

TRAINING AND LABOUR MARKET FLEXIBILITY: IS THERE A TRADE-OFF?*

Wiji Arulampalam⁺
University of Warwick

and

Alison L Booth
University of Essex

September 1997
Revised September 1998

ABSTRACT

This paper explores the nexus between work-related training and labour market “flexibility” (which we proxy by contract type, part-time employment, and lack of union coverage), using the first five waves of the British Household Panel Survey (BHPS) conducted over the period 1991-1995. Our results show that workers on short-term employment contracts, who are working part-time, or who are not covered by a union collective agreement, are significantly less likely to be involved in any work-related training to improve or increase their skills. These findings suggest that there is a trade-off between expanding the more marginal forms of employment, and expanding the proportion of the workforce getting work-related training.

Keywords: Labour market flexibility, skills acquisition, work-related training, panel probits.

JEL Classification: J24

* Paper presented at the British Association for the Advancement of Science Meetings (Economics Section) in Leeds, 10-11 September 1997, under the title “Labour market Flexibility and Skills Acquisition: Is There a Trade-off?”. We should like to thank Tony Atkinson, Tim Hatton, John Hills, Paul Marginson, two referees, and participants of the BAAS Meetings for their helpful comments, Mark Taylor for his excellent assistance with the data and Bill Greene for software advice. Any errors remain our responsibility. This paper is produced as part of the project on *Unemployment and Technical and Structural Change*, which is funded by the Leverhulme Trust. The views in the paper are those of the authors, and do not necessarily reflect those of the Leverhulme Trust.

⁺ nee Narendranathan

INTRODUCTION

There has been growing emphasis in Britain on the need to increase flexibility in the labour market and to facilitate work-related skills acquisition in order to allow Britain to meet the competitive challenges of the new millennium (see for example Beatson, 1995; OECD, 1995). However, the term “labour market flexibility” has been interpreted in different ways. To some, a flexible labour market appears to be one in which the returns to entrepreneurs and the start-up and demise of firms are unconstrained by institutional rigidities such as employment restriction legislation and trade union activity. In such a world, entrepreneurs can hire workers as readily and for as long as they wish, without facing costs in adjusting either hours or workers at the margin. To others, a flexible labour market means one in which workers are able to adapt to changing demands by firms for skills by training and retraining as necessary over their working lives.

How compatible is the goal of promoting flexibility (in the sense of removing institutional rigidities) with the aim of increasing workers’ flexibility through skills acquisition? In particular, new forms of flexible employment maybe detrimental to long-run economic performance if they are associated with the under-valuation of training investment through the shortening of agents’ time horizons. According to the human capital approach, agents are more likely to invest in the acquisition of skills the longer is the post-training period over which they can amortise their investment. If either the firm or the worker expects job attachment to be short-term, then work-related training will either not be provided (the firm) or will not be accepted (the worker), depending on who bears the training costs. Workers who are in the more flexible forms of employment such as in part-time employment, or in contract jobs, may be less likely to undergo training in precisely those skills that are supposed to make them more adaptable and flexible in the face of technological

change. Only if skills have a very short life (as might be the case with rapid obsolescence of technology) would firms be indifferent to training temporary as opposed to permanent workers. Moreover, past cross-sectional studies have shown that, for Britain, there is a positive correlation between work-related training on the one hand, and trade union presence and firm size on the other.¹ So the increasing weakness of one form of “institutional rigidity” - the trade union - observed over the past fifteen years in Britain, and the growing proportion of new firms with no union recognition, may be associated with less provision of skills at the workplace.

The purpose of this paper is to explore the nexus between work-related training and labour market “flexibility” (as proxied by employment status, contract type, and lack of union coverage). The data source used in our analysis is the British Household Panel Survey (BHPS), Waves 1-5, conducted over the period 1991-1995. The precise form of work-related training that we investigate is the more formal measure indicating work-related training to improve or increase skills in the current job. We also explore the relationship between general education, and subsequent training. In so doing, we document the extent to which there is inequality in access to work-related training in Britain in the 1990s, which may exacerbate earnings inequality. We exploit the panel nature of the data to estimate panel probits of training incidence, in order to control for what econometricians term “unobserved individual heterogeneity”, as will be explained below. The analysis is carried out separately for men and women in employment. Our results show that workers on short-term employment contracts, in part-time employment, or who are not covered by a union collective agreement, are significantly less likely to be involved in any work-related training to improve their skills. The estimated negative impact of these variables on the probability of training is quite large. Our results suggest that there is a trade-off between expanding the more marginal forms

¹ See inter alia Booth (1991), Greenhalgh and Mavrotas (1994), and Green et al (1996), who use the 1987 British Social

of employment, and expanding the proportion of the workforce getting work-related training. Moreover, many studies have shown, after controlling for other earnings-augmenting attributes, that workers who receive work-related training earn higher wages subsequently (see *inter alia* Duncan and Hoffman, 1979; Booth, 1991; Lynch, 1992; Arulampalam *et al.*, 1997). Thus our analysis of the extent to which there is inequality in access to work-related training in Britain in the 1990s also offers some tentative suggestions as to why earnings inequality is increasing. Expansion of the more marginal forms of employment may exacerbate earnings inequalities in Britain, since these jobs tend to offer less training, and pay lower earnings.

