21(2), 147-171.
- Orrje, H. (2000). *The incidence of on-the-job training. An empirical study using Swedish data.*
- Pischke, J. S. (2001). Continuous training in Germany. *Journal of population economics*, 14(3), 523-548.
- Prasad, S., & Tran, H. (2013). Work practices, incentives for skills, and training. *Labour Economics*, 23, 66-76.
- Rowden, R. W. (2002). The relationship between workplace learning and job satisfaction in US small to midsize businesses. *Human Resource Development Quarterly*, 13(4), 407-425.
- Rowden, R. W., & Conine Jr, C. T. (2005). The impact of workplace learning on job satisfaction in small US commercial banks. *Journal of workplace Learning*, 17(4), 215-230.
- Salas, E., Wilson, K., Priest, H. and Guthrie, J. (2006), 'Design, Delivery, and Evaluation of Training Systems', in G. Salvendy (ed.), *Handbook of Human Factors and Ergonomics*, 3rd edn (Hoboken, NJ: John Wiley & Sons), pp. 472–512.
- Sieben, I. (2007). Does training trigger turnover-or not? The impact of formal training on graduates' job search behaviour. *Work, Employment and Society*, 21(3), 397-416.

Tharenou, P., Saks, A. M., & Moore, C. (2007). A review and critique of research on training and organizational-level outcomes. *Human Resource Management Review*, 17(3), 251-273.

Valle, R., Marti'n, F., Romero, P.M. and Dolan, S. (2000), "Business strategy, work processes and human resource training: are they congruent?", *Journal of Organizational Behavior*, Vol. 21, pp. 283-97

Veum, J. R. (1997). Training and job mobility among young workers in the United States. *Journal of population economics*, 10(2), 219-233.

Ability is also positively associated with the receipt of ON-OP

Zweimüller, J., & Winter-Ebmer, R. (2000). Firm-specific training: consequences for job mobility.

Appendix

Table V: more men than women work fulltime

```
. sum female if fulltime==1
```

Variable	Obs	Mean	Std. Dev.	Min	Max
female	71,279	.4590412	.4983231	0	1

```
. sum female if fulltime==0
```

Variable	Obs	Mean	Std. Dev.	Min	Max
female	79,728	.5278321	.4992279	0	1

Table VI: self-employed

```
. tab y15_Q7
```

Q7. Are you working as an employee or are you self-employed ?	Freq.	Percent	Cum.
Employee	134,691	82.84	82.84
Self-employed	27,898	17.16	100.00
Total	162,589	100.00	

Table VII: Regression results model IIIb

Table VII: Regression results model IIIb

Dependent variable: organizationalbenefit	(1)	(2)	(3)	(4)	(5)	(6)
daystraining	0.111*** (0.00571)	0.110*** (0.00571)	0.112*** (0.00571)	0.112*** (0.00571)	0.110*** (0.00648)	0.109*** (0.00669)
skills		-0.104*** (0.0125)	-0.104*** (0.0125)	-0.104*** (0.0125)	-0.0925*** (0.0135)	-0.108*** (0.0142)
trainingpaidyourself			-0.0578* (0.0329)	-0.0799** (0.0343)	-0.127*** (0.0390)	-0.191*** (0.0407)
bothtraining				0.372*** (0.0901)	0.347*** (0.0992)	0.334*** (0.107)
age					-0.00348 (0.00599)	0.00313 (0.00620)
agesq					-7.22e-06 (6.81e-05)	-6.17e-05 (7.04e-05)
female					0.0362* (0.0187)	0.0208 (0.0204)
logyearsatfirm					-0.0209* (0.0115)	-0.0263** (0.0120)
learnnewthings					0.190*** (0.0297)	0.244*** (0.0304)
sector					0.0170 (0.0195)	-0.00955 (0.0259)
firmsize					-0.121*** (0.0137)	-0.0714*** (0.0149)
Country fe	NO	NO	NO	NO	NO	YES
Industry fe	NO	NO	NO	NO	NO	YES
Constant	3.852*** (0.0205)	4.070*** (0.0326)	4.068*** (0.0325)	4.066*** (0.0325)	4.452*** (0.131)	4.135*** (0.138)
Observations	12,638	12,595	12,595	12,595	10,956	10,853
R-squared	0.031	0.036	0.037	0.037	0.051	0.118

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Model IIIb (H6 – H8)

$$\text{organizationalbenefit} = \alpha + \beta_1(\text{daystraining}) + \beta_2(\text{skills}) + \beta_3(\text{trainingpaidyourself}) + \beta_4(\text{bothtraining}) + \beta_5(\text{age}) + \beta_6(\text{agesq}) + \beta_7(\text{female}) + \beta_8(\text{logyearsatfirm}) + \beta_9(\text{learnnewthings}) + \beta_{10}(\text{sector}) + \beta_{11}(\text{firmsize}) + \gamma_c + \gamma_i + \varepsilon$$

i: individual level / respondent *i*

γ_c : country fixed effects

γ_i : industry fixed effects

Table VIII: Intercorrelation between independent and control variables to test for multicollinearity

