DISCUSSION PAPER SERIES

IZA DP No. 933

Training in Europe

Wiji Arulampalam
Alison L. Booth
Mark L. Bryan

November 2003

IZA

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

Training in Europe

Wiji Arulampalam
University of Warwick and IZA Bonn

Alison L. Booth
Australian National University, University of Essex,
CEPR and IZA Bonn

Mark L. Bryan
University of Essex

Discussion Paper No. 933
November 2003

IZA

P.O. Box 7240
D-53072 Bonn
Germany

Tel.: +49-228-3894-0
Fax: +49-228-3894-210
Email: iza@iza.org

IZA Discussion Paper No. 933
November 2003

ABSTRACT

Training in Europe[*]

Using the European Community Household Panel, we investigate gender differences in training participation over the period 1994-1999. We focus on 'lifelong learning', fixed-term contracts, part-time versus full-time work, public/private sector affiliation, educational attainment, and the individual's position in the wage distribution prior to training. Women are typically no less likely than men to train. While there is no significant training-age profile for women, there is a negative profile for men. In several countries there is a negative association between fixed-term contacts and training, particularly for men. In most countries and, for both sexes, training is positively associated with public sector employment, high educational attainment and a high position in the wage distribution.

JEL Classification: J16, J24, J40

Keywords: work-related training, gender, fixed term contracts

Corresponding author:

Alison Booth
Economics Program, RSSS
Australian National University
Canberra ACT 0200
Australia
Email: alison.booth@anu.edu.au

[*] This version of the paper includes an appendix detailing the selection of the sample used in the estimation. We are grateful for financial support from the Leverhulme Trust under the Award F/00213/H "Training in Europe: Its Causes and Consequences". For useful comments, we thank Andrea Bassanini and participants of the European Panel Users Network Conference July 2003 (Colchester), the European Economic Association Congress August 2003 (Stockholm) and the CEPR/IZA September 2003 Workshop (Ammersee).

Introduction

Initial education ensures that individuals enter the labour market with the appropriate level of human capital for their chosen occupation, while on-the-job skills acquisition potentially continues throughout individuals' working lives. It is well-known that cross-country differences in the stock of human capital and in educational systems are important in explaining differences in growth (see *inter alia* Lucas 1988; Romer 1990). Although cross-country differences in work-related training systems are also likely to be important, there is relatively little comparative work investigating the extent and economic impact of continuing work-related training. This is no doubt because harmonized data facilitating such comparisons became available only very recently (OECD, 1999).

In this paper we establish some stylised facts about the extent and determinants of work-related training in European Union (EU) countries, and how these differ by gender.[1] Our data source is the European Community Household Panel (ECHP), collected annually since 1994, and containing rich information on education and work-related training.

While the studies by the OECD (1999), Brunello (2001) and Leuven and Oosterbeek (1999) provided comparative cross-country analyses of training, our paper is different in the following respects.[2] First, we use harmonized data for the period 1994-1999 for ten European Union countries. Secondly, ours is the first study to exploit the panel nature of the data to control for unobserved heterogeneity.[3]

---

[1] In a companion paper, we estimate the impact of this training for workers at differing quantiles of the wages distribution (Arulampalam, Booth and Bryan, 2003).

[2] The OECD (1999) analyse four surveys: the International Adult Literacy Survey (IALS) 1994-5, the European Labour Force Survey (ELFS) 1997, 1991-96 data from the Indicators of Education Systems, and the 1994 Continuing Vocational Training Survey. Leuven and Oosterbeeck (1999) use IALS data for four countries. While Brunello (2001) uses the ECHP, he analyses only waves 1 and 3 and the focus of his analysis is very different. See also Lynch (1994) for a collection of country-specific studies of training.

[3] Our work is complementary with earlier studies such as Leuven and Oosterbeck (1999) and Ryan (2001), who examine a subset of our EU countries.

A problem with cross-country studies based on micro-data is the enormous complexity of the analysis. Some studies adopt the simplifying strategy of estimating single equations with country-identifying dummy variables capturing any nation-specific effects (see for example, Brunello, 2001). However, we estimate separate country-specific equations, as do Leuven and Oosterbeek (1999), a procedure allowing the identification of cross-country differences in the impact of observable characteristics. We also estimate separate equations for men and women, which to our knowledge has not been done before in comparative analysis of training.

We focus on only a few issues in order to tease out, in an economically meaningful way, gender differences across EU countries in training participation, using decomposition analysis. Our interest is in gender differences with regard to the following issues: access to "lifelong learning"; the relationship between fixed-term contracts and training; part-time versus full-time work; public and private sector training; complementarities between education and training; and the individual's position in the wage distribution prior to training. We find that women are no less likely than men to undertake training and considerably more likely to train in four EU countries. The differing effects of characteristics and 'returns' can explain the gaps. There is no significant training-age profile for women and a strong negative profile for men. In several countries there is a negative association between fixed-term contacts and training, particularly for men. In most countries and for both sexes, training is positively associated with public sector employment, high educational attainment and a high position in the wage distribution.

1. The Data and Explanatory Variables

Our data are from the first six waves of the European Community Household Panel (ECHP), a survey collected annually since 1994 in a standardised format that facilitates cross-country comparisons.[4] To avoid conflating work-related or 'continuing training' with initial vocational education or training,[5] we exclude individuals under the age of 25 years, paid apprentices and those on special employment-related training schemes.[6]

Our estimating sub-samples comprise employed men and women who are: (i) between the ages of 25 and 54 years and working at least 15 hours per week; (ii) observed in at least two consecutive waves; (iii) not employed in agriculture; and (iv) with valid observations on all the variables used in the training equations. Where the number of missing values was substantial, we include a dummy variable for missing value observations in order to preserve the sample sizes. The restriction of working at least 15 hours per week was necessary because of the nature of the ECHP data, where – in the first two waves – we were unable to distinguish individuals regularly working fewer than 15 hours from those out-of-the labour force. In addition, some important variables like firm size and tenure are only available for individuals working 15 hours or more. Thus our estimating sub-samples under-represent low-hours part-timers, though for most countries they represent only a tiny fraction of workers.[7] We analyse the ten European countries listed in Table 1.[8]

---

4 We have five waves for Austria and four for Finland, as they joined the ECHP after 1994. For Britain we use only the first five waves because the format of the training question altered from 1998 onwards.

5 Despite the harmonisation of the ECHP, what is reported as training may depend partly on country-specific training systems or what is classed as training versus education. Therefore comparisons of absolute training levels may be misleading. However, cross-country comparisons of continuing training are likely to be more robust for two reasons. First, there is typically much less regulation of continuing training than initial training and education. Second, the incidence of general education after age 25 is very low (typically less than 2%), so there is little danger of confusing training and education.

6 Apprentices and those on special training schemes account for only 1.1% of the sampled age group.

7 Exceptions are Britain (6.2% of the sub-sample), the Netherlands (8.8%) and Ireland (4.0%). In all other countries the proportion of low-hours part-timers is under 3%.

8 We omit Greece and Portugal owing to apparent gaps in the training data and because of the smaller estimating sub-samples with usable information. We also omit Germany because the data sets supplied as part of the ECHP have shortcomings for our analysis: the six wave data set derived from the GSOEP survey excludes many shorter training spells (communication from DIW), whilst in the original three-wave ECHP data set, interview dates are treated as confidential, so it is not possible to construct job tenure or know whether training was before or after the previous interview.

