

Abstract

Using data from the European Labour Force Survey, the characteristics of individuals who receive vocational training is compared in six European countries; Germany, France, the Netherlands, Portugal, Sweden and the UK. As well as the incidence of training, the intensity is also considered. In addition, training is split into its on-the-job and off-the-job components. The spectrum of training within these six countries runs from Germany at one end, where most training is the intensive upskilling of young, unqualified workers, to Sweden at the other end, where the typical training spell is of short duration and is given to middle-aged, well-educated employees in professional jobs. Thus the pattern of training is largely determined by a country's system of education. In Germany, vocational skills are not taught within the formal education sector, and are learned through participation on an apprenticeship scheme, while in Sweden, students do learn vocational skills at school, and so the workplace training we observe is mainly 'top-up' courses.

**A Cross-Country Comparison
of the Determinants of Vocational Training**

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1. Introduction

Workplace training is increasingly becoming recognised as an important means for advanced economies to maintain their position within the world economy. As competition from the developing world increases, the countries who industrialised first are having to upgrade their technology to stay ahead. Expertise in the provision of specialist goods and services, rather than mass production of standardised goods, is considered to be the best way to improve economic performance (UK Department of Employment, 1988; US Department of Labor, 1989). In turn, this requires, amongst other things, a highly trained workforce, capable of using the new technologies and adapting to new work practices. The alternative would seem to be hiring low productivity workers in low wage jobs that can compete with the developing countries. While this may appear attractive to some employers in the short-term, in the long-term at the national level it will lead to falling economic performance and declining living standards.

Although state-run training schemes can be found in most advanced countries, the provision of workplace training by employers, either on-the-job or off-the-job at institutes of education and training, is considered to be an important source of training, since firms are driven by market forces and will supply the skills that the market demands. If training is to be undertaken by private individuals, then it must be worthwhile to those economic agents, regardless of the benefits to the nation as a whole. The well-known theory of human capital acquisition predicts that individuals will invest in their human capital, up to the point at which the marginal returns from that investment just equal the marginal cost of undertaking the training. Firms typically pay at least some of the costs of training themselves, and so they must also perform a similar cost-benefit analysis to determine the desirability of offering training. For the firm, the extra productivity of the trained worker must cover the cost of funding the training. This is the reason why firms are more likely to fund firm-specific rather than general training, since the worker is more tied to the firm in the former case if he or she wants to see the returns to their human capital investment, and so firms are more likely to receive the enhanced productivity that they have paid to create.

The aim of this paper is to describe the characteristics of individuals who are receiving training in six European countries; France, Germany, the Netherlands, Portugal, Sweden and the UK. Is it the young or the old, male or females who are more likely to receive training? Is training received at the beginning of a job, or do employers wait before deciding who train? Are part-time, temporary workers more or less likely to be trained than full-time, permanent workers? Importantly for the re-skilling of national workforces, as described above, is it the unskilled who are receiving training, or those who already possess qualifications and skills? Finally, in which sectors is training taking place - is it in the new, developing industries, or the old traditional ones? This paper uses data from the European Labour Force Survey to answer these questions, in an effort to build a picture of how different countries are addressing the need to re-skill their workforces.

The next section describes previous studies that have attempted to analyse the determinants of the receipt of workplace training. The following sections then describe the data to be used, present the results, then offer some conclusions, respectively.

2. Literature Review

A large literature has grown that examines workplace training, who receives it and where. Most of this work relies upon individual level data, and self-reporting of incidences of training. One of the problems faced by the literature is a lack of consistency in the definition of the word 'training', used in each of the studies. There is an agreement that it is vocational training for work that is being considered, rather than formal education, but the former still encapsulates a range of options, from formal training on-the-job, through informal learning by doing, to formal training off-the-job. In addition, there is a range of time periods considered in the various data sets considered by the different authors. The questionnaire may ask the respondent whether they have received any training in the four weeks prior to the interview, in the twelve months prior to the interview, at any time during the current job, or indeed any other time period. Clearly, the answers provided, and the empirical results derived from them, will depend upon the time-frame under consideration.

Despite these limitations, a number of findings seem to be consistent across studies. A typical study has as its dependent variable a dichotomous variable indicating the receipt or otherwise of training within the time period under consideration. The explanatory variables include the usual range of individual characteristics, and often a limited set of workplace characteristics, as reported by the individual, such as firm size and industry. Examples include Booth (1991, 1993) and Greenhalgh and Stewart (1987), all of which use UK data. The usual findings are that males are more likely to have received some training than females, and similarly for the well educated relative to the less well educated, the young relative to older workers, those in more senior occupations relative to those in lower ones and those working in large firms relative to those working in small firms. A few variables do not enjoy such consistent findings, for example race. Amongst the studies mentioned above, Greenhalgh and Stewart (1987) find that white males are more likely to receive training than non-white males, while the reverse is true for females. Booth (1993), in her sample of graduates only, finds that non-whites are in general more likely to receive training, other things held constant. Similarly, the relationship between union status and the receipt of training has attracted controversy. Many studies seem to find that union members, or individuals working in a unionised workplace, are more likely to receive training, but exceptions to this do exist.

An example of the problems that can exist when considering different time periods is the results obtained when the individual's job tenure is included as an explanatory variable. When a 'snapshot' of training over a specified period is being used, those with longer tenure are found to be less likely to have been in receipt. However, if the question asks whether the respondent has ever received any training in their current job, it is those who have been in that job longer who are more likely to reply in the affirmative. This may be due to the simple fact that they have been in the job longer, and so are more likely to have been trained at some point, or that all training is received at the beginning of jobs, but employers are more likely to provide it to those individuals who will remain in the job longer. Loewenstein and Spletzer (1997) examine this issue by using longitudinal data, and find both reasons have a part to play in explaining the positive relationship between job tenure and ever receiving training. When they split their sample into those who eventually stay in the job for up to one year, two years, three years and four years or more, they find, within each group, a rising training-tenure profile, suggesting that some training is delayed. However, they also find that the amount of initial training rises with the length of time that individuals eventually remain with the firm, suggesting that employers can in some way identify the long-stayers, and concentrate their training resources on those individuals accordingly.

An approach adopted by some studies is to use data sets that focus on a particular type of

training. For example, Booth and Satchell (1994) and Knight and Latreille (1996) both concentrate on apprenticeship training. The variables included in these two studies are largely incompatible with those described above, although both find that the probability of receiving apprenticeship training rises with firm size, while Booth and Satchell (1994) report apprentices being of higher measured ability than non-apprentices.

An increasingly common style of reporting research on the determinants of training receipt has been to estimate separate equations for different types of training, if such information is provided within the data set being used. Examples of this approach include Altonji and Spletzer (1991), Blundell *et al* (1995), Cameron and Heckman (1993), Green (1993a, 1993b), Greenhalgh and Mavrotas (1994), Kennedy *et al* (1994), Lillard and Tan (1992) and Lynch (1992). Often the distinction made is between on-the-job and off-the-job training, but sometimes training is broken down into even narrower categories. The results described above for total training equations typically hold when training is broken down into its various components, but there are exceptions. For example, Kennedy *et al* have a whole list of explanatory variables that have the same signed effect (with slight differences in statistical significance) on both in-house and external training. However, they do find that youths under the age of 20 are more likely to receive in-house training than prime-aged workers, but less likely to partake in external training, and that the incidence of in-house training increases with firm size, while the highest firm size dummy variable in their external training equation attracts a statistically significant negative coefficient. Altonji and Spletzer (1991) find with respect to race that blacks in their US data set are more likely than whites to receive on-the-job training and financial assistance for after-hours education, but less likely to receive off-the-job training. A difference in the Greenhalgh and Mavrotas (1994) paper is perhaps not too surprising, where they show that part-time workers are less likely than full-timers to participate in employer-provided training, but more likely to undertake a training course that they arrange themselves. Lynch (1992) finds that individuals living in a high unemployment area of the US are more likely to do an apprenticeship than those in low unemployment regions, but less likely to receive on-the-job training. In addition, she reports that the incidence of on-the-job training within the survey year is positively related to labour market experience, while the receipt of off-the-job training over the same period is negatively related to job tenure. Finally, while Lynch finds the usual positive and statistically significant coefficient on her male dummy variable in her on-the-job training and apprenticeship equations, she finds that females are more likely to receive off-the-job training. Interestingly, other papers have found different effects of explanatory variables on different forms of training, when they also divide their sample by gender. For example, Green (1993a) finds that, for males, age is negatively related to the receipt of on-the-job training, while for females, age is positively related to the incidence off-the-job training, at least up to a peak in the mid-30s. Also, Blundell *et al* (1995) show that males who are working in large firms are more likely to receive employer-provided training, while for females, those in large firms benefit from more participation in qualification training courses.

