TRAINING, JOB SATISFACTION AND ESTABLISHMENT PERFORMANCE

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Sector Skills Development Agency: Research Series
Foreword

In October 2002 the Department for Education and Skills formally launched Skills for Business (SfB), a new UK-wide network of employer-led Sector Skills Councils (SSCs), supported and directed by the Sector Skills Development Agency (SSDA). The purpose of SfB is to bring employers more centre stage in articulating their skill needs and delivering skills-based productivity improvements that can enhance UK competitiveness and the effectiveness of public services. The remit of the SSDA includes establishing and progressing the network of SSCs, supporting the SSCs in the development of their own capacity and providing a range of core services. Additionally the SSDA has responsibility for representing sectors not covered by an SSC and co-ordinating action on generic issues.

Research, and developing a sound evidence base, are central to the SSDA and to Skills for Business as a whole. It is crucial in: analysing productivity and skill needs; identifying priorities for action; and improving the evolving policy and skills agenda. It is vital that the SSDA research team works closely with partners already involved in skills and related research to generally drive up the quality of sectoral labour market analysis in the UK and to develop a more shared understanding of UK-wide sector priorities.

The SSDA is undertaking a variety of activities to develop the analytical capacity of the Network and enhance its evidence base. This involves: developing a substantial programme of new research and evaluation, including international research; synthesizing existing research; developing a common skills and labour market intelligence framework; taking part in partnership research projects across the UK; and setting up an expert panel drawing on the knowledge of leading academics, consultants and researchers in the field of labour market studies. Members of this panel will feed into specific research projects and peer review the outputs; be invited to participate in seminars and consultation events on specific research and policy issues; and will be asked to contribute to an annual research conference.

The SSDA takes the dissemination of research findings seriously. As such it has developed this dedicated research series to publish all research sponsored by the SSDA and results are being made available in both hard copy and electronically on the SSDA website.

Lesley Giles

Acting Director of Strategy and Research at the SSDA

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Executive Summary

1: Introduction

This research was commissioned by the Sector Skills Development Agency to help develop the evidence around one of its key research themes – Understanding the demand for skills and the link between skills and performance. The research seeks to do this by examining three questions. First what determines the incidence of employee training in the workplace? Second, does training affect job satisfaction? And third, does training affect workplace performance either directly or indirectly through its affect on job satisfaction? In attempting to answer the above questions we make use of three different data sets – the Skills Survey 2001, the British Household Panel Survey (BHPS), 1991-2004, and the Workplace Employment Relations Survey 2004 (WERS), together with its panel of establishments 1998-2004.

2: Literature Review

The study commenced with a review of the literature. Training is normally defined in terms of a period off-the-job either at the workplace or off the premises. It can be measured as the proportion of workers receiving training over a defined period of time and/or by the duration of the activity. Key factors explaining its incidence are personal characteristics of the worker such as gender, age, qualifications, union membership and length of tenure and structural characteristics such as whether work is full-time or part-time, the size of the employer and the industry. Both degree of competition in the labour market and the geographical density of employment units can influence its incidence. One study suggests that an increased incidence of training raises value added more than it raises wages.

Virtually all studies find that most workers have high levels of job satisfaction, though women appear to have higher levels of job satisfaction than men, at least in the UK. Other important determinants of job satisfaction are age, education and absolute and relative pay. Fewer studies have focused on the impact of training on job satisfaction. A number of studies have, however, found that higher levels of job satisfaction result in reduced absenteeism, a lower quit rate and higher productivity.

Performance is most often measured in terms of productivity and profitability. Both of these will be influenced by market share and the degree of competition in the market-place. UK productivity is low by international standards, though the gap has declined in recent years and this masks considerable differences among different industries. A number of studies

examine the impact of training on performance[1], for instance, one suggests that incremental training increases the probability of long-term firm survival[2] and another finds that training can improve financial performance[3].

3: The data sets

The Skills Survey 2001 involved face to face interviews with 4,470 individuals. There is a detailed job analysis and the possibility of examining changes over a five year period. Specific features are the possibility of examining the relationship between skills and job satisfaction and the nature of tasks and the structure of work.

The British Household Panel Survey (BHPS) is an annual survey of 5,500 households which has been conducted since 1991. The same individuals are, as far as possible, re-interviewed each year, which means that one can follow individual behaviour over time. There are questions on both training and job satisfaction.

The Workplace Employment Relations Survey (WERS) 2004 covers 2,300 workplaces and a sample of 22,500 employees from these workplaces, with only establishments with less than five employees being excluded from the sample. The survey of management includes subjective performance measures and questions on training offered to the largest occupational group. The survey of employees includes questions on training and facets of job satisfaction. A new financial performance questionnaire provides objective data on financial performance and productivity for a sub-sample of establishments from which data were collected in 1998, so it is possible to examine changes in performance over time.

4: The determinants of training

The questions asked in each of the three data sets are not entirely consistent and in the BHPS have changed over time, so that this must be borne in mind in interpreting the results from modelling the determinants of training. The Skills Survey suggests that the varying incidence of training across industries is a function of the specific features of jobs within these industries. Previous qualifications increase the likelihood of training, but if the worker is over-educated for the current job (as defined by the employee), this reduces the likelihood. The BHPS confirms the varying incidence of training across industry with some variation over time. The econometric analysis suggests that being young, with qualifications, in a professional job and being a member of a trade union increases the likelihood of training,

[1] See Tamkin et al., *Skills Pay: The Contribution of Skills to Business Success*, 2005.
[2] See Collier et al., *Training and Establishment Survival*, 2007.
[3] See Addison and Belfield, Unions, Training and Firm Performance: Evidence from the British Workforce Employee Relations Survey, 2004.

while being male, single, disabled and living in Scotland reduces it. WERS suggests that the incidence of training is much higher than implied in the other two data sets with up to two thirds of employees in the sample receiving some (non-health and safety) training in the preceding twelve months. The variability of training across industry is confirmed both with respect to incidence and duration. The most common subject of training is health and safety followed by the operation of new equipment and computing skills. Organisation size is an important determinant of the likelihood of training, as is gender. These results suggest that it is inappropriate to assume that all types and durations of training have the same determinants and therefore, the impacts may also be different.

5: Job satisfaction

The Skills Survey includes a question on overall job satisfaction. Job satisfaction is found to vary across industries. Women have higher job satisfaction than men, but not significantly so when controls for personal and employment characteristics are included. Unlike the case in earlier studies, pay seems more important to the job satisfaction of women than of men. For both genders being able to use acquired skills on the job raises job satisfaction, but training appears to have no significant effect on job satisfaction.

The BHPS also has a question on overall job satisfaction, but in addition includes questions on various facets of job satisfaction. Here, those that have been trained tend to have higher job satisfaction, but not significantly so across all industries, and over all time periods. The econometric analysis also suggests that women have significantly higher levels of job satisfaction than men. Self-funded training has a negative effect on job satisfaction and employer funded training a positive effect in waves 11-14.

WERS does not include a question on overall job satisfaction, but it does have questions on various facets of job satisfaction. Those who have received training in the past year are significantly more satisfied on all satisfaction indicators than those who have not. The econometric analysis suggests that males, disabled workers, the more highly qualified, union members, and those working in larger establishments are generally less satisfied than those who do not fall into these categories. Having received training in the previous twelve months is positively and significantly related to all seven facets of job satisfaction even after controlling for other potential determinants of satisfaction. However very short periods of training do not have such an effect. Thus, while the analysis finds a number of common strands in relation to job satisfaction, not all results are consistent across the three data sets.

6: Establishment performance

Only WERS contains data which enable us to analyse the effect of training and job satisfaction on performance. An extra year of education increases the earnings of an individual by about 6 percent and having received training by a similar amount. In addition workers benefit substantially from the education of their co-workers, but no similar spill-over effect could be found for the training of co-workers. Using managers' subjective evaluations of establishment performance relative to other establishments in the same sector training appears to have a positive effect on establishment productivity and on financial performance (profits). However, workplace education does not have any significant effect. Using objective data on financial performance from the financial performance questionnaire no significant effect of training could be identified. Average years of workplace education did have a significant effect – the reverse of the case using subjective data. Higher levels of job satisfaction are associated with lower rates of absenteeism and quit rates. The average amount of time spent by the largest occupational group on training has a significant effect on reducing quite rates, but this is the only training measure which shows a significant impact on quit or absence rates. It is also possible to link the 2004 panel with 1998 to assess changes in performance over this period, again based on managers' subjective assessments. It was found that certain degrees of training intensity did have positive effects on establishment survival and employment growth, though it is difficult to disentangle cause and effect in this case.

7: Conclusions

In relation to the three questions raised initially we can say first that training intensity varies considerably across industries and is influenced by personal characteristics such as gender, age and qualifications. Second, certain types of training can raise levels of job satisfaction. Third, training and/or job satisfaction can improve establishment performance in relation to productivity, profits, absenteeism, quits and long-term growth. But the effects differ and depend on the particular types and extent of training provided and on whether worker skills are effectively utilised. It is dangerous, therefore to infer that training is homogenous and equal, or greater, consideration needs to be given to the use of skills by workers in the workplace. Further research is required on the differing results on subjective and objective measures of establishment performance. It appears that they may be measuring different things. Managers may regard their companies as competing in a narrow segment of a particular industry, while objective data can only be assessed in terms of industries defined according to the standard industrial classification – a much broader definition.

Chapter 1 – Introduction

In this chapter we outline the main questions to be addressed in this report and provide a general introduction to the research. In 2002, the Government set up the Sector Skills Development Agency (SSDA) with responsibility for developing the new network of 25 Sector Skills Councils (SSCs). Together they constitute the Skills for Business network, which is leading on working with employers to equip them with the skills they need.

Over the long term, by operating with key partners, the Skills for Business network aims to address four strategic/high level goals:

- Improvement in productivity, business and public services performance through specific strategic and targeted skills and productivity action;
- Reduction of skills gaps and shortages and anticipation of future needs;
- Increased opportunities to develop and improve the productivity of everyone in the sector's workforce, including action to address equal opportunities;
- Improvement in the quality and relevance of public learning supply, including the development of apprenticeships, higher education and national occupational standards.

The SSDA has commissioned a number of research projects to develop understanding in key areas, fill gaps in knowledge and thus strengthen the evidence base. This report presents the findings of one such project under the research theme of 'Understanding the Demand for Skills and the links between skills and performance'.

An important strategic goal of the Skills for Business network is improving productivity, business and public services' performance through specific strategic and targeted skills and productivity action. Recent research by the National Institute of Economic and Social Research (NIESR) and others[4] indicate that skills are an important component of the productivity gap with the UK's major competitors, suggesting that as much as one-fifth of the productivity gap between the UK and Germany could be explained by the UK's relatively low level of skill within the workforce. This issue was also identified by the Leitch Review of Skills in the UK

[4] See, for instance, O'Mahoney and De Boer (2002) and Jagger et al. (2005).

(2005) which noted that improving the flow of better qualified young entrants into the labour market would be insufficient to close the productivity gap since 70 per cent of the workforce 15 years ahead will have already finished compulsory education. This places the focus on the need for both training and retraining of existing workers.

The aim of this project is to consider the relationship between training, job satisfaction and economic performance at establishment level, based on the secondary analysis of three data sets. In particular, the three main questions investigated are:

1) What determines workplace training incidence?
2) Does training affect employee job satisfaction?
3) Does training affect company performance either directly or indirectly through the effect of training on job satisfaction?

Investigating these questions requires us first to identify the amount of training undertaken and the form it takes. We need also to identify how its incidence varies across sectors and particular types of employee. A good discussion of the existing literature is contained in Shields (1998) as outlined in Chapter 2. Training can have a direct effect on economic performance if it serves to make the individual more proficient at his or her job, but it can also have an indirect effect if it increases job satisfaction by, for instance, making it easier to perform the job or making the individual feel that the employer is providing training because he or she values the individual worker. A more satisfied worker may put more effort into performance of his or her duties and be more likely to stay with the firm which will then benefit from the greater experience of its workforce. A useful survey of the job satisfaction literature in the UK can be found in Green and Tsitsianis (2005), while the relationship between training and business performance is detailed in Cosh et al. (2003) and Dearden et al. (2006).

At the outset it must be recognised that training can take many forms including induction training, on-the-job and off-the-job, formal and informal training through work experience, training for young workers and (re-) training for adults. Its incidence can be measured through the proportion of workers trained and/or the duration of training. It may be paid for by the employer or the employee. We can also distinguish between general and specific training. General training increases the marginal productivity of trainees by exactly the same amount in the firms

providing the training as in other firms. Specific training has no effect on the productivity of trainees that would be useful to other firms (e.g. induction training). We would expect workers rather than firms to bear the costs of general training as the firm would lose the benefit of the training if the worker moves. In contrast, we would expect firms to bear the costs of specific training as they will gain the benefits as the worker cannot use the skills received elsewhere. In analysing such issues we are, however, constrained by the precise nature of the training questions contained in each of our three data sets. This diversity makes interpretation of its effects somewhat hazardous.

Job satisfaction is normally measured on a ranking scale such as 1 to 7 with 1 representing the response of a worker who is totally dissatisfied with his or her current job and 7 representing the response of a worker who is completely satisfied with his or her current job. However, we cannot necessarily assume that each point on the scale represents the same thing to each or every worker or that workers are not affected by mood swings over time. However, such measures seem to be good predictors of worker behaviour such as likelihood of quitting the current job. Workplace performance may be measured in terms of productivity (e.g. output per worker or output per hour), product quality (perhaps measured in terms of the percentage of items produced that are fit for sale) or in terms of financial performance such as profitability. Measuring performance in terms of only one of these measures could, therefore, fail to capture some of the benefits of training.

Three data sets are used in this study. The first of these is the Skills Survey 2001 which can be used to investigate the link between skills and job satisfaction. Individuals were asked whether they had undertaken any job-related training since completing full-time education and a second question asked them about different types of training they may have undertaken. The second is the British Household Panel Survey (BHPS) which has been carried out annually since 1991 and surveys the same respondents at regular intervals. In the first seven waves there were two training questions, but thereafter only one different question was asked, which means that we must analyse waves 1-7 and subsequent waves separately. The third data set is the Workplace Employment Relations Survey (WERS) 2004. The survey contains both cross-section and panel elements with interviews with senior managers and up to 25 employees in each workplace. Thus we have matched employer-employee data. Managers were asked about the proportion of experienced staff who had been given time off for training in the previous 12 months and its duration, what it

covered and its objectives. Likewise employees were asked how much training they had received in the previous 12 months, their satisfaction with it and how the work skills they have match the skills needed to do the job. A new financial performance questionnaire enables us to estimate the effects of training and job satisfaction on establishment performance for a sub-sample of the establishments covered in the main survey.

We have chosen to adopt a thematic approach in this report. After a brief literature review we describe the three data sets in some detail. Then we examine the determinants of training, followed by an analysis of the impact of training on job satisfaction and its impact on establishment performance. The final chapter attempts to draw overall conclusions and consider policy implications.

Chapter 2 – Literature Review

2.1 Introduction

In this chapter we consider three distinct aspects of the labour market literature. The first relates to training in terms of its definition and measurement, its determinants, incidence and its impact. The second aspect relates to job satisfaction, again examining in turn its definition and measurement, its determinants, incidence and its impact. The third element is performance. While we are again concerned with its definition and measurement, in examining its determinants we are particularly concerned with how training and job satisfaction impact upon it, incidence in this case referring to the level of performance. Finally, there is the question of how performance determines the growth and survival of the organisation.

2.2 Training

2.2.1 Definition and Measurement

Training is about improving the level of skill of the individual worker. This may occur simply as a result of the worker learning by doing, but this is better regarded as a return to experience. Thus we define training as a period off-the-job either at the workplace or off the premises. Whether this is paid for by the employer or the employee it represents an investment on which a return is obtained in the future. Often data sets simply report the response to a question (yes or no) on whether an individual has received training over a specified period of time. A question may be asked about the duration of training specified over a range of time periods. Both these questions are relevant in judging the impact of training as outcomes may differ according to training duration, perhaps depending also on the mode of delivery and the type of job or individual receiving it.

2.2.2 The Determinants of Training

The probability of training being offered by employers and undertaken by employees is far from random. Thus, Shields (1998), reviewing the literature, reports that the probability of an individual receiving training is positively related to the level of qualifications held, the size of the employer and trade union membership status and

negatively related to age, part-time work and length of job tenure. There is less agreement, he suggests, over the roles of gender, stage of technological advance, public or private sector[5] and whether the incidence of training moves procyclically. Table 2.1 reproduced from his paper reports the main findings in the British literature.

Since Shields wrote there have been a number of developments. Thus, as he himself notes, we would expect the continued ageing of the workforce to reduce the demand for training as this shortens the period over which the costs of training can be recouped. In contrast, the increased level of education in the workforce should increase the demand for training, given the positive relationship between the two. Jones, Latreille and Sloane (2005) found that the training 'advantage' previously enjoyed by men has now been reversed with women now more likely to participate in training, and there is similar evidence for some other countries (see Arulampalam et al., 2004). The Labour Force Survey (LFS) results for the UK show that the gender differential in favour of women exists for several different definitions of training: any training, on- and off-the-job training with an employer contribution, and any training involving an employer contribution. Consideration of changes in training incidence over the period 1995-2001 suggests that most of this change in favour of women cannot be explained by the industrial and occupational distribution of employment by gender. It still remains the case, however, that part-time women are less likely to receive training than full-time women.

The incentive to train will also be a function of the degree of competition in the labour market and the extent to which wages are compressed. Acemoglu and Pischke (1998) developed an imperfect competition model based on the notion that the degree of monopoly power of an employer in the local labour market will decline the greater the employees' probability of re-employment with other employers. The denser or more concentrated in terms of population the local labour market the better the matching opportunities for potential employees and the higher the probability of re-employment either through workers changing jobs voluntarily or employers poaching workers from other firms. This will have the effect of making training more general and less profitable to the employer, thereby reducing the incentive to train. Such agglomeration effects have been found for Britain by Brunello and Gambarotto (2004) using the European Community Household Panel for 1997. Their results suggest that a 10 per cent increase in geographic density will reduce the probability

[5] In common with many other studies we find that there is a higher probability of being trained in the public sector.

of employer provided training by 0.07 (more than 20 per cent of its average incidence). Related to these agglomeration effects is the notion that the employers' incentive to provide training will be greater the greater the degree of wage compression (i.e. the narrower the gap between the pay of a skilled and an unskilled worker) as this makes skilled workers relatively more profitable. Using WERS 1998 data Almeida-Santos and Mumford (2005) found that higher levels of wage compression (whether measured in absolute or relative terms) were, indeed, positively related to the incidence of training.[6]

2.2.3 The Incidence of Training

The most recent quarterly training statistics available from the LFS are reported in Table 2.2. These suggest that there are no strong seasonal effects on the incidence of training measured as the receipt of job related training in the last four weeks. These figures compare favourably with those recorded in other countries. They confirm that the incidence is higher for women than for men, for those aged under 24, for those in managerial and professional occupations and for those in service industries. The BHPS has different questions on the incidence of training than the LFS. Since 1998, respondents are asked about the number of training schemes they have undertaken in the last 12 months, their duration, type and whether it led to a qualification. Booth and Bryan (2005) used data from waves 8 to 10 for private sector, full-time employees aged 16-65 years. For each wave approximately 30 per cent of individuals received training, the vast majority of which was regarded as general, but contrary to expectations, paid for by the employer.

[6] They also find that training is positively associated with having a recognised vocational qualification and with current trade union membership. It is negatively related to being non-white, having shorter current job tenure and being part-time or on a fixed-term employment contract. See also Acemoglu and Pischke (1998) for the USA and Booth and Bryan (2005) for Britain on the determinants of training.

Table 2.1:

The Main Findings from the British Literature on the Determinants of Training

Variable Type	Variable list	Effect on the probability of training	Level of agreement
Personal	Age	-	#
	Female	-	?
	Married	+	?
	Dependent child(s)	-	?
Work-related	Qualifications	+	#
	New to job	+	#
	Trade union membership	+	#
	Part-time worker	-	#
Employer	Public sector	+	?
	High technology industry	+	?
	Small employer	-	#
	High regional unemployment	-	?

Note: A '#' in the final column indicates a relationship which has a general consensus, whilst a '?' refers to relationships for which conflicting findings are observed.

Source: Shields (1998)

Table 2.2:

Job Related Training in Great Britain

	Sep 2003-Aug 2004	Dec 2003-Nov 2004	Mar 2004-Feb 2005	Jun 2004-May 2005
Working-age people receiving job related training in the last 4 weeks as % of all working age people	13.4	13.6	13.6	13.7
Working-age males receiving job-related training in the last 4 weeks as % of all working age males	12.2	12.3	12.3	12.3
Working-age females receiving job-related training in the last 4 weeks as % of all working age females	14.7	15.0	15.0	15.1
People aged 25-retirement receiving job-related training in the last 4 weeks as % of all people 25-retirement age	11.7	11.9	11.9	11.9
Employees & self-employed receiving job-related training in the last 4 weeks as % of all employed & self-employed	14.5	14.7	14.7	14.7
Employees + self-employed in manual/professional occupations receiving job-related training in the last 4 weeks as % of all employees and self-employed	19.0	19.3	19.2	19.2
Employees & self-employed in service industries receiving job-related training in the last 4 weeks as % of all employees and self-employed	16.1	16.4	16.4	16.4

Source: Labour Force Survey – Quarterly: Four quarter averages

2.2.4 The Impact of Training

The link between training and productivity has been discussed comprehensively in earlier research reports for the SSDA[7], so we merely summarise some of this here. Tamkin et al. (2004) note that most training periods are short, much of it is driven by statutory requirements such as health and safety rather than business needs, and only about half of it leads to formal qualifications. Therefore, it is doubtful if all training activities impact positively or equally on performance. However they report that several studies at the level of the firm have shown that increasing training activity, the type of training provided and its depth can all, in practice, positively influence performance. As Dearden, Reed and Van Reenan (2006) point out the standard approach in the literature is to assume that wages equal marginal productivity and, therefore, suffice to capture the impact on productivity. That is, if wages increase after training the assumption is that this is the case because workers are more productive as a consequence of the training. Dearden et al. are, however, able to measure the impact on productivity directly using a panel of British industries over the period 1983 to 1996. They find that a 1 percentage point increase in training using the LFS measure of incidence is associated with an increase in value added per hour of about 0.6 per cent, but an increase in wages of only 0.3 per cent due to monopoly power of the employer in the labour market. It appears, therefore, that part of the improvement in productivity is captured by the employer, so that using wages to measure productivity will tend to underestimate the size of the productivity gain. Finally, when they compare their industry and individual level wage regressions they find that longer lengths of time in training are associated with significantly higher wages, consistent with training externalities.

The importance of the type of training was highlighted by Barrett and O'Connell (1998), who suggest that vocational training has the greatest impact on wages and productivity when it is specific to the firm providing it. General training, on the other hand, tends to have less impact on individual firm performance. Depth of training has been examined in a series of papers by Cosh et al. in 1998, 2000 and 2003. They conclude that training was linked to improved business performance, at least over part of the periods they analysed. They also found a strong and significant effect of training on employment growth for small firms which were persistent trainers, but not for those which were ad hoc trainers. Finally, especially for larger

[7] See also Campbell and Garrett (2004), and The Evaluation Main Report (2005).

firms, there seemed to be an association between intensity of training and profitability.

2.3 Job Satisfaction

2.3.1 Definition and Measurement

Job satisfaction was defined by Locke (1976) as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (p. 1300). This obviously is a subjective judgement and information on it can only be obtained from workers themselves. This is normally achieved by presenting respondents with a ranking scale, frequently, but not always, from 1 to 7 and asking them to rank their job on this scale in relation to the overall job aspects. Some surveys also ask them to rank different facets of the job on such a scale, often including the nature of work itself, the level of pay, hours of work, promotion prospects, job security and inter-personal relations. In this way it is possible to compare job satisfaction in different work environments, among different categories of worker and over time.

2.3.2 The Determinants of Job Satisfaction

While psychologists and sociologists have investigated various aspects of job satisfaction over many years it is only comparatively recently that economists have taken an interest in this phenomenon recognising that it can shed light on a number of aspects of worker behaviour. Economists suggest there is a trade-off between earnings and hours of work with satisfaction rising with increases in real wages and decreasing as hours of work rise. However, there is also evidence to suggest that these features are not the only or even the most important determinants of job satisfaction. In particular, individuals obtain satisfaction from the nature of work itself, from feelings of job security, from relationships with co-workers, promotion prospects and being able to use their initiative (Clark, 1996). Both absolute and relative pay have been found to influence job satisfaction as workers beliefs about what is equitable are governed not first by what they earn, but also by what other workers in comparable jobs earn (Rees, 1993; Baxter, 1973 and 1993). In the case of the UK studies of job satisfaction generally find that women report higher levels of satisfaction than men, but weight different facets differently in terms of the

determinants of overall satisfaction, with men being more concerned with pay and promotion than women (Sloane and Williams, 2000).