The form of the training question is as follows: "Have you at any time since January (in the previous year) been in vocational education or training, including any part-time or short courses?". Since this reference period may overlap with the reference period of the previous wave, and to avoid counting long events more than once, where possible we use the starting dates of the course to identify training, which began since the previous interview.[9] We define *training incidence* to take the value one if the employee received any such training and zero otherwise. The framing of this question suggests that training responses should be interpreted as more formal courses of instruction, rather than informal on-the-job training. A separate question asks about "general or higher education". Participation in these more general courses is very low (average annual take-up by 25-54 year olds is less than 1%) so we are confident that our results are not affected by interactions with countries' differing formal educational systems.

The incidence of training starts, reported in row [1] of Table 1, varies considerably across countries. We identify three high-incidence countries – Britain, Denmark and Finland – where each year over a third of individuals begin training. In contrast Austria, Belgium, France and Spain form a group of medium-incidence countries, where the proportion ranges from 10% to 16%. Finally, Ireland, Italy and the Netherlands have incidence below 10%. The ranking of countries compares reasonably well (especially for high incidence countries) with cross-country comparisons using different data sources reported in OECD (1999).

Rows [2] and [3] show incidence for men and women separately. In most countries training participation rates for women and men are quite similar and the differences are only

[9] The modal interview month is October, corresponding to a reference period of 22 months. The British data do not include training dates. However they are derived from the British Household Panel Survey (BHPS), where the reference period only slightly exceeds one year. Since events are generally very short in Britain, there should be little chance of double counting. For France, we do not use training dates as they are missing for the majority of events.

statistically significant in four countries - Denmark, Finland, Italy and the Netherlands – where women are more likely than men to begin a training course. We later decompose the within-country gender differentials, to see if they arise because of women's different characteristics (for example, in some countries women are disproportionately found in the public sector), or because their characteristics are 'rewarded' differently. We find that, even in countries where men and women have similar training incidences, there can be different, but opposing, effects of characteristics and 'returns' at work.

2. The Econometric Model

The observed dependent variable is binary, taking the value of one if the individual started training since the last interview and zero otherwise. We estimate static random-effects (RE) probit models separately for each country and gender. Unfortunately there is no information on the complete history of training received by individuals in the sample.[10] All we observe is whether or not an individual receives an additional training event at each wave. However, to account for the effect of past training, education and work history on individual earnings prior to the receipt of training, we include lagged quintile group dummy variables to pick up the individual's position in the wage distribution.[11] Moreover, to avoid problems of simultaneity, we measure all explanatory variables at the wave prior to the wave where the training information was elicited.[12] All covariates in the model are time-varying.

---

[10] An alternative would be to model the training probability at time t conditional on what happened at t-1. This would necessitate selecting individuals continuously present in the sample and addressing the potential endogeneity of 'initial' conditions by using an appropriate instrument (Heckman 1981). However, to avoid restricting the sample by dropping individuals not continuously present we estimate a 'static' model here.

[11] Note time-varying covariates (as we have) in non-linear models are sufficient for identification of the parameters of interest (Hyslop, (1999)).

[12] The only exceptions are individuals who changed jobs between waves, and began training in the new job. Then we use job characteristics from the later wave to ensure they correspond to the new job, but retain

The random effects probit assumes that the distribution of the random effects conditional on the covariates has a standard normal distribution with zero mean and constant variance. This assumption could be relaxed by allowing for correlation between the unobserved heterogeneity and included covariates by, for example, including time-means of the covariates as additional regressors (Chamberlain, 1980). However, since all our variables are binary indicators, there is not enough variation in the time-means of the covariates to enable us to account for possible correlation. We have therefore not followed this route.

3. Country-specific Estimates of Training Incidence

Our reduced form estimates for each of the ten countries are reported in Tables 2 and 3 for men and women respectively.[13] Although we estimated all specifications with and without job tenure, there was little difference between the estimates for our coefficients of interest. We therefore report only the results with tenure excluded. For these EU countries, the tables report marginal effects for our variables of interest.

Lifelong Learning

Training over the working-life cycle might be viewed as 'lifelong learning', a concept that has been made much of by OECD members (see for example, OECD, 1999: 134). In this paper, we interpret 'lifelong learning' as training starts over the life cycle. Human capital theory predicts that

---

their personal characteristics from the earlier wave, including their position in the wave distribution. This procedure resulted in changes to the explanatory variables in only 0.4% of cases.

[13] We also estimated these models by restricting the coefficients to be equal across gender but allowing for the variances of the unobserved heterogeneity to be different. This enables one to test for equality of coefficients across gender using a likelihood ratio test. The null of equal coefficients was rejected for all countries at 5% or less significant levels, except for Ireland [p-value=0.11], The Netherlands [p-value=0.07] and Spain [p-value=0.85].

younger workers are more likely to be trained than older workers, since the period over which the training investment can be amortised is longer. On the other hand, with rapid skills obsolescence, that period might be relatively short; hence it may be in agents' interests to train workers of any age. In that case we might observe 'lifelong learning' – where continuing training is observed across all age groups.

Our RE probit estimates reported in Tables 2 and 3, which control for other factors affecting training that might be correlated with age, are quite striking in the following ways. First, younger men are typically more likely to be trained. The marginal effects in Table 2 reveal that, in seven out of the ten countries - Austria, Belgium, Britain, Finland, France, the Netherlands and Spain – the training probability is significantly reduced for men 40 and over, relative to the base group of men aged 25-29 by about 3-7 percentage points. In all seven countries, the negative effect is larger in absolute terms for men over 50 than for men 40-49. For Austria, France, the Netherlands and Spain, men aged 30-39 are also statistically significantly less likely to be trained than the 25-29 year olds. In addition, Irish men aged 40-49 are significantly less likely to be trained, whereas in Denmark there is a significant negative age effect for the over 50s only. In only one country – Italy – are men of all age groups are equally as likely to be trained. Interestingly, compared to Ireland where there is a very small age effect, Spain is the only other country where the negative age differentials are the least for men. For example, men aged 30-39 are only 2 percentage points and men aged 40 or more are only 3 percentage points less likely to have started training relative to men aged 25-30, *ceteris paribus.*

Second, there is typically no statistically significant difference in the training probability for older women as compared to the base group of women aged between 25 and 29. There are only a few exceptions: Austrian women in the 30-39 age group are more likely to be trained, as are

Italian women in the 40-49 age group. Only in France are women over 50 less likely to be trained than the base group of women aged between 25 and 29.

In summary, after controlling for industry, occupation, firm-size and the like, for women there is virtually no correlation between the probability of starting formal training and age. This result might be construed as some evidence of lifelong learning for women. However, there is a significant negative age effect for men in nine out of our ten EU countries. For these men in these countries there is no evidence of 'lifelong learning'.

These gender differences might arise if women are more likely to do jobs requiring regular skills-upgrading (or multi-skilling) and occupational dummies are insufficient to control for this. They might also arise if - relative to men - women have many jobs as they move in and out of the labour market and get induction training at each job. While we cannot include labour market experience or the number of previous jobs (this information is not available in the ECHP), we do include quintile group dummy variables picking up the individual's position in the wage distribution for the wave prior to the training start. This should account for the effect of past job history, training and education on individual earnings prior to training.

Fixed-term Contracts (FTC)

Some temporary work is by its nature seasonal or casual. For other jobs, where the work itself does not dictate temporary employment, the job is temporary due to a characteristic of the *employment contract* under which the worker is hired, namely its fixed-term duration. We distinguish where possible between seasonal/casual temporary jobs (not covered by formal contracts) and jobs covered by fixed-term contracts.