In the following section we describe the data source, and examine the raw data to see the extent of work-related training for workers characterised by various measures of employment flexibility. In Section III.1, we describe the econometric model, while in Section III.2 we present the estimated effects and discuss the results. The final section summarises and draws some conclusions.

Attitudes Survey, the General Household Survey, and the 1990 Workplace Industrial Relations Survey respectively.

II. THE DATA

The data used in our analysis are the first five waves of the British Household Panel Survey (BHPS). This is a nationally representative random sample survey of private households in Britain. Wave 1 interviews were conducted during the autumn of 1991, and annually thereafter (see Taylor et al (1996)). Our analysis is based on the sub-sample of men and women aged between 18 and 55 in 1991 who provided complete information at the interview dates, who were in employment at the time of the survey, and who were not self-employed, in the armed forces or farmers.² These restrictions do not guarantee a continuous record for the entire sample period. For example, a worker leaving employment for Waves 2 and 3 would be represented in 1991 and 1994-5, but excluded for the intermediate years. Our estimating sample includes 2982 men and 3117 women, with respectively 9659 and 9904 person-year observations for each.

Campanelli et al (1994) note, from a study of both linguistic and survey data, that the interpretation of the term “training” varies across groups in the population. In particular, it varies across employers, employees, and training researchers. They emphasise that individuals in the general population typically interpret training as referring to “that which happens in formal courses” (page 92). This is our focus of interest in the present study, rather than on less formal training that is harder to measure. The precise form of the BHPS training incidence question, asked of all individuals currently in work, is as follows: "Since September 1st last year, have you taken part in any education or training schemes or courses, as part of your present employment?" If yes, the respondent was then asked: "Was any of this training (a) Training to help you get started in your current job? (b) To increase your skills in your current job for example by learning new technology? (c) To improve your skills in your current job? (d) To prepare you for a job or jobs you might do in

² Agricultural workers are included in the male sub-sample, but excluded for women because there were too few cases.

the future? (e) To develop your skills generally?" Our focus of interest in the present paper is on work-related training to improve or increase skills in the current job, rather than induction training or training for future work or for skills generally.³ For this reason, we use the responses to (b) and (c) of this training question to construct a variable taking the value unity if individuals received training to increase or improve skills in the current job, and zero otherwise. The responses are given in Table 1, for all person-year observations, disaggregated by gender and by our three measures of the flexibility of a job: *type of contract*, *part-time employment*, and *non-coverage by a trade union*.

³ However, in our econometric estimation we experimented with an alternative definition of work-related training that also included (d) and (e) from the training question. This increases the training incidence by 3 percentage points for both men and women (the training categories are not mutually exclusive) . We found that the main results of the paper are unchanged.

The BHPS asks individuals in employment if their current job is permanent, or a seasonal, temporary or casual job, or one done under contract or for a fixed period of time. We construct a dummy variable “seasonal/temporary/casual/fixed term” taking the value of unity if individuals report that they are on such flexible contracts, and zero otherwise. The variable “part-time job” takes the value of unity if the individual’s usual hours of work (excluding overtime and meal breaks) in a normal week are 30 or less, and zero otherwise. The third variable that proxies flexibility of employment is “Not covered by a trade union”, which takes the value of unity for workers not covered by a union and zero otherwise. This variable was constructed from the responses to the question about whether or not there is a recognised trade union or staff association for negotiation of pay or conditions.⁴ While Waves 1 and 5 questionnaires of the BHPS asked both job-movers and job-stayers for information on union status, the Waves 2-4 questionnaires only requested this if individuals changed employer. Therefore in our empirical estimation in Section III, we make the assumption that the Wave 1 union coverage remains constant across Waves 2, 3 and 4 for people who did not change employer.

[Insert Table 1 near here]

⁴ The precise form of the question is as follows: “Is there a trade union, or a similar body such as a staff association, recognised by your management for negotiating pay or conditions for the people doing your sort of job in your workplace?”

The top panel of Table 1 shows that the incidence of training for men is generally higher than for women, with the exception of men who are on temporary/seasonal/casual/fixed term contracts. The incidence of training for women on these flexible contracts is very similar to the training incidence for part-time women. For both men and women, these raw data show that not being covered by collective bargaining is associated with lower training incidence than for all employees.