Another way in which a number of studies have extended the basic framework is to consider the amount of training received, rather than or in addition to the simple incidence of training. Examples of papers that consider this aspect include Altonji and Spletzer (1991), Arulampalam and Booth (1997), Barron *et al* (1987), Frazis *et al* (1998), Green *et al* (1996) and Machin and Wilkinson (1995). The previous studies mentioned can say how likely an individual is to receive training, but can say nothing about the quality of that training. The papers just listed are an attempt to rectify that situation, by using time spent training as a measure of quality. Typically, however, a variable has the same effect on training intensity as it does on training incidence. For example, the more highly educated seem to undertake longer periods of training, as well as being more likely to receive any period of training. There are some exceptions to this rule, however. For example,

Frazis *et al* (1998) report that firm size is positively related to the incidence of training, but negatively to the duration of training. Similarly, Arulampalam and Booth (1997) find that, for the males in their UK data set, the incidence of training is highest in large firms, as is usually obtained, but given that a spell exists, that the total number of training spells is highest in medium sized firms. For females the reverse is true. The authors also find, in common with Altonji and Spletzer (1991) that the more able, in terms of scores in reading tests and aptitude tests, are more likely to undertake a spell of training, but that the quantity of training is no greater for the more able than for the less able. Machin and Wilkinson (1995) also suggest that the skills gap in terms of hours of training may not be very large. Other results obtained by Altonji and Spletzer (1991) reveal that, although they can find no statistically significant difference in the incidence of training between males and females, women receive fewer hours of all types of training. They also include necessary skills amongst their explanatory variables, and show that jobs requiring clerical skills have a high incidence of training, but when such training is provided, it is typically of only short duration.

Most of the studies described above have made use of data supplied by individuals. An alternative is to use descriptions of training as supplied by employers. The benefit of this approach is that more detailed descriptions of the firm characteristics that are associated with training can be provided. Green *et al* (1996) and Kennedy *et al* (1994) adopt this approach. The former finds that recognition of a trade union, and the presence of a skill shortage in the establishment, as well as firm size, are positively associated with the receipt of training, while the female share of employment has a negative effect. Kennedy *et al* (1994) show that in-house, but not external training, is positively related to firm size, while both types of training are more likely if the workplace management bargain with a union, and if the workplace employs a higher percentage of managers, para-professionals or workers with more than ten years of tenure. External training is shown to be statistically significantly lower in service sector workplaces. In addition, the higher the proportion of females or casual employees, the lower is the likelihood of external training being provided, while the greater the presence of older workers, the lower the probability of both in-house and external training.

The previous two studies attempt to allow for the characteristics of the employees by including the variables that measure the proportion of the workforce having certain characteristics. Data sets that merge information on individuals with information on their place of work are very useful for controlling for both individual and workplace characteristics. Studies that have used such data include Boon (1998), Frazis *et al* (1998) and Jacobs *et al* (1996). Jacobs *et al* (1996) present a job training equation with establishment attributes and individual characteristics as explanatory variables. Amongst the former category, variables that attract statistically significant coefficients are establishment size (+), parent size (+), degree of internal formalisation (+) and the external environmental complexity (+). The only individual characteristic to have a statistically significant coefficient is the education variable, at the 10% level. The authors use this fact to argue that previous studies based on individual data only are biased by the lack of information on firm characteristics. However, when they run an equation that includes only individual characteristics, few variables have statistically significant coefficients then either. In particular, race, age and gender, which have been found to have important affects in previous studies, all have statistically insignificant coefficients in Jacobs *et al*'s (1996) equation, suggesting that their results are down to a peculiarity of their data set, rather than the inclusion of establishment characteristics. Boon (1998) and Frazis *et al* (1998) both include individual and workplace variables in their equations, with both sets proving to be important in explaining variation in the incidence and intensity of training.

Few studies have attempted cross-country analyses of the determinants of workplace training,

presumably because of the difficulty in finding data sets that define training consistently across countries. Two studies that have been made are Tan *et al* (1992) and Winkelmann (1997). The former performs an econometric analysis for three countries; Australia, the UK and the US. Whereas most variables attain similar results in each country, which are in line with the results described above, there are some differences. For example, the young are more likely to receive training in Australia and the UK, but not in the US. As American workers get older, the chances of them undertaking a training spell rise, while this probability falls in the other two countries. Winkelmann (1997) does not undertake an econometric analysis, but his data are useful for showing the different ways in which young workers in Germany and the US receive their training. In the US, at most one out of five young workers receive some kind of formal company training, whereas in Germany, 72% of the workforce have been through the dual apprenticeship system of workplace training combined with classroom teaching.

A final example of research on workplace training is a case study by Heyes (1993). He considers three unionised workplaces, and asks why the union was instrumental in formulating training policy in one, but not in the other two. He concludes that the relevant factors are for the union to be a single union on a single site, with a high density amongst the workforce. In addition, it is also beneficial for union involvement in designing a training programme if that union has an historic concern with apprenticeship, and if there is an easy transferability of the skills created by the training.

In summary, there have been many empirical studies of the determinants of vocational training. This literature review has highlighted the changes to the standard results, when different research methods are used, although this discussion perhaps masks some of the empirical regularities that have been found. The vast majority of studies have found that males, the well-educated, the young, individuals working in senior occupations, in large firms or in unionised establishments, are more likely to receive vocational training. These results typically hold when different types of training are considered, such as on- and off-the-job, and when training intensity is considered rather than training incidence, with the exception that there is some evidence that the training gap between the well-educated and the less well-educated narrows when training intensity is considered.

3. The European Labour Force Survey

This paper uses data from the 1995 European Labour Force Survey (ELFS) to investigate the determinants of vocational training in six countries: France, Germany, the Netherlands, Portugal, Sweden and the UK. The ELFS is based upon the national Labour Force Surveys of the member countries. An EU regulation stipulates that each member country must include within its Labour Force Survey questions that elicit information on a range of employment and unemployment issues. In 1982, the Thirteenth International Conference of Labour Statisticians passed a *Resolution concerning statistics of the economically active population, employment, unemployment and underemployment*, containing exact definitions of the various concepts of interest. These definitions were then applied to the variables in the ELFS, and the member states agreed to put the appropriate questions within their own Labour Force Surveys to match these definitions. Thus the data should be comparable across countries. The answers to the required questions are supplied to Eurostat for processing and holding.

The key variable of interest for the present paper asks whether the respondent has received any education or training during the four weeks prior to the survey. Two of the possible responses are: 'received specific vocational training in a working environment (without complementary instruction at a school or college)' and 'received specific vocational training within a system

which provides both work experience and complementary instruction elsewhere (any form of “dual system” including apprenticeship)’. If respondents answered in the affirmative to either of these questions, then for the purposes of the present analysis they were coded as having received any vocational training. In addition, respondents were also divided according to whether they answered each question in turn in the affirmative, and were classified as being in receipt of on-the-job and off-the-job training respectively (though note that the latter category encompasses joint on-the-job and off-the-job training).

Although these definitions sound clear cut, what training is included and what training is excluded by such questions is not always obvious. The question specifies ‘apprenticeship’ as a particular example of the second type of vocational training (labelled ‘off-the-job’) being considered, so it seems fair to assume that apprentices will be counted within this group. In addition, apprentices are also classified as ‘employees’, and so remain in the sample when the data set is restricted to employees. However, it is less clear whether individuals on government-sponsored training schemes will be included in our definition of employees receiving training. The problem is that the ELFS contains no information on the source of finance for the training, so there are no clues as to whether a trainee is part of a government-financed scheme or not. Similarly, we cannot say anything about whether the training being discussed is employer-provided and employer-financed or not.

The term ‘specific’ in the questionnaire also needs to be clarified here. Economists often distinguish between firm-specific and general training, but it is unlikely that the phrase ‘specific’ in the ELFS questionnaire implies ‘firm-specific’. Another of the optional answers to the education and training question (not analysed here) is ‘attended a school which provides specific vocational training’. It is highly unlikely that training in a general education setting with no formal work experience will be specific to any single firm, and yet the term ‘specific’ still appears. It seems likely that the term is therefore referring to training specific to a particular vocation, but which is still general in the sense that the skills could be used in a range of firms.

Another problem with the data set is that it is a ‘snapshot’ of training incidences, identifying only those individuals who have received training within a four week time period. Thus, we can say nothing about the total amount of training received by categories of individuals, and hence nothing about their total stock of human capital. All we can say is who was more or less likely to receive training within that four week period. This is a limitation of the data. In particular, it affects the results on variables such as age and tenure. For example, if long-tenured individuals receive less training in the four week period than short-tenured individuals, this does not necessarily imply that the former are less likely to receive training at some point in their working lives, since they are more likely to have already received a certain amount of training. Similarly for old workers *vis-a-vis* younger individuals. With other explanatory variables, this is less of a problem. For example, controlling for age and tenure, if males are found to be more likely to have received training in the four week period than females, then it seems reasonable to deduce that males are on average more likely to receive training at some point in their careers.

There are other problems associated with using the ELFS, highlighted by Felstead *et al* (1998), in addition to those outlined above. For example, the questionnaire was significantly altered in 1992, creating a discontinuity in the data. While this makes analysis of trends over time a problem, it does not affect the current analysis, which is based on a single year’s data, namely 1995. More important is the problem of proxy interviews, whereby information for a particular individual is obtained from a member of his or her household, when the subject of interest is unavailable for interview. Proxy interviews are used extensively in the ELFS, to reduce the costs caused by repeat visits to addresses. Felstead *et al* suggest that proxy interviews can be a particular problem for the analysis of training data. While the proxy respondent may know very

well such things as the labour force status of a member of their household, they may have less knowledge about incidences of training, particularly if they were informal and on-the-job. The problem is amplified by the fact that the young are disproportionately represented by proxy interviews, and they are the very group most likely to be in receipt of training.