Among other findings are a u-shaped relationship between overall job satisfaction and age with those in their 20s and 30s being the least satisfied. There is a strongly negative relationship between self-reported physical health and job satisfaction. There is a negative relationship also between education and job satisfaction, which is not easy to explain but may be due to rising aspirations among the more educated. Non-white people tend to be less satisfied than white people, married people more satisfied than single people, renters more satisfied than those paying off their home through a mortgage and those in certain regions more satisfied than others. The most satisfied workers are also found in smaller establishments. Finally, union membership is negatively associated with job satisfaction, though this may simply reflect the fact that more dissatisfied workers are more likely to join a union (see Bender and Sloane, 1998).

In this study we are concerned with the impact of training on job satisfaction and generally in the earlier literature this has not been included directly in estimating models. One exception is a study of 13 countries based on the European Community Household Panel (ECHP) 1994-2001, by Siebern-Thomas (2005), who found that job satisfaction tended to be higher where there was access to training at the workplace. However, a number of studies have examined related variables. Thus Battu, Belfield and Sloane (1999) found that graduates who were over-educated (i.e. who were in jobs that did not require a degree) had significantly lower job satisfaction than those graduates who were in graduate-type jobs. Green and Tsitsianis (2005) found likewise for a cross section of workers that job satisfaction was lower for both over-educated and under-educated workers in their British sample. Bauer (2004), using data from the European Survey on Working Conditions (ESWC) covering all EU member states, showed that higher involvement of workers in High Performance Work Organisations (HPWOs)[8] was associated with higher job satisfaction. He includes in his model a skill index derived from information on the number of days of training paid for or provided by the employer in the past 12 months. The skill index has a positive and significant effect on job satisfaction for the

[8] HPWOs are organisations which take a strategic approach towards managing people, recognising that the full benefits of workforce development can only be achieved by adopting a wide array of workplace changes and human resource practices which impact on performance. See, for instance, Becker and Huselid (1998).

15 countries overall, but does not reach significance for the UK. WERS 2004 included a question on how well the skills the individuals possessed matched the skills needed to do their present job and over half the sample felt they were over-skilled.

2.3.3 Levels of Job Satisfaction

Most workers appear to be satisfied with their job. Thus using wave 11 of the BHPS Jones and Sloane (2004) find that the mean recorded level of overall job satisfaction for all workers in 2002 was 5.37 on a 7 point scale, with women having a mean of 5.49 compared to 5.23 for men. This suggests that dissatisfied workers are likely to leave their current job, while satisfied workers tend to stay. There is an incentive for employers, therefore, to try and ensure that they have satisfied workforces if they wish to reduce labour turnover. Job satisfaction does, however, appear to have been declining somewhat in Britain. Green and Tsitsianis (2005) find that contrary to popular belief this does not appear to be a result of an increase in job insecurity, but rather the result of the intensification of work effort and declining task discretion.

2.3.4 The Impact of Job Satisfaction

Empirical research has shown that responses to questions on job satisfaction are strong predictors of individual behaviour over such dimensions as voluntary quits, absenteeism and productivity (see, for instances, Mangioni and Quinn, 1975, Hamermesh, 1977, Freeman, 1978 and Clegg, 1983). Thus, whilst it might be true that what two individuals perceive to be 'very satisfied' or 'very dissatisfied' may not match each other very well, it is still true that satisfied workers are more likely to be productive and less likely to quit or be absent from work than those workers who report low levels of job satisfaction. However, it is also the case that direct studies of the relationship between job satisfaction and productivity are rare in Britain.

2.4 Performance

2.4.1 Definition and Measurement

The ultimate measure of a company's performance is profitability which is most appropriately measured as the rate of return on capital. Profitability can be improved

by increasing output and/or reducing costs and additional training might be designed to achieve either of these. Productivity is normally measured in terms of output per worker, but for comparative purposes needs to take into account the number of hours worked and the quality of the workforce. Thus, one establishment might be more productive than another because it has a higher ratio of skilled workers or more capital per worker. For such reasons productivity might be measured in terms of value added, which takes into account the cost of bought - in materials.

2.4.2 Determinants of Performance

Tamkin et al. (2004) note that there is a range of productivity performance among individual firms in the UK with the best performing firms in the manufacturing sector around five times more productive than the worst. This is partly explained by a significant positive relationship between productivity and market share (i.e. size matters). One must, however, also take into account the degree of competition in product markets, since firms exposed to a high degree of competition at home and abroad will have to be efficient to survive. It is also generally held that skills are an important element in closing the productivity gap as large sections of the UK economy are dependent on the management and processing of knowledge and information (see DTI, 1995 and 2003).

2.4.3 The Level of Performance

The UK performs below the European Union average with respect to labour productivity per hour worked, achieving 90 per cent of the EU average in 2002, which is a smaller gap than ten years earlier. However, there are larger differentials between sectors than between countries and regions. Jagger et al. (2005) show, for instance, that the UK has above average total factor productivity performance (a more comprehensive measure) relative to 15 other countries in 13 of 23 sectors included in the analysis, ranking first in one sector (Other Products and Recycling) and second in 5 others including Agriculture; Food, Drink and Tobacco; Transport; Private Sector Professional Services and Public Administration and Defence.

2.4.4 The Longer Term Impact of Performance

Collier, Green and Pierson (2005) examined the relationship between training, profitability and establishment survival, using the 1990 Workplace Industrial Relations Survey (WIRS) and a follow-up survey conducted in 1998. They found that 181 of the original 1,693 establishments in the sample had closed down by 1998. Nearly 19 per cent of those establishments not undertaking training closed down compared with 13 per cent of those which did not (a significant difference), which suggests training increases the probability of business survival[9]. In another study using the 1998 WERS, Addison and Belfield (2004) find that training also has a significant positive effect on financial performance.

However, the nature of the management of the firm may influence training outcomes. High performance workplaces may be able to extract a higher return from a given training input than is the case for other establishments. The SSDA's model of capability, linking individual capability with organisational action and development with deployment is an attempt to make this more explicit. As Tamkin et al. (2004) state we need to learn more about precisely how these aspects contribute to performance and to highlight differences between organisations/sectors providing high value added strategies and those pursuing low cost strategies.

[9] This work was extended in Collier, Green and Kim (2007) using WERS 2004. They found that 24 percent of establishments were non-training in the sense that they provided no off-the-job training to the largest group of non-managerial employees in the workplace. A substantial negative association was found between training and the likelihood of establishment closure. More than one in four non-training establishments shut-down over the period 1998 to 2004 compared to only one in nine training establishments. The estimated effect of providing training was to reduce the probability of closure by nine percentage points.

Chapter 3 – The Data Sets In Detail

3.1 Introduction

As outlined in the first chapter the aim of the project is to analyse the relationship between training, job satisfaction and economic performance at establishment level using econometric techniques. However, no single data set is ideal for this purpose since it is unusual to find all three aspects covered in a single survey. Further, the questions asked may differ and as we have seen training has several dimensions and particular surveys may be conducted at different times. For this reason we analyse three separate data sets. The first, the Skills Survey 2001, has a range of questions on training, the nature of jobs and job satisfaction, but as it is a survey of employees it cannot provide information on establishment performance. The second, the British Household Panel Survey is similar to the above as it is a household survey including questions on training and job satisfaction, and having no data on company performance. Its advantage over the Skills Survey is that it is a panel, so that we can examine changes over time. The third data set, WERS 2004 is a survey of establishments, but contains information on individuals within them. It, therefore, provides matched employer-employee data. This makes it particularly useful for examining the relationship between training, job satisfaction and company performance. In 2004 a separate financial performance questionnaire was applied to a sub-sample of establishments, which is particularly important given the nature of this project. It is, therefore, the only data set covering all three aspects and is complementary to the other two data sets used in this study. Using all three data sets, however, enables us to cover a wider range of training questions than otherwise would be possible. Below we outline the way in which information was collected, a description of the data and specific features of the data for each of the three data sets.

3.2 Skills Survey 2001

3.2.1 Collection of Information

This survey was carried out by the ESRC Research Centre on Skills, Knowledge and Organisational Performance (SKOPE) on behalf of the Department for Education and Skills. It consisted of face-to-face interviews with 4,470 individuals in employment in

Great Britain aged between 20 and 60. The main focus was on the skills that individuals use in their jobs and their relationships to individual and job characteristics and labour market rewards. The survey replicated many aspects of an earlier Skills Survey conducted in 1997, enabling one to assess the degree of change over the period 1997 to 2001. However, there was some commonality also with the Social Change and Economic Life Initiative Survey (SCELI) conducted in 1986-87 and the Employment in Britain Survey 1992. An analysis of changes over the full period 1986-2001 is contained in Felstead, Gallie and Green (2002).

3.2.2 Data Description

The data in the 2001 Survey cover employment, skills currently held and held five years ago, detailed job analysis, computing skills, educational attainment, organisations, pay, changes over the past five years and demographic characteristics. Full variable descriptions are contained in Appendix Table A1.

3.2.3 Specific Features of the Data-set

The Survey can be used to investigate the link between skills and job satisfaction, or more specifically how qualifications, more general skills and training impact on job satisfaction. In addition, it is possible to identify the importance of organisational and job specific requirements in determining levels of job satisfaction as there is detailed information on skill utilisation, the nature of tasks (e.g. repetition) and the structure of work (e.g. employee views considered by management). Since training may also have a direct link with company performance the determinants of training receipt are also covered, again focusing specifically on skills and the structure of work.

3.2.4 How is the Skills Survey used in this Report?

In chapter 4 we analyse the two different measures of training incidence by industry and estimate probit models in each case, controlling for a large number of job characteristics. In chapter 5 we began with a descriptive analysis of job satisfaction by industry. Ordered probit models are considered separately for men and women again controlling for personal and job characteristics. There are, however, no data in the Skills Survey that can be used to estimate the effect of training and job satisfaction on performance.

3.3 The British Household Panel Survey

3.3.1 Collection of Information

The British Household Panel Survey (BHPS) is an annual survey or panel consisting of a nationally representative sample of about 5,500 households recruited in 1991, containing a total of approximately 10,000 interviewees. The sample is a stratified clustered design drawn from the Post Code Address File and all residents present at those addresses at the first wave of the survey were designated as panel members. These same individuals are re-interviewed every year and are followed up even if they leave the household to form a new household. Similarly, new members joining sample households, together with children as they reach the age of 16 are interviewed. The Institute for Social and Economic Research at the University of Essex is responsible for carrying out the survey, of which there are now 14 waves in the public domain.

3.3.2 Data Description

The core questionnaire contains a broad range of social science and policy issues including household composition, housing conditions, residential mobility, education and training, health and usage of the health services, labour market behaviour, socio-economic values and income from employment, benefits and pensions.

There is also a variable component containing questions which are not asked on a regular basis and questions designed to provide retrospective data on panel members' life histories prior to their first interview. For the purposes of this study we make use of questions on training and job satisfaction, but as a household survey there are no data on company performance. Full variable descriptions are contained in Appendix Table A2.

3.3.3 Specific Features of the Data-set

The unique value of the BHPS is its panel structure which enables us to control for unobservable factors which may determine individual behaviour. It follows the same representative sample of individuals over a period of years. It is household based, including every adult member of households in the survey and it contains sufficient cases for meaningful analysis of certain groups, such as the young and the elderly, the highly educated and the less well educated. Additional samples of 1,500 households in each of Scotland and Wales were added to the main sample in 1999 and in 2001 a sample of 2000 households was added in Northern Ireland, making the panel suitable for regional analysis of the UK.

3.3.4 How is the BHPS used in this Report?

In chapter 4 we analyse separately the periods from 1990 to 1997 and 1998 to 2004 as the training questions altered after 1997. We also consider who pays for the training, the reasons for training, whether a qualification was awarded and trends over time across industries. A probit model is estimated to explain the determinants of training. In chapter 5 we test whether those who have received training report higher levels of job satisfaction than those who have not received any and also whether this varies according to whether the employee or employer pays for it or whether a qualification is obtained. Further we consider whether the reasons for training are linked to the level of job satisfaction. As with the Skills Survey there are no data which enable us to link training and job satisfaction to work performance.

3.4 Workplace Employment Relations Survey (WERS) 2004

3.4.1 Collection of Information

WERS 2004 is a national survey of workplaces sponsored jointly by the Department of Trade and Industry (DTI), the Advisory, Conciliation and Arbitration Service (ACAS), the Economic and Social Research Council (ESRC) and the Policy Studies Institute (PSI). Earlier surveys were conducted in 1980, 1984, 1990 and 1998. The survey contains both cross-section and panel elements. The former contains a face-to-face interview with the senior manager responsible for personnel issues; a new self completion questionnaire on the financial performance of the establishment over

the previous twelve months; a face-to-face interview with a trade union representative (where present) and/or a non-union employee representative; and a self completion questionnaire distributed to a random sample of up to 25 employees at each workplace.

In scope WERS 2004 covers all but the smallest workplaces (i.e. excluding those with less than five employees) in Great Britain. It covers both private and public sectors and almost all areas of industry. The principal unit of analysis is the establishment or workplace, which is defined as comprising the activities of a single employer at a single set of premises. Examples include a single branch of a bank, a factory or a school.

The 1998-2004 Panel Survey returned to a random selection of workplaces that had participated in the Cross-Section element of the 1998 WERS to identify change over this period. Around 2,300 workplaces, 1000 employee representatives and 22,500 employees took part in the 2004 Cross-Section Survey. Around 950 surviving workplaces participated in the 1998-2004 Panel Survey. New in 2004 is a financial performance questionnaire providing quantitative data on productivity and profitability.

3.4.2 Data Description

The central focus is on the formal and structural relations which take place between management and employees at the workplace. Principal topics in the management interview include workforce composition, management of personnel and employment relations, recruitment and training, workplace flexibility and the organisation of work, consultation and information, employee representation, payment systems and pay determination, grievance, disciplinary and dispute procedures, equal opportunities, work-life balance, workplace performance and employee attitudes to work.

Topics covered in the Survey of Employees include working hours, job influence, aspects of job satisfaction, working arrangements, training and skills, information and consultation, employee representation and pay.

Topics covered in the Finance Performance Questionnaire include turnover (or budget if public sector), value of assets, capital expenditure, purchase of goods,

materials and services, employment costs and R&D activity. Full variable descriptions are contained in Appendix A3.

3.4.3 Specific Features of the Data-set

The purpose of each survey is to provide large scale and systematic evidence on numerous aspects of employment relations across most sectors of the British economy. In particular, it provides a mapping of employment relations and enables one to monitor changes over time. An important feature is that it provides matched employer-employee data. This enables one to separate within-firm from between firm variation and to compare management and worker responses to the same questions.

3.4.4 How is WERS used in this Report?

In chapter 4 we consider first the amount of (non health and safety) training received across industries over the previous twelve months. We then consider training duration. From the management questionnaire we next consider the average amount of training received by experienced workers in the largest occupational group in each establishment and then the type of training received and the reasons for it. The econometric analysis focuses on training incidence (estimated by random effects ordered probit) and training intensity (ordered probit). In chapter 5 we consider different facets of job satisfaction (as there is no question in WERS on overall job satisfaction) and variations across industries and according to whether training has been received in the last twelve months or not. In chapter 6 the focus is on establishment performance both measured subjectively by managers and objectively from the financial performance questionnaire. In addition we consider whether there are spill-over effects from measuring education and training in the workplace and changes over the period 1998 to 2004. Ordered probit analysis is carried out for labour productivity and financial performance and tobit analysis of workplace absence and quits in relation to training and job satisfaction.

Chapter 4 – The Determinants of Training

4.1 Introduction

In this chapter we describe the main features of the training data contained in each of the three data sets and then model the determinants of training for each data set controlling as far as possible for personal and job characteristics. Finally we conclude by assessing the extent to which the data sets are consistent in explaining why some individuals and industries are more likely to receive training than in other cases and the extent to which findings diverge across the data sets.

4.2 Types of Measures of Training in the 3 Data-sets.

4.2.1 Skills Survey 2001

The Skills Survey 2001 contains two alternative measures of training. The first simply asks employees "since completing full-time education have you ever had, or are you currently undertaking, training for the type of work you currently do?" From this we can construct a dummy variable (train1) to assess the incidence of job-related training across the sample. A second question elicits more information about the nature of the training received, asking "since your last job three, four or five years ago, have you done any of these types of training and/or education connected with your job or a job that you might do in the future?"

(i) "received instruction whilst performing your normal job",
(ii) "taught yourself from a book/manual/video/computer/cassette",
(iii) "followed a correspondence course (such as Open University)",
(iv) "taken an evening class",
(v) "done some other work-related training",
(vi) "none of these".

Whilst, it is possible to calculate an alternative dummy variable (train2) from this question such that any type of training is given a value of 1 and no training a value of 0 this will give a different measure of training incidence than train1. In fact, 58 per cent of the sample respond positively to train1, but 77 per cent do so in the case of train2, despite the fact that the latter has a more constrained time period. In part the

difference could be explained by the inclusion of future career in train2, but possibly more crucial is the likelihood that some individuals would not consider, unless prompted, that options like "taught yourself" or "taken an evening class" constitute training. In turn, this suggests that differences in individual perceptions of what constitutes training can give rise to measurement error as individuals with the same training experience may give different responses depending on the questions asked. In so far as training questions refer to what happened in the past they may also be subject to recall error.

The Skills Survey also contains more detailed information about the type and duration of training for each of the training measures adopted. This is important, as incidence may be a misleading indicator if some of it is of short duration or poor quality. The length of training for train1 is divided into seven categories ranging from less than one week to more than two years and that for train2 into five categories ranging from at most one day to more than six months. There is also a question in relation to both train1 and train2 on whether a qualification was awarded at the end of the course. Train2 also provides details of training both for training in the last five years and training with the current employer which can be used to examine who provided and paid for the training, the extent to which it improved skills and the extent to which it was useful to the current or other jobs.

4.2.2 British Household Panel Survey (BHPS)

The BHPS differs from the 2001 Skills Survey in two respects:

(1) it asks respondents about both job-related and non-job-related training, the implications of which are potentially quite different.

(2) the nature of the question asked changed in the eighth wave and subsequently.

- In the first seven waves, 1991 to 1997, respondents were asked whether they had "taken part in any education or training, other than training that was part of any job you may have." Individuals were also asked whether they had received any work-related training/education in the previous year. This question could relate to a broad range of training activities.
- For the following waves, respondents were only asked if "they had taken any part-time courses in the previous year".

For waves 1-7 this restricts the analysis to work related training. For waves 8 to 14, we also make use of a follow-up question, which asks who funds the training, to restrict our analysis to training which has either been funded by an employer or future employer through the New Deal scheme or by Training for Work/Employer Training/TEC. In both cases they were also asked about the reasons for having either type of training, whether to develop general skills, to prepare for a future job, to extend the range of skills or to improve existing range of skills. A further question asked them whether or not they received a qualification for the training received.

From 1998 respondents were asked whether they had taken any part-time courses in the previous year and whether this was to help start the current job, increase or improve skills in the current job, prepare for a future job or to develop skills generally. As a panel data set the BHPS enables us to examine trends over time in each of these aspects.

In the BHPS interviews, training is defined as at least potentially job-related, and therefore excludes education or training undertaken as pastime, hobby or solely for general interest.

4.2.3 Workplace Employment Relations Survey (WERS 2004)

WERS 2004 asked questions on training of both managers and employees. The former were asked about the proportion of experienced staff who had been given time off for training in the previous twelve months and also questions on the duration of training, what it covered, its objectives and the amount of formal training that was provided to enable workers to undertake tasks other than their own. Employees were also asked how much training they had received in the previous twelve months, their satisfaction with it and how the work skill they possessed matched the skills needed to do the job. More particularly, the question explicitly excluded health and safety training and the duration was divided into six categories from zero up to ten days or more. The management questions related to the average number of days training undertaken by experienced members of the largest occupational group over the past twelve months. Managers were also asked about the proportion of experienced members of the largest occupational group given time-off from normal daily work duties to undertake training over the past twelve months. Further questions were asked on what was covered in the training in terms of the types of

skill (11 categories including health and safety) and on the purpose of the training (6 categories).

It can be seen, therefore, that there are some common elements in the training questions asked in the three data sets (see Table 4.1). All of them have questions on training incidence, its type and the reasons for it. However, there are also distinctive features. Only the 2001 Skills Survey and WERS ask questions on the duration of training, though even here the durations identified differ. Only the Skills Survey and the BHPS asked whether a qualification was awarded. Only WERS makes a clear distinction between health and safety and other forms of training and specifies particular questions in relation to experienced members of the largest occupational group. It also asks questions of both managers and employees, enabling one to check whether answers on training are consistent between the two sides of industry.

Table 4.1

Training Questions in the Data Sets

	Training since leaving full-time education	Training in the last 12 months	Types of training	Duration of training	Reasons for training	Qualification awarded
Skills Survey	√	-	√	√	√	√
BHPS	-	√	√	-	√	√
WERS	-	√	√	√	√	-

For each data set we now review the evidence with regard to the determinants of training, but we begin each summary of the analysis with an analysis of training by industry sector, as reported by each data set.

4.3 The Determinants of Training

The descriptive analysis will be followed by the results of econometric analysis to explore the determinants of training. More detail on the methodology can be found in the Appendix 1a.

4.3.1 Skills Survey 2001

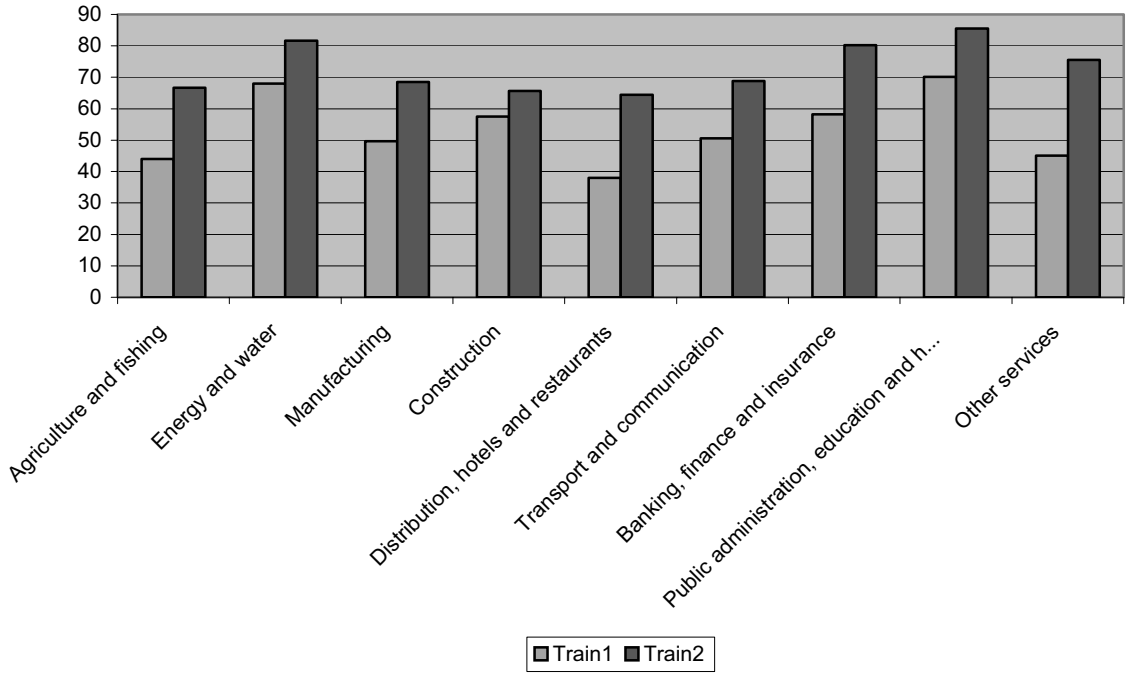
Descriptive Statistics

The Skills Survey descriptive data (see the Appendix Table A1 for full variable definitions) suggest that train1 (job-related training) tends to be of longer duration than train2 (any training) answers. In the former case over 46 per cent of training in the public sector and 29 per cent in the private sector lasts more than two years, whereas in the case of train2 only just over 24 per cent in the public sector and 18 per cent in the private sector lasts more than six months. Workers in the public sector are also marginally more likely to attain a qualification associated with new training – 62 per cent compared to 58 per cent according to train1 and 41 per cent compared to 35 per cent according to train2.

Figure 4.1 provides data on training incidence by industry. Levels of training (train1) differ quite dramatically with 70 per cent of individuals receiving job-related training, since leaving full-time education in Public Administration, Education and Health compared to less than 40 per cent in Distribution, Hotels and Restaurants. The alternative measure of training (train2) has a higher incidence for all industries than train1, but identifies the same two industries as having the highest and lowest incidence.

Figure 4.1:

Incidence of Training by Industry sector (in %)



Source: Skills Survey 2001

Econometric analysis

In the regression analysis (Appendix Tables A4 and A5) there are few significant differences between occupation and industry, suggesting that the controls for specific job features capture the differences identified in Figure 4.1. However, the effect of occupation is not consistent across the two definitions of training. For example, using train1 sales and elementary occupations are significantly less likely to receive training than Managers and Senior Officials since leaving full time education. However, for training undertaken in the last five years (train2) working in personal service occupations and administrative and secretarial occupations has a positive effect relative to Senior Managers. This is consistent with the important distinction between the definitions of training where train1 may cover more training prior to entry to the occupation.