When the information on training is disaggregated across waves, as shown in the bottom panel of Table 1, it can be seen from the column headed “All Employees” that both men and women reported significantly more training in Wave 1 (conducted in 1991) than in subsequent waves. However, the incidence of training is roughly similar across the period 1992 to 1995. While it may have been the case that substantially more training was experienced in 1991, even though this was a recession year, it may also be the case that there is some recall error. Individuals may have over-reported training in the first wave by reporting any training events spent in, say, the last 15 months rather than the one-year period requested. In subsequent waves, there is less likelihood of such a recall error, because individuals were prompted by the 12 month period since they were last interviewed to focus on training between interview dates.⁵

Several features of Table 1 merit comment. First, the overall proportions of all male and female employees receiving training to increase/improve their skills in the current job are approximately the same. Secondly, the proportion of workers on temporary, seasonal or casual contracts receiving training is consistently lower than for “permanent” employees. But proportionately more women on such flexible contracts receive training than men. Thirdly, and somewhat curiously, the fraction of part-time male workers being trained is not much smaller than the

⁵ We are grateful to Heather Laurie for this point. For this reason, we also experimented with estimating our models only for Waves 2 -5, and found it made little difference to our estimates.

fraction of all male workers being trained, with the exception of Wave 5, when the proportion of part-time men being trained is 13 percentage points lower than for all male employees. In contrast, substantially fewer part-time women receive training than all women. This gender difference is particularly interesting, given that the elapsed job tenure of female part-time workers exceeds that of full-time women, but is similar to that of part-time men.⁶ Fourthly, proportionately fewer workers who are not union-covered receive training than all workers, but the proportion of uncovered women workers getting training is considerably smaller than the proportion of male uncovered workers being trained. In the following section, we investigate the extent to which flexible employment affects training incidence after we control for other factors, both observable and unobservable.

III. ESTIMATION OF TRAINING INCIDENCE

III.1 The Econometric Model

The experience of work-related training is taken to be the result of optimising decisions made by both an individual worker and an employer. For employer-provided training, the employer decides to offer training to increase or improve skills in the current job to a worker, who then decides whether or not to accept. Since the data preclude it, we do not model the structural framework for the training decision. Instead, using binary models we estimate reduced form equations of the determinants of training incidence.

The observed dependent variable is binary, taking the value one if the individual has received training to increase or improve skills in the current job over the past 12 months, and zero otherwise. It is important to control for what econometricians term “unobserved individual heterogeneity”, since failure to do so may lead to biased coefficients (Heckman, 1981). Unobserved individual

⁶ In 1991 (Wave 1), average elapsed job tenure was 141 months for full-time women, and 153 months for part-time women. The comparable figures for men were 186 months (full-time) and 153 months (part-time).

heterogeneity may be thought of as individual differences in some attribute that is unobservable to the survey statistician, but which may nonetheless affect the training probability; an example is individual motivation or ability. Individuals may be characterised by different degrees of motivation or unmeasured ability that have a significant effect on the probability of receiving work-related training. Individuals may only accept or volunteer for training, or firms may only offer training to workers, if they are highly motivated, or have high levels of ability (and thus lower costs associated with training).

We therefore specify the model for individual i in period t as:

$$Y_{it}^* = X_{it}'\beta + v_{it} \quad (1)$$

where $Y_{it} = 1$ if $Y_{it}^* > 0$, and $= 0$ otherwise, Y^* denotes the unobservable individual propensity to train, X is a vector of time-varying and time-invariant exogenous variables (including the flexibility of employment variables), β is the vector of coefficients associated with the vector X , and v is the unobservable error term. Thus it is assumed that training incidence is observed only when the individual's propensity to receive training crosses a threshold (zero in this case). This specification assumes that all the inter-individual heterogeneity can be captured by the observed variables. However as noted above, unobserved, and possibly unobservable, variables may also influence the individual's propensity to receive training. Assuming that the heterogeneity across individuals is time-invariant, we decompose the error term v_{it} in (1) as

$$v_{it} = \alpha_i + u_{it} \quad (2)$$

where the α_i denotes the individual specific unobservable effect and the u_{it} is a random error. We treat the α_i as random, and estimate the random effects probit models (see the Technical Appendix for further details).

In the table of results reported in Section III.2, we report estimates from, first, a pooled probit model, and secondly, from a random effects probit model. The pooled probit model essentially treats the data as a cross-section; all the waves of data are pooled, and a single probit model is estimated. In contrast, in the random effects model, the data are not pooled. The random effects model throws up an additional estimate, reported as rho (ρ) in Table 2. This coefficient may be thought of as representing the proportion of the observed total variance of the error term accounted for by unobserved heterogeneity. A test of the random effects model against the pooled probit is simply a -t-test of the hypothesis that $\rho = 0$.