European countries have adopted widely varying policies concerning employment protection. In economies where permanent workers have high levels of employment protection, temporary contracts can provide a mechanism enhancing labour market flexibility, since firms can adjust their workforces by varying the number of temporary workers. In Spain, and to a lesser extent France, countries characterised by high levels of employment protection, there has been a dramatic growth in temporary jobs over the last 15 years (Dolado et al, 2002; Blanchard and Landier, 2002). Britain's experience provides a contrast, since weak employment protection has been associated with a low, stable percentage of the workforce in temporary jobs (Booth, Francesconi and Frank, 2002).[14]

Since a FTC is short, human capital theory would predict that it should be associated with a lower training probability than a permanent contract. This is because there is a shorter period over which the training returns can be realized. However other arguments suggest that FTCs might be associated with more training-starts. First, to the extent that FTC are probationary (as for example in the Netherlands and Austria), firms might offer training as a means of learning about worker ability before offering a permanent contract. Second, US evidence reveals that the majority of U.S. temporary help supply firms offer nominally free, unrestricted computer skills training to their contract workers and Autor (2001) suggests that such general training induces self-selection and screens worker ability. Some of our FTC workers might be from temporary supply agencies (a possibility we cannot investigate with our data) and for this reason there might be a positive correlation between training starts and FTCs. Third, in some countries (for instance, Finland, France, Italy and Spain), legislation specifically permits the use of FTCs for training purposes (OECD, 1999: pp104-5) and this too might contribute to a positive correlation.[15]

[14] Temporary work is increasingly falling under the aegis of European Union (EU) directives, as indicated in the 1999 EU directive concerning the framework agreement on fixed-term work. For information see the Department of Trade and Industry site (http://www.dti.gov.uk/er/europe/directives.htm).

[15] To the extent that some individuals self-classify themselves as being on training schemes, they will be eliminated from the sample, since we drop paid apprentic es and those on special employment-related training schemes. However, see also footnote 5.

Tables 2 and 3 report marginal effects for workers on FTC, and separately for casual workers where data permit, relative to the base of permanent workers.[16] For the countries for which we have information about casual work, there is no statistically significant difference between casual and permanent workers in their training probability, with the exception of Danish men and women. In Denmark, women in casual/seasonal jobs are 25.5 percentage points less likely than women in permanent jobs to receive training. The estimated effect for Danish men is 11.5.

For men, being on a FTC is associated with a statistically significant lower training probability for five countries – Austria, Britain, Denmark, Finland and Spain. In Finland and Spain, this effect is not only statistically significant at the 5% level or more but the estimated effect is large at about 10-13 percentage points. There is no statistically significant positive association for men for any country.[17] This finding provides some support for the orthodox human capital predictions of a likely negative correlation between short jobs and training starts. It is also consistent with lower job satisfaction reported in Petrongolo (1993) for FTC workers.

As reported in Booth, Dolado and Frank (2002) using aggregate cross-country data, there is a significant positive correlation between the proportion of a workforce that is temporary and the strictness of EPL. The negative effect of FTC on training, revealed in Table 2 for men in five countries, highlights a potential further indirect outcome of the EPL. Since EPL increases temporary contracts and temporary contract workers are less likely to get training, then EPL through this mechanism affects a country's human capital acquisition. This mechanism may be at

[16] Our FTC and casual proportions in Table A.1 are lower than those reported in Booth, Dolado and Frank (2002, p. F183). This might be because fixed and casual workers in the ECHP data are only defined for individuals working more than 15 hours/week.

[17] The proportions of men on FTC (as distinct from casual) in these four countries varies considerably. For example, as Appendix Table A.1 shows, both Britain and Austria are characterized by relatively low proportions of workers on FTCs. Finland has a higher proportion, at 8.5% for men and 12.8% of women, while some 22% of Spanish male and female workers are on FTCs. Finland experienced a recession following the Soviet Union break-up.

work in Finland, for example, where the negative effect of a FTC is quite strong, at 10.3 percentage points, and where a relatively large proportion of men, 8.5%, are covered by FTCs.

For women (Table 3), in contrast, there is a positive correlation between FTC and the training-start probability for France (significant only at the 10% level), and a negative correlation for Denmark (significant at the 1% level) and for Finland (significant at the 1% level). The significant negative effect that was found for men in Finland is also present for women FTC workers in Finland (although of half its magnitude in absolute value).[18]

Part-time

In eight of our ten EU countries, part-time and full-time workers are as likely to start training in any year. Our sample includes only part-time workers working at least 15 hours per week, but nonetheless this is a striking result that does not accord with the predictions of human capital theory (which suggests that part-timers get less training as in part-time jobs there are fewer hours in which to capture the returns). The exceptions are Britain and Finland, where part-time men and women are less likely to be trained. The absolute value of the marginal effect is particularly large for British and Finnish men. In these two countries, the training probability for part-time men is estimated to be about 27 percentage points less compared to full-time men, *ceteris paribus*. Note, however, that male part-time incidence is very low in both countries (see Appendix Table A.1). While for Dutch women there is a small negative effect, this is statistically significant only at the 10 percent level.

[18] The lack of statistical significance of many of the FTC coefficients does not appear to be because FTCs are collinear with the youngest age or bottom quintile group dummies. For example, on average some 30% of FTC workers are older than 40, and typically only 30-40% of FTC workers are in the lowest fifth of the wage distribution (an exception is the Netherlands, where the figure is 62%).

Public/Private Sector

The results in Tables 2 and 3 show that public sector men and women in Belgium, Britain, Finland, France, and Spain are significantly more likely to be trained than their private sector counterparts.[19] Public sector men in Denmark and Ireland, and public sector women in Italy and the Netherlands -- are also significantly more likely to be trained. The marginal effect is quite large (about 13 percentage points) in the case of Finnish public sector men and women, and Danish men. Only in Austria does working in the public sector seem to have no effect on training starts for both men and women. For men, only in Italy and the Netherlands is there no statistically significant correlation between training starts and sector.

These overall findings are as expected *a priori*. As noted in Booth (1991), to the extent that private sector firms are more constrained than public sector by the need to make profits, they may be less willing to finance training through fears of losing trained workers to rival non-training firms. They might also be subject to greater demand fluctuations, making worker redundancies expensive since the training investment would be lost.

Complementarities between Education and Formal Training

Existing evidence shows strong complementarities between education and training (see *inter alia* Booth, 1991; Arulampalam and Booth, 1998; Brunello, 2001). Education levels of the working population – and their dispersion - differ considerably across EU countries, as inspection of the

[19] Public sector – any size. Notice that Finland and Denmark both have high proportions of women in the public sector. (Finland has 31% (men) and 54% (women), compared to 30% and 59% in Denmark). Other countries with many public sector workers, but not the same gender division, are Belgium, France and Italy. However, in all countries women are more likely to work in the public than the private sector.

means in Appendix Table A.1 makes clear. Education is categorised according to the International Standard Classification of Education (ISCED), where Levels 0-2 cover less than upper secondary education, level 3 is upper secondary education (e.g. GCE A-levels, baccalauréat) and levels 5-7 cover tertiary education, both university and non-university.[20]

We show that, estimating separate models for each country, for both men and women, there are seven out of ten countries in which highly educated individuals are significantly more likely to get training than the base group of less than upper secondary level.[21] For both sexes, the common set of countries comprises Britain, Denmark, Finland, Italy and Spain. However highly educated women in France and the Netherlands, and men in Austria and Ireland, are more likely to experience training starts than the base. Only in Belgium does education have no significant effect, ceteris paribus. In our companion paper (Arulampalam et al, 2003), we suggest that the complementarity of the education and training systems may explain some part of the observed differences in wage inequality across EU countries documented in, for example, Blau and Kahn (1996).[22]

Quintile groups

While we cannot include labour market experience or the number of previous jobs, (this information is not available in the ECHP), we do include quintile-group dummy variables to pick up the individual's position in the wage distribution for the wave prior to the training start. This should

---

[20] Note that there were no level 4 qualifications in our data.