Consistent with previous evidence, qualifications are particularly important in increasing the probability of receiving job related training. Training also appears to be used to update skills due to changes in work practices as individuals who state that they have to learn new things are also much more likely to receive training. Conversely, those who report that they are over-educated are less likely to receive training, suggesting that they have the ability to meet any changes in the requirements of the job without the need for further training. For train2 this effect is only significant in the private sector, where over-education is a more prevalent phenomenon[10].

In the private sector certain job specific characteristics have a positive influence on training. Examples are being closely supervised, having a formal appraisal system, being given targets and having a choice over the way in which work is conducted. There are also gender differences with such characteristics having a greater impact on male training probabilities.

4.3.2 British Household Panel Survey (BHPS)

In the BHPS interviews, training is defined as at least potentially job-related and, throughout this analysis we consider working age people only. Our data are unweighted as we cannot use the weights provided with some of the econometric techniques utilised. In wave one, only employees were asked the training question. At wave two, this was extended to all currently working. Thus for consistency we consider employees only. Variable descriptions are contained in the appendix. As noted earlier the training questions in the BHPS were altered in 1998. Further there were changes in the industry classification codes in wave 11. For these reasons it is necessary to conduct the analysis separately for waves 1-7 (1991-1997), waves 8-11 (1998-2001) and waves 11-14 (2001-2004). Two separate definitions are available for 2001 and this is the reason for the overlap in this year.

[10] There are differences in the significance of particular variables according to whether train1 or train2 is the dependent variable e.g. with respect to age, occupation, union membership and job attributes.

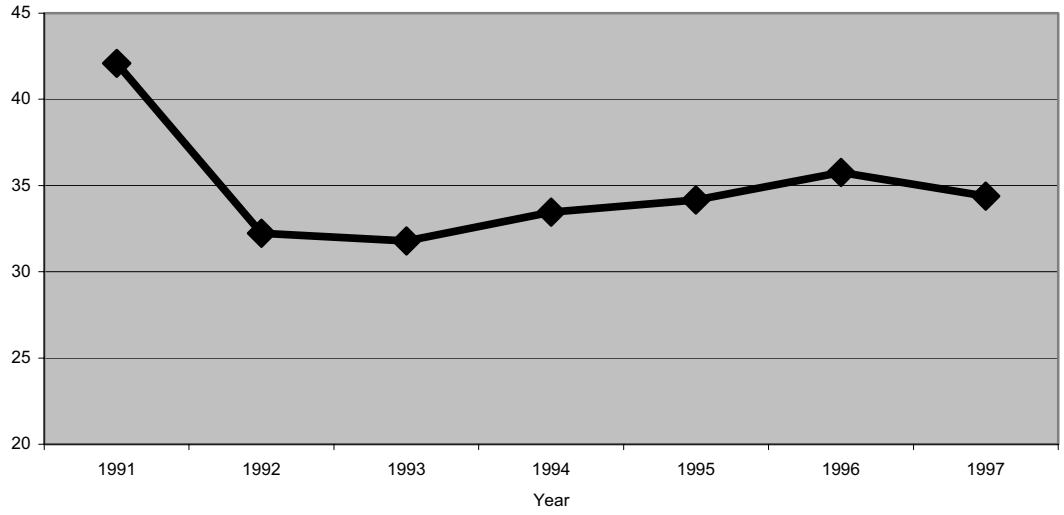
Analysis using Waves 1-7 (1991-1997)

Descriptive Statistics

First we present some statistics describing the incidence of training in different industries. Figure 4.2 shows the distribution of responses to the question 'have you received any work related training/education in the previous year?' Around one-third of employees in the BHPS report that have received work related training in the past year. There is a notable drop in the training rate between 1991 and 1992. This may be, in part, due to the block of questions on training being moved from near the beginning of the employment section, to near the end perhaps changing what people had in mind when discussing training. Also in wave 1 questions were also asked in a slightly different order.

Figure 4.2:

Training Rates in the UK 1991-1997: All Industries (in %)



Source: BHPS

As shown in Table 4.2 the lowest rate of training rate is the Agriculture, Forestry & Fishing sector where around 14% of individuals employed in that sector saying they have received job related training. There are less than 100 individuals in this sector per wave so the calculated training rate is sensitive to small changes in the training

status of the questioned individuals. The training rate is highest in the Energy and Water Supplies sector, with more than half of the workers in this sector receiving job related training.

Table 4.2:

Training Incidence by Sector BHPS Waves 1-7

								Average (%)
Agriculture, forestry & fishing								13.7
Energy & water supplies								53.7
Extraction of minerals & ores other than fuels; manufacture of metals, Mineral products & chemicals								38.6
Metal goods, engineering & vehicles industries								30.5
Other manufacturing industries								21.3
Construction								21.1
Distribution, hotels & catering								23.6
Transport & communication								32.3
Banking, finance, insurance, business services & leasing								42.9
Other services								46.4
All Sectors								34.8
All Sectors	1991	1992	1993	1994	1995	1996	1997	1991-97
	42.0	32.2	31.8	33.5	34.2	35.8	34.4	34.8

Source: BHPS

Econometric Analysis

We then pose the question what are the characteristics of those workers who are receiving job related training? As noted in 3.3.4 to answer this we use a probit estimation framework. These models are used when the dependent variable, the variable we are trying to explain, is dichotomous. In this context, the dependent variable takes the value '1' if the individual has received job related training in the previous year and '0' if they have not. The results of the econometric analysis are shown in Appendix Table A6 (column 2). Factors which increase the likelihood of having job-related training/education in the previous year include, being under 30, having previous qualifications, working in a professional or associate professional occupation, and being a member of a trade union. Factors which decrease the

likelihood of having job-related training/education in the previous year are, being male, being single, being registered as disabled, and living in Scotland.

Analysis using the BHPS Waves 8-14

Our training variable measures any training schemes or courses (whether employer-provided or not) received by individuals since September 1 in the previous year. It excludes spells of full-time education and leisure courses.

Descriptive Analysis

The training rates by wave are shown in Table 4.3. Because of the two sets of industry codes two sets of results are reported; the first from waves 8-11 using the SIC80 codes, the second from waves 11-14 using the SIC92 codes.

Table 4.3:

Training Rates by Wave

(a) Training Incidence by Sector BHPS Waves 8-11

	Average (%)
Agriculture, forestry & fishing	14.1
Energy & water supplies	41.4
Extraction of minerals & ores other than fuels; manufacture of metals, mineral products & chemicals	31.9
Metal goods, engineering & vehicles industries	28.3
Other manufacturing industries	19.8
Construction	28.4
Distribution, hotels & catering (repairs)	22.9
Transport & communication	27.5
Banking, finance, insurance, business services & leasing	33.9
Other services	39.9
All industries	34.4

(b) Training Incidence by Sector BHPS Waves 11-14

	Average (%)
Agriculture, forestry & fishing	17.5
Mining and Quarrying	39.2
Manufacturing	24.4
Electricity, Gas and Water Supply	32.9
Construction	29.7
Wholesale and Retail Trade	20.6
Hotels and Restaurants	22.8
Transport, Storage and Communication	23.8
Financial Intermediation	33.8
Real Estate, Renting and Business Activities	29.7
Public Administration and Defence Compulsory Social Security	39.0
Education	42.8
Health and Social Work	46.2
Other Community, Social and Personal Service Activities	31.4
All Industries	31.4

(c) Training Incidence for all sectors Waves 8-11 and Waves 11-14

Training Rates by Wave – All Industries					
	Waves 8-11				
	1998	1999	2000	2001	Total
All Industries	31.8	30.0	33.3	30.7	34.4
	Waves 11-14				
	2001	2002	2003	2004	Total
All Industries	30.69	30.30	31.57	33.01	31.37

Training incidence appears to have fallen slightly between these two periods. Agriculture etc. has the lowest percentage of its workforce engaged in training and Other Services the highest. These are split into Health and Social Work, Education and Public Administration etc. in the later period and these each record the highest incidence of training. As with the Skills Survey Distribution, Hotels and Catering have one of the lowest recorded figures.

Econometric Analysis

The econometric analysis of the later waves largely confirms the results for the earlier period i.e. being under 30, having previous qualifications, having short job tenure and being a member of a trade union increase the likelihood of receiving training. However, working in a professional or associate professional occupation now has no significant effect on the probability of receiving training in waves 8-11, as does the former in waves 11-14. (See Appendix Table A6, columns 3 and 4). Of the factors which decrease the likelihood of having job-related training or education being male and living in Scotland remain significant, but being single and registered disabled are no longer significant.

Training "quality"

In later waves, we are able to explore additional factors related to the quality of training, such as location and whether this led to a qualification. The results are provided below.

Training location

Individuals were asked for details of up to three training events they had participated in since September of the previous year. For each of these they were asked about where the training took place. Most commonly this was in the current workplace (35-36 per cent of cases), followed by the employer's own training centre (18-20 per cent), a private training centre (18-19 per cent) and an FE College (16-18 per cent). (See Appendix Table A7 for further details).

Reasons for being trained

Individuals were asked for details of up to three training events received since September 1 of the previous year. For each of these they were asked about the reason for the training.

The precise questions were: "Was this course or training:

(i) To help you get started in your current job? (induction)

(ii) To increase your skills in your current job? (increase skills)

(iii) To improve your skills in the current job? (improve skills)

(iv) To prepare you for a job or jobs you might do in the future? (prepare for new job)

(v) To develop your skills generally?" (develop skills)

The categories are not mutually exclusive.

Table 4.4:

Reasons for being trained

	Induction	Increase Skills	Improve Skills	Prepare for New Job	Develop Skills
Waves 8-11	13.6	73.6	78.2	64.9	86.4
Waves 11-14	13.2	71.9	79.3	65.7	87.0

These data in Table 4.4 suggest that only a minority of training is induction training, which is to be expected as under normal circumstances only a minority of the workforce will be new recruits. Each of the other categories applies to most employees receiving training. We do not know the extent to which category (iv) applies to new jobs in the current place of employment or in new employment in a different workplace.

Paying for the Training

Respondents were asked "Which statement or statements on this card describe how any fees were paid, either for the course or for the examinations?" This is relevant to the benefits to be obtained since employers will pay for training if they believe it will result in improved workplace performance, while workers will pay for it if they believe it will enhance future earnings.

The non-mutually exclusive categories were no fees, self/family, employer/future employer, New Deal scheme, training for work, youth training, TEC training or other arrangements.

Most commonly it is the employer who pays for training followed by cases where there is no fee payment. This might be misleading, however, since there is always an opportunity cost to training. For instance, there might be some loss of production while individuals train. (See Appendix Table A8 for further details).

Qualifications

Respondents were asked whether the course or training was designed to lead directly to a qualification, part of a qualification, or no qualification at all. The answers were non-mutually exclusive since individuals could have more than one episode of training. The data suggest there is a roughly equal division between

those who receive a qualification and those who do not. (See Appendix Table A9 for further details). The relevance of this is that certification of training may be more beneficial to the worker in the long-run as it can prove to a new employer what the worker has previously accomplished.

4.3.3 Workplace Employment Relations Survey (WERS 2004)

Descriptive Statistics

Training incidence, intensity and purpose

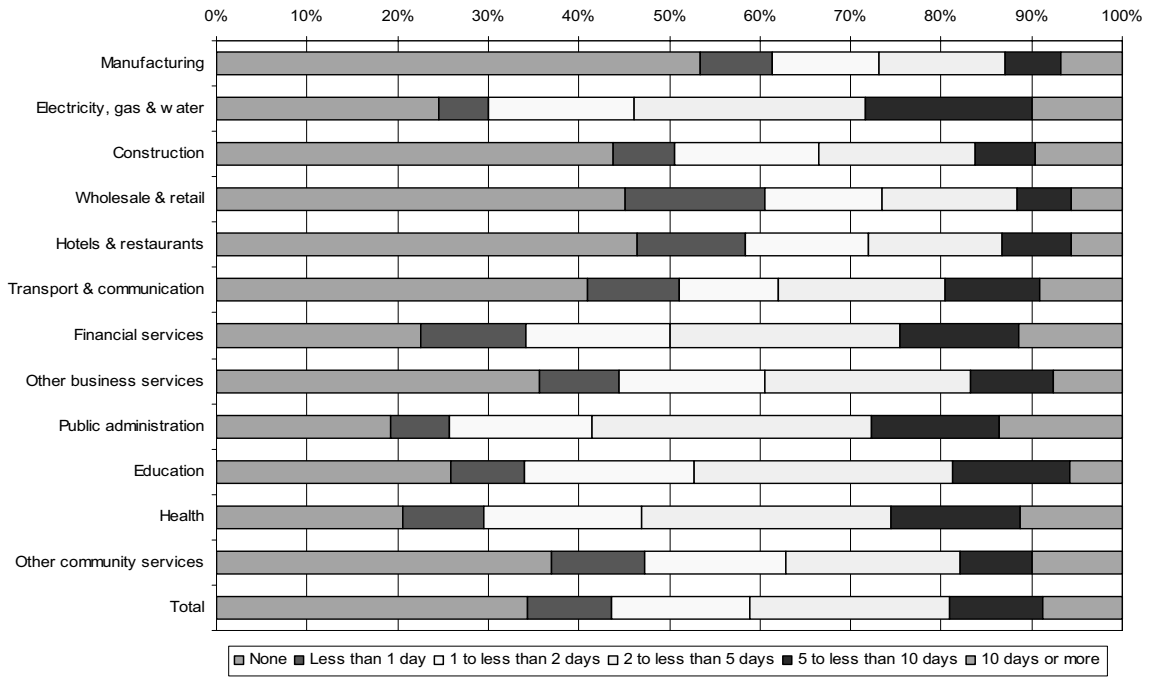
A basic descriptive analysis of the data reveals a number of interesting patterns. Starting with the employee data, Figure 4.3 reveals that in aggregate, around two thirds of employees in the sample had received some non-health and safety (H&S) training in the preceding 12 months paid for or organised by their employer, with slightly fewer than 20 per cent having 5 days or more.

Broken down by sector (see Figure 4.3 below), the data reveal an interesting pattern. Thus, more than 40 per cent of employees in Construction, Wholesale and Retail, Hotels and Restaurants, Transport and Communication, and especially Manufacturing (53 per cent of all employees) received no non-H&S training during the previous year. This stands in stark contrast to sectors such as Electricity, Gas and Water, Financial Services, Public Administration, Education, and Health, where training incidence stands at approximately 75 per cent or more. These last three sectors are of course dominated by the public sector, and the above is thus consistent with the previous findings both from WERS (Cully et al., 1999) and elsewhere (see for example, Latreille, et al., 2005 and the references therein) that training incidence is higher in the public sector relative to the private[11].

[11] An explicit public-private sector comparison reveals the percentage of employees receiving training exceeds 75 per cent in the public sector (and 70 per cent in 'other' sectors such as charities, etc.), falling to below 60 per cent for those working in the private sector.

Figure 4.3:

Apart from health and safety training, how much training have you had during the last 12 months, either paid for or organised by your employer, by sector? (% of employees)



Source: WERS

When comparing days of training received, as might be expected from the above, the proportion of employees receiving training of 2 days or more in the previous year is especially low in Manufacturing, Wholesale and Retail and Hotels and Restaurants, and conversely is substantially higher in those sectors identified above as exhibiting higher training incidence[12]. Restricting attention to those persons actually receiving training (i.e. looking at training duration conditional on incidence), relative to the average across all sectors training receipt of less than 1 day is more common in Manufacturing, Wholesale and Retail, Hotels and Restaurants, Transport and Communication and Electricity, Gas and Water, while intermediate volumes of 2-10 days are accordingly less common with the exception of the last two industrial groups. Public Administration, Education and Health in contrast, are all characterised by markedly lower than average proportions of employees receiving less than 1 day

[12] There is again a differential in favour of those working in the public sector, where almost a quarter of employees (24 per cent) receive 5 or more days, compared with just 17 per cent of those working in the private sector.

of training conditional on receiving any. The first two of these sectors display a higher conditional incidence of training of between 2 and 5 days, but whereas Public Administration employees were more likely than the average across all groups to have received in excess of 10 days training, the reverse was true for Education. In Construction, a more complex picture emerges, with conditional training volumes of between 2 and 10 days less common than average, while higher proportions of respondents indicated they had received 1-2 days or 10 or more days of training, the last likely reflecting 'time-serving' forms of training such as apprenticeships. Taken as a whole however, the raw data lead to the conclusion that not only is there a lower training frequency in certain sectors such as Manufacturing, Wholesale and Retail, Transport and Communication and Hotels and Restaurants compared with Public Administration, Education and Health, but that average time spent in training (even conditioning on its receipt) is also shorter.

Turning next to training incidence in the management (workplace level) questionnaire, Figures 4.4 and 4.5 respectively document for experienced members of the largest occupational group the average number of days training received and the (banded) proportion given time off for training. The fact that these data relate (only) to the largest occupational group in the workplace rather than the whole workforce is important, and may explain in part the higher incidence and time spent in training reported by managers compared with the accounts of individual employees in Figure 4.3. It should also be noted that training may here *include* H&S, unlike Figure 4.3 (see also Figure 4.6 below, which reveals this form of training to be especially prevalent), and are subject to the caveat of small sample sizes for a number of industries, most notably Electricity, Gas and Water and Hotels and Restaurants.

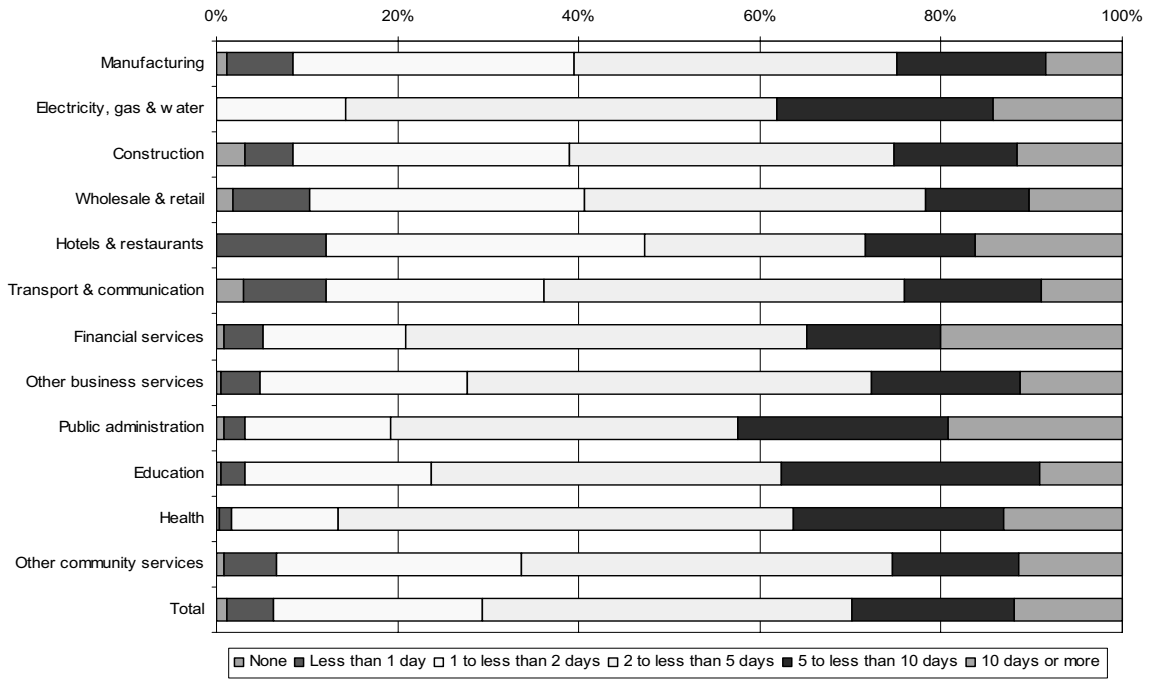
These points notwithstanding, the data in Figure 4.4 essentially confirm the individual accounts in terms of sectoral comparisons, albeit with virtually all employers claiming to provide some training[13], and accordingly only very small differences in the incidence of non-zero training days are evident. However, the broad pattern in terms of the time spent in training in Figure 4.3 is largely repeated, with the proportion of workplaces in Electricity, Gas and Water, Public Administration, Education, Health and Financial Services reporting higher percentages (75 per cent or more) of the

[13] To the extent that it reflects positively on both themselves and the organisation, managers may have an interest in reporting high levels of training.

largest occupational group receiving 2 or more days of training compared with those in Manufacturing, Construction, Wholesale or Retail and Hotels and Restaurants (typically fewer than two thirds).

Figure 4.4:

Average number of days training undertaken by experienced members of the largest occupational group over the past 12 months, % of workplaces by sector

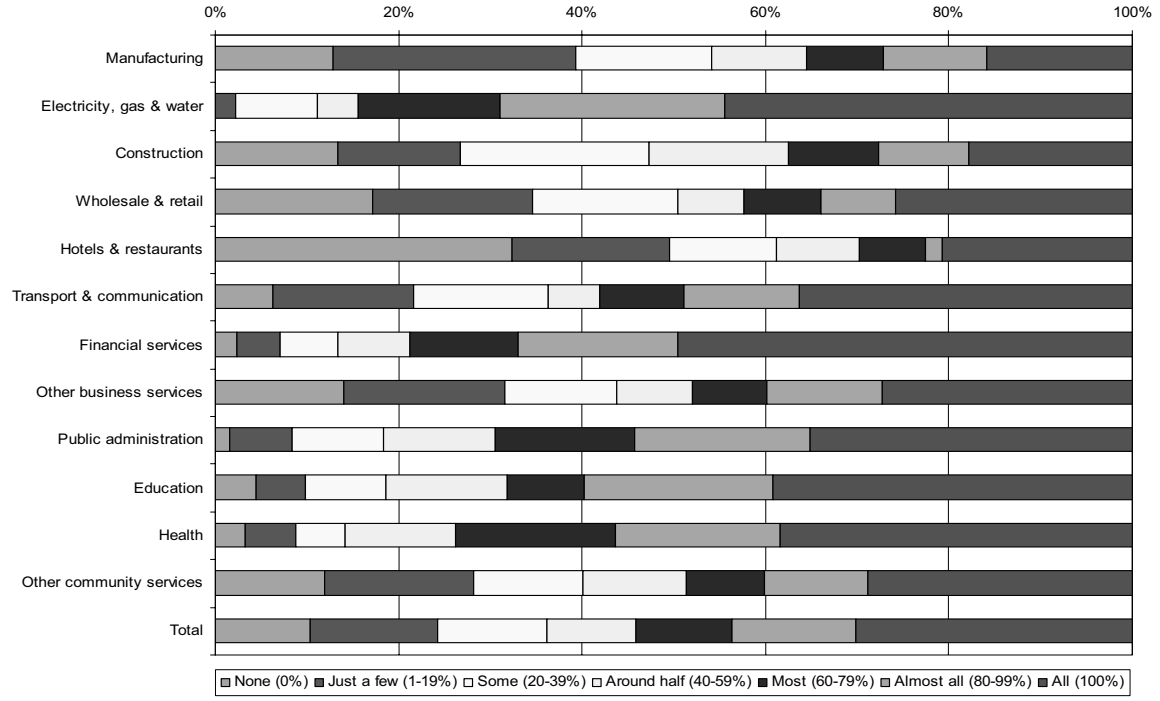


Source: WERS

Figure 4.5 instead focuses on the percentage of the largest occupational group given time off from normal work activities in order to undertake training, again in the preceding 12 months. As is apparent, a significant proportion of respondents claimed to have given time off for all or almost all of the largest occupational group, with three quarters reporting allowing one fifth of this group time off, and 90 per cent giving at least some of the group time off. This illustrates the importance attached by employers to training issues, and is *prima facie* evidence of employers' recognition that this training needs to be distributed across (at least) the (largest section of the) workforce. Again however, there is substantial variation across sectors, although with a similar pattern emerging to that identified in the preceding graphic.