III.2 The Estimates

The estimates of the determinants of work-related training are presented in Table 2 for men and women. We report only the marginal effects,⁷ estimated for two models: a pooled cross-sectional probit (Model 1) which ignores the panel nature of the data, and a random effects probit model (Model 2) which exploits the panel nature of the data to control for unobservable individual heterogeneity. Our preferred model for both men and women, is the random effects probit, as the null hypothesis that $\rho = 0$ is easily rejected. Estimated ρ (rho) is 0.359 for men and 0.330 for women, and is statistically significant at the 1% significance level for both men and women. This estimate of ρ reveals that the proportion of the total error variance accounted for by unobservable individual heterogeneity is roughly one third for both sexes. The estimated effects of the other variables are similar in sign and magnitude across Models 1 and 2. This is not surprising since the pooled probit model produces consistent parameter estimates. But on efficiency grounds random effects probit model is chosen as the preferred model.⁸

[Insert Table 2 near here]

Flexibility of employment

We now consider the impact on training of the variables that proxy flexible employment, in order to investigate the extent to which flexibility of employment affects training in 1990s Britain. The first variable under this heading is “*seasonal/temporary/casual/fixed term*”. The type of labour contract under which an individual is employed is likely to affect work related training. Individuals on temporary or fixed-term contracts are less likely to receive work-related training, because of the

⁷ All the marginal effects are calculated as the derivative of the conditional expectation of the observed dependent variable, and evaluated at the sample means, following the procedure in Limdep (Greene (1995)).

expected shorter post-training period over which the investment can be amortised. We find that, for both men and women on insecure contracts, the expected probability of receiving work-related training is significantly reduced, relative to workers on permanent contracts. The reported marginal effects for Model 2 show that men are 16% less likely to be trained if they are employed on flexible contracts than they are on permanent contracts *ceteris paribus*, while women are nearly 12% less likely. While it may be a rational response for firms not to train such workers if they are not expected to remain long at the firm, it does raise the question of how work-related skills can be imparted to workers on flexible contracts.

The second variable proxying flexible forms of employment is “*part-time job*”. A priori, we would expect that part time workers will receive less training, since they are likely to have a shorter post-training period in which the returns from training can be enjoyed. Even if the total expected number of hours remaining in a part-time job were the same as for a full-time job (for example, if the part-time job were to last for a longer calendar period of time), the returns to training for part-time workers would still be lower to the extent that future benefits are discounted. We find that the training probability for part-time workers is significantly lower than that of full-time workers. For men, the training probability falls by 7% if they switch from full-time to part-time, while for women the training probability falls by 9% if they make this change. Yet, as already noted, the average elapsed duration of part-time jobs is quite high. We also experimented with the inclusion of job tenure as an explanatory variable, and found that the coefficients of the job flexibility variables were robust to the inclusion or exclusion of this variable. We do not report these estimates in the table, since tenure may be endogenously determined with training.

⁸ Since not all women participate in the labour market, and those who do participate may be a non-random sample of the adult female population, we carried out some additional estimation for women. We tested for potential sample-selection biases, and found these not to be a problem (see Arulampalam and Booth (1997b) for more details).

The third variable used to proxy labour market flexibility is “*not covered by a trade union*”. According to textbook neo-classical economics, it might be expected that unions, in their monopoly role, use their power over labour supply to extract a larger share of the surplus, and thereby induce dead-weight losses. Higher union wages, restrictive work practices, and any union resistance to the introduction of new skill-intensive technologies, may therefore be expected to reduce employer incentives to provide training.

On the other hand, it has long been recognised that unions are in some circumstances co-operative and instrumental in improving worker morale and organisation at the work place (Freeman and Medoff, 1984), and may thereby be associated with increased training and productivity. More recently, some commentators have emphasised that there may be market and/or government failures in training provision (see inter alia Streeck (1989), Stevens (1994) and Booth and Snower (1996)). In this context, Streeck (1989) notes that higher wages may actually increase the incentives for employers to invest in training, and points out the potential for trade unions and employers to co-operate to exploit mutual gains in the provision of training, a notion developed more formally in the context of a monopsonistic labour market by Booth and Chatterji (1998). Moreover, there is evidence that some unions may be attempting to introduce training onto a new bargaining agenda in which both wage rates and training are the subject for negotiation (see for example Mahnkopf (1992); and Streeck (1989)).

Previous econometric studies using British data have found a positive correlation between work-related training incidence, and measures of union presence such as union coverage for collective bargaining or union density (Booth (1991); Claydon and Green (1994); Green et al (1996); Groot (1996)). The increasing weakness of trade unions in British establishments over the past two decades has been well documented (Disney et al (1996); Arulampalam and Booth

(1997c)). An interesting question is the extent to which trade union presence remains associated with a higher level of work related training, and whether or not the decline in union coverage over the period 1991-5 has had an adverse impact on training investment.