[21] The pattern of our estimates differs from that of Brunello (2001). This is not surprising, as he included non-workers and young people in his analysis and used the ECHP as a cross-section in which countries were pooled. Our analysis also differs from Bassanini and Brunello (2003) who use the 1996 wave of the ECHP to investigate training for full-time men in seven countries.

[22] Groot and Maassen van den Brink (2000) also argue that training can exacerbate wage inequality.

account for the effect of past job history, training and education on the individual's earnings just prior to the receipt of training.

The results in Tables 2 and 3 show that in four countries – Austria, Britain, Finland and France – the lowest paid fifth of workers were less likely to begin training in any year than the highest paid fifth for both men and women. The magnitude of the effects in Finland is particularly large: 23 percentage points for men and 14 percentage points for women. In Ireland, Belgium and Spain, low paid men, though not women, are less likely to train; whilst in Denmark there is only a negative effect for low paid women. In the Netherlands, there is some evidence that women in the bottom fifth of the distribution do get more training, but there is no effect for men. In Italy there does not seem to be any effect for low paid men or women. Though the results also show some negative effects higher up the wage distribution, these are typically smaller.

Unobserved heterogeneity

Tables 2 and 3 report estimates of rho, the proportion of the total error variance accounted for by unobservable individual heterogeneity (such as unobservable ability). Our preferred model, for both men and women, is the random effects probit, as compared with a pooled cross-sectional model, since the null hypothesis that rho = 0 is easily rejected for all countries. The estimates of rho range from 0.14 for Dutch women to 0.45 for French women, and from 0.22 for Spanish men to 0.43 for French men. They are generally lower in Denmark, Italy, the Netherlands and Spain. In these countries the regressors included in the model have done a relatively good job in capturing individual specific factors, which affect training. But there clearly remain important aspects of individual heterogeneity (perhaps owing in part to the particular institutional framework of each country) that remain unexplained.

5. Gender Differences in Training Incidence

We now investigate how much of the observed gender differences arise because of differing characteristics of women (for example, in some countries women are disproportionately found in the public sector), or because their characteristics are 'rewarded' differently. The latter might occur if the training probability for men differs from that of women because, for example, differences in preferences for training might make one gender more likely to accept training than the other. Alternatively, the probability of being trained for otherwise identical men and women might differ because one gender is more likely to be offered training opportunities by their employers, either because they are less likely to quit or because there is discrimination.

Another reason often put forward in the decomposition literature as to why 'returns' might differ is that institutions - as well as preferences and opportunities - might vary across two groups. However, in our case when considering intra-country gender differences, it is hard to think of institutional factors that could lead to differences in returns (where returns to characteristics are given by differences in the marginal effects of particular characteristics), apart from differences in any application of anti-discrimination legislation or in the ease with workers are laid off.

It is common in the literature to use either cross-sectional or pooled panel data estimates to decompose differences between two groups of individuals. Since our model is a random effects probit that accounts for unobserved individual-specific error components, we take a different route. After the estimation of the RE model, we use the Bayesian framework to estimate for each individual of each gender the unobserved individual-specific component.[23] We then use this, along with the vector of observable characteristics and the estimated coefficients, to predict the individual's training probability during the period. These predicted probabilities are then averaged over the full sample of observations for each gender. The resulting average is the probability of a randomly chosen individual undertaking training (Gomulka and Stern, 1990).[24]

For example, for men we calculate the predicted probability using their characteristics and the estimated coefficients (the impact of the characteristics on the probability). Then we also use the estimated coefficients from the female model to obtain the average predicted probability for males if the impact of their characteristics were the same as the females'. In Table 4, the 'own' predicted probabilities are reported along the leading/principal diagonal for each country and the 'other gender' predicted probabilities are reported along the off-diagonal.[25] Thus, for men in Austria, the average predicted training probability is 0.142, while for women it is 0.135. But if men had the same returns as women, then their predicted probability is 0.121 and if women had the same returns as men, their predicted probability is 0.151. The standard errors are then calculated along the lines suggested by Gomulka and Stern (1990).

For each set of four predictions, if the rows are more similar than the columns, then characteristics are more important than returns in explaining differences, and vice versa. In Italy and Spain the rows are clearly more similar than the columns. So it appears that in these two countries it is basically women's characteristics, which explain their higher training incidence relative to men (though a Spanish man does have a higher training probability than a woman with the same characteristics). As noted previously, the gender differences in training incidence are

---

[23] Estimations were carried out using Stata7 (2001) and Limdep version 8 (2002). The gllamm command in Stata provides the estimate of α_i. These estimates are sometimes referred to as the empirical Bayes predictions or shrinkage estimates (Goldstein, 2003).

[24] Another method is to calculate predicted probabilities using sample averages of the variables used in the analysis and ignoring the individual specific unobservable component. This method, appropriate for linear models, is routinely used in decomposition analysis. Since the representative individual given by the sample characteristics is not a real individual we do not use this technique. Although we pursue the most appropriate analysis, its chief disadvantage is that we are unable to provide an inter-country decomposition because of the presence of regional dummy variables in the country-specific models (Leuven and Oosterbeek, 1999).

statistically significant in Italy and Spain.

The other two countries with significantly different incidences are Denmark and Finland. In Denmark, holding coefficients constant, female characteristics favour training. But for a woman with typical characteristics, training would be higher with a man's returns. So the two effects oppose one another, but it seems that the characteristics 'win'. In Finland, on the other hand, both characteristics and returns favour female training. This is also the case in the Netherlands, though as the columns are more similar, the effect of returns is the more important. However, as noted, there is no overall statistically significant difference in the training incidence of men and women in the Netherlands.

In the remaining countries the differences in incidence are not significant, but these similarities can mask some competing effects. For example in Austria, female characteristics favour training but they are counteracted by lower returns for women. In Belgium and Britain the picture is more ambiguous. Women with typical characteristics would get less training with men's returns, or with men's characteristics, but on the other hand, men would get less training if they had women's characteristics. In France and Ireland, Table 4 does not suggest any significant differences between the effects of characteristics and returns.

5. Conclusions

In this paper we established some stylised facts about work-related training in European Union countries and investigated gender differences using decomposition analysis. Our interest was in: 'lifelong learning'; the relationship between fixed-term contracts and training; part-time versus full-time work; public and private sector training; complementarities between education and training;

[25] If the model had been a random-effects logit, the own predicted probabilities would have been the same as the actual raw data training incidence. In probit models such as ours, they are approximately the same.

and the individual's position in the wage distribution prior to training. Our analysis yielded the following stylised facts for employed men and women aged between 25 and 54 years:

- Women are no less likely than men to start a training course. In Denmark, Finland, Italy and Spain they are considerably more likely to undertake training (by between 10% and 60%).
- In Italy and Spain, women's different characteristics explain their different training probabilities relative to men. In Denmark and Finland differing returns also seem important. In other countries, similar overall incidences across the sexes can hide the opposing effects of characteristics and returns.
- The countries with the highest - predicted and actual - formal training probabilities are Denmark, Britain and Finland, all with probabilitie s for both men and women of over 35%. The next highest country was Austria, with 16%.
- For women, there is little correlation between the probability of starting formal training and age, which provides some evidence of 'lifelong learning'. However, there is a significant negative age effect for men in nine out of our ten EU countries.
- For men, being on a FTC is associated with a significantly lower training probability for five countries – Austria, Britain, Denmark, Finland and Spain. This finding provides some support for the orthodox human capital predictions of the likely correlation – negative - between short jobs and training starts. For women in most countries, there is no statistically significant correlation. For the countries for which we have information about casual work, only for Danish men and women is there a statistically significant negative effect of casual work on training.