Model I

(obs=29,265)

	firmsize	unioni~d	sizeun~d	sector	age	agesq	educat~l	fulltime	female	female~e	logyea~m	learnn~s
firmsize	1.0000											
unionized	0.4755	1.0000										
sizeunioni~d	0.5879	0.9715	1.0000									
sector	0.2305	0.3495	0.3373	1.0000								
age	0.0323	0.1076	0.1047	0.1302	1.0000							
agesq	0.0193	0.0911	0.0879	0.1212	0.9883	1.0000						
education~l	0.1687	0.1739	0.1756	0.2462	-0.0630	-0.0713	1.0000					
fulltime	0.1052	0.0746	0.0730	0.0437	-0.0632	-0.0928	0.0830	1.0000				
female	-0.0548	-0.0086	-0.0166	0.1198	0.0177	0.0125	0.0836	-0.2078	1.0000			
femalefull~e	0.0032	0.0235	0.0145	0.1370	-0.0168	-0.0310	0.1278	0.3854	0.7432	1.0000		
logyearsat~m	0.1846	0.2709	0.2764	0.2154	0.5204	0.4918	0.0127	0.0937	-0.0167	0.0247	1.0000	
learnnewth~s	0.1716	0.1637	0.1710	0.1224	-0.0510	-0.0563	0.2624	0.0627	0.0074	0.0341	0.0638	1.0000

Model II

(obs=30,510)

	age	agesq	educat~l	fulltime	female	learnn~s	logyea~m
age	1.0000						
agesq	0.9882	1.0000					
education~l	-0.0674	-0.0759	1.0000				
fulltime	-0.0658	-0.0958	0.0868	1.0000			
female	0.0181	0.0132	0.0810	-0.2086	1.0000		
learnnewth~s	-0.0554	-0.0611	0.2650	0.0670	0.0048	1.0000	
logyearsat~m	0.5153	0.4864	0.0147	0.0991	-0.0163	0.0656	1.0000

Model IIIa

	daystr~g	skills	traini~f	age	agesq	female	logyea~m	learnn~s	sector	firmsize
daystraining	1.0000									
skills	-0.0097	1.0000								
trainingpa~f	0.1650	0.0197	1.0000							
age	-0.0756	0.0132	-0.0721	1.0000						
agesq	-0.0787	0.0089	-0.0672	0.9895	1.0000					
female	-0.0557	-0.0265	0.0183	0.0180	0.0157	1.0000				
logyearsat~m	-0.0371	0.0082	-0.1004	0.5510	0.5253	-0.0055	1.0000			
learnnewth~s	0.1420	-0.0645	-0.0229	0.0082	0.0051	0.0285	0.0466	1.0000		
sector	0.0531	-0.0331	-0.0350	0.1527	0.1449	0.1635	0.2056	0.0828	1.0000	
firmsize	0.1033	0.0337	-0.1482	0.0579	0.0488	-0.0692	0.1357	0.0653	0.1215	1.0000

Model IIIb

	daystr~g	skills	employ~g	age	agesq	female	logyea~m	learnn~s	sector	firmsize
daystraining	1.0000									
skills	-0.0097	1.0000								
employerpr~g	-0.1686	-0.0214	1.0000							
age	-0.0756	0.0132	0.0706	1.0000						
agesq	-0.0787	0.0089	0.0651	0.9895	1.0000					
female	-0.0557	-0.0265	-0.0152	0.0180	0.0157	1.0000				
logyearsat~m	-0.0371	0.0082	0.1014	0.5510	0.5253	-0.0055	1.0000			
learnnewth~s	0.1420	-0.0645	0.0244	0.0082	0.0051	0.0285	0.0466	1.0000		
sector	0.0531	-0.0331	0.0351	0.1527	0.1449	0.1635	0.2056	0.0828	1.0000	
firmsize	0.1033	0.0337	0.1427	0.0579	0.0488	-0.0692	0.1357	0.0653	0.1215	1.0000

Table IX: VIF tests for multicollinearity

Model I

. vif

Variable	VIF	1/VIF
age	48.48	0.020629
agesq	47.16	0.021205
sizeunioni~d	28.33	0.035296
unionized	24.27	0.041204
femalefull~e	7.13	0.140172
female	6.43	0.155459
fulltime	3.51	0.285043
firmsize	2.13	0.469546
sector	1.55	0.644766
logyearsat~m	1.55	0.645469
industry	1.50	0.667499
education~l	1.21	0.824087
learnnewth~s	1.11	0.901124
country	1.02	0.979030
Mean VIF	12.53	

Model II

. vif

Variable	VIF	1/VIF
age	47.17	0.021199
agesq	45.81	0.021827
logyearsat~m	1.44	0.693746
industry	1.19	0.841635
education~l	1.18	0.847245
fulltime	1.14	0.876265
female	1.12	0.889594
learnnewth~s	1.09	0.915716
country	1.01	0.988584
Mean VIF	11.24	

Model IIIa

. vif

Variable	VIF	1/VIF
age	51.25	0.019511
agesq	49.31	0.020278
logyearsat~m	1.53	0.652739
sector	1.10	0.909331
daystraining	1.08	0.925085
firmsize	1.08	0.928849
employerpr~g	1.07	0.937291
female	1.04	0.958790
learnnewth~s	1.04	0.965302
skills	1.01	0.991244
bothtraining	1.00	0.997311
Mean VIF	10.05	

Model IIIb

. vif

Variable	VIF	1/VIF
age	51.25	0.019511
agesq	49.31	0.020278
logyearsat~m	1.53	0.652739
trainingpa~f	1.13	0.883436
sector	1.10	0.909331
daystraining	1.08	0.925085
firmsize	1.08	0.928849
bothtraining	1.06	0.940051
female	1.04	0.958790
learnnewth~s	1.04	0.965302
skills	1.01	0.991244
Mean VIF	10.06	