The ELFS does, however, have some advantages. The literature review above described a number of ways in which the literature on training has developed from modelling simple yes/no responses concerning the receipt or otherwise of vocational training. The ELFS allows most of these developments to be adopted here. First, two different types of training can be identified, broadly classified as on-the-job and off-the-job training, as described above. Second, the ELFS contains information on the intensity of training. In particular, all respondents who report an incident of training are asked how many weeks that training spell lasts in total, and also how many hours on average are spent per week training. Finally, and obviously, the ELFS allows cross-country comparisons to be made, using comparable data.

The ELFS contains information on many of the determinants of workplace training that have been identified in the literature described above. The analysis that follows considers gender, age, formal education level, tenure in the current employment, full-time/part-time status, permanent/temporary status, establishment size, industry and occupation.

A complication in the analysis is that Eurostat will not supply individual level data, even anonymously. All the data, as supplied, tell us is the weighted number of individuals in the population who share different combinations of characteristics. Clearly it is an easy matter to obtain the number of individuals with a particular characteristic who receive training, and express this as a proportion of the total number of individuals with that characteristic. However, the lack of individual level data makes multivariate analysis less straightforward. What can be calculated is, for every combination of the characteristics, the number who have received training, expressed as a proportion of the total number of individuals with that set of characteristics. Thus the data are grouped, with the unit of observation being a single permutation of the explanatory variables, and the dependent variable being the proportion of individuals with that permutation of characteristics who receive vocational training. A weighted least squares estimation procedure was used to obtain the minimum chi-squared estimates of the coefficients on the explanatory variables (see Greene, 1993, for details of the procedure).

4. Results

4.1 Training incidence

Table 1 begins the results section by presenting simple cross-tabulations between the training variable and each explanatory variable in turn. The numbers in the table represent the percentage of individuals within each category who have received any vocational training in the four weeks prior to the interview. In this, and all tables, only employees are considered. The first line of the table displays the percentage of all employees to have received some training within the given period. This is highest at just over 10% in Sweden, and then follows the UK on 7.3%, the Netherlands on 5.3% and Germany on 4.9%. In both France and Portugal, fewer than 1% of employees report a training incident in the four weeks prior to interview. However, despite the best intentions of Eurostat, the training question is treated differently in those countries, so that the

data are not comparable. In particular, to be recorded, a training spell in France and Portugal in fact must actually be underway at the time of the survey, rather than just occurring some time in the four weeks prior to the interview. Clearly this will reduce the measured incidence of training. In addition, in France, exclusively undertaking in-house training is not counted, so that there must be at least some element of external training before a training incident is recorded in the French Labour Force Survey. These caveats must be borne in mind when considering the results.

An alternative source of information on training in European countries is the Continuing Vocational Training Survey (CVTS). This survey was conducted in 1994, and asked about the training offered by enterprises in 1993. The question asked about training at any time during the year, and so clearly the resulting incidence rates will be higher than those derived from the ELFS with its four-week question. Nevertheless, the ranking of employee training incidence rates between the UK, the Netherlands and Germany is the same using CVTS data (39%, 26% and 24% respectively) as it is using the ELFS. Sweden did not participate in the CVTS while the two surveys should not be compared for France and Portugal, because of the problems outlined above with the ELFS in those countries. In the CVTS, France has a high training rate, third only to Ireland and the UK out of the (then) EU12 countries surveyed, while Portugal has the lowest rate of all the countries involved, together with Greece.¹

The remainder of Table 1 indicates how the incidence of training is distributed across the various characteristics of individuals and their jobs. With respect to gender, there seems to be little difference in access to training across the sexes in any of the six countries. Table 2 presents the information in a different way, displaying the distribution of all training incidences across the variables of interest. Thus, while males and females have similar training rates in all countries, the fact that there are more male employees than female employees means that in most countries, a higher proportion of the total number of training places go to men (the exceptions being in Portugal and Sweden).

There are striking differences when age is considered. With the exception of Sweden, where the 41-50 year old age group has the highest incidence of training, the young have the highest training rates in all countries. This is most clearly shown in Germany, where two-thirds of all 15-20 year olds in employment have received some sort of training in the four week spell under consideration. Only very small numbers of individuals in the older age groups are trained. In France and the UK, one-quarter of the youngest age group have received training, which is still a large number, if less striking than the German case. Although not matching the high numbers of older trainees in Sweden, the UK and the Netherlands both have around 5% of each group up to the age of 50 in training. Looking at the distribution of training spells across age groups, Germany and France clearly stand out in that almost three-quarters of all employees receiving training are under 20 years of age. In the Netherlands and the UK, the modal group is 21-30 year olds, while in Portugal and Sweden it is 41-50 year olds.

The prior education level of employees has been one of the strongest predictors of the receipt of vocational training in the literature. Sweden and the UK, and Portugal as far as the data allow in that country, follow the pattern that those at a high ISCED level² are most likely to receive

¹ See Greenhalgh (forthcoming in 1999) for more details of the CVTS.

² ISCED high represents a university first or higher degree, higher level qualifications below a degree, or the completion of recognised third level education. An individual at the medium ISCED level will have completed a course of specific vocational training within a system which provided both work experience and complementary instruction elsewhere, completed a course (of minimum one year) at a school providing specific vocational training, or completed the second stage of secondary level education, but not third stage. The low

further training. In the Netherlands, the education group with the highest incidence of training is the medium ISCED group, although there are only small differences across all three education categories. Germany stands out in that it is the least qualified who are most likely to receive vocational training in the four week time period. One in four of all employees with low or no qualifications received a training spell within the specified period. The results for France display a similar pattern, though less dramatic, because of the problems with the French data. In terms of the distribution of training spells across ISCED groups, Germany and France again stand out in that just over 70% of all their trainees in employment are in the low ISCED group. The percentage in the remaining countries ranges from 42% in Portugal to 13% in Sweden.

In France, as far as training is reported, it is employees who have taken up their job within the previous year who are most likely to be receiving training at the time of the interview. In Germany, this extends to individuals who have joined their firms within the previous five years. Less than one half of one per cent of German employees with job tenure of longer than 5 years receive some training in the survey period. The UK is also most likely to train its new job incumbents, although the differences there are smaller across tenure groups. The pattern reverses in the other three countries, however, those who have served their employers longer are more likely to be in receipt of training. This is so particularly in Sweden, where there is a monotonic increase in the probability of training as tenure increases, and where more than 11% of those with over five years of tenure receive training in the four weeks under consideration.

The type of job can also affect the likelihood of training. With the exception of France and Portugal, where the data are not comparable anyway, training seems to occur more in full-time rather than part-time jobs in all countries. Given the preponderance of full-time jobs in all countries, the vast majority of training places are shown to go to full-time employees in Table 2. However, there are differences when the permanent or temporary status of a job is considered. In Germany and France almost all employees who are trained in the given period hold only temporary jobs (84% and 91% respectively). In Germany, a third of all those in a fixed term job receive some training in the specified four weeks. In the remaining countries, the vast majority of trainees hold permanent positions, although the difference in training rates across job categories in the UK and Portugal is small.

Turning to characteristics of the firm, differences across establishment size are small in all countries, but the general trend in most countries seems to be that small establishments have higher training rates, with the Netherlands and Portugal being the exceptions. This is a somewhat surprising result, going against the theoretical idea that large firms have more resources with which to offer training, and previous evidence. Note that since larger establishments dominate most economies, we still observe most training occurring in establishments with at least 50 employees in most countries. The exceptions are in Germany, and in France where, rather peculiarly, 90% of all training incidences are reported in the smallest establishments.

The results for the incidence of training with respect to industrial sector tie in quite closely with the results described above for education level. In Germany the sector with the highest incidence of training is construction, with other industries that typically employ less qualified individuals such as agriculture and hotels and restaurants also having relatively high training rates. Similarly, in France, by far the highest incidence of training, amongst the low levels in all sectors, is found in the hotels and restaurants industry, followed by agriculture, construction, wholesale and

ISCED level implies someone who has completed a course (minimum one year) of specific vocational training in a working environment, received other vocational qualifications, has no further education or vocational training, has completed first stage of secondary level education, but not second stage, has less than first stage of secondary level education, or has undertaken other general education.

retail trade and social or personal services. In the UK, the highest rates are found in construction and agriculture, but most of the other major trainers are where more qualified individuals are typically found; in finance, education and health and social work. The pattern of more training in highly qualified industries is mirrored in the other three countries, the probability of receiving training being highest in the finance industry in the Netherlands and Sweden, and in real estate and business in Portugal. The distributions of training incidences across industries in Table 2 reflect these differences in training rates, and the relevant sizes of the sectors. Thus for example, while the training rate is quite high in agriculture for a lot of countries, the tiny size of this sector means that agriculture's share of the total number of training incidences is negligible.

A similar story across the different countries is revealed when we consider occupation (for which there is no Swedish data available). In Germany, the four occupations that were most likely to receive training in the specified timescale were elementary occupations, craft or trade workers, agricultural workers and service or shop workers. The same occupations dominate in France, with the exception of the first. In terms of the distributions of training incidences across occupations (Table 2), craft or trade workers receive one half of all observed training in France, while in Germany the number is 40%, with a further 16.5% going to those in elementary occupations. The targeting of training at different types of workers in the UK is again in evidence when occupation is considered, craft and trade workers and agricultural workers being the first and third most likely occupations to receive training, with professional occupations coming between them. Professionals receive one-quarter of all the training provided in the UK, with just under 20% going to craft/trade workers. The Netherlands also displays a somewhat mixed pattern, with the highest proportions of trained employees, ignoring the armed forces, being found amongst craft or trade workers, and technicians or associate professionals. These occupations dominate the distribution of Dutch training incidences in Table 2. The latter group also have the highest training rate in Portugal, again ignoring the armed forces.