- In eight of our ten EU countries, part-time and full-time workers are equally likely to start training in any year, a result that does not accord with the predictions of human capital theory. The exceptions were men and women in Britain and Finland.
- For most EU countries, participation in training is higher in the public sector than in the private sector for both sexes. These findings are as expected a priori.
- For most countries, highly educated individuals are significantly more likely to start training than those with low educational qualifications, even taking account of their position in the wage distribution in the previous wave.
- In all countries except Italy and the Netherlands workers in the bottom part of the wage distribution get less training *ceteris paribus*. But in the Netherlands there is evidence that the lowest paid are more likely to undertake training.

References

Arulampalam, Wiji and Alison L Booth (1998), "Training and Labour Market Flexibility: Is there a Trade-off?" *The British Journal of Industrial Relations*, December 1998, 36(4) pp521-536.

Arulampalam, Wiji, Alison L Booth and Mark L Bryan, (2003), "Asymmetries in the Training Effect on European Union Wages", mimeo, University of Essex.

Autor, David H. (2001) "Why Do Temporary Help Firms Provide Free General Skills Training?", March 2001, MIT Dept. of Economics Working Paper No. 01-03.

Bassanini, Andrea, and Giorgio Brunello (2003) "Is Training More Frequent When Wage Compression is Higher? Evidence from the European Community Household Panel". IZA Discussion Paper No. 839, August.

Blanchard, Olivier, and Augustin Landier, (2002)"The Perverse Effects of Partial Labour Market Reform: Fixed term Contracts in France," *The Economic Journal*, 112, F214-244, June.

Blau, Francine and Lawrence Kahn (1996), "Wage Structure and Gender Earnings Differentials: An International Comparison", *Economica*, New Series, Vol. 63, No. 250, Supplement: Economic Policy and Income Distribution, pp. S29-S62.

Booth, Alison L. (1991), "Job-related Formal Training: Who Receives it and What is it Worth?", *Oxford Bulletin of Economics and Statistics* 53(3) pp 281-94, August.

Booth, Alison L., Juan Dolado and Jeff Frank. 2002. 'Introduction to the Symposium on Temporary Work.' *The Economic Journal*, 112, F181-F188, June.

Booth, Alison L., Marco Francesconi and Jeff Frank. 2002. 'Temporary Jobs: Stepping Stones or Dead Ends?' June, *The Economic Journal*, 112, F189-F213, June.

Brunello, Giorgio. 2001. "On the Complementarity between Education and Training in Europe." IZA Discussion Paper No. 309, June. http://www.iza.org/

Chamberlain, Gary. 1980. 'Analysis of covariance with qualitative data', *Review of Economic Studies*, 47, 225-238.

Dolado Juan.J., Carlos Garcia Serrano and Juan F. Jimeno, (2002) "Drawing Lessons from the Boom in Temporary Jobs in Spain," *The Economic Journal*, 112, F270-F295, June.

Gllamm (2001) – Software for the estimation of Generalised Linear Latent and Mixed Models, a routine in Stata by Sophia Rabe-Hesketh, Andrew Pickles and Anders Skrondal.

Goldstein, Harvey (2003). *Multilevel Statistical Models*, 3rd Edition, Kendall's Library of Statistics 3, Arnold, London.

Gomulka, Joanna and Nicholas Stern (1990) "The Employment of Married Women in the United Kingdom 1970-83." *Economica,* 57, pp.171-199.

Groot, W and H. Maassen Van den Brink (2000) 'State Dependency in Firm-related Training: A Random effects Ordered Probit Model'. Mimeo, Scholar Programme, University of Amsterdam.

Heckman, J. J. (1981) "The incidental parameters problem and the problem of initial conditions in estimating a discrete time-discrete data stochastic process", in *Structural Analysis of Discrete Data with Econometric Applications*, eds. C. F. Manski and D. McFadden, 114-178, Cambridge: MIT Press.

Holmlund Bertil and Donald Storrie (2002) "Temporary Work in Turbulent Times: The Swedish Experience," *The Economic Journal,* 112, F2245-F269, June.

Hyslop, Dean R. (1999), State dependence, serial correlation and heterogeneity in intertemporal labour force participation of married women, *Econometrica*, 67(6), 1255-94.

Leuven, Edwin, and Hessel Oosterbeek. 1999. "Demand and Supply of Work-related Training: Evidence from Four Countries." *Research in Labor Economics,* Vol. 18, pp. 303-30.

Limdep 2002. *Limdep Software, Version 8*, Econometric Software, Inc.

Lucas, Robert E. Jr. 1988. "On the Mechanics of Economic Development." *Journal of Monetary Economics*, Vol. 22, pp. 3-42.

Lynch, Lisa M. 1994. ed. *Training and the Private Sector: International Comparisons.* Chicago: University of Chicago Press.

OECD. 1999. "Training of Adult Workers in OECD Countries: Measurement and Analysis." Chapter 3 in OECD *Employment Outlook*, pp. 134-175, Paris: OECD.

Petrongolo, Barbara (2003). "Gender Segregation in Employment Contracts". Mimeo, Department of Economics, London School of Economics.

Romer, Paul M. 1990. "Endogenous Technological Change." *Journal of Political Economy*, Vol. 98, No. 5 (part 2), pp. S71-S102.

Ryan, P., (2001) 'The School-to-Work Transition: A Cross-National Perspective', *Journal of Economic Literature*, Vol. XXXIX, March, pp 34-92.

Stata 7 (2000). *Stata Statistical Software,* Stata Corporation, USA.

Table 1: Training Participation across Europe for Men and Women in Employment Aged 25-54 Years

	Austria	Belgium	Britain	Denmark	Finland	France	Ireland	Italy	Netherlands	Spain
Incidence of training starts										
(1) All	0.16 (4)	0.14(6)	0.41 (2)	0.42 (1)	0.34 (3)	0.15 (5)	0.09 (8)	0.06 (10)	0.07 (9)	0.10 (7)
(2) Men	0.16 (4)	0.14 (6)	0.41 (2)	0.42 (1)	0.34 (3)	0.15 (5)	0.09 (8)	0.06 (10)	0.07 (9)	0.10 (7)
(3) Women	0.16 (4)	0.13 (5)	0.43 (2)	0.47 (1)	0.41 (3)	0.16 (4)	0.10 (7)	0.09 (8)	0.08 (9)	0.12 (6)

Notes: Cross-country ranks are in parentheses. Estimates are weighted using the supplied weights (PG003), which account for non-random sample selection due to the survey design and patterns of individual non-response. The statistics can therefore be taken as representative of each country's population.