Figure 4.5:

Proportion of experienced members of the largest occupational group given time off from normal daily work duties to undertake training over the past 12 months, % of workplaces by sector



Source: WERS

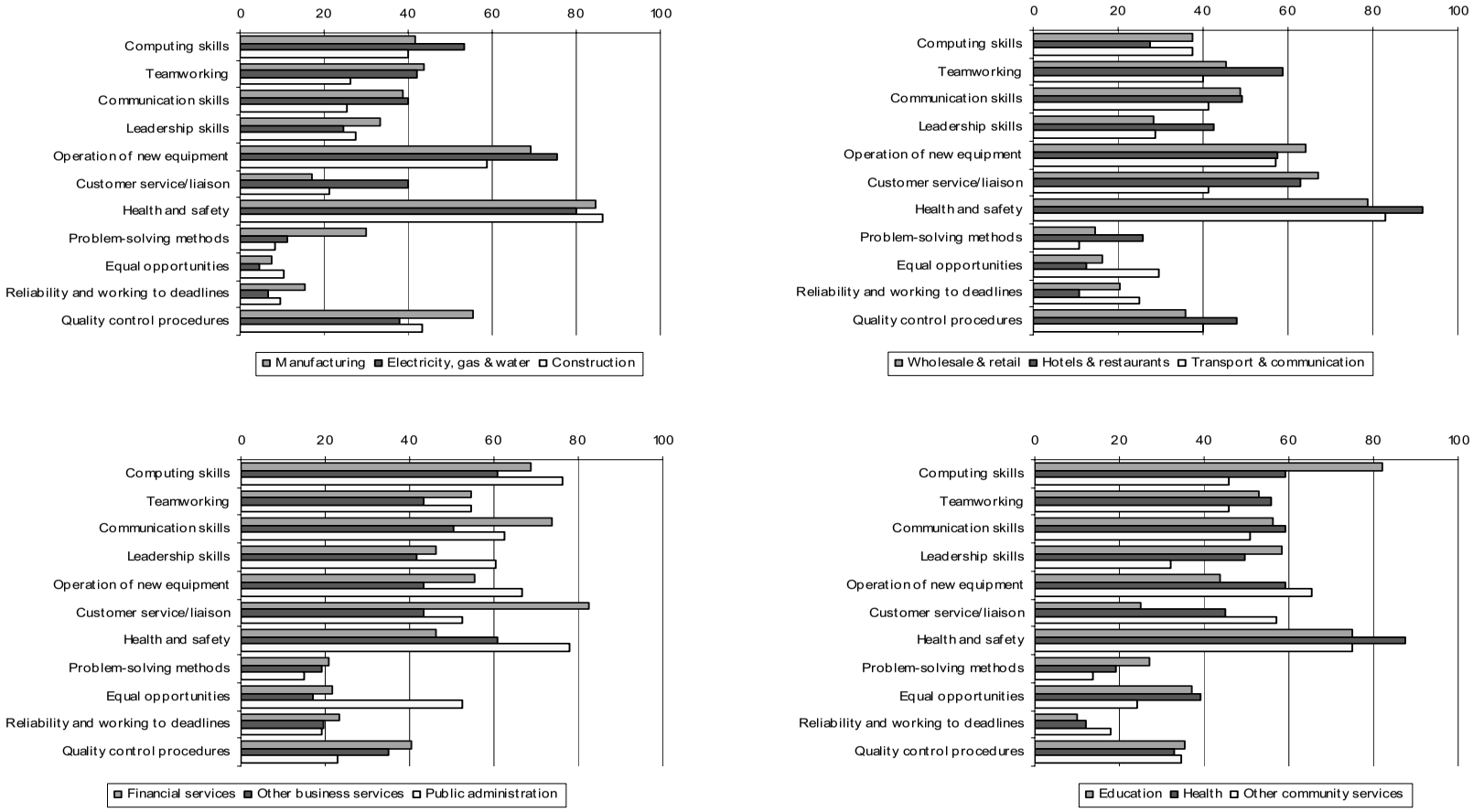
Thus, almost half of workplaces in Financial Services allowed all of the workers in the largest occupational group to have time off from their normal duties for training purposes in the preceding 12 months, while around 80 per cent of workplaces in both this sector and in Electricity, Gas and Water allowed most (60 per cent or more) of the dominant occupational group time off for this end. In contrast, just over one fifth of establishments in Hotels and Restaurants allowed all of the main occupational group time off, and around a third actually made no such provision for any members of this group.

As noted above, an important issue concerns not just whether training is provided and how much, but what that training covers, and Figure 4.6 accordingly examines this issue in the context of the training received by the largest occupational group, again split by sector. As is apparent, the most common component of training offered

across the whole sample relates to H&S (77 per cent), followed by the operation of new equipment (59 per cent) and computing skills (54 per cent). The figure also reveals some interesting differences between sectors. Thus, employers in Financial Services, Business Services, Public Administration, Education and Health are all more likely than average to provide training involving computing skills, and with the exception of Business Services, in respect of inter-personal skills such as communication, leadership and teamworking (which is found to be significant also in the Hotels and Restaurants sector). As might perhaps be expected, far greater emphasis on equal opportunities training exists in industries dominated by the public sector, while H&S training is less important in Financial Services, reflecting its relative risk compared with other industries such as say, Hotels and Restaurants and Health. Financial services and Wholesale and Retail are also most likely to report training covering customer service, while quality control is clearly more pertinent in Manufacturing. In contrast, quality control procedures and reliability/working to deadline are more likely to form part of training provision in what might loosely be classed as the private sector, and in particular Transport and Communication and Financial Services.

Figure 4.6:

Coverage of training of experienced members of the largest occupational group given time off from normal daily work duties to undertake training over the past 12 months by sector

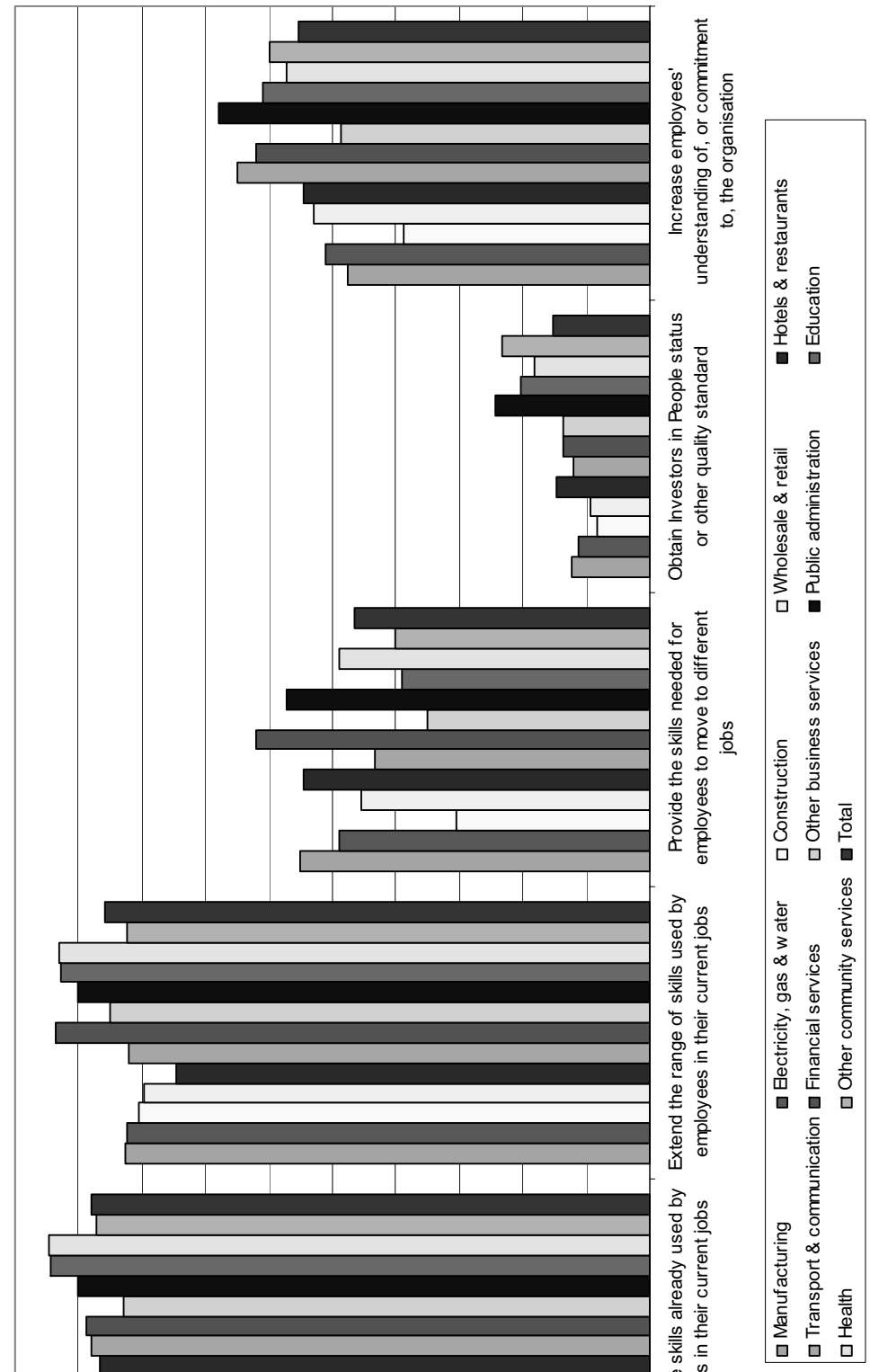


Source: WERS

Figure 4.7 next documents the reasons for/purpose of training provided for the largest occupational group as reported by management respondents. As can be seen, in the vast majority of cases managers reported that the training was to improve the skills or extend the range of skills used by employees in the current jobs (88 and 86 per cent respectively), although around half of the respondents also claimed the training was needed to allow employees to move to different jobs (46 per cent) or to increase employee understanding of or commitment to the organisation (55 per cent). Only a minority (15 per cent) reported that training was intended to obtain Investors in People (IiP) or some other quality standard, with this being notably more commonly reported by managers in organisations that were part of the public sector than their private sector counterparts.

In terms of comparisons across sectors in the objectives of training offered, some interesting patterns emerge. Thus, a markedly lower proportion of employers in Construction reported training was designed to improve the skills already used by employees, while the converse was true for employers in the Electricity, Gas and Water, Public Administration, Education and Health. Extending the range of skills used by employees in their current jobs was more important than average for these last three sectors, together with Financial Services, but rather less so for those in Hotels and Restaurants. In contrast, providing the skills for employees to move to different jobs was important in Hotels and Restaurants, along with Manufacturing, Financial Services and Public Administration, perhaps because this provides important cover for absence etc. Finally, it is worth noting that employers in Public Administration and Financial Services, together with Transport and Communication, Education and Other Community Services are more likely than average to report that securing employee understanding of, or commitment to the organisation was a motive for training. Such incentives are less evident in Manufacturing, Electricity, Gas and Water, Wholesale and Retail, Other Business Services and most notably Construction (just 39 per cent of workplaces compared with the average of 55 per cent across the sample). This last perhaps reflects the fixed-term nature of much employment in this sector, and suggests that such considerations will be revealed in the econometric analysis later.

Figure 4.7:
Objectives of training received by experienced members of largest occupational group in previous 12 months by sector



Econometric analysis

Training incidence, intensity

Estimates for the various training measures documented above appear in Appendix Tables A10 and A11. The first set of estimates (presented in Appendix Table A10) are respectively the random effects probit and ordered probit models for the individual level training incidence and intensity (number of days) variables. Appendix Table A11 then presents ordered probit estimates of the (banded) average number of days training received by members of the largest occupational group in the previous 12 months and the proportion of that group given time off for training purposes during the same period. Although perhaps obvious, it should be reiterated that both of these last measures are reported by managers, while the results in Appendix Table A10 relate to the accounts of individual employees.

Rather than providing a blow-by-blow account, many of the results in Appendix Tables A10 and A11 are now well-established in the literature[14], and we accordingly focus only on the main patterns emerging from these various sets of results. Beginning with Appendix Table A10, both the probability of receiving training and its volume (as measured by number of days) fall monotonically with age, reflecting the shorter period over which returns may be amortised[15]. For example, a worker aged 50-59 is, other things being equal, around 10½ percentage points less likely to have received training in the previous 12 months than a worker aged 21 or under (as shown by the marginal effect). The same logic underpins the negative relationship between both training measures in Appendix Table A10 and being employed on a temporary/fixed term basis, and the positive relationship between training and hours worked. The data also reveal a negative association between both training incidence/days and tenure independent of age; training is actually more likely for workers with modest tenures (1-2 years), but the probability declines thereafter, and days of training is lower for all tenures in excess of 2 years compared with tenure of less than 1 year, reflecting the fact that much training is of an induction variety.

[14] In the UK context, see for example the papers by Booth (1991, 1993), Green (1991, 1993, 1994), Green and Zanchi (1997), Greenhalgh and Stewart (1987), Greenhalgh and Mavrotas, (1994, 1996), Dearden et al. (1997), Shields (1998), Almeida-Santos and Mumford (2004), Jones *et al*. (2004); Latreille *et al*. (2005) and the pan-European work by Arulampalam et al. (2004).

[15] See footnote 14.

Reflecting existing results in the literature, training is more likely for those with higher qualifications, and also vocational qualifications. Interestingly, the probability of receiving training and training duration are both lower for workers whose skills are significantly above or below those required for their jobs. The latter in particular is perhaps surprising, and suggests that employers are not making up the deficit by investing in such workers. There is also evidence that training varies by occupation and is also more likely where employees use computers as part of their work. As might be expected, both measures are positively related to organisational size (but not workplace size) and to the presence of various consultative arrangements in respect of training such as the existence of a Joint Consultative Committee or briefing group.

Finally, even controlling for the extensive set of potential determinants of training in Appendix Table A10, the results still reveal a substantial and significant role for industrial sector. Thus, the marginal effects (Table A10, column 3) indicate that, compared with the omitted category of Manufacturing, employees in Construction are around 8 per cent more likely to have received training, with the corresponding figure being around 12 per cent in Hotels and Restaurants, Transport and Communication and Other Business Services, 14 per cent in Other Community Services, 16 per cent in Electricity, Gas and Water and more than 20 per cent in Financial Services, Education, Public Administration and Health. These last three are of course largely synonymous with the public sector, and suggest that a substantial differential exists that is not simply due to other explanatory variables such as those in Appendix Table A10 (see Latreille et al., 2005 for further discussion).

The next sets of estimates relate not to the individual data, but instead to the workplace level measures, namely the (banded) variables for the average number of days of training for the largest occupational group and the percentage of same receiving training. These are presented in Appendix Table A11. One cautionary note here is that while the training measure relates to the largest occupational group, the demographic variables instead relate to the workforce as a whole. This is an unavoidable feature of the data, and should be borne in mind when considering the results[16].

[16] Although it would be possible to include full-/part-time splits and male-female splits specifically for the largest occupational group, this would mean that the demographics were measured on a non-consistent basis, and for this reason the demographics at the workplace level relate to the workforce as a whole.

Among the main significant results are that while the proportion of the largest occupational group receiving training is higher in larger organisations, little role is found for workplace size. In contrast, the average number of days of training received by experienced members of this group is not significantly related to organisational size, but is instead influenced by workplace size, albeit only at the 10 percent level. Training is also generally higher in organisations that consult about training matters; such consultation is likely one among a raft of what might be termed 'high commitment' practices which are also associated with a greater propensity to train. An interesting feature of Appendix Table A11 is that the use of agency staff appears to be positively associated with the proportion of the largest occupational group receiving training, presumably due to the need to inculcate cover staff in the organisation and its values. Further, and in conformity with previous work done by members of the research team (Jones *et al*., 2004), the incidence of training is also higher (lower) where a higher proportion of the workforce is female (works part-time).

Finally, looking at the sectoral dummy variables in Appendix Table A11, these again confirm the strong residual variation present among industries even after controlling for a wide range of other potential determinants. In broad terms these results follow similar lines to those discussed in the context of the raw data and in relation to Appendix Table A10 above: both the proportion of largest occupational group and average days of training are higher in the majority of sectors compared with the omitted category of Manufacturing, this difference being more pronounced in the context of the proportion of workers trained. Again the effects are substantial in magnitude. For example, the marginal effects (not reported here) reveal employers in Health and in Education are in excess of 20 percent more likely to have trained all of their experienced employees in the largest occupational group in the previous year compared with employers in Manufacturing, while they are around seven percentage points less likely to have trained none of these workers. Once again therefore, sector is found to be a key driver of training volumes.

4.4 Chapter Summary

What workers perceive to be training is partly a function of the nature of the question that they are asked. It is important, therefore, to consider carefully the nature of survey questions on training. Most training is, in fact, organised and paid for by employers, but it is important to distinguish between job-related and non job-related training, as these may be influenced by different factors. The former is much more common and such training is generally designed to improve or develop skills in the current job, whereas the latter may be used to prepare individuals for a different job. The public sector is more training-intensive than the private sector, with a higher proportion of its workforce receiving training, which is generally of longer duration and marginally more likely to offer the trainee a qualification. The usual length of training is 2 to 5 days. Most commonly it covers health and safety issues, followed by the operation of new equipment and computing skills. Whilst it is true that some industries are much more training intensive than others, this is largely explained by the nature of the working environment and the personal characteristics of the workforce. Workers are more likely to receive training if they are young, female, not disabled, already possess a qualification and are in a professional job. Trade union membership also seems to be positively related to training provision. It is clear that there are dangers in treating training as a homogeneous entity and care must be taken in comparing different studies of training which may be defined differently in each of them.

Table 4.5 attempts to summarise the determinants of training incidence using two versions of training incidence in the Skills Survey, three separate waves of the BHPS and WERS. The two training measures in the Skills Survey do not always produce consistent results with differences relating to the significance of gender, ethnicity, age, marital status, job tenure, establishment size and trade union membership. However, it should be noted that Skills Survey models are estimated separately by gender and public/private sector, unlike the case with the other two data sets. Waves 1-7 and 8-11 in the BHPS differ with respect to the significance or otherwise of marital status, disability and establishment size. Waves 11-14 differ in relation to the significance or otherwise of marital status, disability, industry and trade union membership.

Table 4.5: Determinants of Training Incidence[1]

Dataset	2001 Skills Survey (train1)	2001 Skills Survey (train2)	BHPS Waves 1-7	BHPS Waves 8-11	BHPS Waves 11-14	WERS 2004
Gender (male = 1)	×[2]	×[2]	-	-	-	+
Age	×	-[3]	-	-	-	-
White (= 1)	+	+	×	×	×	×
Marital Status (married = 1)	×	- (women only)	+	×	×	-[4]
Disabled (= 1)	N/A	N/A	-	×	×	-
Highest Qualification	+	+	+	+	+	+
Job Tenure	×	-[3]	-	-	-	-
Industry	+/-	+/-	+/-	+/-	×	+/-
Establishment size	×	×	×	-	-	×[5]
Job Characteristics	+/-	+/-	+/-	+/-	+/-	+/-
Trade Union Member	+	×	+	+	×	+
Occupation	+/-	+/-	+/-	+/-	+/-	+/-
Over education/skill[6]	-	-	N/A	N/A	N/A	-

Notes to table: N/A denotes the variable is not present in the survey; × denotes no significant influence; + and - denote a significant and respectively positive or negative influence.
1: See Appendix Tables A4 to A11 for coefficient estimates and t-statistics.
2: Estimation is performed separately by gender, but in the overall model gender is not statistically significant.
3: Only significant for the quadratic variable
4: Training duration only.
5: Firm size is however significant using WERS; this is not available in the Skills Survey or BHPS.
6: The Skills Survey over-education variable refers to NVQ qualification held exceeding level required; the WERS variable refers to skills held greater than job requirements.

Chapter 5 – Job Satisfaction

5.1 Introduction

In this chapter we describe the measures of job satisfaction contained in each of the three data sets paying attention to their distribution across industry. Then we model the determinants of job satisfaction and conclude by considering the extent to which the results are consistent across data sets.

5.2 Measures of Job Satisfaction in the 3 Data-sets

5.2.1 Skills Survey 2001

This survey contains a question on overall job satisfaction. Respondents were asked "all in all how satisfied are you with your job?". This is ranked on a seven point scale from completely dissatisfied (1) to completely satisfied (7).

5.2.2 British Household Panel Survey (BHPS)

As above the BHPS contains a question on overall job satisfaction based on the same seven point scale. Similar questions are asked using the same scale on total pay (including any overtime and bonuses), job security, the actual work itself and hours of work. Earlier BHPS waves included questions on job satisfaction with promotions, with the boss and with initiative.

5.2.3 Workplace Employment Relations Survey (WERS)

WERS differs from the above in not containing any question on overall job satisfaction. It does, however, contain questions on various dimensions of job satisfaction on a five point scale (1 = very dissatisfied and 5 very satisfied). The dimensions of job satisfaction included are the sense of achievement an individual obtains from his or her work, the scope for using his or her own initiative, the amount of influence they have over their work, job security, the nature of work itself and satisfaction with the training received.

5.3 Modelling the Determinants of Job Satisfaction

Before looking at the determinants of job satisfaction and the impact of training, as with the previous chapter we will begin with a descriptive analysis of job satisfaction by industry sector which again will be a factor in the econometric modelling. The econometric modelling is detailed in Appendix 1b.

5.3.1 Skills Survey 2001

Descriptive Statistics

Table 5.1 displays statistics for mean job satisfaction by whether employed in public or private sector. Whilst average levels of satisfaction are similar across sectors, the incidence of training is far higher in the public sector independent of the specific measure of training adopted. For training since full time education the gap is nearly 20 percentage points; for training within the last five years the gap narrows to about 15 percentage points. This suggests training may not have an impact on satisfaction in this survey, but this will be further explored in the econometric analysis.

Table 5.1:

Job Satisfaction by Sector

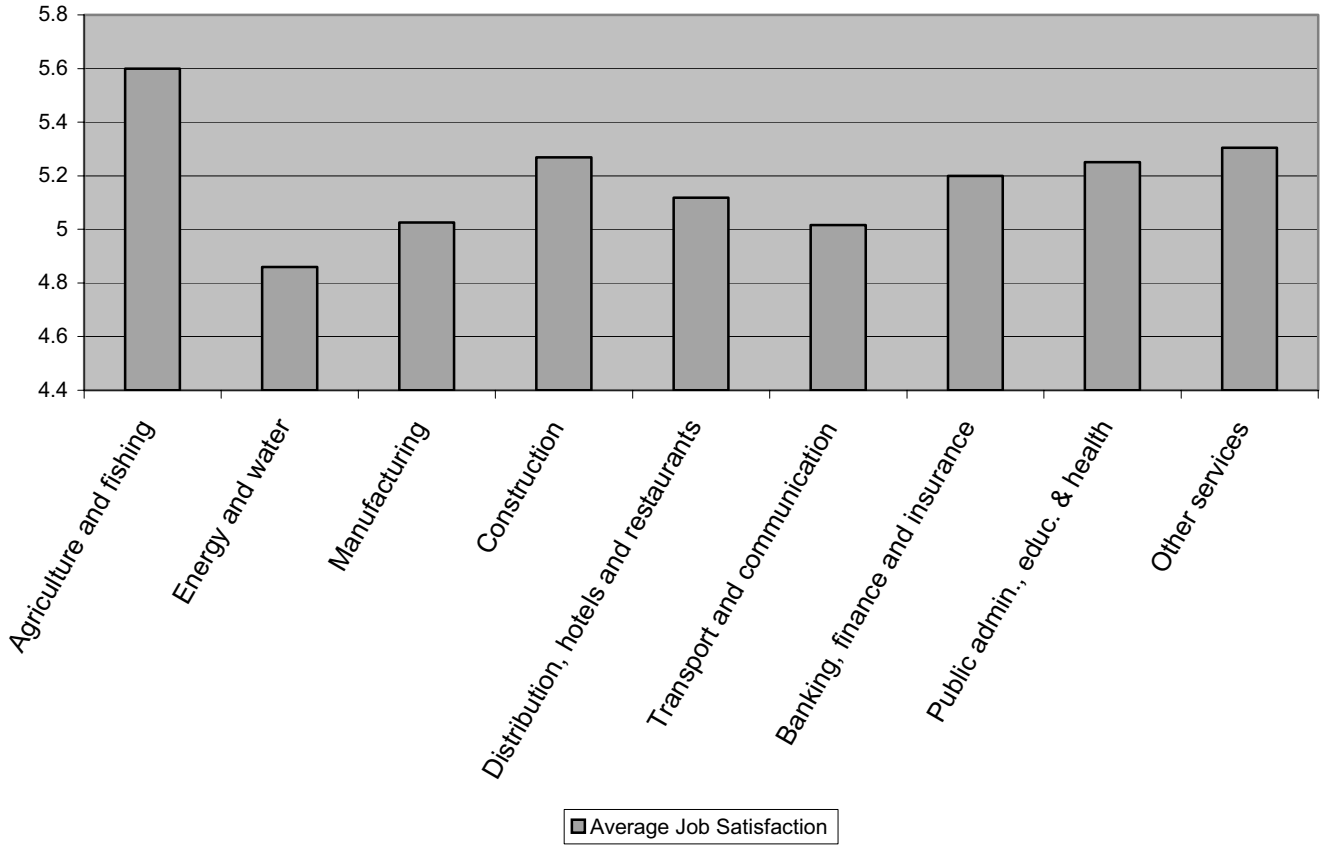
	Average Job Satisfaction	% Completely or Very Satisfied
Public	5.20	40.8
Private	5.14	40.6

Source: Skills Survey 2001

Figure 5.1 considers the role of industry for average levels of job satisfaction. The mean level of satisfaction is lowest in Energy and Water at just over 4.8 and highest in Agriculture, Forestry and Fishing at about 5.6. Again, this suggests a minimal role of training as recorded by this survey, but this will also be further explored in the econometric analysis below.

Figure 5.1:

Job Satisfaction by Industry



Source: Skills Survey 2001

Econometric Analysis

A full set of regression estimates for job satisfaction are reported in Appendix Table A12. The same specification is estimated on four samples - namely individuals in the public sector, in the private sector, males and females.