An interesting extension to the final part of Table 2 is to attempt to use the information on the distribution of skills across occupations to reveal where the demands for skills are highest. Table 3 examines how training incidences are distributed across occupations for 21-64 year olds, while Table 4 considers only continuous, as opposed to initial, training. The assumptions behind these analyses are that if there is, say, a particular need for skilled craft workers, then we should see a higher rate of training amongst such workers, particularly amongst older workers receiving continuous training, as firms upgrade their workforces to meet their skill demands. The results reveal that there appears to be a demand for more skilled workers. For example, consider professional workers. In Germany 9.8% of all training places amongst those aged at least 21 are taken by professionals, with the percentage in France being 12.2% and in the UK, 33.7%. These figures should be compared to the share of training places amongst all employees that are taken by professionals in these three countries, which are 2.7%, 4.2% and 24.4% in Germany, France and the UK respectively. The picture is similar, if slightly less striking, if we consider only continuous training, the percentage of such training places going to professionals being 14.4% in Germany, 10.6% in France and 24.8% in the UK. A similar pattern emerges when we consider technicians and associate professionals. On the other hand, if we consider craft or trade workers, there is a far larger share of training places in such fields when we consider all employees, compared to when the analysis is restricted to 21-64 year olds or continuous training only, in Germany, France, Portugal and the UK. Only in the Netherlands does the distribution of training places not differ significantly across Tables 2, 3 and 4. It therefore appears that when it comes to upgrading of existing workers, as opposed to initial training of new labour market entrants, firms are particularly keen to upgrade employees in skilled occupations, suggesting that skill demands are greatest in such areas.

All the discussion so far has been of cross-tabulation results, and it is of course important to perform a multivariate analysis, to determine the separate effects of each variable, holding the others constant. Table 5 displays the results when separate weighted least squares equations are estimated for each country in turn, as described above. An examination of the table reveals that most of the effects discussed above show up as statistically significant coefficients in these estimated equations.³ The coefficients in this table reveal the estimated increase, in terms of percentage points, in the proportion of employees receiving training, when each of the dummy variables changes from 0 to 1, holding the values of all others constant.

With respect to gender, the coefficient is statistically significant in each equation, but small in economic terms in every case, the largest gender difference in the proportion receiving training being just over 0.2 percentage points in France. The female coefficient takes the usual negative coefficient in Germany, France, the Netherlands and Portugal, while females seem to be slightly favoured in terms of training in Sweden and the UK.

The strong pattern of training being more likely for the young that was found in the cross-tabulations is repeated in the multivariate analysis in all countries, except in Portugal and Sweden where the age differences in the incidence of training are not statistically significant.

Turning to prior education level, we find negative effects of education on the likelihood of further training in Germany and France, where the differences between ISCED levels are over one whole percentage point in size, while the more usual positive effect is obtained in Sweden and the UK. The Netherlands, which seemed somewhere between the two in the cross-tabulation above, comes out with negative education effects in the multivariate analysis.

The key tenure period for training seems to be between one and five years, the coefficient on that dummy variable being positive, relative to the omitted category of less than one year, and statistically significant in four countries. The exceptions are the negative coefficients in France and Sweden, the former being statistically significant. Most training seems to be completed within five years, however, with the negative and statistically significant coefficients on the long tenure variables suggesting that such employees are less likely to receive training than new incumbents. The exceptions are Portugal and the UK, where those with long tenure are more likely to have received some training in the reference period.

Full-time jobs are clearly more likely to offer training than part-time ones, the effect being particularly large in Germany. The only exception is Portugal, where the data are unreliable. However, holding other things constant, in all countries except the Netherlands and in Sweden, permanent jobs are less likely to offer training than those of fixed term; there being no statistically significant difference between job types in the latter case.

Finally, considering establishment size, the cross-tabulations suggested that small establishments are more likely to offer training. Holding other things constant, however, we find positive effects of establishment size on the probability of training in the Netherlands, Portugal and the UK, except for the largest size in the case of the UK. There are no statistically significant differences across establishment size in France, while in Germany, only in the largest establishments is the training probability lower than in all other categories.

Table 6 re-estimates the equations of Table 5 with the sample reduced to 21-64 year olds only, as the analysis of occupations above showed that the results can be significantly affected by the presence of individuals in the youngest age group. In fact, there is not a great difference in the estimated coefficients when the sample is restricted in this way. Of note, however, is the falling

³ Note that Greene (1993) describes how the variance of the minimum chi-squared estimator is inversely proportional to the number of observations, so when there is a large sample, as is the case here, low standard errors can emerge, thus explaining some of the large t-statistics evident in this table.

(in absolute terms) of the coefficients on the prior education level dummy variables in the German and French equations, so that the lower probability of the more well-educated receiving training is somewhat attenuated, although the differences remain statistically significant. The fact that the low-skilled are more likely to receive training in Germany and France is, therefore, at least in part, explained by the provision of training for young, low-skilled school-leavers in those countries.

4.2 On- and off-the-job training

As described above, the available data allow a distinction to be made between exclusively on-the-job training and training that includes an external element (here described as ‘off-the-job’). Note that the proportion of training in Germany that is reported as exclusively on-the-job differs markedly from the other countries: this proportion is 8% in Germany, compared to 61% in the UK, 63% in Portugal, 67% in the Netherlands and 71% in Sweden. Tables 7 and 8 re-estimate the weighted least squares equations of Table 5, to investigate the determinants of each of these types of training in turn. Since no exclusively on-the-job training is reported for France, the off-the-job training equation is identical to the overall training equation. In the other countries, the determinants of the two types of training largely reflect the determinants of the overall probability of training, as described above. Here we highlight the differences.

In Germany, women were revealed to be less likely to receive any form of training. However, Tables 7 and 8 reveal that this can be decomposed, and that women are more likely to receive on-the-job training than men. However, most training in Germany has an off-the-job component, and the negative female coefficient in Table 8 clearly drives the overall result.

With respect to age, the strong inverse relationship between age and training incidence remains for both on- and off-the-job training in Germany. However, the size of the age effect is much larger for off-the-job than for on-the-job training in the Netherlands and the UK. Indeed, there is no statistically significant difference at all between the on-the-job training probabilities of 15-20 year olds and 51+ year olds in the UK. Finally, note that, although there were no large age differences in Sweden with respect to the overall training incidence, the decomposition reveals that, unlike in other countries, the young in Sweden are less likely to receive off-the-job training, most of which seems to go to those in the middle age brackets.

Education level reveals some interesting differences. In the two countries where the standard positive relationship between prior education and overall training was observed, it continues to be the case for both on- and off-the-job training in Sweden, while in the UK the relationship is only statistically significant for exclusively on-the-job training. Also, the negative effects of education on overall training that were observed earlier for Germany and the Netherlands are here shown to be completely driven by the off-the-job training, where the effects are large in numerical and statistical terms. Indeed, in these two countries when it comes to on-the-job training, it seems that the more well-educated are more likely to be in receipt of such training.

The only difference in the tenure effects when training is decomposed into its on- and off-the-job components are found in the Netherlands, where those with over six years of tenure are statistically significantly less likely to receive on-the-job training, but more likely to receive off-the-job training, and in the UK, where the same category are more likely to receive on-the-job training, but show no statistically significant difference when off-the-job training is considered.

All of the relationships between overall training and both full-time/part-time and permanent/temporary status hold when training is decomposed, so nothing needs to be added here. Similarly, the positive effect of establishment size on overall training that was found in the Netherlands, Portugal and the UK is confirmed for both on- and off-the-job training in the latter two countries, while it is mainly observed for on-the-job training in the Netherlands. Note also

that an inverse relationship is now obtained between establishment size and on-the-job training in Germany, although this is the minority form of training in that country.

4.3 Purpose and length of training

Table 9 reports the responses to a question asking for the purpose of the training received by individuals. Training was reported to be either ‘initial’ or ‘continuous’ (a few respondents also gave the response ‘other’). Considering the composite training measure in the first block of the table, we can see that Germany again stands out, in that over 90% of the training incidences reported in the survey period provide initial training. The only other country to have a majority of its training in this category is France, where just over two-thirds of trainees report being in initial training. In the remaining countries, the percentage of initial training amongst all training ranges from 23% in Portugal, to less than 1% in the UK. In these countries, continuous training dominates, plus a small proportion of individuals reporting ‘other’ types of training (the latter category rising to 10% in Portugal).

Differentiating between on- and off-the-job training, we obtain the result that on-the-job training is more likely to be continuous than off-the-job training. In every country, the majority of on-the-job training is continuous, with the percentage rising from 61% in Germany to 100% in the UK. Again in every country, there is a higher percentage of off-the-job training falling into the ‘initial’ category than is found with on-the-job training. In only three countries, however, is the majority of off-the-job training categorised as initial (Germany, France and Portugal), and the percentage so categorised varies widely across the six countries, from 96% in Germany, to less than 1% in the UK.