Table 2: RE Training Probits for Selected Variables (tenure omitted) - Marginal Effects (standard error) for Men

Variable	Austria	Belgium	Britain	Denmark	Finland	France	Ireland	Italy	Netherlands	Spain
30-39 year old	-0.031*	0.001	-0.017	-0.012	-0.039	-0.025**	-0.014	-0.001	-0.025***	-0.020**
	(0.018)	(0.020)	(0.022)	(0.027)	(0.033)	(0.011)	(0.014)	(0.007)	(0.009)	(0.010)
40-49 year old	-0.053**	-0.045**	-0.074***	-0.037	-0.067*	-0.066***	-0.033**	-0.010	-0.056***	-0.027**
	(0.021)	(0.022)	(0.025)	(0.028)	(0.035)	(0.012)	(0.016)	(0.007)	(0.010)	(0.011)
50-54 year old	-0.097***	-0.074***	-0.078**	-0.091***	-0.105**	-0.107***	-0.025	-0.013	-0.074***	-0.032**
	(0.030)	(0.027)	(0.033)	(0.035)	(0.042)	(0.017)	(0.019)	(0.009)	(0.014)	(0.014)
Fixed term contract	-0.069*	0.036	-0.098*	-0.125**	-0.103***	0.005	0.001	-0.002	0.009	-0.016*
	(0.039)	(0.025)	(0.052)	(0.052)	(0.038)	(0.017)	(0.026)	(0.010)	(0.021)	(0.009)
Casual / seasonal	0.022	0.068	-0.054	-0.115**	-0.073		-0.005	-0.005	0.039	-0.010
	(0.130)	(0.111)	(0.078)	(0.047)	(0.093)		(0.039)	(0.027)	(0.063)	(0.046)
Part-time	-0.022	-0.100	-0.266***	-0.120	-0.269***	-0.012	-0.025	0.001	-0.001	0.001
	(0.061)	(0.061)	(0.098)	(0.087)	(0.099)	(0.031)	(0.035)	(0.012)	(0.026)	(0.028)
Public sector	0.024	0.059**	0.075**	0.135***	0.132***	0.056***	0.044**	0.006	0.014	0.040***
	(0.023)	(0.024)	(0.033)	(0.030)	(0.030)	(0.015)	(0.021)	(0.007)	(0.014)	(0.011)
2nd level education	0.066**	-0.014	0.021	0.058*	0.031	0.001	0.056***	0.023***	0.003	0.041***
	(0.029)	(0.017)	(0.028)	(0.030)	(0.029)	(0.010)	(0.015)	(0.006)	(0.008)	(0.009)
3rd level education	0.080**	0.006	0.108***	0.081**	0.102***	0.005	0.066***	0.024***	-0.013	0.051***
	(0.038)	(0.016)	(0.023)	(0.034)	(0.035)	(0.013)	(0.018)	(0.008)	(0.010)	(0.010)
1st fifth of wage dist	-0.088***	-0.096***	-0.090***	0.023	-0.225***	-0.078***	-0.054**	-0.012	-0.005	-0.030**
	(0.026)	(0.023)	(0.033)	(0.031)	(0.039)	(0.016)	(0.024)	(0.008)	(0.011)	(0.014)
2nd fifth of wage dist	-0.074***	-0.057***	-0.093***	0.006	-0.157***	-0.038***	-0.048**	-0.020***	-0.007	-0.029**
	(0.021)	(0.020)	(0.028)	(0.030)	(0.033)	(0.013)	(0.019)	(0.007)	(0.010)	(0.012)
3rd fifth of wage dist	-0.076***	-0.028	-0.016	0.016	-0.133***	-0.028**	-0.015	0.000	0.008	-0.005
	(0.019)	(0.019)	(0.024)	(0.030)	(0.031)	(0.012)	(0.015)	(0.006)	(0.009)	(0.009)
4th fifth of wage dist	-0.030*	-0.012	0.018	0.019	-0.113***	-0.010	-0.011	-0.006	0.000	-0.001
	(0.017)	(0.016)	(0.021)	(0.025)	(0.025)	(0.010)	(0.011)	(0.005)	(0.009)	(0.008)
Estimated Rho [p-value]	0.380***	0.333***	0.411***	0.225***	0.318***	0.434***	0.388***	0.237***	0.246***	0.221***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	4241	4091	5361	4478	3367	9695	3781	9338	8315	8274

Notes: Asterisks denote level of significance: * 10%, ** 5%, *** 1%. Other controls included but not reported are: dummies for married or cohabiting, health affects daily life, presence of children under 12, firm size in private sector, occupation , region, industry and year. Dummies were also included for cases where there were a very large number of missing values.

Table 3: RE Training Probits for Selected Variables (tenure omitted) - Marginal Effects (standard errors) for Women

Variable	Austria	Belgium	Britain	Denmark	Finland	France	Ireland	Italy	Netherlands	Spain
30-39 year old	0.038*	0.015	0.002	0.005	-0.050	-0.007	-0.015	0.017	0.000	-0.024
	(0.022)	(0.017)	(0.023)	(0.031)	(0.040)	(0.012)	(0.017)	(0.011)	(0.011)	(0.016)
40-49 year old	0.023	-0.016	-0.008	0.029	-0.048	-0.015	-0.020	0.023*	-0.007	-0.010
	(0.023)	(0.021)	(0.026)	(0.032)	(0.041)	(0.013)	(0.019)	(0.012)	(0.012)	(0.017)
50-54 year old	-0.037	-0.046	-0.030	0.042	-0.059	-0.039**	-0.021	0.022	-0.010	-0.029
	(0.036)	(0.031)	(0.032)	(0.040)	(0.047)	(0.019)	(0.029)	(0.015)	(0.017)	(0.024)
Fixed term contract	0.039	0.002	-0.015	-0.112***	-0.048*	0.035*	0.015	-0.016	-0.011	-0.006
	(0.030)	(0.022)	(0.044)	(0.039)	(0.029)	(0.018)	(0.026)	(0.015)	(0.025)	(0.014)
Casual / seasonal		-0.054	-0.056	-0.255***	-0.165		-0.041		-0.066	0.008
		(0.095)	(0.055)	(0.071)	(0.120)		(0.036)		(0.065)	(0.050)
Part-time	-0.025	-0.025	-0.109***	-0.049	-0.153***	-0.023	0.018	-0.011	-0.019*	0.011
	(0.023)	(0.019)	(0.028)	(0.036)	(0.056)	(0.017)	(0.020)	(0.010)	(0.011)	(0.023)
Public sector	0.008	0.055***	0.166***	0.040	0.127***	0.036**	0.020	0.027**	0.023*	0.032*
	(0.022)	(0.019)	(0.029)	(0.034)	(0.031)	(0.016)	(0.022)	(0.011)	(0.013)	(0.017)
2nd level education	0.045*	0.009	0.096***	0.094***	0.038	0.013	0.006	0.032***	0.020*	0.040**
	(0.026)	(0.022)	(0.028)	(0.033)	(0.033)	(0.013)	(0.021)	(0.010)	(0.012)	(0.018)
3rd level education	0.017	0.021	0.122***	0.126***	0.077**	0.044***	0.037	0.044***	0.041***	0.054***
	(0.036)	(0.020)	(0.023)	(0.035)	(0.035)	(0.015)	(0.024)	(0.013)	(0.015)	(0.019)
1st fifth of wage dist	-0.098***	-0.027	-0.110***	-0.125***	-0.142***	-0.054***	-0.045	-0.019	0.029*	-0.024
	(0.028)	(0.022)	(0.034)	(0.040)	(0.044)	(0.018)	(0.030)	(0.013)	(0.017)	(0.025)
2nd fifth of wage dist	-0.071***	0.022	-0.032	-0.050	-0.066	-0.038**	-0.016	-0.016	0.040**	-0.021
	(0.026)	(0.019)	(0.031)	(0.038)	(0.041)	(0.017)	(0.026)	(0.011)	(0.017)	(0.021)
3rd fifth of wage dist	0.007	0.016	0.001	-0.068*	-0.060	-0.029*	0.001	-0.015	0.022	-0.020
	(0.022)	(0.019)	(0.030)	(0.035)	(0.039)	(0.015)	(0.022)	(0.010)	(0.016)	(0.018)
4th fifth of wage dist	-0.013	-0.006	0.042	-0.001	-0.006	-0.017	0.016	-0.009	0.010	0.000
	(0.021)	(0.017)	(0.028)	(0.033)	(0.038)	(0.013)	(0.021)	(0.009)	(0.016)	(0.014)
Estimated Rho [p-value]	0.398***	0.286***	0.397***	0.267***	0.296***	0.453***	0.326***	0.254***	0.138***	0.288***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	2834	3322	5331	4157	3420	7871	2664	6161	4966	4390

Notes: See notes to Table 2.