On average, individuals report relatively high levels of job satisfaction, although it has previously been shown that dissatisfied individuals are more likely to leave their current employment leading to a selection effect. Over three quarters of workers are fairly satisfied or more with their work and on average women report a slightly higher level of job satisfaction than men. This is consistent with previous studies. However

the gender effect is not significant after controlling for personal and employment characteristics, unlike in earlier studies.

Despite many data sets being unable to control for requirements of the job and the structure of the workplace it is these features that are most significant for the analysis of job satisfaction. Several of the main determinants of job satisfaction are common across several of the samples and it is to these which the discussion now turns. In terms of specific job characteristics insecurity, repetition, tension and risk are all associated with lower job satisfaction. Conversely, having a job which requires attention to detail, having choice over the way your job is carried out, being able to use the skills and knowledge the individual possesses and having meetings where views about the firm can be expressed have a positive effect on job satisfaction. The importance of task organisation for job satisfaction is consistent with the emphasis on 'application', that is, how employers deploy their resources influences firm performance highlighted in Tamkin et al. (2004).

After controlling for these task influences many of the personal and employment related effects are insignificant. The only personal characteristic that has a consistent effect is the negative influence of deterioration in health over the last 5 years. In terms of occupation, relative to managers and senior officials, individuals in administrative and secretarial occupations and individuals in sales are consistently less satisfied.

There are some sector specific effects. Satisfaction depends more heavily on financial rewards in the private sector, with labour market earnings and relative earnings and bonus or performance pay being important. In the private sector having a job which is relatively easy to replace has a negative effect on satisfaction, but being required to learn new things has a positive effect on satisfaction.

The results are also fairly similar when compared across genders. However, for females, higher education levels are also associated with lower job satisfaction, probably reflecting the higher expectations among this group. In addition, females are more satisfied working in a job which is predominately done by females. In contrast with previous evidence pay appears more important for females than men. For women, own hourly earnings have a positive effect on job satisfaction and relative earnings have a negative effect.

To conclude whilst job satisfaction is, in part, determined by personal characteristics employment related characteristics and job specific requirements appear more important. After controlling for personal and work place characteristics no link can be established between job related training and job satisfaction using either of the two measures of training available in this survey. Interestingly though, skills and qualifications are important for job satisfaction, particularly in relation to those required for the task. For men, having a job which requires they keep learning new things and having a job which has taken more than two years to learn to do well, has a positive influence on satisfaction. Most importantly, for both men and women, being able to use the skills they possess in their job has a positive effect on satisfaction. This indicates the importance of matching workers and employment opportunities.

5.3.2 British Household Panel Survey (BHPS)

Descriptive Statistics

In this section we examine the effect training has on job satisfaction as obtained from BHPS. In Table 5.2 we present the average response by industry and test whether the mean reported satisfaction is different for those who have received training compared with those who have not received training using Hotelling's T-squared generalized means test[17]. The results of the test suggest that in both samples, average satisfaction for those who have received training is higher than average satisfaction for those who have not received training.

When we perform the test by sector for waves 8-11, the difference in average satisfaction is negatively significant in the Agriculture, Forestry & Fishing sector. For waves 11-14, average satisfaction is significantly higher for those who have not received training in the Real Estate, Renting and Business Activities sector; whilst average satisfaction is significantly higher for those who have received training in the Education and Health and Social Work sectors.

[17] This tests whether two groups have the same mean. The null hypothesis is that the means of the two groups are equal and the alternative hypothesis is that the means are different. An f-statistic above the critical value for the appropriate degrees of freedom leads to the rejection of the null hypothesis. In Table 5.2 we are reporting the level of significance for each industry. When the difference is positively (negatively) significant, it means that the group receiving training is significantly more (less) satisfied than the group not receiving training.

Table 5.2: Hotelling's T-squared generalized means test

Hotelling's T-squared generalized means test – BHPS Waves 8-11			
Group	Average Satisfaction of those who have not received training	Average Satisfaction of those who have received training	Significant difference
All industries	**5.341**	**5.372**	**Yes - Positively**
Agriculture, forestry & fishing	5.649	5.214	Yes - negatively
Energy & water supplies	5.221	5.208	No
Extraction of minerals & ores other than fuels; manufacture of metals, mineral products & chemicals	5.220	5.372	No
Metal goods, engineering & vehicles industries	5.224	5.195	No
Other manufacturing industries	5.230	5.151	No
Construction	5.452	5.453	No
Distribution, hotels & catering (repairs)	5.385	5.327	No
Transport & communication	5.162	5.195	No
Banking, finance, insurance, business services & leasing	5.246	5.288	No
Other services	5.470	5.442	No

Hotelling's T-squared generalized means test – BHPS Waves 11-14			
Group	Average Satisfaction of those who have not received training	Average Satisfaction of those who have received training	Significant difference
All Industries	**5.341**	**5.372**	**Yes - Positively**
Agriculture, forestry & fishing	5.627	5.689	No
Mining and Quarrying	5.345	5.079	No
Manufacturing	5.186	5.120	No
Electricity, Gas and Water Supply	5.105	5.022	No
Construction	5.525	5.529	No
Wholesale and Retail Trade	5.373	5.355	No
Hotels and Restaurants	5.384	5.331	No
Transport, Storage and Communication	5.049	5.146	No
Financial Intermediation	5.120	5.269	No
Real Estate, Renting and Business Activities	5.334	5.214	Yes - Negatively
Public Administration and Defence Compulsory Social Security	5.362	5.356	No
Education	5.460	5.608	Yes - Positively
Health and Social Work	5.528	5.669	Yes - Positively
Other Community, Social and Personal Service Activities	5.429	5.518	No

Source: BHPS

Econometric Analysis

In this section we take into account other factors which might determine job satisfaction, using an ordered probit with random effects framework. We include a dummy variable which takes the value one if the individual has received job related training in the past year and zero if they haven't, as one of the variables which may explain job satisfaction. We also include a range of other variables which capture the effects of personal and job characteristics on job satisfaction. We estimate this model several times and, because of the inconsistent industry codes, on two sub-samples i.e. waves 8-11 and 11-14. In the first run, in our basic specification, we enter the training dummy variable on its own. The results of these estimates are shown in Appendix Table A13. This shows men to be less satisfied at work than women; that job satisfaction is lower for those who are older, have longer job tenure, work in large workplaces and are a member of a trade union. Satisfaction varies significantly across industries and occupations and is higher for those workers who are married, receiving bonus payments, annual pay rises and have promotion opportunities. The training variable was significant in waves 1-7 and 11-14, but not in waves 8-11.

In a second set of estimations, not reported here, we interacted the dummy variable with the industry variables. This allows us to test whether training has a different effect on job satisfaction in different industries. None of the interaction terms were statistically different from zero suggesting that the industry where the training takes place, does not effect job satisfaction.

Further aspects of Training and Job Satisfaction

As noted in the section on training incidence, workers who have received training are then asked a series of follow up questions to elicit more details about the training they have received. We use these to extend our satisfaction equation by adding in variables derived from worker responses in Tables 5.3 to 5.6. We do this by adding them in as a group per regression because of the high collinearity between responses to different questions.

Financing of Training

Table 5.3:

Financing of training and job satisfaction

Financer	Waves 8-11	Waves 11-14
No Fees	0.020 (0.456)	0.126 (2.730)***
Self	-0.130 (2.082)**	-0.157 (2.284)**
Employer/Future Employer	0.054 (1.545)	0.138 (3.851)***
New Deal	0.431 (1.252)	-0.087 (0.248)
Train for work/youth training/TEC training	0.270 (1.338)	0.208 (0.867)
Other	-0.123 (1.080)	0.026 (0.235)
Notes: Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%		

Source: BHPS

Table 5.3 shows that self-funded training has a negative effect on job satisfaction, whilst employer funded training or training with no fees are associated with higher job satisfaction. Though as noted above, the no-fees training may also be employer funded.

Location

Individuals are asked for details of up to three training events received since September 1st in the previous year. We include the non-mutually exclusive options in our satisfaction equation and the results were as follows.

Table 5.4:

Location of training and job satisfaction

Location	Waves 8-11	Waves 11-14
Current workplace	0.007 (0.18)	0.107 (2.60)***
Former workplace	0.017 (0.10)	-0.013 (-0.73)
Employer's training centre	0.061 (1.27)	0.109 (2.13)**
Private training centre	0.014 (0.26)	0.070 (1.17)
Job centre/ job club	0.231 (0.50)	0.168 (0.35)
HFE College	-0.091 (-1.50)	-0.004 (-0.06)
Adult Education centre	-0.06 (-0.68)	0.040 (0.40)
University	0.059 (0.72)	0.164 (1.80)*
At or from own home	0.051 (0.43)	0.024 (0.21)
Other	-0.03 (-0.48)	0.005 (0.07)
Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%		

Source: BHPS

For waves 8-11, the location of the training had no effect on job satisfaction. For waves 11-14, training which took place in the workers current workplace, at the employer's training centre or at a university was associated with higher job satisfaction.

Qualification

Individuals are asked whether their training was designed to lead directly to a qualification, part of a qualification, or no qualification at all.

Table 5.5:

Qualification and satisfaction

Qualification	Waves 8-11	Waves 11-14
Full Qualification	0.023 (0.60)	0.117 (3.01)***
Part Qualification	0.099 (1.13)	0.104 (1.15)
No Qualification	-0.018 (-0.52)	0.083 (2.33)**
Notes: Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%		

Source: BHPS

There was no relationship between qualification and satisfaction for the waves 8-11 sample, but there was a positive relationship between full qualification and satisfaction for the waves 11-14 sample and a positive relationship between no qualification and satisfaction for the waves 11-14 sample.

Reasons for Training

For each of their training episodes employees were asked about the reason for the training. Again we include these in our satisfaction equation with the results shown below.

Table 5.6:

Reasons for training and satisfaction

Reason for training	Waves 8-11	Waves 11-14
To help you get started in your current job?	0.101 (1.41)	0.188 (2.50)***
To increase your skills in your current job?	0.041 (0.71)	0.004 (0.07)
To improve your skills in the current job?	-0.012 (-0.19)	0.175 (2.64)***
To prepare you for a job or jobs you might do in the future?	-0.014 (-0.30)	-0.064 (-1.26)
To develop your skills generally?	0.187 (0.34)	0.016 (0.29)
Notes: Absolute value of z statistics in parentheses * significant at 10%; ** significant at 5%; *** significant at 1%		

Source: BHPS

There was no relationship between reasons for training and satisfaction for waves 8-11 sample, but training to get workers started in their new job and training which aimed to improve skills in the current job were positively associated with satisfaction for the waves 11-14 sample.

5.3.3 Workplace Employment Relations Survey (WERS)

Descriptive Statistics

As with the BHPS, Hotelling's t-test is used to determine the significance (or otherwise) of these differences according to whether or not training was received. Using this method, we can detail the differences in satisfaction from individual responses for each of the job satisfaction indicators by sector, split according to whether a worker received any training during the previous 12 months. Table 5.7 below presents the overall results and if the difference is significant or not (p-values and t-test figures are available on request).

From Table 5.7, two features stand out. The first is that mean satisfaction levels vary across the different dimensions; perhaps unsurprisingly, pay exhibits the lowest mean (e.g. 2.92 among those receiving training in the previous 12 months) by some distance relative to the other indicators, with training being the next lowest (3.48 for the same group). Overall work appears to have substantial intrinsic value to employees, with high scores being reported for autonomy, achievement and the work itself. The second feature to highlight is that those who have received training in the past year are significantly more satisfied on all of the satisfaction indicators relative to those who have not (the comparable means being 2.75 and 2.97 respectively). While this would perhaps be unsurprising on the training dimension, it is evident that the higher mean satisfaction scores among training recipients extend to other dimensions not directly associated with training. Of course, training may facilitate greater autonomy/initiative, improve pay and be associated with greater job security, so this outcome should not be entirely unexpected. Nonetheless, the positive impact of training on these other measures of job satisfaction is important.

Turning to the sectoral breakdowns, the data confirm this last pattern; in only four comparisons of those receiving training with those who have not do the latter have higher mean satisfaction scores (three of these are in Hotels and Restaurants and one in Transport and Communications), and none of these is statistically significant. While significant differences are not found consistently in all sectors and for all indicators (reflecting in part the smaller sample sizes used in these comparisons), most are, and notably those in Manufacturing, Transport and Communications, Financial Services, Other Business Services, Public Administration, Education and

Health. The other interesting and noteworthy feature is that there are also differences in the means for particular indicators among sectors. While a slightly mixed pattern of responses is apparent in general across the table as a whole, five sectors exhibit consistently above-average scores for the vast majority of the satisfaction indicators, namely Construction and Other Community Services, Other Business Services, Education and Health. The latter two sectors also exhibit especially high scores for the sense of achievement from work, reflecting the strong sense of vocation among many of those employed in such lines of work.

Table 5.7: Hotelling's T-square generalised means test WERS – Difference in average satisfaction between those receiving training in the previous twelve months and those who have not

	Manufacturing		Electricity, gas & water		Construction		Wholesale & retail		Hotels & restaurants		Transport & communica-tion		Financial services	
	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT
Sense of achievement from work	3.69	3.51	3.53	3.45	3.92	3.78	3.71	3.69	3.72	3.82	3.62	3.47	3.59	3.44
	Significant		Insignificant		**Significant**		Insignificant		Insignificant		**Significant**		**Significant**	
Scope for using own initiative	3.81	3.63	3.76	3.52	3.96	3.86	3.77	3.74	3.86	3.91	3.60	3.45	3.64	3.50
	Significant		**Significant**		Insignificant		Insignificant		Insignificant		**Significant**		**Significant**	
Amount of influence over job	3.60	3.39	3.49	3.36	3.73	3.68	3.57	3.54	3.65	3.65	3.35	3.19	3.38	3.24
	Significant		Insignificant		Insignificant		Insignificant		Insignificant		**Significant**		**Significant**	
Training received	3.31	2.90	3.34	2.83	3.61	3.03	3.40	3.19	3.68	3.30	3.41	2.89	3.35	2.73
	Significant		**Significant**		**Significant**		**Significant**		**Significant**		**Significant**		**Significant**	
Amount of pay received	2.94	2.68	3.03	2.79	3.19	2.93	2.85	2.75	2.89	2.88	2.91	2.64	2.89	2.62
	Significant		Insignificant		**Significant**		**Significant**		Insignificant		**Significant**		**Significant**	
Job security	3.40	3.26	3.24	2.85	3.75	3.54	3.79	3.77	3.89	3.84	3.37	3.41	3.45	3.04
	Significant		**Significant**		**Significant**		Insignificant		Insignificant		Insignificant		**Significant**	
The work itself	3.70	3.56	3.57	3.54	3.87	3.78	3.77	3.76	3.84	3.88	3.66	3.48	3.57	3.40
	Significant		Insignificant		**Significant**		Insignificant		Insignificant		**Significant**		**Significant**	

Table 5.7: Continued

	Other business services		Public administra-tion		Education		Health		Other community services		Total	
	T	NT	T	NT	T	NT	T	NT	T	NT	T	NT
Sense of achievement from work	3.80	3.64	3.65	3.45	4.02	3.91	3.99	3.88	3.91	3.81	3.81	3.66
	Significant		**Significant**		**Significant**		**Significant**		**Significant**		**Significant**	
Scope for using own initiative	3.93	3.74	3.72	3.47	3.95	3.84	3.96	3.83	3.88	3.81	3.84	3.70
	Significant		**Significant**		**Significant**		**Significant**		Insignificant		**Significant**	
Amount of influence over job	3.65	3.52	3.42	3.26	3.59	3.54	3.65	3.50	3.62	3.54	3.57	3.46
	Significant		**Significant**		Insignificant		**Significant**		Insignificant		**Significant**	
Training received	3.51	2.92	3.36	2.81	3.51	3.02	3.67	3.08	3.55	2.88	3.48	2.97
	Significant		**Significant**		**Significant**		**Significant**		**Significant**		**Significant**	
Amount of pay received	3.04	2.84	2.72	2.57	3.00	2.86	2.87	2.71	2.90	2.76	2.92	2.75
	Significant		**Significant**		**Significant**		**Significant**		**Significant**		**Significant**	
Job security	3.56	3.42	3.45	3.23	3.71	3.55	3.79	3.64	3.65	3.55	3.61	3.46
	Significant		**Significant**		**Significant**		**Significant**		**Significant**		**Significant**	
The work itself	3.81	3.66	3.68	3.53	3.98	3.93	3.97	3.85	3.93	3.84	3.82	3.68
	Significant		**Significant**		Insignificant		**Significant**		**Significant**		**Significant**	

Source: WERS 2004

Econometric Results

The WERS data set, as described previously, is an extremely rich source of information about various dimensions of individual job satisfaction. This section considers the determinants of these various dimensions, with particular reference to individual training receipt, as measured both by incidence and by volume (number of days) in the previous 12 months.

In addition to the 'direct' satisfaction measures discussed above, we also examine the impact of training on several more 'indirect' indicators such as the extent to which individuals consider they share the values of their organisation, feel loyal to the organisation, are proud to tell people who they work for, and believe management encourage people to develop their skills. The last of these is clearly important in identifying the characteristics of employers with a positive training 'culture', while the other three measures provide further evidence on the route(s) through which training may impact on organisational performance.

It is important to emphasise that the models below, which are estimated as random effects ordered probits, include a very extensive range of additional control variables as described in the notes to the tables and briefly in discussing the results below; any training effect identified is thus robust to and exerts an independent effect from these additional controls. Results for these controls are however, generally well-established in the literature, and for the sake of parsimony are not reported in detail here, where the focus is on the training measures. A full set of results is however, available on request.

'Direct' measures

Results for the seven dimensions of job satisfaction described previously appear in Table 5.8 (parts a and b) below. Although as noted above a full set of results is not tabulated for these regressions, it is perhaps worth commenting briefly on the effect of some of the key control variables before focusing attention on training, as reported in the tables below. Thus, while there are differences in the impact of particular variables across the various 'direct' satisfaction dimensions, many of the controls impact consistently on each measure, and largely in accordance with both priors and with the extant literature.

Thus for example and *inter alia*, males, disabled workers, more highly qualified employees, union members and those working in larger organisations are generally less satisfied, while the reverse is true for older workers and those at the higher end of the earnings distribution. In terms of industrial variation, as might be expected, a more mixed pattern emerges, although those in financial services *ceteris paribus* appear generally less satisfied compared with for example, those in industries that might loosely be classed as 'public sector' (most notably Health and Education).

Turning to the effect of training on the various satisfaction measures, as is immediately evident from Table 5.8 (part a), having received training in the previous 12 months is positively and significantly related to all seven 'direct' indicators. The relationship is, as would be expected, especially strong when considering satisfaction with training received. Taken together, these results suggest that training of the type considered here improves both an individual's (perceived) job security and their pay, and also increases their work autonomy with a concomitant raising of the intrinsic, non-pecuniary rewards of the job such as sense of achievement etc. However, as Table 5.8 (part b) makes clear, workers who receive very short amounts of training (less than one day) in the previous year are actually *less* satisfied on several dimensions than those who received no training at all. The rationale for this is unclear, but it may perhaps reflect the fact that receiving *any* training raises individuals' expectations, but that these are not fulfilled when only a very modest amount of training is provided. Alternatively, very short volumes may be associated with particular types of training which reflect a more regimented, bureaucratic approach to (at least some facets of) work, with a corresponding reduction in levels of satisfaction for measures such as achievement and autonomy.

'Indirect' measures

Turning to the 'indirect' measures in Table 5.9 (parts a and b), a number of the control variables (not tabulated) impact qualitatively similarly across the different measures. Thus, value sharing, loyalty and pride in who they work for all tend to be higher among older workers, management employees, those working longer hours and in workplaces in Health and Education. Conversely, worker attachment as measured by pride in the organisation and loyalty are lower for males, while all four 'indirect' indicators are lower for union members and for those working in larger

workplaces/firms. This last of course is a well-known phenomenon, and reflects the tendency for workers in large organisations to become alienated.

Turning to the training variables that are the focus of the analysis, matters are unequivocal: both training incidence and training volumes (days) are positively related to each of the indicators, and with the exception of loyalty and pride in the employer in the case of training durations of less than one day, all training coefficients in the tables can be seen to be statistically significant. This is clear evidence that off-the-job training (of whatever duration) promotes a sense of attachment to the employer, something that is examined directly by consideration of quit rates elsewhere in this report.

Table 5.8:

Job Satisfaction measures – 'direct measures'

a. Ordered probit estimates of job satisfaction dimensions – 'direct measures' – training incidence							
	Sense of achievement from work	Scope for using own initiative	Amount of influence over job	Training received	Amount of pay received	Job security	The work itself
Training incidence	0.154*** (7.54)	0.126*** (6.20)	0.123*** (6.09)	0.567*** (27.61)	0.148*** (7.28)	0.170*** (7.99)	0.159*** (7.77)
b. Ordered probit estimates of job satisfaction dimensions – 'direct measures' – training volume (number of days)							
Days of training	Sense of achievement from work	Scope for using own initiative	Amount of influence over job	Training received	Amount of pay received	Job security	The work itself
Less than 1 day	-0.068** (2.08)	-0.110*** (3.39)	-0.079** (2.44)	0.100*** (3.09)	0.016 (0.50)	0.018 (0.52)	-0.032 (0.96)
1 to less than 2 days	0.060** (2.15)	0.048* (1.70)	0.062** (2.21)	0.372*** (13.35)	0.098*** (3.50)	0.100*** (3.47)	0.080*** (2.83)
2 to less than 5 days	0.231*** (8.83)	0.202*** (7.78)	0.182*** (7.06)	0.668*** (25.54)	0.193*** (7.46)	0.215*** (7.97)	0.233*** (8.89)
5 to less than 10 days	0.240*** (7.11)	0.254*** (7.53)	0.214*** (6.45)	0.954*** (28.16)	0.211*** (6.36)	0.272*** (7.85)	0.210*** (6.21)
10 days or more	0.473*** (12.97)	0.381*** (10.53)	0.361*** (10.10)	1.361*** (36.51)	0.312*** (8.73)	0.384*** (10.27)	0.426*** (11.67)

Notes to table: Absolute value of z statistics in parentheses, * denotes significant at the 10% level, ** at the 5% level and *** at the 1%. All models include individual controls for gender, age, marital status, ethnicity, disability, tenure, fixed term employment, temporary job status, hours of work, use of computers in job, levels of skills relative to those needed in job, highest academic qualification, vocational qualification, occupation, gender balance of job, union membership and earnings (banded), plus employer controls for workplace size, organisation size, workplace age, industry, proportions of workforce aged less than 21, over 50, female, union members, from ethnic minority, with disabilities, working part-time, on fixed term contracts, agency staff and the presence of briefing groups discussing training, JCCs discussing training and meeting groups discussing training.

Table 5.9:

Job Satisfaction measures – 'indirect measures'

a. Ordered probit estimates of job satisfaction dimensions – 'indirect measures' – training incidence				
	I share many of the values of my organisation	I feel loyal to my organisation	I am proud to tell people who I work for	Managers at this workplace encourage people to develop their skills
Training incidence	0.276*** (13.15)	0.191*** (9.22)	0.237*** (11.43)	0.464*** (22.24)
b. Ordered probit estimates of job satisfaction dimensions – 'indirect measures' – training volume (number of days)				
Days of training	I share many of the values of my organisation	I feel loyal to my organisation	I am proud to tell people who I work for	Managers at this workplace encourage people to develop their skills
Less than 1 day	0.099*** (2.95)	0.020 (0.59)	0.051 (1.56)	0.115*** (3.48)
1 to less than 2 days	0.231*** (8.06)	0.127*** (4.46)	0.161*** (5.66)	0.316*** (11.13)
2 to less than 5 days	0.323*** (12.11)	0.235*** (8.89)	0.285*** (10.76)	0.550*** (20.68)
5 to less than 10 days	0.378*** (11.03)	0.305*** (8.96)	0.355*** (10.43)	0.725*** (21.13)
10 days or more	0.461*** (12.50)	0.406*** (11.06)	0.511*** (13.87)	1.002*** (26.72)

Notes to table: Scales for dependent variables are 1-5: 1=strongly disagree; 5=strongly agree. Absolute value of z statistics in parentheses, * denotes significant at the 10% level, ** at the 5% level and *** at the 1%. All models include individual controls for gender, age, marital status, ethnicity, disability, tenure, fixed term employment, temporary job status, hours of work, use of computers in job, levels of skills relative to those needed in job, highest academic qualification, vocational qualification, occupation, gender balance of job, union membership and earnings (banded), plus employer controls for workplace size, organisation size, workplace age, industry, proportions of workforce aged less than 21, over 50, female, union members, from ethnic minority, with disabilities, working part-time, on fixed term contracts, agency staff and the presence of briefing groups discussing training, JCCs discussing training and meeting groups discussing training.

5.4 Conclusions

The Skills Survey 2001 has some results which conflict with those obtained from the BHPS and WERS (see Table 5.10). The two latter surveys in line with other studies find that women are generally more satisfied at work than men, while in the Skills Survey the gender results are similar (though again in contrast to other UK findings pay seems to matter more to women than to men).