Our estimates in Table 2 show that men and women who are not covered by unions have a significantly lower probability of receiving work-related training to increase or improve their skills. A man in a non-union job is 7% less likely to receive training than an otherwise identical man in a union-covered job, while a woman a non-union job is 9% less likely to receive training than her counterpart in a union-covered job. This finding is of particular interest, given that between 1991 and 1995 (Waves 1 and 5 of the BHPS), the percentage of male workers who were not covered by a union grew from 44% to 51%, while for women the percentage of uncovered workers increased from 47% to 50 %.

The Impact of Other Variables on Training Incidence

Also included in the training models are a number of other controls. Since the estimated coefficients to these variables are consistent with results found in other studies, including in our own earlier work in Arulampalam and Booth (1997a, 1997b), we only briefly summarise the main results here. Note that definitions and means of the variables reported in Table 2 are given in Table A1 in the Appendix.

First, we find that the travel-to-work area (TTWA) unemployment to vacancy variable has an insignificant impact on the training probability across all specifications. This suggests that training is unresponsive to demand-side factors *ceteris paribus*, at least for our sample over the period 1991-5. Second, our results show that the male training probability is significantly increased by full-time work experience, by marriage or cohabitation, and by white ethnic origin, and is higher for younger men. These variables all have an insignificant impact on the female training probability. Third, we find that, for both men and women, the training probability is significantly higher for higher occupational classifications, with the coefficients increasing with the higher occupational categories. This effect is particularly large for the professional and managerial occupational groups, whose training probability is some 21-24 % higher than for the base of unskilled workers for women, and 20-22% higher for men. Fourth, we find that, for both men and women, there is a large positive and statistically significant correlation between training and most of the highest educational qualification variables. This finding is consistent with the hypothesis that the costs of training are lower for more highly educated workers, or that training and education are complements in production. Workers with less general training may also have higher discount rates, and hence be less willing to invest in training through lower earnings. Highest educational qualification is measured by six dummy variables, which can change across waves, and which indicate the highest qualification attained by the respondent at time of interview at each wave.⁹ Fifthly, we find that, for both men and women, the likelihood of receiving work-related training increases with establishment size, and is higher in the public sector *ceteris paribus*.¹⁰

⁹ Since the cell size for apprenticeship is very small for women, we combined them with the base category.

¹⁰ Relative to the base, a man in a public sector workplace of 1,000 or more employees will have a 15.0% higher training probability {calculated as 0.150 (1000+ employees) + 0.163 (public sector) - 0.163 (public sector*1000+ employees) = 0.150 }. Similar calculations can be made with each of the other size categories for the public sector, and show that in general the training probability does not vary substantially across establishment size in the public sector, *ceteris paribus*. Larger firms and public sector firms may be more likely to train workers because they are more forward looking or better placed to bear any risk associated with training. Large firms may also benefit from economies of scale in training

Finally, we note that the training probability is higher in the non-profit-making sector (“charity”) than in the base of the smallest private sector establishment, an effect that has not been investigated before in any training studies, to our knowledge. The non-profit-making sector includes charities and co-operatives.

IV. SUMMARY AND CONCLUSIONS

This paper has explored the nexus between work-related training and labour market “flexibility” (which we proxy by contract type, part-time employment, and lack of union coverage), using the first five waves of the British Household Panel Survey (BHPS) conducted over the period 1991-1995. Our results show that workers on short-term employment contracts, who are not covered by a union collective agreement or who are employed part-time, are significantly less likely to be involved in any work-related training to improve or increase their skills. A man on a temporary or fixed term contract is 16% less likely to receive training in his current job than a man on a permanent contract, while a comparable woman is nearly 12% less likely. A man in a non-union job is 7% less likely to receive training than an otherwise identical man in a union-covered job, while a woman in a non-union job is 10% less likely to receive training than her counterpart in a union-covered job. In addition, we find that part-time male workers are 7% less likely to receive work-related training than full-time men, while women in part-time work are 9% less likely to receive work-related training than their full-time counterparts.

The fact that union presence is associated with more training to increase or improve skills for the current job suggests that some unions and firms are co-operating to exploit mutual gains in training provision. However, given the increasing weakness of trade unions in British establishments

provision, or they may provide more training in the nature of meeting safety regulations etc. (Felstead and Green (1996)).

over the past two decades, our finding of a significant negative correlation between work-related training and the lack of union coverage has wider implications for the level of training provision in the British economy.

Our results suggest that there is a trade-off between expanding the more flexible forms of employment, and expanding the proportion of the workforce getting work-related training. Moreover, many statistical studies show that workers who receive work-related training also earn higher wages. Thus our analysis of the extent to which there is inequality in access to work-related training in Britain in the 1990s may also offers some tentative suggestions as to why earnings inequality is increasing. It is possible that expansion of the more marginal forms of employment may exacerbate earnings inequalities in Britain, since these jobs tend to offer less training.