Table 4: Predicted Average Probability of Training (standard error)

Country	Characteristics	Coefficients	
		Male	**Female**
Austria	**Male**	0.142 (0.005)	0.121 (0.009)
	Female	0.151 (0.009)	0.135 (0.006)
Belgium	**Male**	0.112 (0.005)	0.102 (0.006)
	Female	0.093 (0.006)	0.107 (0.005)
Britain	**Male**	0.405 (0.006)	0.411 (0.011)
	Female	0.381 (0.013)	0.423 (0.006)
Denmark	**Male**	0.437 (0.006)	0.436 (0.013)
	Female	0.517 (0.012)	0.473 (0..007)
Finland	**Male**	0.356 (0.007)	0.378 (0.014)
	Female	0.365 (0.013)	0.421 (0.007)
France	**Male**	0.111 (0.003)	0.096 (0.005)
	Female	0.112 (0.004)	0.118 (0.004)
Ireland	**Male**	0.069 (0.004)	0.081 (0.007)
	Female	0.072 (0.006)	0.077 (0.005)
Italy	**Male**	0.042 (0.002)	0.045 (0.003)
	Female	0.066 (0.004)	0.072 (0.003)
Netherlands	**Male**	0.050 (0.002)	0.061 (0.005)
	Female	0.055 (0.004)	0.065 (0.003)
Spain	**Male**	0.078 (0.003)	0.065 (0.004)
	Female	0.108 (0.004)	0.104 (0.004)

Notes: (i) The predicted probabilities are calculated as the average of predicted probabilities over gender using estimated models with tenure omitted. See text for further details.

(ii) The standard errors are calculated as the square root of $\frac{\partial \hat{P}}{\partial \hat{b}'}[c\hat{o}v(\hat{b})]\frac{\partial \hat{P}}{\partial \hat{b}} + \frac{1}{n^2}\Sigma\left(\hat{p}_i - \hat{P}\right)^2$ where $\hat{b}$ are the logit model coefficient estimates, $c\hat{o}v(\hat{b})$ is the estimated variance covariance matrix, $\hat{P}$ = (1/n) $\sum \hat{p}_i$ $\hat{p}_i$ is the predicted probability of starting a training event, and n is the total number of observations used in the summation. See Gomulka and Stern (1990) for further details.

Appendix

Table A.1: Means of key variables

		Austria	Belgium	Britain	Denmark	Finland	France	Ireland	Italy	Netherlands	Spain
Fixed-term contract	Men	0.034	0.051	0.017	0.032	0.085	0.054	0.022	0.040	0.018	0.220
	Women	0.046	0.092	0.029	0.047	0.128	0.059	0.044	0.045	0.033	0.222
Casual / seasonal	Men	0.005	0.002	0.008	0.050	0.012	0.000	0.026	0.016	0.001	0.008
	Women	0.000	0.006	0.018	0.020	0.010	0.000	0.069	0.017	0.009	0.028
Part time	Men	0.017	0.022	0.013	0.015	0.021	0.041	0.044	0.036	0.030	0.018
	Women	0.269	0.247	0.290	0.158	0.067	0.197	0.281	0.211	0.439	0.130
Public sector	Men	0.257	0.322	0.219	0.301	0.313	0.409	0.374	0.343	0.235	0.253
	Women	0.326	0.428	0.407	0.591	0.540	0.553	0.393	0.470	0.383	0.395
Education ISCED 0-2	Men	0.121	0.249	0.395	0.147	0.184	0.244	0.325	0.445	0.157	0.494
	Women	0.216	0.165	0.522	0.141	0.186	0.235	0.225	0.326	0.182	0.329
Education ISCED 3	Men	0.796	0.344	0.143	0.451	0.455	0.467	0.410	0.438	0.590	0.206
	Women	0.682	0.268	0.140	0.401	0.339	0.393	0.509	0.540	0.549	0.228
Education ISCED 5-7	Men	0.083	0.346	0.459	0.401	0.361	0.258	0.260	0.113	0.243	0.300
	Women	0.102	0.507	0.336	0.458	0.475	0.344	0.262	0.132	0.263	0.443
Bottom fifth of wage dist	Men	0.110	0.178	0.104	0.170	0.161	0.143	0.124	0.163	0.165	0.159
	Women	0.335	0.261	0.281	0.262	0.283	0.223	0.275	0.244	0.275	0.215
Second fifth of wage dist	Men	0.202	0.205	0.172	0.175	0.177	0.183	0.177	0.203	0.184	0.195
	Women	0.223	0.208	0.219	0.204	0.256	0.188	0.214	0.204	0.243	0.195
Third fifth of wage dist	Men	0.216	0.214	0.192	0.165	0.182	0.203	0.220	0.207	0.194	0.203
	Women	0.167	0.180	0.201	0.245	0.207	0.207	0.182	0.197	0.215	0.193
Fourth fifth of wage dist	Men	0.230	0.190	0.244	0.215	0.229	0.224	0.256	0.214	0.205	0.215
	Women	0.158	0.196	0.165	0.184	0.152	0.204	0.175	0.170	0.176	0.188
Top fifth of wage dist	Men	0.242	0.213	0.288	0.275	0.250	0.247	0.222	0.213	0.251	0.228
	Women	0.116	0.155	0.134	0.105	0.102	0.178	0.154	0.186	0.090	0.209

Note: estimates are weighted.

Table A.2: Training Participation Ratios in Europe, Disaggregated across Key Variables