The results from the Skills Survey do not suggest any direct link between receipt of training and job satisfaction after controlling for personal and job characteristics, but being able to use acquired skills on the job does have a positive impact on job satisfaction, as is the case in WERS. The BHPS descriptive results also suggest that training only impacts on job satisfaction in three sectors, in two cases positively and in the other case negatively. However, the BHPS econometric results suggest a positive relationship across all industries between training and job satisfaction, apart from waves 8-11. This conceals the fact that it is only training to improve skills which impacts positively on job satisfaction. Further, workplaces which allow these skills to be used are likely to have workers who are more satisfied. This is consistent with the 4As model which stresses the links between individual capability, organisational action, deployment and development as key factors in a business performance model (See Tamkin et al., 2004). Finally, WERS data suggest that satisfaction with training is lower than other dimensions apart from pay. Yet, those who have received training in the previous year are more satisfied than those who have not across all of the satisfaction indicators, apart from those who have received only very short periods of training. Clearly, the relationship between receipt of training and job satisfaction is a complex one, as the summary in Table 5.10 shows.

Table 5.10 Determinants of Job Satisfaction[1]

Dataset	Skills Survey	BHPS Waves 1-7	BHPS Waves 8-11	BHPS Waves 11-14	WERS 2004
Gender (male = 1)	×[2]	-	-	-	-
Age	×	-	-	×	+
White (= 1)	×	+	×	+	-
Marital Status (married = 1)	+	+	+	+	+
Disabled (= 1)	N/A	×	×	×	-
Highest Qualification	-	-	-	-	-
Job Tenure	N/A	-	-	-	-
Industry	+/-	+/-	×	×	+/-
Establishment size	×	-	-	×	-
Job Characteristics	+/-	+/-	+/-	+/-	+/-
Trade Union Member	-	-	-	-	-
Occupation	+/-	+/-	+/-	+/-	+/-
Over education/skill	+[3]	N/A	N/A	N/A	-
Training	×	+	×	+	+

Notes to table: N/A denotes the variable is not present in the survey; × denotes no significant influence; + and - denote a significant and respectively positive or negative influence.
1: See Tables 5.8 and 5.9 and Appendix Tables A12 and A13 for coefficient estimates and t-statistics.
2: Estimation is performed separately by gender, but in the overall model gender is not statistically significant.
3: This is significant for ability to use acquired skills, but not for the over-education variable.

Chapter 6 – Establishment Performance

6.1 Introduction

In this chapter we consider the different measures of performance available in the WERS data-set and then attempt to model different measures of performance as a function of both training and job satisfaction, controlling for personal and job characteristics. Finally, we consider the extent to which there is a consistent story concerning the impact of training and job satisfaction on performance.

6.2 Measures of Establishment Performance

The 2001 Skills Survey and the BHPS being surveys of individuals do not contain data on establishment performance so reliance has to be placed upon WERS for this part of the analysis. The Management Questionnaire asks whether the respondent would assess their workforce as a lot better than average, better than average, about average for the industry, below average, or a lot below average in terms of three measures of performance – financial, labour productivity and quality of product or service. They were also asked how they interpreted financial performance. Various criticisms can be levelled at such subjective measures.[18] First, they are based on the assessments of employee relations managers who may not always be in the best position to make such judgements. Second, they rely on management's ability to locate the performance of their own establishment in relation to an industry average which is left undefined. Third, it is not clear what measure of labour productivity is being considered – output per head, value added or perhaps some measure of total factor productivity. Fourth, these subjective measures are ordinal in nature so there is no precise estimate of relative position. Finally, individuals may not measure things in precisely the same way and tend on the whole to be over-optimistic in the sense that most of them think their establishment is above average. Nevertheless, earlier studies have found, for example, that financial performance is a good measure of whether a workplace is likely to close or not (see Machin and Stewart, 1996, and Bryson, 2004).

In 2004 a new objective financial performance questionnaire (FPQ) was completed by a sub-sample of establishments which enables one to construct measures of

[18] See Kersley B. et al. (2006)

sales per worker, value added per worker and profit per worker. Kersley et al. (2006) use these data to mimic the subjective answers provided by managers and find that though the correlations are positive they are not very strong. They go on to suggest that these subjective and objective answers may in fact be measuring different things and advise caution in using these data. There is also substantial panel attrition arising from non-response to the FPQ, from missing data. In this chapter we use both subjective and objective measures to establish whether or not there is a relationship between the provision of training and establishment performance. We also make use of absence and turnover data as job satisfaction has been shown in earlier studies to have an impact on reducing the size of both of these variables.

It is possible to link the 2004 Panel with 1998 to assess changes in performance over the period to obtain a subjective evaluation of workplace financial performance. Managers were asked whether their establishment's financial performance had improved, stayed the same or declined since 1998. Further, they were asked to compare the performance of other establishments in their industry or field. Thirty-four percent of managers felt performance was above the industry average, 46 percent about average and 10 percent below average while 8 percent did not answer this question. The Panel can also be used to assess the impact of training on establishment survival[19].

6.3 Modelling the Determinants of Performance

It is well known that an individual's human capital has a strong impact on earnings. Relatively few studies, however, have examined the proposition that there are possible externalities arising from the human capital of co-workers within particular establishments through such factors as information sharing, skill complementarity and training by co-workers, particularly in environments emphasising team work. Battu, Belfield and Sloane (2003), using WERS 1998, found that there was a strong and significant effect on own earnings arising from the education of co-workers in addition to the effect of own education. Working with others, each of whom had 12 years (one standard deviation of additional education) would boost own earnings by 11.1 per cent. Or put another way an additional year of a single colleague's education is worth about 3.2 per cent of an additional own year of education. Clearly, workers benefit from working in more educated workplaces, but what about the

[19] For a full discussion see Forth and McNabb (2007).

employers? WERS 1998 asked managers whether they considered their establishments to be above average, average or below average in terms of financial performance, labour productivity and product quality.

Workplace education had no significant effect on any of these measures of performance, however, suggesting either that workers appropriated all the available economic rents or these subjective answers of managers did not capture these dimensions of performance sufficiently accurately. As noted above, WERS 2004 included a new financial performance questionnaire for a sub-sample of establishments covered in the main survey which enables us to test the relationship between workplace human capital and more objective measures of establishment performance. Education is, however, only one form of human capital. Battu, Belfield and Sloane (2004) examined the proposition that similar externalities might apply in the case of training. Whilst no significant effects were found in two low paying service sectors, there were strong positive effects on own earnings elsewhere from increases in mean workplace training. It should be noted also as referred to in Chapter 4 that Dearden, Reed and Van Reenan (2006), using a panel of British industries over the period 1983 to 1996, found that a one percentage point increase in training was associated with an increase in value added per hour of about 0.6 per cent, but an increase in wages of only 0.3 per cent. This suggests that employers do, indeed, capture part of the economic rents arising from investments in training.

Here we utilise WERS 2004 to examine whether similar returns apply to workplace education and workplace training six years after the earlier survey and whether more objective measures of establishment performance reveal a relationship with workplace human capital. It should be noted that whereas WERS 1998 had a cut off of ten employees or establishments to be included in the sample of 2004 this was reduced to 5 employees, so any findings could be influenced by the inclusion of micro firms employing between 5 and 9 employees.

6.4 Descriptive Data

For estimation, the sample here is restricted to full-time workers and to workplaces where more than three workers responded to the worker survey. This yields information on 11,395 workers across 1,303 workplaces. Incorporation of the detailed workplace-level characteristics naturally reduces the information obtained.

The derivation of the key variables is briefly described here. The simplest way to estimate these relationships is to use years of education as the unit of account. First, each worker's full-time equivalent years of education were calculated to obtain e_i; these calculations were based on reported qualifications. Second, workplace education levels E_j were derived. Based on the full worker sample (reported by the manager for the entire workforce), mean years of education per occupation are calculated. This mean can then be weighted for each workplace, using information on the occupational mix of the entire workforce at each workplace. Third, the dispersion of workplace education levels is also calculated, where this dispersion measure is the average of absolute differences between own education and mean workplace education. Fourth, pay levels y_{ij} are taken from individual workers' self-reports (across 12 wage bands), and estimated as earnings per hours worked. Median pay across the workplace Y_j is also available; this variable is based on the distribution of pay across the workforce, as reported by the manager. With respect to training, WERS2004 asks workers how much training they have had during the last 12 months, either paid for or organised by the employer. Only training away from the normal place of work was incorporated, though this could be located on or off the premises. A host of answers from none to ten days or more were reported. Any training in the last year (1) or otherwise (0) is the chosen variable. Workplace training was proxied by a variable (T_j) measuring the percentage of workers trained.

The summary statistics are reported in Appendix Table A14. The average years of education per worker is 12.78. Mean education per workplace is 12.75, and so the sample of respondents has slightly more education than the estimated average of their workplace. The dispersion of education across a workplace is 0.62. For the dependent variable, log pay per hour per individual worker is 2.22. With respect to training, 67 per cent of the sample has received training and the corresponding statistics for workplace training is 66 per cent.

One potential caveat is that this analysis relates to workplaces; co-worker, in this sense, refers to those in the same workplace, as opposed to those doing the same tasks or team-working. Another is that in the absence of the availability of ability controls, it is not possible to account for endogenous decisions to accumulate education based on aptitude; in general there is a potential for omitted variable bias.

6.5 Econometric Specification

Following Idson and Kahane (2000)[20]

$$\ln y_{ij} = \alpha_1 + \alpha_2 e_{ij} + \alpha_3 E_j + \alpha_4 e_{ij} * E_j + \alpha_5 t_{ij} + \alpha_6 T_j + \alpha_7 t_{ij} * T_j + \alpha_8 z_{ij} + \alpha_9 Z_j + v_j + u_i \quad (6.1)$$

In equation (6.1), y_{ij} (own earnings) is determined by years of education (e_{ij}) of individual i in workplace j, the years of education of co-workers E_j and the interaction between these two education levels. Similar relationships apply to training as suggested by the return to coefficients α_5, α_6 and α_7. A vector of worker and workplace controls, (z_{ij} and Z_j) is also included [$v_j \sim N(0, \sigma_j)$ and $U_i \sim N(0, \sigma_i)$ are identically and independently distributed workplace and individual error terms]. In this specification each additional year of an individual worker's own education affects his or her earnings by $\alpha_2 + \alpha_4 E_j$. The coefficient α_2 captures the direct impact of years of education, while the coefficient α_4 captures the impact of average co-worker education on earnings. An additional cross-workplace increase of one year in education will influence earnings directly through the α_3 coefficient, and indirectly through the interaction coefficient α_4. If α_3 is non-zero, omission of E will serve to bias upwards α_2, the conventional measure of the education premium. If α_3 is positive, own earnings will be positively related to co-workers' education. If α_4 is positive increased co-worker education raises wages more for workers with high education levels. Similar relationships also hold for training. Furthermore, the importance of workers being compatible when working together is examined. One approach is to incorporate the absolute mean dispersion of training levels into an earnings equation. Greater dispersion of workplace training, controlling for t, should reduce own earnings. As a general test to capture non-linear effects, the square of workplace human capital T^2_j is included in the earnings equation; if there are increasing returns to co-workers' training the coefficient for this parameter will be positive. Similar remarks hold for education.

In summary, the following hypotheses are proposed. First training will be rewarded at a relatively higher rate in workplaces where training levels are already high if increasing returns to human capital apply. Second, the dispersion of workplace training levels will lower earnings if "skills compatibility" matters. Similar hypotheses

[20] Idson, T. L. and Kahane, L. H. (2000): "Team effects on compensation: an application to salary determination in the National Hockey League", *Economic Inquiry*, Vol. 38, pp. 345-357.

hold for education. It is only possible to test these hypotheses using matched worker-workplace data. Overall, while other British datasets permit for some workplace controls, the random sample of workers and the detailed information on both workers and workplaces in the WERS, which are critical for investigating the hypotheses, are unique for the British economy.

6.6 Econometric Results

The main hypothesis to be tested is whether earnings are increasing in the education and training levels of co-workers. Appendix Table A15 reports a series of Mincerian log pay per hour equations, estimated with both own and co-worker levels of education and training. We start with a very basic equation and then add in firm level characteristics, mean workplace education, interaction terms, squared terms and dispersion terms. Equation (6.1), which includes error terms for workplaces and individuals, uses random effects generalised least squares[21]. Model (1) includes individual characteristics z_i only. It shows that an earnings premium for an individual year of education is 6.4%, consistent with the extant literature. This individual-level model of learning explains 33% of the variation in earnings and the fraction of the variance attributable to the workplace error term ρ is 33%. The provision of training in the workplace significantly raises earnings and by a greater amount than it does for education. Model (2) incorporates firm-level characteristics Z, including industries, workforce composition and size of workplace variables. The premium to education rises slightly to 6.5%, with an increase in the explained variation to 46%; and the workplace error term variance falls to 28%. The training effects on earnings fall slightly. Overall, there are relatively few changes with the inclusion of the firm-level characteristics.

Model (3) incorporates the average years of education in each workplace, E_j, as an additional workplace-level variable, in conjunction with the provision of training across the workplace, T_j. E_j is statistically significant and has a strong impact on own earnings. An across-the-workplace increase in education of one year raises earnings by 12%. The premium to own education is reduced to 3%. The strength of the α_3 coefficient suggests that co-worker's education has a strong impact on own earnings.

[21] Random effects GLS is a less biased estimator than OLS, since the data are grouped across workplaces (Moulton, 1987). A Hausman test firmly rejects the use of fixed effects GLS. All models in Appendix Table A15 were also investigated using the OLS and fixed effects estimation techniques, but as noted above these are not appropriate estimation techniques for this dataset. Details are available on request.

Positive externalities are evident. The impact of own training on earnings also falls to 3%, but there are also spillover effects arising from the training of co-workers. An across-the-workplace increase in training of one year raises earnings by 18%. It seems that co-workers training has a powerful impact on own earnings and there are positive externalities to training.

Model (4) is the full estimation specification specified in equation (6.1), incorporating the interaction between own and co-worker years of education. This interaction term is negative and significant, suggesting for example, an intra-workplace competitive effect. The interaction between own and co-workers training has a positive and significant impact on earnings, indicating in contrast a 'complementarity' effect or increasing returns to scale of this form of human capital. This corroborates the predictions of Idson and Kahane (2000) and Kremer (1993). However, mean workplace training becomes negative and significant in this model.

Model (5) examines potential non-linearity in the returns to human capital and training. The square of workplace years of education is reported in conjunction with the square of workplace training. The coefficient on workplace education is positive and significant, but for its square it is negative and significant. This indicates that workplace education boosts own earnings, but at a diminishing rate. Yet, co-worker education boosts own earnings for all meaningful levels of education. With respect to training, the coefficient on workplace training is negative and significant but for its square it is positive and significant. The test with respect to education appears to contradict the hypothesis of increasing returns to skill in standardised workplaces, while the test with respect to training seems to conform with the hypothesis of increasing returns to skill in standardised workplaces. In Model (6) a direct measure of dispersion of education is incorporated in place of the interaction term. Adjusting for overall workforce human capital, greater dispersion of education across the workplace has a significant impact on own earnings. Thus adjusting for overall workforce human capital, greater dispersion of training across the workplace is associated with higher own earnings. The coefficient of the dispersion of training term is significant and negative. This corroborates the importance of "standards compatibility" for those working in close proximity to each other as far as training is concerned.

Investigating the impact of training on labour productivity as assessed subjectively by managers, it was found that workplace training proxied by the percentage of workers trained in the workplace over the last twelve months increases productivity (see Table 6.1). Similarly, it was also found that workplace training proxied by the percentage of workers trained in the workplace over the last twelve months increases financial performance significantly (see Table 6.2). In neither case did workplace education have a significant effect on performance.

In Table 6.3 we use the Panel question on relative performance as subjectively assessed by managers to determine whether those establishments which trained more in 1998 had improved financial performance in 2004, controlling for other variables in that year. It can be seen that those who trained 80 percent or more of their workforce in 1998 had a significantly better performance than those who trained less. However, those who did not undertake any training also had a better financial performance than the referenced category (40 – 59 percent). This could be consistent with a situation in which no training was offered because workers were trained earlier, though we lack data to test this hypothesis.

A large number of equations for the objective data using the financial performance questionnaire were also carried out including value added per full-time equivalent, log of sales per worker and profit per worker as dependent variables. The denominator was either number of workers or full-time equivalents. Equations were run with or without degree of competition in the product market as this reduced sample size from 526 to 389 establishments. Equations were also run excluding education and with interaction teams for education and training to allow for the fact that there is a positive relationship between the two. In no case did the training variable, measured as mean percentage of workers trained turn out to be significant in contrast to the results for the subjective measures of performance. However, years of education had a significant and positive effect on log of sales per worker, sales per worker, sales per full-time equivalent, value added per worker, value added per full-time equivalent, profit per worker and profit per full-time equivalent. The non-significance of the training variable could be due to the definition of training used or because of the reduced sample size for the objective data. Because of the non-significance we have not reported the detailed results here.

In Appendix Table A16 we examine the question of whether those establishments which train workers are more likely to survive. In this case those who trained

between 60 and 80 percent of their workforce in 1998 are significantly more likely to continue in operation in 2004 than those who trained between 40 and 59 percent of their workforce but while those who trained more than 80 percent have a positive sign on the training variable this is not significant by conventional standards. We also analyse whether those who train more are subject to more rapid employment growth, though there is a problem of endogeneity here as more rapid employment growth might require more training. Appendix Table A17 suggests that employment growth is positively and significantly related to 100 percent of workers being trained, but also 0 percent being trained relative to the omitted category (40-59 percent).

TABLE 6.1:

Labour productivity: Mean workplace training and education levels

(Ordered Probit estimates)

Workplace size (reference group ≥1000 and ≤3999)	
<50	0.10 (1.65)*
≥ 50 and ≤99	0.13 (2.07)**
≥100 and ≤499	0.01 (0.16)
≥500 and ≤999	0.01 (0.18)
≥4000	0.16 (0.84)
Ratio of part-time workers	-0.03 (-0.30)
Sectors (reference group Other Business Services)	
Manufacturing	0.001 (0.02)
Electricity, gas and water	0.05 (0.40)
Construction	-0.001 (-0.02)
Hotels and Restaurants	0.04 (0.44)
Transport and communication	0.03 (0.38)
Financial services	-0.09 (-0.92)
Other business services	0.17 (2.10) **
Public administration	-0.33 (-3.50)***
Education	-0.11 (-1.18)
Health	0.07 (0.88)
Other community services	0.13 (1.49)
Of all the companies operating employee share schemes for employees at the workplace and employees who are eligible for it, the proportion of non-managerial employees at this workplace who participate in the employee share ownership scheme(s) (reference group 0)	0.26 (5.38)***
Ratio of female Workers	0.03 (0.30)
Workplace aged < 20 years	0.18 (5.08)***
The proportion of the establishment's (sales revenue/operating costs) which is accounted for by wages, salaries and other labour costs like pensions and national insurance (reference group < 25%)	
25%-49%	-0.05 (-1.11)
50-74%	-0.26 (-4.55)***
>75%	-0.07 (-1.10)
During the last 12 months, the number of employees who have sustained injuries	-0.04 (-1.00)
The proportion, if any, of the largest occupational group at this workplace who work in teams	
≥60%	0.06 (0.88)
Mean workplace education	0.01 (0.92)
Mean workplace training	0.41 (5.14)***
Pseudo R^2	0.02
Log pseudolikelihood	-5130.22
Prob > chi^2	0.0000
N_j	1,211

Notes: z statistics are in parentheses.

Source: WERS

TABLE 6.2:

Financial Performance: Mean workplace training and education levels

(Ordered Probit estimates)

Workplace size (reference group 1000<3999)	
<50	-0.14 (-1.86)**
≥ 50 and ≤99	-0.01 (-0.14)
≥100 and ≤499	0.09 (-1.26)
≥500 and ≤999	0.05 (0.58)
≥4000	-0.09 (-0.69)
Ratio of part-time workers	-0.07 (-0.73)
Sectors (reference group Other Business Services)	
Manufacturing	-0.05 (-0.79)
Electricity, gas and water	0.12 (0.93)
Construction	0.09 (1.09)
Hotels and Restaurants	0.28 (3.21)***
Transport and communication	-0.07 (-0.68)
Financial services	0.26 (2.67)***
Other business services	0.02 (0.31)
Public administration	-0.21 (-2.28)**
Education	0.10 (1.08)
Health	-0. 10 (-1.24)
Other community services	-0.12 (1.43)
Of all the companies operating employee share schemes for employees at the workplace and employees who are eligible for it, the proportion of non-managerial employees at this workplace who participate in the employee share ownership scheme(s) (reference group 0)	*0.14 (2.75)***
Ratio of female Workers	0.11 (0.67)
Workplace aged < 20 years	0.18 (2.71)***
The proportion of the establishment's (sales revenue/operating costs) which is accounted for by wages, salaries and other labour costs like pensions and national insurance (reference group < 25%)	
25%-49%	-0.29 (-3.22)***
50-74%	-0.32 (3.11)***
>75%	-0.27 (-2.32)**
During the last 12 months, the number of employees who have sustained injuries	0.09 (1.12)
The proportion, if any, of the largest occupational group at this workplace who work in teams	
≥60%	0.12 (1.60)
Mean workplace education	-0.01 (-0.95)
Mean workplace training	0.39 (5.20)***
Pseudo R^2	0.02
Log pseudolikelihood	-5937.46
Prob > chi^2	0.0000
N_j	1,250

Notes: z statistics are in parentheses.

Source: WERS

Table 6.3:

Impact of Training on Financial Performance with 2004 year Explanatory Variables with the exception of the 1998 year Training Variable (Ordered Probit estimates)

The proportion of experienced workers who have been in receipt of off-the-job training over the past 12 months (reference group 40-59%)	
100%	0.57 (3.14)***
80-99%	0.49 (2.51)***
60-79%	0.28 (1.42)
20-39%	0.28 (1.54)
1-19%	0.16 (0.88)
0%	0.40 (2.02)**
Workplace size (reference group 1000-3999)	
<50	0.22 (1.14)
≥ 50 and ≤99	0.34 (1.57)
≥100 and ≤499	0.39 (1.95)**
≥500 and ≤999	0.61 (2.51)***
≥4000	0.81 (2.12)**
Sectors (reference group Other Business Services)	
Manufacturing	0.04 (0.23)
Electricity, gas and water	-0.92 (-0.35)
Construction	0.34 (1.43)
Wholesale and Retail	0.29 (1.35)
Hotels and Restaurants	0.34 (1.48)
Transport and communication	-0.36 (-1.40)
Financial services	0.50 (1.76)*
Public administration	0.18 (0.84)
Education	-0.06 (-0.36)
Health	0.06 (0.35)
Other community services	0.04 (0.18)
Workplace aged ≥ 20 years (reference group <20 years)	0.19 (1.91)**
The proportion, if any, of the largest occupational group at this workplace who work in teams (reference group < 60%)	
≥60%	-0.07 (-0.57)
Pseudo R^2	0.0353
Log pseudolikelihood	-538.31935
Prob > chi^2	0.0176
N_j	601

Notes: z statistics are in parentheses.
Financial Performance since 1998

Source: WERS

6.7 Descriptive Statistics on Quits and Absence

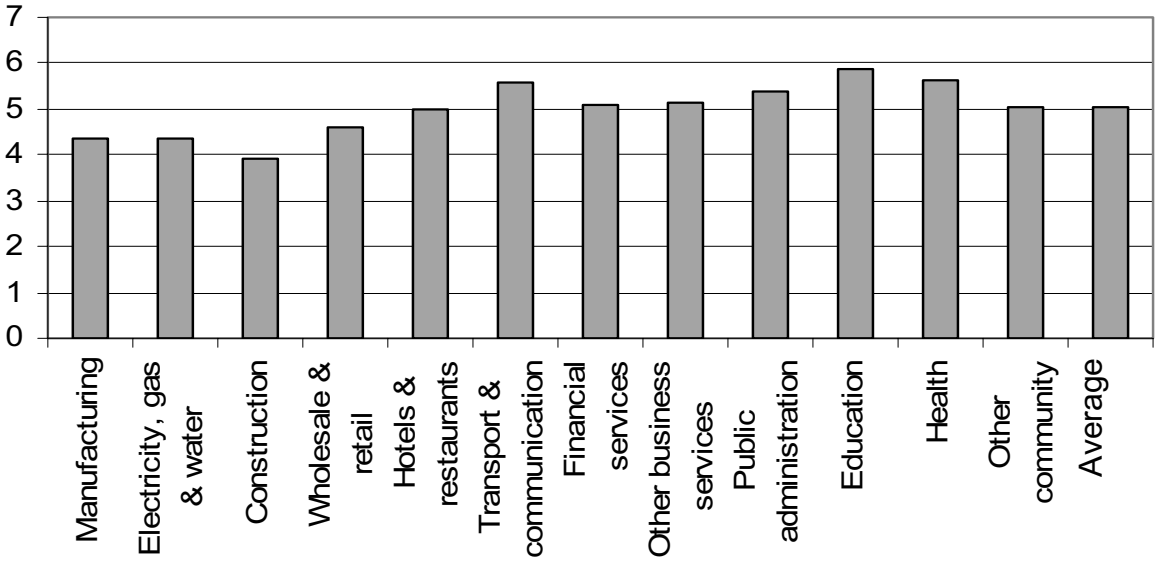
Two final variables which we explore relate to absence and quit rates (the percentage of workers employed a year ago subsequently leaving the firm) at the workplace. While these are continuous measures, they are bounded from below at zero (and have a theoretical maximum at 100 per cent), and consequently are estimated using a tobit model.