The ELFS also provides data on the time spent in training, if a training incident is reported, in terms of the total number of weeks, and the average number of hours per week. It would be an easy matter to tabulate the responses to these questions. However such a table for the weeks of training would be misleading, because the question is asking about the four weeks prior to the survey only. A training spell of a year would show up within this period no matter at what point in the year it began. At the other extreme, a spell lasting under one week would have to begin either during the four week period being asked about, or in the week before this period, if it was to show up in the data. Thus, all training spells lasting a year or more will be included in the data, while only a small proportion of those lasting under a week will be included. In general, the likelihood of the training spell being recorded in the data set will vary in direct proportion to the length of the spell. Therefore a simple tabulation of the weeks of training variable would suggest that training spells in a country are, on average, longer than they actually are. Thus the responses were re-weighted to take account of this problem, applying a weight to each spell length that was inversely proportional to the probability of spells of that length being recorded in an annual survey. Tables 10 and 11 report the results, for any kind of training, and then separately for exclusively on-the-job training and training with an off-the-job component.

Of the six countries considered here, training is clearly most time intensive in Germany. Even when the data are re-weighted to allow for the fact that many short duration spells will not be captured by the survey, over half of all training incidences reported in Germany last for at least one year. Similarly, with respect to hours of training per week, over 75% of all training incidences in Germany are full-time, in terms of comprising at least 21 hours training per week. No other country’s statistics can come close to matching those of Germany. Just over one in five training spells in France last for one year or more, with this figure being just over one-tenth in the Netherlands and Portugal. France and Portugal are also quite close in terms of hours per week, with just over one-half of training spells involving an average of over 20 hours per week in both

countries. However, on this measure, the Netherlands joins the two low-intensity countries, Sweden and the UK, with over 90% of all training incidences falling into the ‘20 hours per week or fewer’ category. In Sweden, three-quarters of all spells last a week or less, with a further 17% lasting no longer than a month, while only 16% comprise over 20 hours per week, on average. Finally, the UK appears to have the lowest intensity, in that 86% of all training spells last for one week or less, and 80% are for 20 hours or under per week.

When the training spells are divided into exclusively on-the-job training, and training with an off-the-job component, it is clear that the latter type typically last longer than the former. In all countries, the majority of on-the-job training spells last for a month or less, and are for 20 hours per week or less. The ordering across the countries in terms of length remains the same as that for the composite training measure. With regards to training with an off-the job component, we observe two-thirds of all such training spells lasting for over a year in Germany, and almost 85% taking up over 20 hours per week. In terms of weeks Germany is followed, perhaps surprisingly, by the UK, where one-half of all off-the-job training spells are of over one year’s duration, with 45% being for more than 20 hours per week. France, the Netherlands and Portugal all have just over 20% of off-the-job training spells lasting longer than a year, although they vary in terms of hours per week. Portugal has over three-quarters of its off-the-job training spells lasting for more than 20 hours a week, France has 50%, while in the Netherlands we again observe the prevalence of part-time training, with only 5% of off-the-job spells taking up more than 20 hours per week. In Sweden, even when considering off-the-job training, almost three-quarters of such spells last less than a week. Portugal also has a majority of off-the-job spells lasting less than one month.

Finally, Table 12 contains some very approximate calculations of the average spell lengths of training in each country. The calculations are only approximate, because of the grouped nature of the time variables. The mid-points of each group were calculated (for example, individuals reporting 6-12 months of training were assigned nine months for the purpose of the calculation). Respondents reporting over one year of training were arbitrarily assigned one and a half years of training. The number of weeks was then multiplied by the number of hours per week to give a rough estimate of the total number of hours that each spell lasted. The numbers were weighted as before, to allow for the higher probability of observing a longer spell. The first row of the table displays the total amount of training averaged across all employees, therefore including those who receive no training. Thus, the first row is an indicator of the total amount of training offered in each country by employers. The results reveal that the average spell length is longest in Germany, at 82 hours. Thus, although the reported incidence rate is low in Germany, the total amount of training is clearly higher than in any other country, the average number of hours being almost twice as high as in the next ranked country, the UK. In this row of the table, the UK clearly benefits from its high incidence rate, offsetting the low intensity in that country. Similarly, France and Portugal are affected by their very low incidence rates, which in turn are the result of data problems outlined earlier. The second row considers the average training length, amongst those who have received training; thus abstracting from the incidence issue and focusing only on intensity. Germany’s position as leader is strengthened by doing this, the average length of a training spell being 1,360 hours, with France a long way behind in second place with 567 hours. As the focus is now only on intensity, the UK now slips behind both the Netherlands and Portugal into fifth place, with an average spell length of 135 hours. Training in Sweden is the least intensive, with an average spell length of just 28 hours.

Differentiating between the two types of training, the result that off-the-job training spells are longer than on-the-job spells is demonstrated in all countries. With respect to on-the-job spells, we see a similar pattern across countries as with the composite training measure, although Portugal is a lot closer to Germany. With respect to off-the-job training we again observe the relatively

strong position of the UK, with an average spell length of 1,220 hours, which trails only the German figure of 1,545 hours. Even when only off-the job training is considered, the average spell length is still only 33 hours in Sweden.

5. Conclusion

The results presented in the previous section allow us to construct a picture of the type of training being offered in the six countries under consideration. In Germany, although the overall incidence of training is lower than in some other countries, certain groups seem to be trained intensively; and overall, the total amount of training offered by employers is greater than in any other country studied, once we take into account the time spent training each trainee. In particular, two-thirds of 15-20 year olds in employment report training within the four week window being considered. These individuals typically have low or no prior qualifications, and are being trained in occupations and industries associated with less-skilled workers, such as craft or elementary trades with respect to occupation, and construction and catering with respect to industry. They are usually in full-time but only temporary employment, and they receive the training early in their tenure. Almost invariably the training contains an element of external training in a college, as well as on-the-job training. The training is intensive in terms of hours per week, and in most cases lasts at least one year. Most of the training we are observing is thus consistent with being part of the German 'dual' apprenticeship scheme.

Although the data for France are not as high quality, due to the omission of exclusively on-the-job training and the inclusion of only spells of training that are current at the time of the survey, nevertheless the pattern of training appears to be similar to that in Germany. Again, we observe young, unskilled individuals working in full-time temporary jobs in occupations and industries typical of semi- and less-skilled workers. Only the intensity of the training appears different, with France lagging Germany. Note, however, that the results may give the misleading impression that the apprenticeship system is as developed in France as it is in Germany. Anecdotal evidence suggests that this is not the case. The problem is again connected to the data quality problem in France. In particular, because we only observe training with an off-the-job component (for example, apprenticeship) while exclusively on-the-job training is not counted by the survey, the results are likely to overestimate the extent of the apprenticeship system. If on-the-job training was also included in the French Labour Force Survey, the picture of training in that country may be closer to that observed in the other countries in this study.

At the other extreme of the training scale, across the six countries considered here, is Sweden. The typical Swedish trainee observed in the ELFS is middle-aged (particularly for on-the-job training) and already well-qualified. She (for females have higher training rates) has a full-time job in a skilled industry such as finance, and works as a professional. The training she receives is of short duration, typically of less than one week and almost always less than one month, and lasts for less than 20 hours per week. The training we are observing in Sweden, therefore, seems to be short courses that top up the skills of senior employees and managers.

The other countries considered lie between these two extremes. The UK is next closest to Sweden, in that it is typically highly educated and middle-aged individuals who receive training, particularly when on-the-job training is being considered, and the training is of short duration and intensity. Such individuals receive their training in professional occupations and industries. There seems to be another smaller, but distinct group in the UK, however. When training with an external element is considered the young are much more likely to be in receipt, and there are no differences across prior educational groups. We also observe a significant number, over 50%, of off-the-job

training incidences lasting for one year or longer. It would therefore appear that, while most training remains as short courses for well-educated professional employees, there is a smaller amount that attempts to match the German training model. It is this type of training which the UK must increase, if it wants to narrow the gap in the proportion of unskilled workers in the respective labour forces of Germany and itself.

The typical off-the-job trainee in the Netherlands has most of the characteristics of the typical German trainee, that is, they are young with no or low qualifications, working in craft or manual occupations and industries. However, the majority of Dutch training is done exclusively on-the-job, and here the picture is different, with the more highly educated in good, permanent jobs being more likely to receive training. Another way in which the Netherlands departs from the German model is that the training is much less intensive; over 90% of spells last for less than 20 hours a week. The Netherlands, like the UK, therefore does not devote itself to raising the skill levels of the low-skilled, as in Germany, but like the UK only has a limited amount of the training necessary to successfully help the low-skilled.

Finally, the data in Portugal suffer from only current training spells being counted, and the number of training spells observed is so small that it is difficult to come to any firm conclusions. The evidence available suggests that it is medium-skilled, middle-aged, semi-professional employees who are most likely to receive a training spell, 30% of which last for at least six months, and about half of which last for at least 20 hours per week.