Since particular industries may by their nature require more training, or may have a past legacy of training provision through the old Industry Training Boards, industry controls were also included.

REFERENCES

- Arulampalam W, AL Booth and P Elias (1997) "Work-related Training and Earnings Growth for Young Men in Britain", Research in Labor Economics, 16, 119-147, Fall.
- Arulampalam W and AL Booth (1997a) "Who Gets over the Training Hurdle? A Study of the Training Experiences of Young Men and Women in Britain", Journal of Population Economics, 10(2), 197-217.
- Arulampalam W and AL Booth (1997b) "Labour Market Flexibility and Skills Acquisition; Is There a Trade-off?" Institute for Labour Research, University of Essex Discussion Paper No. 97/13, August.
- Arulampalam W and AL Booth (1997c) "Union Status of Young Men in Britain: A Decade of Change", mimeo, Department of Economics, University of Warwick.
- Beatson M (1995) Labour Market Flexibility, Employment Department, April, Research Series No. 48.
- Booth AL (1991) "Job-related Formal Training: Who Receives it and What is it Worth?" Oxford Bulletin of Economics and Statistics, August, 281-294.
- Booth AL and M Chatterji (1998) "Unions and Efficient Training", forthcoming The Economic Journal, March, 1998.
- Booth AL and DJ Snower (1996) (eds) Acquiring Skills: Market Failures, their Symptoms and Policy Responses, Cambridge: Cambridge University Press.
- Campanelli P and Joanna Channell, with contributions from L McAulay, A Renouf and R Thomas (1994) "Training: An Exploration of the Word and the Concept". Employment Department Research Series No. 30, July.
- Claydon T and F Green (1994) "Can Trade Unions Improve Training in Britain?" Personnel Review, 23, 37-51.
- Disney R, A Gosling and S Machin (1996) "What has happened to union membership in Britain?" Economica, 63, 1-18.
- Duncan GJ and S Hoffman (1979) "On-the job Training and Earnings Differences by Race and Sex" The Review of Economics and Statistics, LXI 594-603.
- Felstead A and F Green (1996) "Training and the Business Cycle", in AL Booth and DJ Snower (eds) Acquiring Skills: Market Failures, their Symptoms and Policy Responses, Cambridge University Press.

- Freeman RB. and JL Medoff (1984) What Do Unions Do?, New York: Basic Books.
- Green F, S Machin and D Wilkinson (1996) "Trade Unions and Training Practices in British Workplaces", mimeo, Centre for Economic Performance, London School of Economics.
- Greene WH (1995) LIMDEP Version 7.0 User's Manual and Reference Guide, Econometric Software Inc., New York.
- Greene WH (1993) Econometric Analysis (second edition), Macmillan Publishing Company.
- Greenhalgh C and G Mavrotas (1994) "The Role of Career Aspirations and Financial Constraints in Individual Access to Vocational Training" Oxford Economic Papers, 46(4), October, 579-604.
- Groot W (1996) "On-the-Job Training, Job Mobility and Wages in Britain", mimeo, University of Amsterdam.
- Heckman JJ (1981) "Statistical Models for Discrete Panel Data", 114-178 in CF Manski and D McFadden (eds) Structural Analysis of Discrete Data with Econometric Applications, Cambridge Ma: MIT Press.
- Lynch LM (1992) "Private Sector Training and the Earnings of Young Workers" American Economic Review, 82, 299-312.
- Mahnkopf B (1992) "The 'Skill-oriented' Strategies of German Trade Unions: Their Impact on Efficiency and Equality Objectives" The British Journal of Industrial Relations, 30(1), 61-81, March.
- OECD (1995) The Jobs Study, Paris.
- Streeck W (1989) "Skills and the Limits of Neo-Liberalism: The Enterprise of the Future as a Place of Learning", Work, Employment and Society , 3(1), 89-104, March.
- Stevens M (1994) "A Theoretical Model of On-the-job Training with Imperfect Competition", Oxford Economic Papers, 46 (4), 537-562, October.
- Taylor Taylor, M. F. (1996) (ed. with J Brice et al) British Household Panel Survey User Manual Volumes A and B, Wivenhoe Park: University of Essex.

TECHNICAL APPENDIX

The random effects probit model is estimated under the common assumption that $u_{it} \sim IN(0, \sigma_u^2)$ and the u_{it} are independent of the X , and IN refers to Independent Normal distribution. In order to marginalise the likelihood, we assume that $\alpha_i \sim IN(0, \sigma_\alpha^2)$ and is independent of the u_{it} and the X . This implies that the correlation between two successive error terms for the same individual is a constant, given by

$$\rho = \text{corr}(v_{i2}, v_{i1}) = \frac{\sigma_\alpha^2}{\sigma_\alpha^2 + \sigma_u^2}. \quad (3)$$

This formulation is referred to as the specification of ‘equicorrelation’ in the literature, since the correlation between the v_{it} s over time are the same. The parameters of this model are easily estimated by noting that the distribution of Y_{it}^* conditional on α_i is independent normal. We also provide estimates of the above model under the assumption that $\rho = 0$. This is the pooled probit model, ignoring the panel nature of our data.