Some descriptive information on these two variables are contained in Figures 6.1 and 6.2, again split by sector. Over the whole sample, managers reported an average of 5.0 per cent of working days lost to sickness or absence. However, as Figure 6.1 reveals, absence rates were higher in Education (5.9 per cent), Transport and Communication (5.6 per cent), Health (5.6 per cent) and Public Administration (5.4 per cent). Most of these industries are of course dominated by public sector employers, and thus the data confirm the now well-established pattern of higher absence rates in this sector (see for example the Chartered Institute of Personnel and Development (CIPD) annual *Absence Management* survey[22]). In contrast, an especially low rate is reported in Construction (3.9 per cent), perhaps reflecting the nature of contracts/employment in this sector. However, even these data reveal some very substantial variations: absence rates in the survey vary from zero to well in excess of 20 per cent (around 2 per cent of workplaces). Rates at the upper end of this range are clearly not likely to be sustainable in the longer term.

[22] The Health and Safety Executive (HSE) however, indicate that this difference is almost entirely accounted for by compositional differences such as the gender and age profiles and organisational size. It may also reflect reporting differences.

Figure 6.1:

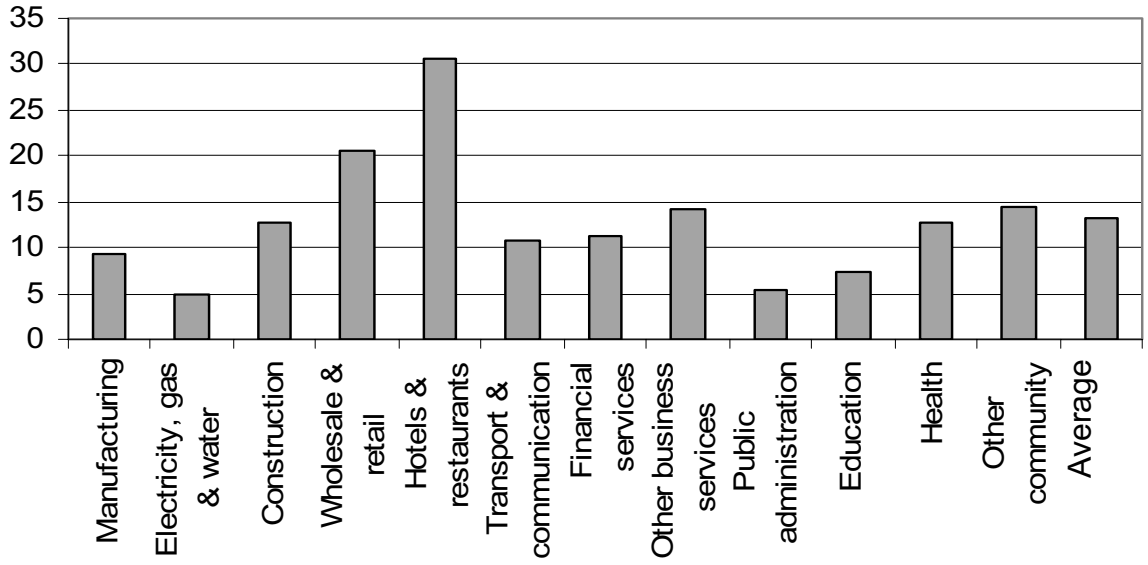
Average percentage of working days lost to sickness or absence in the previous 12 months ('absence rate')



Source: WERS

Figure 6.2:

Average percentage of employees employed 12 months ago subsequently resigning from the firm ('quit rate')



Source: WERS

Figure 6.2 shows the quit rate. Across the whole sample, the mean rate is around 13 percent. However, this also varies substantially across sectors from 4.8 per cent in Electricity, Gas and Water to over 30 percent in Hotels and Restaurants. The latter is of course well-known to be characterised by lower levels of employee attachment and higher turnover along with Wholesale and Retail (20.6 percent). In contrast with the picture in terms of absence rates, sectors such as Education and Public Administration exhibit low levels of voluntary separations (7.4 and 5.4 percent respectively). Again there are very substantial variations even within sectors: a small number of workplaces report 100 percent turnover during the year; again this is unlikely to be sustainable over a longer time period due to the loss of continuity and the hiring and induction costs likely incurred.

Of course the above are simple bi-variate associations. The extent to which these patterns are robust to the inclusion of other control variables, and vary in particular with job satisfaction and training is the focus of the econometric estimates which follow, and to which attention now turns.

6.8 Econometric Results

As noted above, part of the focus of the work here is to include a measure of job satisfaction in the modelling of absence and quit rates. Unfortunately/fortunately, depending on how one views it, WERS actually contains seven measures of satisfaction as discussed previously, none of which constitutes an overall measure (as is available in the BHPS). These seven measures are clearly likely to be strongly collinear, and as such this militates against their simultaneous and independent inclusion among the set of explanatory variables. Instead we therefore combine the various indicators into an index (S) according to $S = \sum_{k=1}^{7} \theta_k s_k$ where s_k denotes the k^{th} component of the index and θ_k the associated weight. Rather than assign weights on an *ad hoc* basis, we adopt a data reduction approach used by *inter alia* Machin (1991) in which the weights are derived from the scaled first principal component of the variance-covariance matrix of the elements of the index, and normalised such that they sum to unity. The correlation matrix between the seven indicators is given in Appendix Table A18, which reveals

relatively high levels of correlation, most notably among the first three satisfaction measures. The first principal component accounts for almost exactly half (49.3 per cent) of the covariance; the second in contrast, accounts for just 15.3 per cent, suggesting that restricting attention to the first principal component is appropriate. Appendix Table A19 documents the (scaled) weights used in constructing the composite measure. Interestingly these are all positive and relatively similar in magnitude, ranging from 0.157 for 'influence' to 0.123 for 'security'.

Because we include means of the composite individual satisfaction measure in our estimates, the reported results all relate to a slightly smaller sample where 3 or more observations were available for each workplace[23]; results are qualitatively similar when using the larger sample (in fact, if anything the impact of satisfaction on quits is actually slightly stronger if all workplaces are included).

Estimates of the various models for the absence rate appear in Table 6.4. In all cases the estimated models include a battery of control variables as detailed in the notes to each table. In terms of absence, these other controls generally have the predicted association. Thus, absence rates are higher in larger organisations and where a higher proportion of the workforce is unionised, but is lower where merit pay is used. As discussed previously, the inclusion of these additional workplace characteristics completely sweeps out sectoral differences.

In terms of the variables of interest, Table 6.4 reveals little role for any of the measures of training deployed, with only one coefficient (for workplaces where between 70 and 99% of the largest occupational group receive training during the previous 12 months in column 5) being statistically significant, and then only weakly. In contrast, the satisfaction measure is consistently negative and strongly significant, indicating that workplaces with higher levels of job satisfaction experience lower rates of absence. This is of course entirely what might be expected a priori, but it is important that the prediction is confirmed empirically.

[23] This is a crude and simple approximation to the 60 per cent threshold recommended and which preserves as many workplaces in the sample as possible.

Turning to quit rates, estimates are presented in Table 6.5. Although not reported, the coefficient estimates in this case show that even after controlling for other factors, significant sectoral variation remains: quit rates are significantly higher in both Wholesale and Retail and Hotels and Restaurants, reflecting the dramatic differences in the raw data described above. As with absence, higher rates are in evidence in very large organisations (2,000 plus employees). In addition, voluntary separations are also higher where a higher proportion of the workforce is aged below 21, reflecting the greater mobility of younger workers while the converse applies for workplaces with an older (50 or over) workforce. Similarly quit rates appear lower as union density rises, in line with the exit-voice story proposed by Freeman and Medoff (1984).

Turning to the main variables of interest, as can be seen from the table, neither the proportion of the largest occupational group receiving training nor the mean proportion of individuals in the workplace who participated in the employee survey reporting they received training exert any discernible influence. The average number of days training among members of the largest occupational group however, is strongly and negatively associated with the quit rate: volumes clearly matter in this regard more than just the numbers receiving training. As column 3 shows, this effect is not mediated through higher workplace job satisfaction. In fact, the estimates show that mean satisfaction exerts a strong, independent/additional effect on quits.

Taken together, the results in Tables 6.4 and 6.5 show therefore that workplace satisfaction is an important predictor of both absence and quit behaviour. Training in contrast, essentially affects only quit behaviour, and then solely when defined in terms of average training days (among the largest occupational group). These results thus suggest that the last effect is a direct one independent of, or in addition to (any effect mediated through) job satisfaction. The data do not enable us to determine for sure whether an effect of training on absence may arise through its impact on satisfaction (with which it is positively correlated as shown previously); what is however clear, is that satisfaction is a key driver of absence rates, and that no additional, direct role for training is found.

Table 6.4:

Tobit estimates of workplace absence rate during the previous 12 months

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean composite workplace satisfaction	-0.021*** (3.16)		-0.020*** (2.86)		-0.021*** (3.20)		-0.021*** (2.24)
Amount of time LOG spend in training: less than one day		0.002 (0.09)	-0.002 (0.09)				
Amount of time LOG spend in training: 1 to < 2 days		-0.008 (0.43)	-0.009 (0.48)				
Amount of time LOG spend in training: 2 to < 5 days		-0.004 (0.23)	-0.005 (0.25)				
Amount of time LOG spend in training: 5 to < 10 days		0.005 (0.25)	0.004 (0.22)				
Amount of time LOG spend in training: > 10 days		0.012 (0.59)	0.012 (0.61)				
Proportion of LOG trained: 1-19%				-0.001 (0.14)	-0.003 (0.33)		
Proportion of LOG trained: 20-39%				0.003 (0.38)	0.002 (0.21)		
Proportion of LOG trained: 40-59%				-0.008 (0.89)	-0.010 (1.02)		
Proportion of LOG trained: 60-79%				-0.001 (0.09)	-0.003 (0.28)		
Proportion of LOG trained: 70-99%				-0.015 (1.57)	-0.016* (1.73)		
Proportion of LOG trained: 100%				0.002 (0.22)	0.001 (0.07)		
Mean proportion trained at workplace						-0.000 (1.00)	-0.000 (0.82)

Notes:

1. * indicates significance at 10 per cent level; ** indicates significance at 5 per cent level and *** indicates significance at 1 per cent level.
2. Absolute value of t statistics in parentheses.
3. All models include employer controls for workplace size, organisation size, industry, establishment age, proportions of workforce aged less than 21, over 50, from ethnic minority, with disabilities, working part-time, union members, on fixed term contracts, agency staff and the presence of performance related pay, payment by results and merit pay.
4. LOG denotes largest occupational group.
5. Mean composite satisfaction and mean proportion trained at workplace obtained from employee questionnaire.

Source: WERS

Table 6.5:

Tobit estimates of workplace quit rate during the previous 12 months

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean composite workplace satisfaction	-0.038*** (2.65)		-0.046*** (3.12)		-0.039*** (2.69)		-0.039*** (2.66)
Amount of time LOG spend in training: less than one day		-0.134*** (3.21)	-0.144*** (3.43)				
Amount of time LOG spend in training: 1 to < 2 days		-0.151*** (3.99)	-0.154*** (4.08)				
Amount of time LOG spend in training: 2 to < 5 days		-0.148*** (3.93)	-0.149*** (3.97)				
Amount of time LOG spend in training: 5 to < 10 days		-0.143*** (3.72)	-0.145*** (3.78)				
Amount of time LOG spend in training: > 10 days		-0.124*** (3.19)	-0.124*** (3.19)				
Proportion of LOG trained: 1-19%				-0.018 (0.96)	-0.022 (1.20)		
Proportion of LOG trained: 20-39%				0.002 (0.11)	-0.002 (0.10)		
Proportion of LOG trained: 40-59%				-0.006 (0.31)	-0.009 (0.43)		
Proportion of LOG trained: 60-79%				-0.002 (0.09)	-0.006 (0.28)		
Proportion of LOG trained: 70-99%				-0.011 (0.57)	-0.014 (0.72)		
Proportion of LOG trained: 100%				-0.016 (0.94)	-0.019 (1.12)		
Mean proportion trained at workplace						0.000 (0.05)	0.000 (0.21)

Notes:

1. * indicates significance at 10 per cent level; ** indicates significance at 5 per cent level and *** indicates significance at 1 per cent level.
2. Absolute value of t statistics in parentheses.
3. All models include employer controls for workplace size, organisation size, industry, establishment age, proportions of workforce aged less than 21, over 50, from ethnic minority, with disabilities, working part-time, union members, on fixed term contracts, agency staff and the presence of performance related pay, payment by results and merit pay.
4. LOG denotes largest occupational group.
5. Mean composite satisfaction and mean proportion trained at workplace obtained from employee questionnaire.

Source: WERS

6.9 Conclusions

We found that both workplace education and workplace training have a positive impact on earnings. The spillovers from education and training in the workplace are substantial and are independent from the impact of own education and training. We also found that the square of training had a positive and significant impact on hourly pay. In addition, the interaction between own and co-workers years of education and training had a positive and significant impact on hourly pay. A greater dispersion of training at the workplace was not associated with lower earnings. This is consistent with the hypothesis of skills compatibility. These spillovers indicate that part of the return to human capital emanates from the interaction of workers with each other as reflected in teamwork or knowledge transferrals. A crucial result is that own education and in particular, training is rewarded at a relatively higher rate in workplaces where education and training levels are already high.

When we examined the relationship between workplace education and workplace training on establishment performance there were conflicting results. Using subjective data only training had a significant impact on productivity and financial performance, while the reverse was the case using objective data. Whether this is a result of other subjective and objective data measuring different things or a consequence of the reduced sample size in the latter case remains to be determined. Training does seem to have a beneficial effect in lowering quit rates. There were also found to be some positive effects on establishment survival and employment growth for certain rates of training intensity, though it is difficult to disentangle cause and effect in this case.

Workplace satisfaction has a significant impact on reducing the rate of absenteeism, while training essentially has no such effect. In contrast, the average length of training received by members of the largest occupational group has a significant effect on reducing quits, while job satisfaction exerts a powerful reducing impact in respect of this performance indicator also.

Chapter 7

Conclusions

This report has examined three main questions concerning the relationship between training, job satisfaction and workplace performance. The first question is what determines training incidence? As far as personal characteristics are concerned some workers are more likely to receive training than others, perhaps because the potential benefits are greater. Younger workers have a longer period over which to recoup the benefits of training; those with existing qualifications may learn more quickly and be able to apply better what they have learned. Trade Unions may be able to ensure that the benefits from training are shared to a greater degree with employees. Women now seem more likely to receive training than men and the non-disabled more than the disabled. Training intensity varies considerably across industries, but we need to know more about whether this is the result of the requirement for training being greater in some industries than others or whether this reflects a greater awareness of the benefits of training among managers in certain industries or more generally in the public sector. However, in general there appears to be a relatively high incidence of training regardless of its location, and more often than not this is designed to improve the level or range of skills on the current job. In all three data sets there is a positive relationship between educational qualifications and likelihood of receiving training which means that training is more likely to increase inequality in the labour market rather than reduce it. Job characteristics such as the amount of job discretion, whether the job is permanent or temporary or part-time or full-time, and occupation likewise affect the amount of training in each case. A question on over-education together with use of skills only appears in the Skills Survey and a number of questions on over-skilling only appear in WERS, but in each case employees who are over-educated or over-skilled for their job are less likely to receive training. In the case of other key variables there is less agreement. Thus, women are more likely to receive training than men according to the BHPS and WERS, but there is no significant difference in the probability of receiving training according to the Skills Survey, though even here job specific characteristics seem to impact more on male training probabilities. Age is significant in all cases apart from the train1 variable in the Skills Survey and likewise job tenure. Industry is significant in all cases apart from waves 11 to 14 of the BHPS and there is clear evidence that the public sector is more likely to train than the private sector. There is less agreement in the case of marital status, which is insignificant according to the train1 variable in the Skills Survey and waves 8 to 14 of the BHPS while it is only significant in relation to training duration in WERS. Disability questions

were only asked in the BHPS and WERS and again this variable was not significant in waves 8 to 14 of the BHPS, in contrast establishment size is only significant in waves 8 to 14 of the BHPS and firm size in WERS. Trade union membership is significant apart from in the Skills Survey (train2 variable) and BHPS waves 11-14. Therefore the results are not entirely consistent across the three data sets. In part this reflects the differences in the nature of the training question or the duration of the period considered for the incidence of training (i.e. since leaving full-time education, in the last five years, in the last twelve months, or the last month). Or there may be changes over time – waves 11 to 14 of the BHPS seem to have different effects on training than the earlier waves, certainly managers as well as academics should not assume that training is a homogenous entity. General training may have different effects than informal training; training to raise specific skills may impact differently than that designed to improve general skills; short training courses may not have the same impact as longer ones. The effects may differ across occupations and industries.

The second major question considered in the report was whether training affects job satisfaction, and whether in turn this leads to improved workplace performance either directly or indirectly through e.g. reduced labour turnover. There was little evidence for such a relationship in the 2001 Skills Survey, though being able to use the skills possessed on the job seemed to raise job satisfaction. The BHPS, however, does suggest that there is a positive relationship between job related training and job satisfaction (significant at the 10 per cent level), but only for that type of training which raises skills on the current job. Though WERS does not contain a question on overall job satisfaction it does have questions on 7 facets of job satisfaction and having received training in the previous twelve months is positively and significantly related to each of them. Therefore, overall it is fair to say that certain types of training can improve levels of job satisfaction. Considering the consistency of the results for the determinants of job satisfaction across the three data sets there are consistently significant results for marital status, qualifications, job characteristics, trade union membership, occupation and, where the data exist for over-education and over-skilling. That is married people tend to be more satisfied than single people, job satisfaction declines with education, is lower for trade union members, increases with occupational status and is lower where workers are over-educated or over-skilled. In the case of other variables the results are ambiguous. Age is insignificant in the Skills Survey and waves 11-14 of the BHPS; ethnicity is only significant in the BHPS waves 1-7 and 11-14; disabled is only significant in WERS; industry is only significant in the Skills Survey, BHPS waves 1-7 and WERS; establishment size is only significant in BHPS waves 1-7 and 8-11, and in WERS. Finally training is only significant in BHPS waves 1-7 and 11-14 and in WERS. Thus the significance of these variables changes over time.

The third major question considered in this report is whether or not training affects workplace performance either directly, or indirectly through the effect of training on job satisfaction. For answers to these questions we must rely on WERS only. Managers were asked to assess the performance of their establishment relative to others in their industry. This is a subjective question and since their comparators are not defined might mean that they only consider one segment of a standard industrial classification industry. In addition in 2004 there was a new financial performance questionnaire which asked for objective information on establishment performance in relation to productivity, product quality and profitability, but this only covers a sample of establishments in the main survey. In addition there is a panel of establishments in 2004 which survived from 1998 and again this covers a smaller number of establishments than in the main surveys. Managers were asked to assess whether performance between these years had been better, the same or worse than that of other establishments in the same industry. These data can also be used to assess the effect of training on company growth and survival.

It appears that increases in the levels of both education and training have a positive rate of return for individual workers. In addition higher levels of education and training of co-workers across establishments increase the earnings of individual workers though spillover effects. We are also interested, however, in how education and training influence establishment performance. Workplace training, but not workplace education, serves to increase establishment productivity and financial performance as measured subjectively by managers. Similarly there is some evidence that those establishments which trained more in 1998 improved their productivity and financial performance relative to others over the period 1998 to 2004, again according to management's subjective assessments. A similar outcome was observed in relation to the probability of establishment survival and employment growth. Yet when the analysis was conducted in relation to objective measures of productivity and financial performance derived from the financial performance questionnaire, no such positive effects could be observed. Yet they were observed in relation to increased levels of education, the reverse of the case with respect to subjective measures of performance. Future research is needed, therefore, in order to try and resolve this conflicting evidence.

Finally, is it training or job satisfaction that matters? There is some evidence at least to support the proposition that training can increase job satisfaction. There is therefore, an obvious benefit to employers from providing the right type of training. Since more training increases earnings, there is a direct financial benefit to employees. In turn, higher job satisfaction may, through more training, lead to lower levels of absenteeism. In the case of

quit rates, increasing the volume of training in terms of duration does seem to have a beneficial effect, while there is also an additional effect from/via increasing job satisfaction.

The general conclusion must be that there are some positive effects on workplace performance to be obtained from increased training and job satisfaction, but their effects differ and depend on the particular types and extent of training provided and on whether workers skills are effectively utilised. Clearly managements need to monitor the effect of the particular types of training they adopt and the responses of workers in terms of their stated levels of job satisfaction, if they are to maximise the potential positive benefits.

To conclude there are implications both for policy and further research. In relation to the former employers need to pay attention to the type of training they offer, its duration and the characteristics of the workers to whom they offer it. They need to establish what works for them in terms of the potential pay-offs. There is a tendency for those who are already skilled to be offered more training, but there may be circumstances where the less skilled would benefit more. Likewise younger workers are more likely to be offered training than older workers, but this may need to change because of the ageing of the workforce. Both over-education and under-education, overskilling and underskilling may have negative effects on the motivation and outcomes for workers so affected. Greater consideration of the matching of workers to particular jobs may have a positive pay-off for employers as well as employees. As far as further research is concerned we need to know more about the reasons for the variability of training intensity across industries. Does this reflect a greater awareness among managers of the benefits of training within certain industries or does it simply reflect variations in the need for training across industry?

Appendix

1- Econometric Methods

(a) Determinants of training

(b) Determinants of Job Satisfaction

2- Tables

Appendix 1: Econometric Methods

(a) Determinants of training

The basic framework used in a number of studies (e.g. Booth, 1991; Green, 1993; Shields, 1998; and Latreille et al., 2005) is to assume that an individual will participate in training if the perceived net benefits (to the employer and/or employee as appropriate) are positive. This decision may be modelled as a latent variable model in which the net benefit of training for individual *i* in workplace *j* is given by

$$T_{ij}^{*} = X\beta + \varepsilon_{ij} \qquad \text{(1a.1)}$$

where *X* is a vector of individual and firm characteristics, β is a conformable vector of coefficients and ε is an error term. In practice T_{ij}^{*} is unobserved and is replaced in the estimated models by its binary counterpart T_{ij} = 1 or 0 depending on whether there is a training spell or not. Accordingly the empirical models are estimated by either logistic or probit regression (the latter being chosen here).

A further complication arises with respect to the WERS data because these data are multi-level (matched employer-employee data) and thus the error term can be written as:

$$\varepsilon_{ij} = \phi_{ij} + \theta_{j} \qquad \text{(1a.2)}$$

where ϕ_{ij} represents the part of the error term that varies independently across individuals both within and between establishments and θ_{j} measures the part that varies across establishments, but which is constant for workers within establishments. This assumes that there are unobservable factors determining satisfaction that are common to workers within establishments and others that vary randomly across all workers. Thus, the appropriate estimation framework required is the probit model with random effects.

When considering the number of days of training (rather than simply the dichotomy between some or no training), the dependent variable will instead be categorical in nature, and as such an ordered response model is appropriate. In this case we observe $T_{ij} = r$ if $\gamma_{r-1} \leq T_{ij}^{*} \leq \gamma_{r}$ with $\gamma_{0} = -\infty$ and $\gamma_{r} = \infty$. Thus the probability

that alternative *r* is chosen is the probability that the latent variable T_{ij}^{*} is between two boundaries γ_{r-1} and γ_r. Assuming that the error term is independently distributed following a standard normal distribution, this gives us the ordered probit model. Again the use of matched data means that a random effects version is appropriate.

Looking at workplace-level training incidence/intensity measures (i.e. responses from the management survey) however, the issue of matching is absent, and the estimators accordingly revert to the more conventional ordered probits for durations and proportions of largest occupational group in receipt of training.

(b) Determinants of Job Satisfaction

The categorical nature of the dependent variable, job satisfaction, means that an ordered response model is appropriate. The model is based on the assumption that satisfaction is described by an underlying latent variable S^{*}_{i} such that

$$S^{*}_{i} = \mathbf{X}\beta + \varepsilon_i \qquad \text{(1b.1)}$$

where i refer to an individual and X is a vector of individual characteristics β is the coefficient vectors associated with these characteristics. We observe $S_i = r$ if $\gamma_{r-1} \le S_i \le \gamma_r$ with $\gamma_0 = -\infty$ and $\gamma_r = \infty$. Thus the probability that alternative r is chosen is the probability that the latent variable S_i^{*} is between two boundaries γ_{r-1} and γ_r. Assuming that the error term is independently distributed following a standard normal distribution, this gives us the ordered probit model.