It can therefore be concluded that the pattern of vocational training in a country is largely determined by the system of education in that country. This was essentially the conclusion reached by Beret and Dupray (1998) who stated that 'One may therefore posit that the manner in which skills are imparted under the education system partly determines the extent and level of in-company continuous training, which in turn will determine access to training and its effects' (pp36-37). Thus, for example in Germany since 1969, most individuals who do not go on to higher education go through an apprenticeship scheme, so that two-thirds of all labour market entrants have an apprenticeship qualification. Apprentices are given a temporary position in a firm, typically for three years, and taught the skills necessary to work in that occupation or sector. Teaching takes place both on-the-job within firms, and also in classrooms outside the firm (hence the 'dual' system). Through such methods, individuals are provided with the skills that are required to keep the German economy competitive and progressive. Therefore, the apprenticeship 'dual system' bears the brunt of skills formation, rather than formal education in Germany. Determined efforts are made to offer training to the those who need it, that is those who have completed their formal education with few skills to offer the workplace. They are provided with high quality training to provide them with those skills, with the result being the low number of low-skilled workers in the German labour force. The fact that most of the training we observe in Germany is actually apprenticeship training is revealed by the age structure of the trainees, the prior skill level (almost always no higher than the end of compulsory schooling) and the temporary nature of their employment. Indeed, when 15-20 year olds are excluded from the analysis, the profile of the typical German trainee changes somewhat in that the differences in training rates across categories of demographic characteristics, particularly ISCED levels, are not so stark. In addition, in response to the question asking about the nature of the training, 92% of respondents in Germany said that their training was initial training. France is the only other country with a majority of respondents undertaking initial training (69%), while in the remaining countries, continuous training clearly dominates. Thus, to a large extent the results presented above for Germany are driven by the presence of large numbers of apprentices.

In the UK, vocational skills are in general not taught within formal compulsory education, and therefore that country has a need to supply such skills through vocational training. While

vocational training has increased in the recent past through the introduction of the NVQ system and the Modern Apprenticeship scheme, the above results make it clear that the UK cannot yet match Germany. The intensity data show that most training in the UK remains of very short duration, with few training spells matching the year-long, more than 20 hours per week model of German training. In addition, the results reveal that overall, the employees with the highest training rate are those who already possess a degree or an equivalent qualification. As a result, the UK continues to have much a larger proportion of its working population at the unskilled level of ISCED 2 or below. It is true that, when only off-the-job training is considered, spell lengths are impressively close to those in Germany, but the problem is that such training courses are a minority of the total number of courses.

In the Netherlands, there is a mixed system, with some individuals receiving initial training within an apprenticeship system, while others remain in full-time formal education to receive their vocational education. Thus, we observe a mixed pattern amongst the trainees in the Netherlands. While those undertaking training with an off-the-job component appear similar to the apprentices in Germany, there are a significant number in exclusively on-the-job training who are already well-educated and in good jobs.

Finally, the results show that although Sweden has the highest incidence rate, the training is of a very low intensity, and is typically undertaken by middle-aged, well-qualified, professional employees. However, this training profile is again determined by the education system, with vocational training being offered within the formal education sector in Sweden. Thus, the reason firms do not train young unskilled employees is because their workers have already emerged from schooling with the necessary skills, and so Sweden has a low proportion of low-skilled individuals within its population, despite this lack of initial workplace training.

Table 1
Percentage receiving vocational training in the four weeks prior to survey

	Germany	France	N'lands	Portugal	Sweden	UK
all employees	4.91	0.46	5.29	0.1	10.51	7.27
female	4.82	0.30	4.39	0.13	10.83	6.67
male	4.97	0.57	5.81	0.08	10.17	7.81
age 15-20	65.13	26.46	8.04	0.22	3.40	25.63
age 21-30	3.46	0.49	6.70	0.09	8.99	6.60
age 31-40	0.82	0.04	5.37	0.10	12.12	6.18
age 41-50	0.34	0.04	3.75	0.16	12.25	5.62
age 51+	0.21	0.01	1.78	0.00	9.29	3.30
ISCED high	0.97	0.19	3.73	0.25	14.72	10.50
ISCED medium	1.92	0.21	5.76	0.15	10.09	5.99
ISCED low	24.59	1.08	5.09	0.06	6.04	6.50
tenure +6 years	0.47	0.04	4.56	0.18	11.67	5.57
tenure 1-5 years	9.78	0.86	8.49	0.11	9.96	6.73
tenure < 1 year	6.22	2.48	3.35	0.07	7.72	8.05
full-time	5.57	0.44	6.36	0.10	11.54	8.37
part-time	0.33	0.62	3.33	0.31	7.93	3.80
permanent job	0.89	0.06	5.72	0.09	11.21	5.62
temporary job	31.58	4.79	2.01	0.27	5.87	5.33
< 11 employees	5.50	1.37	3.52	0.02	-	9.27
11-19 employees	5.51	1.35	4.43	0.22	-	6.56
20-49 employees	4.36	0.00	3.88	0.00	-	6.86
50+ employees	3.44	0.00	5.86	0.35	-	6.95

Table 1 (continued)

	Germany	France	N'lands	Portugal	Sweden	UK
agriculture	6.00	1.29	4.05	0.00	8.51	10.61
fishing	0.00	0.00	0.00	0.00	0.00	0.00
mining and quarrying	2.20	0.00	7.91	0.00	4.37	5.11
manufacturing	4.24	0.31	5.55	0.08	8.48	5.36
electricity, gas and water	3.41	0.12	7.61	0.00	13.11	8.95
construction	9.73	1.51	6.27	0.00	6.79	11.76
wholesale / retail trade	5.86	1.13	4.75	0.02	8.26	7.22
hotels and restaurants	6.77	2.56	2.58	0.00	6.40	2.39
transport	2.60	0.05	4.00	0.40	10.14	5.47
finance	5.55	0.38	10.76	0.11	18.63	8.22
real estate/business	3.62	0.17	4.13	0.43	9.75	5.99
public administration	2.70	0.07	7.48	0.17	16.06	8.84
education	1.89	0.37	3.72	0.04	11.36	9.13
health / social work	7.22	0.06	6.08	0.29	12.90	9.54
social / personal services	4.75	1.76	4.48	0.00	8.29	8.12
private household service	1.96	0.10	0.00	0.00	0.00	2.41
extra-territorial bodies	1.09	0.00	0.00	0.00	0.00	7.13
armed forces	2.46	0.00	11.66	1.53	-	6.35
senior officials/ managers	0.75	0.08	4.96	0.00	-	6.74
professionals	1.28	0.20	4.04	0.17	-	12.19
technician/associate prof.	4.26	0.11	6.56	0.25	-	8.28
clerks	4.02	0.15	5.30	0.15	-	5.62
service / shop workers	5.52	1.06	5.62	0.08	-	6.26
skilled agricultural	6.45	1.55	4.07	0.00	-	10.26
craft / trade workers	8.12	1.39	8.37	0.03	-	12.41
machine operators	0.68	0.20	5.20	0.00	-	2.33
elementary occupations	8.68	0.11	2.54	0.00	-	2.64

Table 2
How training is distributed across the variables of interest

	Germany	France	N'lands	Portugal	Sweden	UK
female	0.358	0.257	0.345	0.550	0.532	0.436
male	0.642	0.743	0.655	0.450	0.468	0.564
age 15-20	0.731	0.727	0.119	0.100	0.011	0.294
age 21-30	0.202	0.225	0.391	0.215	0.191	0.231
age 31-40	0.044	0.031	0.286	0.275	0.284	0.215
age 41-50	0.014	0.017	0.168	0.409	0.317	0.180
age 51+	0.008	0.001	0.036	0.000	0.197	0.080
ISCED high	0.039	0.078	0.165	0.435	0.412	0.339
ISCED medium	0.247	0.222	0.661	0.146	0.458	0.274
ISCED low	0.714	0.700	0.174	0.419	0.130	0.387
tenure +6 years	0.034	0.043	0.438	0.468	0.652	0.125
tenure 1-5 years	0.407	0.363	0.402	0.145	0.201	0.267
tenure < 1 year	0.559	0.595	0.160	0.387	0.147	0.609
full-time	0.992	0.873	0.762	0.931	0.803	0.872
part-time	0.008	0.127	0.238	0.069	0.197	0.128
permanent job	0.158	0.089	0.949	0.802	0.930	0.934
temporary job	0.842	0.911	0.051	0.198	0.069	0.066
< 11 employees	0.346	0.903	0.089	0.125	-	0.255
11-19 employees	0.138	0.098	0.058	0.143	-	0.082
20-49 employees	0.156	0.000	0.084	0.000	-	0.153
50+ employees	0.360	0.000	0.769	0.733	-	0.510

Table 2 (continued)