Table 1: Training in the Current Job, by Job Flexibility, 1991-1995

	All Employees	Temporary	Part-time	Uncovered by a trade union	Total Number of observations
<u>W1-W5 Pooled</u>					
Men					
% of sample (person years)	100.00 (9659)	5.17 (449)	3.44 (332)	46.69 (4510)	9659
Training %	35.69	19.84	31.02	29.25	
Women					
% of sample (person years)	100.00 (9904)	7.44 (737)	40.31 (3992)	47.59 (4713)	9904
Training %	33.07	24.69	23.10	22.05	
<u>W1-W5 Separately</u>					
Men - Training %					
Wave 1	40.90	27.89	36.84	32.98	2154
Wave 2	33.09	18.29	28.07	26.10	1949
Wave 3	33.05	12.05	31.75	27.01	1776
Wave 4	35.00	14.29	35.39	28.82	1906
Wave 5	35.49	25.23	22.54	30.70	1874
Women - Training %					
Wave 1	36.36	24.35	24.80	26.49	2162
Wave 2	30.90	21.79	20.92	19.76	1974
Wave 3	31.17	23.64	21.07	19.36	1861
Wave 4	33.79	26.39	24.65	22.39	1968
Wave 5	32.70	26.32	23.78	21.56	1939

Notes: (i) Training incidence is defined as training to increase or improve skills in the current job in the previous 12 months.

(ii) Temporary includes casual , seasonal and fixed-term contract workers too.

(iii) Uncovered means that the worker's wages are not covered by a union collective agreement

Table 2: Marginal Effect Estimates of training to increase or improve skills at current employer, 1991-1995

	Men		Women	
	<u>model 1</u> pooled probit	<u>model 2</u> random effects probit	<u>model 1</u> pooled probit	<u>model 2</u> random effects probit
variables	Marginal Effects (absolute t)	Marginal Effects (absolute t)	Marginal Effects (absolute t)	Marginal Effects (absolute t)
Intercept	0.030 (0.351)	0.004 (0.044)	-0.377 (4.083)	-0.323 (3.016)
<u>'Flexible' employment attributes</u>				
Seasonal/temporary/casual/fixed term	-0.187 (7.168)	-0.160 (6.473)	-0.128 (6.386)	-0.118 (5.859)
Part-time (30 or less hours)	-0.053 (1.772)	-0.066 (2.122)	-0.094 (7.853)	-0.087 (6.602)
Not covered by a trade union	-0.084 (6.651)	-0.074 (5.289)	-0.091 (7.115)	-0.096 (6.840)
<u>Demand-side factors</u>				
TTWA u/v ratio *10 ⁻³	-0.427 (0.852)	0.330 (0.689)	0.052 (0.104)	-0.128 (0.249)
<u>Individual characteristics</u>				
Age *10 ⁻¹	-0.241 (6.161)	-0.218 (4.725)	-0.019 (0.485)	-0.043 (0.973)
Age-squared * 10 ⁻³	0.233 (4.634)	0.208 (3.458)	0.012 (0.246)	0.039 (0.679)
White	0.062 (2.137)	0.060 (1.748)	0.051 (1.745)	0.058 (1.511)
Married	0.057 (4.023)	0.048 (2.883)	-0.002 (0.162)	-0.008 (0.534)
Cohabiting	0.045 (2.390)	0.039 (1.885)	0.005 (0.297)	0.010 (0.527)
Full-time experience in 1991 * 10 ⁻³	0.153 (1.862)	0.141 (1.523)	-0.049 (0.664)	0.008 (0.090)
Professional	0.244 (9.765)	0.237 (9.039)	0.220 (6.467)	0.202 (5.500)
Managerial	0.233 (12.21)	0.213 (10.88)	0.247 (14.06)	0.221 (11.57)
Non-manual	0.210 (10.28)	0.189 (8.822)	0.138 (8.483)	0.135 (7.590)
Skilled manual	0.105 (5.922)	0.107 (6.176)	0.116 (5.342)	0.115 (5.128)
<u>Highest educational qualification</u>				
First or higher degree	0.210 (9.047)	0.220 (7.822)	0.135 (5.988)	0.147 (5.457)
Other higher qualifications	0.214 (11.40)	0.221 (9.978)	0.186 (10.17)	0.187 (8.877)
A-level	0.143 (6.954)	0.152 (6.184)	0.115 (5.463)	0.116 (4.613)
O-level	0.110 (5.763)	0.120 (5.183)	0.056 (3.257)	0.062 (3.033)
Apprenticeship	0.134 (3.460)	0.135 (2.727)		
CSE	0.050 (1.836)	0.062 (1.838)	0.001 (0.057)	0.014 (0.513)
<u>Employer attributes</u>				
Charity sector	0.100 (2.492)	0.087 (2.210)	0.116 (4.005)	0.094 (3.152)
25-49 employees	0.070 (3.596)	0.068 (3.256)	0.083 (4.129)	0.073 (3.522)
50-99 employees	0.081 (4.093)	0.077 (3.840)	0.055 (2.525)	0.051 (2.267)
100-199 employees	0.098 (4.823)	0.101 (4.802)	0.087 (3.930)	0.089 (4.130)
200-499 employees	0.115 (5.883)	0.105 (5.056)	0.139 (6.648)	0.133 (5.996)
500-999 employees	0.144 (5.907)	0.133 (5.103)	0.145 (4.828)	0.133 (4.076)
1000+ employees	0.162 (7.028)	0.150 (6.020)	0.158 (5.433)	0.150 (5.044)
Public sector	0.175 (5.505)	0.163 (5.082)	0.163 (7.045)	0.154 (6.371)
Public sector, 25-49 employees	-0.056 (1.248)	-0.071 (1.488)	-0.033 (1.054)	-0.038 (1.197)
Public sector, 50-99 employees	-0.060 (1.457)	-0.063 (1.482)	-0.059 (1.719)	-0.035 (0.989)
Public sector, 100-199 employees	-0.175 (3.986)	-0.158 (3.423)	-0.068 (1.874)	-0.063 (1.694)
Public sector, 200-499 employees	-0.176 (4.351)	-0.151 (3.678)	-0.135 (3.769)	-0.122 (3.181)
Public sector, 500-999 employees	-0.235 (4.861)	-0.207 (4.044)	-0.164 (3.753)	-0.152 (3.244)
Public sector, 1000+ employees	-0.191 (4.513)	-0.163 (3.542)	-0.202 (5.383)	-0.182 (4.706)
Industry dummy variables	Yes	Yes	Yes	Yes
Region of residence dummy variables	Yes	Yes	Yes	Yes
Estimated Rho	n/a	0.359 (19.30)	n/a	0.330 (17.88)
Maximised value of the log likelihood	-5577.788	-5333.192	-5334.615	-5140.857
Log likelihood at the constant	-6292.583		-6285.626	