	Austria	Belgium	Britain	Denmark	Finland	France	Ireland	Italy	Netherlands	Spain
Incidence of training starts										
(1) All	0.16 (4)	0.14(6)	0.41 (2)	0.42 (1)	0.34 (3)	0.15 (5)	0.09 (8)	0.06 (10)	0.07 (9)	0.10 (7)
(2) Men	0.16 (4)	0.14 (6)	0.41 (2)	0.42 (1)	0.34 (3)	0.15 (5)	0.09 (8)	0.06 (10)	0.07 (9)	0.10 (7)
(3) Women	0.16 (4)	0.13 (5)	0.43 (2)	0.47 (1)	0.41 (3)	0.16 (4)	0.10 (7)	0.09 (8)	0.08 (9)	0.12 (6)
Ratios of training starts										
(4) Women to men	0.96 (9)	0.95 (10)	1.04 (8)	1.10 (5)	1.20 (3)	1.07 (6)	1.12 (4)	1.61 (1)	1.06 (7)	1.30 (2)
(5) Young (25-29) to Old (50+)										
Men	1.51 (3)	1.25 (4)	1.20 (5)	1.03 (7)	1.17 (6)	1.96 (2)	0.89 (10)	0.91 (9)	4.19 (1)	1.01 (8)
Women	1.71 (2)	1.64 (3)	1.02 (7)	0.88 (9)	0.96 (8)	1.57 (4)	1.96 (1)	0.45 (10)	1.55 (5)	1.25 (6)
(6) Fixed-term to permanent										
Men	0.48 (9)	0.76 (6)	0.77 (5)	0.98 (3)	0.69 (8)	1.06 (2)	0.75 (7)	0.81 (4)	1.33 (1)	0.31 (10)
Women	0.87 (6)	1.14 (3)	1.11 (4)	0.83 (7)	0.89 (5)	0.77 (8)	1.37 (1)	0.74 (9)	1.26 (2)	0.77 (8)
(7) Public to private sector										
Men	1.26 (8)	1.35 (7)	1.35 (6)	1.40 (5)	1.50 (4)	1.14 (9)	2.01 (1)	1.61 (3)	0.82 (10)	1.79 (2)
Women	1.57 (5)	1.37 (6)	1.73 (4)	1.19 (8)	1.32 (7)	1.17 (9)	2.17 (2)	4.18 (1)	1.02 (10)	2.15 (3)
(8) Education ISCED 0-2 to 5-7										
Men	0.17 (9)	0.37 (6)	0.57 (2)	0.48 (4)	0.47 (5)	0.49 (3)	0.18 (8)	0.17 (9)	0.94 (1)	0.24 (7)
Women	0.26 (6)	0.24 (8)	0.54 (3)	0.47 (4)	0.60 (2)	0.42 (5)	0.25 (7)	0.11 (9)	0.65 (1)	0.25 (7)
(9) Bottom to top fifth of wages										
Men	0.30 (6)	0.30 (6)	0.43 (3)	0.60 (2)	0.39 (4)	0.33 (5)	0.15 (9)	0.20 (7)	1.31 (1)	0.16 (8)
Women	0.19 (8)	0.37 (5)	0.47 (4)	0.50 (3)	0.50 (3)	0.53 (2)	0.20 (7)	0.15 (9)	1.17 (1)	0.25 (6)
(10) Part-time to full-time										
Men	1.22 (3)	0.45 (9)	0.57 (8)	0.74 (6)	0.29 (10)	0.78 (5)	0.85 (4)	1.99 (1)	0.64 (7)	1.36 (2)
Women	0.65 (10)	0.69 (7)	0.65 (9)	0.82 (3)	0.67 (8)	0.77 (4)	0.91 (2)	1.53 (1)	0.69 (6)	0.74 (5)

Notes: Education is categorised according to the International Standard Classification of Education (ISCED). Levels 0-2 cover less than upper secondary education, level 3 is upper secondary education (e.g. GCE A-levels, baccalaureate) and levels 5-7 cover tertiary education, both university and non-university. Cross-country ranks are in parentheses. Estimates are weighted.

Table A.3 Selection of Estimating Sample

Unless otherwise stated, we applied the following initial selection:

Men who are: (i) between the ages of 25 and 54 years and working at least 15 hours per week; (ii) not employed in agriculture; (iii) present in at least two consecutive waves to allow training between waves to be observed; and (iv) not apprentices or participating in special employment-related training schemes

We then dropped observations with missing or invalid data on the variables, that is principally: training, fixed term or casual contract, occupation, industry, region, establishment size, tenure, part-time status, education, health status, marital status and presence of children.

Where the number of missing values was substantial, we also included a dummy variable for missing value observations in order to preserve the sample sizes.

The table details the number of observations remaining at each of these selection stages.

Country	Initial no. of observations after the first selection [males, females]	Additional selections used	Included missing value dummies	Combined categories	Included waves	Final no. of observations [males, females]	Other comments
Austria	7343	Female casual workers dropped because of lack of training		**Women:** Craft + operatives occupations combined together into one category	2-5	4241, 2834	No wave 1 Dummy for regions 5 & 6 in the estimation
Belgium	9253		Industry	**Women:** Craft + operatives are with the base	1-5	4091, 3322	Dummy for regions 8 & 9 in the estimation
Britain (training dates not available)	11106 (without the last wave)		Fixed Term /casual, industry		1-4	5361, 5331	Dummy for UKregions 2-10 in the estimation
Denmark	8791		Fixed Term /casual, industry, occupation		1-5	4478, 4157	No regional dummies
Finland	6897		Industry, occupation		3-5	3367, 3420	Dummy for regions 34-38 in the estimation
France (training dates not available)	19633	NO casual workers	Fixed Term, industry, occupation, firm size	**All:** agriculture is with the base	1-5	9695, 7871	Dummy for regions 40-46 in the estimation
Ireland	7357			**Men:** Hotel industry is with the base **Women:** Agric industry and Craft Occup is with the base	1-5	3781, 2664	Dummy for region 47 in the estimation
Italy	16693	Female casual workers dropped because of lack of training		**All**: Agric industry is with the base	1-5	9338, 6162	Dummies for regions 49-58 in the estimation
Netherlands	14944		Industry		1-5	8315, 4966	No Regions
Spain	13253		Region	**Women:** energy and agric industry with the base	1-5	8274, 4390	Dummies for regions 27 to 32 & region missing dummy in the estimation

IZA Discussion Papers

No.	Author(s)	Title	Area	Date
919	M. Fertig	The Impact of Economic Integration on Employment – An Assessment in the Context of EU Enlargement	2	10/03
920	Ø. A. Nilsen K. G. Salvanes F. Schiantarelli	Employment Changes, the Structure of Adjustment Costs, and Plant Size	1	11/03
921	P. Egger M. Pfaffermayr A. Weber	Sectoral Adjustment of Employment: The Impact of Outsourcing and Trade at the Micro Level	2	11/03
922	J. Merz D. Burgert	Working Hour Arrangements and Working Hours – A Microeconometric Analysis Based on German Time Use Diary Data	5	11/03
923	U. Dulleck P. Frijters R. Winter-Ebmer	Reducing Start-Up Costs for New Firms: The Double Dividend on the Labour Market	5	11/03
924	A. P. Damm M. Rosholm	Employment Effects of Dispersal Policies on Refugee Immigrants, Part I: Theory	1	11/03
925	A. P. Damm M. Rosholm	Employment Effects of Dispersal Policies on Refugee Immigrants, Part II: Empirical Evidence	1	11/03
926	S. E. Black P. J. Devereux K. G. Salvanes	Why the Apple Doesn't Fall Far: Understanding Intergenerational Transmission of Human Capital	5	11/03
927	L. Goette D. Huffman E. Fehr	Loss Aversion and Labor Supply	5	11/03
928	H. Selod Y. Zenou	Does City Structure Affect the Labor Market Outcomes of Black Workers?	3	11/03
929	Z. Eckstein G. J. van den Berg	Empirical Labor Search: A Survey	1	11/03
930	M. Lindeboom F. Portrait G. J. van den Berg	Individual Mortality and Macro-Economic Conditions from Birth to Death	3	11/03
931	P. Kooreman	Time, Money, Peers, and Parents: Some Data and Theories on Teenage Behavior	5	11/03
932	H. N. Mocan E. Tekin	Guns, Drugs and Juvenile Crime: Evidence from a Panel of Siblings and Twins	3	11/03
933	W. Arulampalam A. L. Booth M. L. Bryan	Training in Europe	5	11/03

An updated list of IZA Discussion Papers is available on the center's homepage www.iza.org.