	Germany	France	N'lands	Portugal	Sweden	UK
agriculture	0.013	0.020	0.012	0.000	0.009	0.015
fishing	0.000	0.000	0.000	0.000	0.000	0.000
mining and quarrying	0.003	0.000	0.003	0.000	0.001	0.003
manufacturing	0.266	0.215	0.193	0.238	0.161	0.152
electricity, gas and water	0.005	0.002	0.011	0.000	0.009	0.012
construction	0.211	0.200	0.067	0.000	0.031	0.078
wholesale / retail trade	0.143	0.256	0.141	0.021	0.085	0.158
hotels and restaurants	0.023	0.099	0.015	0.000	0.014	0.015
transport	0.028	0.005	0.047	0.204	0.063	0.048
finance	0.036	0.023	0.070	0.033	0.040	0.054
real estate/business	0.030	0.020	0.071	0.110	0.077	0.070
public administration	0.073	0.010	0.129	0.178	0.088	0.082
education	0.020	0.051	0.048	0.050	0.088	0.102
health / social work	0.117	0.013	0.165	0.166	0.296	0.146
social / personal services	0.031	0.083	0.028	0.000	0.038	0.061
private household service	0.001	0.003	0.000	0.000	0.000	0.001
extra-territorial bodies	0.000	0.000	0.000	0.000	0.000	0.001
armed forces	0.024	0.000	0.014	0.139	-	0.005
senior officials/ managers	0.004	0.004	0.072	0.000	-	0.130
professionals	0.027	0.042	0.107	0.199	-	0.244
technician/associate prof.	0.154	0.038	0.226	0.287	-	0.089
clerks	0.099	0.036	0.140	0.204	-	0.138
service / shop workers	0.107	0.273	0.148	0.089	-	0.141
skilled agricultural	0.011	0.026	0.012	0.000	-	0.008
craft / trade workers	0.397	0.503	0.169	0.082	-	0.186
machine operators	0.012	0.064	0.077	0.000	-	0.028
elementary occupations	0.165	0.012	0.037	0.000	-	0.031

Table 3
The distribution of training across occupations amongst 21-64 year olds

	Germany	France	N'lands	Portugal	Sweden	UK
armed forces	0.086	0.000	0.013	0.155	-	0.007
senior officials/ managers	0.015	0.018	0.078	0.000	-	0.178
professionals	0.098	0.122	0.118	0.221	-	0.337
technician/associate prof.	0.251	0.142	0.238	0.298	-	0.110
clerks	0.141	0.146	0.148	0.227	-	0.142
service / shop workers	0.082	0.116	0.127	0.099	-	0.101
skilled agricultural	0.014	0.019	0.012	0.000	-	0.007
craft / trade workers	0.188	0.322	0.132	0.000	-	0.063
machine operators	0.018	0.093	0.077	0.000	-	0.034
elementary occupations	0.108	0.018	0.031	0.000	-	0.020

Table 4
The distribution of continuous training across occupations

	Germany	France	N'lands	Portugal	Sweden	UK
armed forces	0.136	0.000	0.013	0.171	-	0.002
senior officials/ managers	0.017	0.007	0.074	0.000	-	0.122
professionals	0.144	0.049	0.106	0.390	-	0.248
technician/associate prof.	0.255	0.077	0.225	0.255	-	0.103
clerks	0.101	0.116	0.136	0.184	-	0.113
service / shop workers	0.104	0.237	0.142	0.000	-	0.140
skilled agricultural	0.002	0.010	0.008	0.000	-	0.007
craft / trade workers	0.138	0.409	0.167	0.000	-	0.220
machine operators	0.016	0.065	0.075	0.000	-	0.018
elementary occupations	0.086	0.020	0.036	0.000	-	0.026

Table 5
The determinants of vocational training receipt - minimum chi-squared estimates

variable	Germany	France	N'lands	Portugal	Sweden	UK
female	-0.135*** (0.025)	-0.232*** (0.045)	-0.098*** (0.034)	-0.199*** (0.039)	0.211*** (0.044)	0.101*** (0.021)
age 15-20	2.448*** (0.056)	3.053*** (0.104)	1.476*** (0.083)	0.040 (0.084)	-0.045 (0.221)	1.393*** (0.046)
age 21-30	1.189*** (0.052)	1.138*** (0.100)	0.607*** (0.061)	-0.074 (0.058)	-0.021 (0.061)	0.233*** (0.031)
age 31-40	0.439*** (0.055)	0.406*** (0.101)	0.372*** (0.058)	0.122** (0.054)	0.094* (0.051)	0.151*** (0.029)
age 41-50	0.558*** (0.059)	-0.708*** (0.109)	0.080 (0.060)	-0.057 (0.054)	0.022 (0.049)	0.053* (0.029)
ISCED high	-1.505*** (0.048)	-0.508*** (0.085)	-0.641*** (0.052)	-0.035 (0.075)	0.428*** (0.059)	0.163*** (0.027)
ISCED medium	-1.017*** (0.025)	-1.057*** (0.035)	-0.375*** (0.038)	0.299*** (0.048)	0.082 (0.055)	0.104*** (0.023)
tenure +6 years	-0.473*** (0.037)	-0.226*** (0.072)	-0.232*** (0.044)	0.151*** (0.042)	-0.251*** (0.059)	0.249*** (0.023)
tenure 1-5 years	0.224*** (0.021)	-0.189*** (0.032)	0.281*** (0.042)	0.155*** (0.044)	-0.038 (0.064)	0.143*** (0.019)
full-time	1.320*** (0.052)	0.136*** (0.044)	0.456*** (0.035)	-0.387*** (0.068)	0.096* (0.050)	0.318*** (0.028)
permanent	-1.978*** (0.022)	-2.056*** (0.054)	0.998*** (0.083)	-0.413*** (0.055)	-0.083 (0.083)	-0.272*** (0.044)
11-19 employees	-0.046 (0.035)	-0.060 (0.051)	0.479*** (0.074)	0.350*** (0.062)	-	0.331*** (0.042)
20-49 employees	-0.043 (0.033)	0.110 (0.415)	0.224*** (0.065)	0.241*** (0.054)	-	0.206*** (0.035)
50+ employees	-0.192*** (0.027)	-0.163 (0.373)	0.355*** (0.053)	0.196*** (0.047)	-	-0.169*** (0.031)
constant	-2.253*** (0.083)	-4.259*** (0.142)	-4.226*** (0.140)	-5.241*** (0.120)	-1.972*** (0.141)	-2.331*** (0.094)
industry dummies	yes	yes	yes	yes	yes	yes
occupation dummies	yes	yes	yes	yes	no	yes
number of observations	21270	7931	10434	2407	1639	16509
R ²	0.639	0.772	0.184	0.760	0.223	0.191

Note: Standard errors in parentheses.

***=significant at 1% level, **=significant at 5% level, *=significant at 10% level.

Table 6
The determinants of vocational training receipt (21-64 year olds) - minimum chi-squared estimates

variable	Germany	France	N'lands	Portugal	Sweden	UK
female	-0.124*** (0.027)	-0.103** (0.052)	-0.049 (0.035)	-0.196*** (0.040)	0.214*** (0.045)	0.105*** (0.021)
age 21-30	1.137*** (0.048)	1.096*** (0.091)	0.615*** (0.061)	-0.087 (0.058)	-0.021 (0.063)	0.229*** (0.030)
age 31-40	0.433*** (0.051)	0.335*** (0.092)	0.388*** (0.058)	0.117** (0.054)	0.094* (0.053)	0.143*** (0.029)
age 41-50	0.535*** (0.055)	-0.730*** (0.098)	0.090 (0.060)	-0.061 (0.054)	0.023 (0.050)	0.053* (0.029)
ISCED high	-1.212*** (0.049)	-0.160* (0.082)	-0.733*** (0.053)	-0.042 (0.075)	0.427*** (0.061)	0.204*** (0.027)
ISCED medium	-0.658*** (0.032)	-0.453*** (0.049)	-0.460*** (0.040)	0.284*** (0.050)	0.081 (0.057)	0.176*** (0.024)
tenure +6 years	-0.398*** (0.035)	-0.021 (0.071)	-0.334*** (0.047)	0.135*** (0.042)	-0.255*** (0.061)	0.226*** (0.023)
tenure 1-5 years	0.295*** (0.025)	0.175*** (0.049)	0.155*** (0.046)	0.164*** (0.047)	-0.048 (0.066)	0.123*** (0.020)
full-time	1.318*** (0.050)	0.071 (0.054)	0.479*** (0.036)	-0.330*** (0.072)	0.085 (0.052)	0.270*** (0.029)
permanent	-2.094*** (0.026)	-2.084*** (0.054)	0.984*** (0.095)	-0.430*** (0.059)	-0.106 (0.087)	-0.300*** (0.045)
11-19 employees	0.066 (0.042)	-0.073 (0.068)	0.724*** (0.078)	0.346*** (0.063)	-	0.333*** (0.045)
20-49 employees	0.036 (0.037)	0.204 (0.380)	0.459*** (0.070)	0.233*** (0.056)	-	0.214*** (0.037)
50+ employees	-0.162*** (0.030)	0.074 (0.343)	0.523*** (0.057)	0.192*** (0.048)	-	-0.189*** (0.033)
constant	-2.819*** (0.088)	-4.110*** (0.149)	-4.098*** (0.150)	-5.246*** (0.127)	-1.963*** (0.146)	-2.296*** (0.108)
industry dummies	yes	yes	yes	yes	yes	yes
occupation dummies	yes	yes	yes	yes	no	yes
number of observations	20329	7574	9331	2256	1490	15107
R ²	0.469	0.557	0.180	0.769	0.230	0.179

Note: Standard errors in parentheses.