Number of observations	9659	9659	9904	9904
------------------------	------	------	------	------

Notes: (i) Absolute t-ratios in parentheses.
(ii) See also notes to Tables 1.

Table A1: Summary statistics of variables used in analysis - all waves

Variables	Means	
	Men	Women
<u>Training to increase/improve skills in current job</u>	0.357	0.331
<u>'Flexible' employment attributes</u>		
Seasonal/temporary/casual/fixed term contract	0.052	0.074
Part-time (30 or less hours)	0.034	0.403
Not covered by a trade union for collective bargaining	0.467	0.476
<u>Demand-side factors</u>		
Travel-to-work area (TTWA) u/v (unemployment to vacancy) ratio	19.57	19.77
<u>Individual characteristics</u>		
Age (years)	36.120	36.660
Age-squared	1415.000	1452.000
White ethnic origin	0.966	0.967
Married	0.618	0.615
Cohabiting	0.102	0.112
Full-time experience in 1991 (months)	178.200	111.400
Professional	0.084	0.025
Managerial	0.308	0.298
Non-manual	0.141	0.390
Skilled manual	0.309	0.087
<u>Highest educational qualification</u>		
First or higher degree (holds a university or higher degree)	0.149	0.113
Other higher qualifications (holds teaching, nursing or other higher qualification)	0.251	0.212
A-level (one or more Advanced-level qualifications, or equivalent, representing university entrance-level qualifications, typically taken at age 18)	0.149	0.108
0-level (one or more Ordinary-level qualifications or equivalent, taken at the 16 at end of compulsory schooling, and basis of selection into A-level courses.	0.212	0.279
Apprenticeship	0.021	
CSE (Commercial or clerical qualifications, CSE grades 2-5)	0.058	0.096
<u>Employer attributes</u>		
Charity sector (non-profit-making firms, including charities and co-operatives)	0.017	0.033
25-49 employees	0.129	0.139
50-99 employees	0.133	0.109
100-199 employees	0.120	0.100
200-499 employees	0.151	0.110
500-999 employees	0.081	0.055
1000+ employees	0.107	0.087
Public sector	0.217	0.352
Public sector, 25-49 employees	0.024	0.057
Public sector, 50-99 employees	0.035	0.040
Public sector, 100-199 employees	0.026	0.032
Public sector, 200-499 employees	0.037	0.032
Public sector, 500-999 employees	0.021	0.024
Public sector, 1000+ employees	0.036	0.053
Number of observations	9659	9904