***=significant at 1% level, **=significant at 5% level, *=significant at 10% level.

Table 7
The determinants of on-the-job vocational training receipt - minimum chi-squared estimates

variable	Germany	France	N'lands	Portugal	Sweden	UK
female	0.094*** (0.033)	-	-0.007 (0.035)	-0.189*** (0.035)	0.206*** (0.047)	0.103*** (0.021)
age 15-20	0.790*** (0.073)	-	0.941*** (0.088)	0.009 (0.074)	0.048 (0.206)	-0.094 (0.075)
age 21-30	1.118*** (0.048)	-	0.389*** (0.059)	-0.059 (0.052)	0.009 (0.065)	0.145*** (0.030)
age 31-40	0.528*** (0.049)	-	0.216*** (0.055)	0.038 (0.048)	0.141*** (0.055)	0.090*** (0.028)
age 41-50	0.630*** (0.052)	-	-0.007 (0.056)	-0.041 (0.048)	-0.001 (0.053)	0.031 (0.028)
ISCED high	0.066 (0.052)	-	0.411*** (0.063)	-0.068 (0.067)	0.331*** (0.062)	0.223*** (0.027)
ISCED medium	0.282*** (0.042)	-	0.551*** (0.055)	0.153*** (0.043)	0.091 (0.058)	0.217*** (0.024)
tenure +6 years	-0.277*** (0.037)	-	-0.350*** (0.045)	0.115*** (0.037)	-0.470*** (0.064)	0.217*** (0.023)
tenure 1-5 years	-0.299*** (0.034)	-	0.260*** (0.043)	0.158*** (0.039)	-0.145** (0.069)	0.127*** (0.020)
full-time	1.057*** (0.043)	-	0.540*** (0.035)	-0.356*** (0.060)	-0.015 (0.053)	0.293*** (0.029)
permanent	-0.921*** (0.036)	-	1.074*** (0.082)	-0.415*** (0.049)	-0.088 (0.085)	-0.179*** (0.048)
11-19 employees	-0.969*** (0.051)	-	0.602*** (0.082)	0.337*** (0.054)	-	0.322*** (0.045)
20-49 employees	-0.198*** (0.042)	-	0.522*** (0.072)	0.240*** (0.048)	-	0.240*** (0.037)
50+ employees	-0.341*** (0.035)	-	0.641*** (0.059)	0.079* (0.042)	-	-0.197*** (0.033)
constant	-4.373*** (0.095)	-	-5.530*** (0.147)	-5.214*** (0.107)	-1.944*** (0.152)	-2.488*** (0.107)
industry dummies	yes	-	yes	yes	yes	yes
occupation dummies	yes	-	yes	yes	no	yes
number of observations	22202	-	10605	2409	1656	16621
R ²	0.228	-	0.207	0.159	0.238	0.157

Note: Standard errors in parentheses. ***=significant at 1% level, **=significant at 5% level, *=significant at 10% level.

Table 8
The determinants of off-the-job vocational training receipt - minimum chi-squared estimates

variable	Germany	France	N'lands	Portugal	Sweden	UK
female	-0.160*** (0.024)	-0.232*** (0.045)	-0.389*** (0.043)	-0.200*** (0.039)	0.331*** (0.053)	0.053 (0.035)
age 15-20	2.732*** (0.058)	3.053*** (0.104)	2.427*** (0.101)	0.040 (0.083)	-4.231*** (0.525)	3.741*** (0.064)
age 21-30	1.543*** (0.055)	1.138*** (0.100)	1.455*** (0.091)	-0.074 (0.058)	-0.231*** (0.079)	1.850*** (0.059)
age 31-40	0.542*** (0.060)	0.406*** (0.101)	0.980*** (0.090)	0.122** (0.054)	0.308*** (0.065)	1.135*** (0.061)
age 41-50	0.311*** (0.066)	-0.708*** (0.109)	0.659*** (0.093)	-0.056 (0.054)	0.187*** (0.060)	0.825*** (0.065)
ISCED high	-2.033*** (0.052)	-0.508*** (0.085)	-3.049*** (0.088)	-0.034 (0.075)	0.396*** (0.076)	0.053 (0.045)
ISCED medium	-1.086*** (0.023)	-1.057*** (0.035)	-0.934*** (0.035)	0.299*** (0.048)	-0.025 (0.072)	0.042 (0.031)
tenure +6 years	-0.828*** (0.042)	-0.226*** (0.072)	0.168*** (0.052)	0.151*** (0.042)	-0.640*** (0.076)	-0.065 (0.041)
tenure 1-5 years	0.272*** (0.020)	-0.189*** (0.032)	0.428*** (0.047)	0.155*** (0.044)	-0.073 (0.083)	0.326*** (0.027)
full-time	1.924*** (0.056)	0.136*** (0.044)	0.321*** (0.042)	-0.388*** (0.068)	0.229*** (0.067)	0.451*** (0.037)
permanent	-2.014*** (0.021)	-2.056*** (0.054)	1.015*** (0.077)	-0.414*** (0.055)	-0.123 (0.122)	-0.300*** (0.046)
11-19 employees	0.087*** (0.033)	-0.060 (0.051)	0.258*** (0.073)	0.350*** (0.062)	-	0.159*** (0.051)
20-49 employees	-0.037 (0.032)	0.110 (0.415)	-0.019 (0.066)	0.241*** (0.054)	-	-0.193*** (0.045)
50+ employees	-0.094*** (0.026)	-0.163 (0.373)	0.114** (0.053)	0.197*** (0.047)	-	-0.096** (0.039)
constant	-3.199*** (0.084)	-4.259*** (0.142)	-4.380*** (0.147)	-5.241*** (0.120)	-2.375*** (0.184)	-5.967*** (0.117)
industry dummies	yes	yes	yes	yes	yes	yes
occupation dummies	yes	yes	yes	yes	no	yes
number of observations	21334	7931	10591	2409	1671	16509
R ²	0.692	0.772	0.335	0.760	0.259	0.191

Note: Standard errors in parentheses.

***=significant at 1% level, **=significant at 5% level, *=significant at 10% level.

Table 9
Purpose of training (%)

		Germany	France	N'lands	Portugal	Sweden	UK
all training	initial	91.65	69.11	6.00	23.37	10.56	0.05
	continuous	6.59	30.89	94.00	66.46	87.16	99.40
	other	1.76	0.00	0.00	10.18	2.28	0.55
on-the-job training	initial	28.60		4.48	0.00	9.62	0.00
	continuous	60.58	-	95.52	81.58	88.18	100.00
	other	10.82		0.00	18.42	2.20	0.00
off-the-job training	initial	96.18	69.11	9.17	52.22	12.82	0.20
	continuous	2.71	30.89	90.83	47.78	84.71	97.70
	other	1.11	0.00	0.00	0.00	2.46	2.10

Table 10
Time spent in vocational training, if training received in the four weeks prior to survey (%)

	Time	Germany	France	N'lands	Portugal	Sweden	UK
all training	<1 week	29.93	9.28	32.26	0.00	75.88	86.25
	1 week - 1 month	6.78	26.66	22.87	69.52	17.34	7.07
	1 month - 3 months	2.08	17.68	9.82	0.00	4.56	2.36
	3 months - 6 months	1.50	14.65	5.92	1.31	1.25	0.85
	6 months - 1 year	2.03	9.81	17.22	18.79	0.34	0.72
	1 year or longer	57.67	21.92	11.91	10.37	0.63	2.75
on-the-job training	<1 week	46.69	-	34.09	0.00	76.73	89.13
	1 week - 1 month	26.04	-	24.35	72.37	16.57	7.20
	1 month - 3 months	4.21	-	11.61	0.00	4.65	2.29
	3 months - 6 months	4.31	-	6.30	0.00	1.13	0.59
	6 months - 1 year	5.33	-	15.11	25.20	0.28	0.35
	1 year or longer	13.41	-	8.54	2.43	0.64	0.43
off-the-job training	<1 week	26.43	9.28	26.43	0.00	73.73	27.06
	1 week - 1 month	2.76	26.66	18.13	65.04	19.27	4.38
	1 month - 3 months	1.64	17.68	4.12	0.00	4.36	3.82
	3 months - 6 months	0.92	14.65	4.70	3.38	1.57	6.12
	6 months - 1 year	1.34	9.81	23.96	8.71	0.46	8.38
	1 year or longer	66.91	21.92	22.66	22.87	0.61	50.23

Table 11
Hours spent in vocational training, if training received in the four weeks prior to survey (%)

	hours	Germany	France	N'lands	Portugal	Sweden	UK
all training	01-20	23.03	48.81	93.08	41.97	83.57	80.23
	21-40	73.09	39.38	6.92	56.55	16.00	16.08
	41-60	1.41	11.02	0.00	1.49	0.36	2.94
	61-80	0.67	0.79	0.00	0.00	0.07	0.65
	81+	1.80	0.00	0.00	0.00	0.00	0.11
on-the-job training	01-20	60.37	-	92.49	54.11	85.00	82.54
	21-40	37.95	-	7.51	43.46	14.58	14.39
	41-60	1.63	-	0.00	2.43	0.34	2.31
	61-80	0.04	-	0.00	0.00	0.09	0.65
	81+	0.00	-	0.00	0.00	0.00	0.12
off-the-job training	01-20	15.98	48.81	94.96	22.85	80.02	56.44
	21-40	79.72	39.38	5.04	77.15	19.57	33.44
	41-60	1.37	11.02	0.00	0.00	0.40	9.50
	61-80	0.79	0.79	0.00	0.00	0.00	0.61
	81+	2.14	0.00	0.00	0.00	0.00	0.00

Table 12
Average length of training spells (hours)

	Germany	France	N'lands	Portugal	Sweden	UK
average training length offered	82	1	27	1	12	46
all trainees	1360	567	222	354	28	135
all on-the-job trainees	381	-	186	331	26	34
all off-the-job trainees	1545	567	335	389	33	1220

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