As far as the Skills Survey is concerned variables in X include individual characteristics (such as age, education), employment related characteristics (industry, occupation) and task related characteristics (speed, safety etc).[24] In terms of education and skills, and consistent with previous analysis X includes a measure of formal qualifications (NVQ level). However, this is supplemented with controls for over-education, which occurs when an individual possesses more qualifications than

[24] A full list of variable descriptions is included in the Appendix.

are currently required to undertake the job, and a control for utilisation of skills and knowledge in current employment. It may be anticipated that individuals who feel unable to use their qualifications or skills fully in their present job will be less satisfied. To test the link between training and satisfaction two alternative measures of training train 1 and train 2 are utilised.

An individual's own earnings are likely to be an important determinant of job satisfaction over and above the characteristics of the job itself. However, it is not only absolute pay that may be important and following similar studies a relative measure of pay is constructed. The returns to characteristics are calculated using estimates from a simple log hourly earnings equation on data from the 2001 Labour Force Survey. The coefficients are then used to form a predicted wage for each individual in the sample using their own characteristics but the coefficients from the external sample.

Appendix 2: Tables

Table A1:

Full Variable Descriptions – 2001 Skills Survey[25]

Variable	Description	Mean
Male	Dummy variable = 1 if male, 0 otherwise	0.57
Age	Age, in years	39.52
Single	Dummy variable = 1 if single, 0 otherwise	0.21
Married	Dummy variable = 1 if married, 0 otherwise	0.55
Children	Dummy variable = 1 if has dependent children, 0 otherwise	0.43
White	Dummy variable = 1 if ethnic status white, 0 otherwise	0.94
Qual2-Qual5	Dummy variable for highest NVQ level held Qual1-No NVQ (reference) Qual2-NVQ1 Qual3-NVQ2 Qual4-NVQ3 Qual5-NVQ4 or NVQ5	 0.13 0.09 0.23 0.21 0.32
Ind1-Ind9	Dummy variables for employment in industry Ind1-Agriculture and fishing Ind2-Energy and water Ind3-Manufacturing Ind4-Construction Ind5-Distribution, hotels and restaurants Ind6-Transport and communication Ind7-Banking, finance and insurance Ind8-Public administration, education and health Ind9-Other services (reference) Derived from the SIC92	 0.01 0.01 0.20 0.05 0.17 0.06 0.17 0.31 0.03
Occ1-Occ9	Dummy variables for employment in the following occupations (SOC2000) Occ1-Managers and Senior officials (reference) Occ2-Professional Occ3-Associate Professional Occ4-Administrative and Secretarial Occ5-Skilled Trades Occ6-Personal Services Occ7-Sales Occ8-Plant and Machine Operatives Occ9-Elementary	 0.14 0.14 0.16 0.15 0.10 0.06 0.07 0.10 0.10
Public	Dummy variable = 1 if employed in the public sector, 0 otherwise	0.32
Tenure	Job tenure, in years	8.04
Train1	Dummy variable = 1 if period of training for the type of work your currently do since completing education, 0 otherwise.	0.58

[25] Dummy variable for residence in regional development agency also included but not reported.

Train2	Since your job 5, 4 or 3 years ago, have you done any of these types of training or education connected with your job or a job that you might do in the future? Dummy variable = 1 if reports any of the following: -Received instruction or training from someone. -Received instruction whilst performing your normal job? -Taught yourself from a book/manual/video/ computer/cassette -Followed a correspondence course (such as Open University) -Taken an evening class -Done some other work-related training 0 if none of the above	0.77
Jobsat	Overall satisfaction with job (7 point scale) 7 Completely satisfied 6 Very satisfied 5 Fairly satisfied 4 Neither satisfied nor dissatisfied 3 Fairly dissatisfied 2 Very dissatisfied 1 Completely dissatisfied	5.16
Union	Dummy variable = 1 if union member, 0 otherwise	0.36
Noshift	Dummy variable = 1 if never does shift work, 0 otherwise	0.76
Full-time	Dummy variable = 1 if full-time, 0 otherwise	0.80
Temp	Dummy variable = 1 if non permanent job, 0 otherwise	0.05
Small firm	Dummy variable = 1 if employed in a firm with less 25 than people, 0 otherwise	0.31
Overed	Dummy variable = 1 if NVQ level currently held exceeds level required, 0 otherwise	0.36
jwomen	Dummy variable = 1 if job is almost exclusively done by women, 0 otherwise	0.11
jmen	Dummy variable = 1 if job is almost exclusively done by men, 0 otherwise	0.19
alone	Dummy variable = 1 if work alone, 0 otherwise	0.43
Job characteristics		
Repeat	Dummy variable = 1 if work always or often involves short repetitive tasks, 0 otherwise	0.47
Computer	Dummy variable = 1 if job involves using computerised or automated equipment, 0 otherwise	0.75
Circle	Dummy variable = 1 if involved in a quality circle, 0 otherwise	0.39
Tension	Dummy variable = 1 if work under a great deal of tension, 0 otherwise	0.60
Deadlines	Dummy variable = 1 if working to tight deadlines all the time or three quarters of the time, 0 otherwise	0.44
Speed	Dummy variable = 1 if working at very high speed all the time or three quarters of the time, 0 otherwise	0.27
New	Dummy variable = 1 if job requires that they keep learning new things, 0 otherwise	0.83
Choice	Dummy variable = 1 for those who have a great deal or quite a lot of choice over the way the job is done, 0 otherwise	0.83

Supervision	Dummy variable = 1 for those who are very or quite closely supervised, 0 otherwise	0.38
Detail	Dummy variable = 1 if paying close attention to detail is essential, 0 otherwise	0.62
People	Dummy variable = 1 if dealing with people in your job is essential, 0 otherwise	0.60
Appraisal	Dummy variable = 1 if formal appraisal system at workplace, 0 otherwise	0.65
Lpay	Log of gross hourly pay	2.09
Relw	Predicted wage given own characteristics and a model estimated using data from the Labour Force Survey.	2.13
Bonus	Dummy variable = 1 if receive incentive payment, bonus or commission that is linked to performance, 0 otherwise	0.27
Share	Dummy variable = 1 if individual takes part in a profit share scheme or share option scheme, 0 otherwise	0.17
Useskill	Dummy variable = 1 if able to use skills and knowledge in current employment, 0 otherwise	0.82
Learn	Dummy variable = 1 if it has taken more than 2 years to learn to do current job well, 0 otherwise	0.27
Targets	Dummy variable = 1 if targets set to improve work, 0 otherwise	0.47
Easy	Dummy variable = 1 if it is quite or very easy to get a job as good as current one, 0 otherwise	0.39
Insecure	Dummy variable = 1 if individual perceives a chance of losing their job in the next 12 months, 0 otherwise	0.17
View	Dummy variable = 1 if management hold meeting where views can be expressed, 0 otherwise	0.68
Dethealth	Dummy variable = 1 if a deterioration in health over last 3-5 years, 0 otherwise	0.21

Table A2:

Variable Descriptions - BHPS

Name	Description	Mean Waves 1-7	Mean Waves 8-11	Mean Waves 11-14
Male	Dummy variable = 1 if individual is male, 0 otherwise	0.48	0.46	0.45
Age: 16 to 29	Dummy variable = 1 if individual is in this age range, 0 otherwise	0.04	0.03	0.02
Age: 30 to 39	Dummy variable = 1 if individual is in this age range, 0 otherwise	0.26	0.21	0.19
Age: 40 to 49	Dummy variable = 1 if individual is in this age range, 0 otherwise	0.30	0.31	0.29
Age: 50 to 59	Dummy variable = 1 if individual is in this age range, 0 otherwise	0.26	0.27	0.29
Age: More than 50	Dummy variable = 1 if individual is in this age range, 0 otherwise	0.14	0.19	0.21
White	Dummy variable = 1 if individual is white, 0 otherwise	0.97	0.98	0.98
Marital Status: Single	Dummy variable = 1 if individual is single, 0 otherwise	0.3	0.27	0.29
Marital Status: Married	Dummy variable = 1 if individual is married, 0 otherwise	0.60	0.60	0.58
Marital Status: Divorced/Widowed	Dummy variable = 1 if individual is divorced/widowed, 0 otherwise	0.10	0.13	0.13
Registered Disabled	Dummy variable = 1 if individual is registered as disabled, 0 otherwise	0.01	0.01	0.02
Highest Qualification: Degree	Dummy variable = 1 if individual's highest qualification is a degree or equivalent, 0 otherwise	0.44	0.53	0.60
Highest Qualification: A level	Dummy variable = 1 if individual's highest qualification is 'A' level or equivalent, 0 otherwise	0.14	0.14	0.12
Highest Qualification: O level	Dummy variable = 1 if individual's highest qualification is 'O' level or equivalent, 0 otherwise	0.23	0.18	0.16
Highest Qualification: Other qualifications	Dummy variable = 1 if individual's highest qualification is other qualification or equivalent, 0 otherwise	0.08	0.06	0.05
Highest Qualification: No qualifications	Dummy variable = 1 if individual has no qualifications, 0 otherwise	0.11	0.09	0.07
Job Tenure: Less than 1 year	Dummy variable = 1 if individual's current job tenure is less than one year, 0 otherwise	0.32	0.25	0.25
Job Tenure: 1 to less than 2 years	Dummy variable = 1 if individual's current job tenure is 1 to less than 2 years, 0 otherwise	0.15	0.15	0.16
Job Tenure: 2 to less than 5 years	Dummy variable = 1 if individual's current job tenure is 1 to less than 2 years, 0 otherwise	0.22	0.25	0.26

Job Tenure: 5 to less than 10 years	Dummy variable = 1 if individual's current job tenure is 5 to less than 10 years, 0 otherwise	0.17	0.16	0.15
Job Tenure: 10 to less than 20 years	Dummy variable = 1 if individual's current job tenure is 10 to less than 20 years, 0 otherwise	0.10	0.14	0.14
Job Tenure: 20 years or more	Dummy variable = 1 if individual's current job tenure is 20 years or more, 0 otherwise	0.03	0.05	0.04
Hours worked	Continuous variable: usual weekly hours worked by individual	34.44	34.56	34.09
Establishment size: Less than 25	Dummy variable = 1 if individual works in an establishment which is in this size range, 0 otherwise	0.20	0.21	0.20
Establishment size: 25-49	Dummy variable = 1 if individual works in an establishment which is in this size range, 0 otherwise	0.12	0.12	0.12
Establishment size: 50-200	Dummy variable = 1 if individual works in an establishment which is in this size range, 0 otherwise	0.24	0.23	0.24
Establishment size: 200-499	Dummy variable = 1 if individual works in an establishment which is in this size range, 0 otherwise	0.16	0.17	0.16
Establishment size: 500+	Dummy variable = 1 if individual works in an establishment which is in this size range, 0 otherwise	0.26	0.26	0.26
Permanent Job	Dummy variable = 1 if individual works in an establishment which is in this size range, 0 otherwise	0.91	0.95	0.96
Average Hourly Earnings	Continuous variable – workers average hourly earnings	7.48	9.02	10.40
Pay Rise	Dummy variable = 1 if individual receives annual increments in their pay, 0 otherwise	0.62	0.62	0.63
Bonus Payments	Dummy variable = 1 if individual receives bonus payments, 0 otherwise	0.28	0.26	0.24
Promotion Opportunities	Dummy variable = 1 if individual has promotion opportunities in their job, 0 otherwise	0.59	0.62	0.63
Managerial Responsibilities	Dummy variable = 1 if individual has managerial responsibilities, 0 otherwise	0.18	0.19	0.20
Trade Union Member	Dummy variable = 1 if individual is a member of a trade union, 0 otherwise	0.63	0.62	0.61
Occupation: Senior Managers	Dummy variable = 1 if individual is this occupational group, 0 otherwise	0.10	0.11	0.11
Occupation: Professional occupations	Dummy variable = 1 if individual is this occupational group, 0 otherwise	0.15	0.14	0.15
Occupation: Associate	Dummy variable = 1 if individual	0.14	0.14	0.15

professional & technical occupations	is this occupational group, 0 otherwise			
Occupation: Clerical & secretarial occupations	Dummy variable = 1 if individual is this occupational group, 0 otherwise.	0.21	0.20	0.19
Occupation: Craft & related occupations	Dummy variable = 1 if individual is this occupational group, 0 otherwise	0.09	0.09	0.08
Occupation: Personal & protective service occupations	Dummy variable = 1 if individual is this occupational group, 0 otherwise	0.10	0.11	0.12
Occupation: Sales occupations	Dummy variable = 1 if individual is this occupational group, 0 otherwise	0.05	0.05	0.05
Occupation: Plant & machine operatives	Dummy variable = 1 if individual is this occupational group, 0 otherwise	0.10	0.09	0.08
Occupation: Other occupations	Dummy variable = 1 if individual is this occupational group, 0 otherwise	0.07	0.08	0.07
Industry: Agriculture, forestry & fishing	Dummy variable = 1 if individual works in industry, 0 otherwise	0.03	0.02	
Industry: Extraction of minerals & ores other than fuels; manufacture of metals, mineral products & chemicals	Dummy variable = 1 if individual works in industry, 0 otherwise	0.03	0.03	
Industry: Metal goods, engineering & vehicles industries	Dummy variable = 1 if individual works in industry, 0 otherwise	0.07	0.06	
Industry: Other manufacturing industries	Dummy variable = 1 if individual works in industry, 0 otherwise	0.08	0.07	
Industry: Construction	Dummy variable = 1 if individual works in industry, 0 otherwise	0.02	0.02	
Industry: Distribution, hotels & catering	Dummy variable = 1 if individual works in industry, 0 otherwise	0.09	0.09	
Industry: Transport & communication	Dummy variable = 1 if individual works in industry, 0 otherwise.	0.07	0.08	
Industry: Banking, finance, insurance, business services & leasing	Dummy variable = 1 if individual works in industry, 0 otherwise	0.10	0.09	
Industry: Other services	Dummy variable = 1 if individual works in industry, 0 otherwise	0.49	0.52	
Agriculture, forestry & fishing	Dummy variable = 1 if individual works in industry, 0 otherwise			0.00
Mining and Quarrying	Dummy variable = 1 if individual works in industry, 0 otherwise.			0.00
Electricity, Gas and Water Supply	Dummy variable = 1 if individual works in industry, 0 otherwise			0.01
Manufacturing	Dummy variable = 1 if individual			0.14

	works in industry, 0 otherwise	
Construction	Dummy variable = 1 if individual works in industry, 0 otherwise	0.03
Wholesale and Retail Trade	Dummy variable = 1 if individual works in industry, 0 otherwise	0.08
Hotels and Restaurants	Dummy variable = 1 if individual works in industry, 0 otherwise	0.02
Transport, Storage and Communication	Dummy variable = 1 if individual works in industry, 0 otherwise	0.07
Financial Intermediation	Dummy variable = 1 if individual works in industry, 0 otherwise	0.06
Real Estate, Renting and Business Activities	Dummy variable = 1 if individual works in industry, 0 otherwise	0.04
Public Administration and Defence Compulsory Social Security	Dummy variable = 1 if individual works in industry, 0 otherwise	0.17
Education	Dummy variable = 1 if individual works in industry, 0 otherwise	0.17
Health and Social Work	Dummy variable = 1 if individual works in industry, 0 otherwise	0.17
Other Community, Social and Personal Service Activities	Dummy variable = 1 if individual works in industry, 0 otherwise	0.03

Table A3:

(a) Full Variable Descriptions – WERS 2004 Employee Data

Name	Description	Mean
Male	Dummy variable = 1 if male, 0 otherwise	0.47
Age: 21 or under (reference)	Dummy variable = 1 if aged 21 or less, 0 otherwise	0.06
Age: 22-29	Dummy variable = 1 if aged 22-29, 0 otherwise	0.15
Age: 30-49	Dummy variable = 1 if aged 30-49, 0 otherwise	0.25
Age: 40-49	Dummy variable = 1 if aged 40-49, 0 otherwise	0.27
Age: 50-59	Dummy variable = 1 if aged 50-59, 0 otherwise	0.22
Age: 60-64	Dummy variable = 1 if aged 60-64, 0 otherwise	0.04
Age: 65 or more	Dummy variable = 1 if aged 65 or over, 0 otherwise	0.01
Marital status: Single (reference)	Dummy variable = 1 if single, 0 otherwise	0.32
Marital status: Widowed	Dummy variable = 1 if widowed, 0 otherwise	0.01
Marital status: Divorced or separated	Dummy variable = 1 if separated or divorced, 0 otherwise	0.09
Marital status: Married or cohabiting	Dummy variable = 1 if married or cohabiting, 0 otherwise	0.68
White	Dummy variable = 1 if ethnic status white, 0 otherwise	0.94
Work limiting disability	Dummy variable = 1 if has long-term illness, health problem or disability, 0 otherwise	0.05
Tenure: Less than 1 year (reference)	Dummy variable = 1 if current job tenure is less than 1 year, 0 otherwise	0.15
Tenure: 1 to less than 2 years	Dummy variable = 1 if current job tenure is 1 to less than 2 years, 0 otherwise	0.13
Tenure: 2 to less than 5 years	Dummy variable = 1 if current job tenure is 2 to less than 5 years, 0 otherwise	0.27
Tenure: 5 to less than 10 years	Dummy variable = 1 if current job tenure is 5 to less than 10 years, 0 otherwise	0.19
Tenure: 10 years or more	Dummy variable = 1 if current job tenure is 10 years or more, 0 otherwise	0.26
Temporary job	Dummy variable = 1 if current job is temporary, 0 otherwise	0.04
Fixed term job	Dummy variable = 1 if current job is fixed term, 0 otherwise	0.03
Total hours	Total hours usually worked	39.67
Union member	Dummy variable = 1 if union member, 0 otherwise	0.36
Uses computer in job	Dummy variable = 1 if uses computer as part of work, 0 otherwise	0.75
Skills relative to job requirements: Much higher	Dummy variable = 1 if work skills much higher than needed to do present job, 0 otherwise	0.21
Skills relative to job requirements: Bit higher	Dummy variable = 1 if work skills a bit higher than needed to do present job, 0 otherwise	0.32
Skills relative to job requirements: About the same (reference)	Dummy variable = 1 if work skills about the same as needed to do present job, 0 otherwise	0.42
Skills relative to job requirements: Bit lower	Dummy variable = 1 if work skills a bit lower than needed to do present job, 0 otherwise	0.04

Skills relative to job requirements: Much lower	Dummy variable = 1 if work skills much lower than needed to do present job, 0 otherwise	0.01
Highest academic qualification: None (reference)	Dummy variable = 1 if no academic qualification held, 0 otherwise	0.23
Highest academic qualification: Other	Dummy variable = 1 if highest academic qualification held is other, 0 otherwise	0.07
Highest academic qualification: CSE or equivalent	Dummy variable = 1 if highest academic qualification held is CSE or equivalent, 0 otherwise	0.09
Highest academic qualification: O level or equivalent	Dummy variable = 1 if highest academic qualification held is O level or equivalent, 0 otherwise	0.26
Highest academic qualification: 1 A level or equivalent	Dummy variable = 1 if highest academic qualification held is 1 A level or equivalent, 0 otherwise	0.06
Highest academic qualification: 2+ A level or equivalent	Dummy variable = 1 if highest academic qualification held is 2+ A levels or equivalent, 0 otherwise	0.09
Highest academic qualification: Degree or equivalent	Dummy variable = 1 if highest academic qualification held is degree or equivalent, 0 otherwise	0.20
Vocational qualification	Dummy variable = 1 if vocational qualification held, 0 otherwise	0.64
Occupation: Managers and senior officials (reference)	Dummy variable = 1 if managerial or senior official occupation, 0 otherwise	0.11
Occupation: Professional occupations	Dummy variable = 1 if professional occupation, 0 otherwise	0.12
Occupation: Associate professional and technical occupations	Dummy variable = 1 if associate professional or technical occupation, 0 otherwise	0.16
Occupation: Administrative and secretarial occupations	Dummy variable = 1 if administrative or secretarial occupation, 0 otherwise	0.19
Occupation: Skilled trades	Dummy variable = 1 if skilled trades occupation, 0 otherwise	0.07
Occupation: Personal service occupations	Dummy variable = 1 if personal service occupation, 0 otherwise	0.09
Occupation: Sales and customer service occupations	Dummy variable = 1 if sales or customer service occupation, 0 otherwise	0.07
Occupation: Process, plant and machine operatives	Dummy variable = 1 if process, plant or machine operative occupation, 0 otherwise	0.08
Occupation: Elementary occupations	Dummy variable = 1 if elementary occupation, 0 otherwise	0.11
Number of employees at workplace	Total number of employees at workplace	424.13
Organization size: Less than 250 (reference)	Dummy variable = 1 if total number of employees in organization less than 250, 0 otherwise	0.32
Organization size: 250-1999	Dummy variable = 1 if total number of employees in organization 250 to less than 2000, 0 otherwise	0.17
Organization size: 2000-9999	Dummy variable = 1 if total number of employees in organization 2000 to less than 10000, 0 otherwise	0.21

Organization size: 10000+	Dummy variable = 1 if total number of employees in organization 10000 or more, 0 otherwise	0.30
Establishment age	Length of time workplace at present address	47.51
Briefing groups which discuss training	Dummy variable = 1 if workplace has briefing groups which discuss training, 0 otherwise	0.58
Joint Consultative Committees which discuss training	Dummy variable = 1 if workplace has joint consultative committees which discuss training, 0 otherwise	0.33
Meetings between senior managers/workers about training	Dummy variable = 1 if workplace has meetings between senior managers and workers about training, 0 otherwise	0.49
Industry: Manufacturing (reference)	Dummy variable = 1 if firm in Manufacturing, 0 otherwise	0.15
Industry: Electricity, gas and water	Dummy variable = 1 if firm in electricity, gas or water industry, 0 otherwise	0.02
Industry: Construction	Dummy variable = 1 if firm in construction industry, 0 otherwise	0.05
Industry: Wholesale and retail	Dummy variable = 1 if firm in wholesale and retail industry, 0 otherwise	0.10
Industry: Hotels and restaurants	Dummy variable = 1 if firm in hotels and restaurants industry, 0 otherwise	0.02
Industry: Transport and communication	Dummy variable = 1 if firm in transport and communication industry, 0 otherwise	0.06
Industry: Financial services	Dummy variable = 1 if firm in financial services industry, 0 otherwise	0.06
Industry: Other business services	Dummy variable = 1 if firm in other business services industry, 0 otherwise	0.12
Industry: Public administration	Dummy variable = 1 if firm in public administration industry, 0 otherwise	0.08
Industry: Education	Dummy variable = 1 if firm in education industry, 0 otherwise	0.12
Industry: Health	Dummy variable = 1 if firm in health industry, 0 otherwise	0.16
Industry: Other community services	Dummy variable = 1 if firm in other community services industry, 0 otherwise	0.06
Training incidence	Dummy variable = 1 if individual has received training in the previous 12 months, 0 otherwise	0.66
Training duration	Banded training duration: 0=None; 1=Less than 1 day; 2=1 to less than 2 days; 3=2 to less than 5 days; 4=5 to 10 days; 5=10 days or more	1.91

Table A3:

(b) Full Variable Descriptions – WERS 2004 Management Data

Name	Description	Mean
Number of employees at workplace	Total number of employees at workplace	291.60
Organization size: Less than 250 (reference)	Dummy variable = 1 if total number of employees in organization less than 250, 0 otherwise	0.42
Organization size: 250-1999	Dummy variable = 1 if total number of employees in organization 250 to less than 2000, 0 otherwise	0.15
Organization size: 2000-9999	Dummy variable = 1 if total number of employees in organization 2000 to less than 10000, 0 otherwise	0.16
Organization size: 10000+	Dummy variable = 1 if total number of employees in organization 10000 or more, 0 otherwise	0.27
Establishment age	Length of time workplace at present address	42.23
Proportion aged under 21	Proportion of employees at workplace aged 21 or under	0.09
Proportion aged over 50	Proportion of employees at workplace aged 50 or over	0.21
Proportion ethnic minority	Proportion of employees at workplace from ethnic minority	0.08
Proportion disabled	Proportion of disabled employees at workplace	0.02
Proportion union members	Proportion of employees at workplace who are union members	0.26
Proportion female	Proportion of female employees at workplace	0.50
Proportion part-time	Proportion of employees at workplace who work part-time	0.27
Proportion on fixed term contracts	Proportion of employees at workplace on fixed term contracts	0.06
Proportion agency workers	Proportion of employees at workplace employed as agency staff	0.03
Briefing groups which discuss training	Dummy variable = 1 if workplace has briefing groups which discuss training, 0 otherwise	0.53
JCCs which discuss training	Dummy variable = 1 if workplace has joint consultative committtees which discuss training, 0 otherwise	0.26
Meetings between senior managers & workers re. training	Dummy variable = 1 if workplace has meetings between senior managers and workers about training, 0 otherwise	0.51
Industry: Manufacturing (reference)	Dummy variable = 1 if firm in Manufacturing, 0 otherwise	0.14
Industry: Electricity, gas and water	Dummy variable = 1 if firm in electricity, gas or water industry, 0 otherwise	0.02
Industry: Construction	Dummy variable = 1 if firm in construction industry, 0 otherwise	0.05

Industry: Wholesale and retail	Dummy variable = 1 if firm in wholesale and retail industry, 0 otherwise	0.15
Industry: Hotels and restaurants	Dummy variable = 1 if firm in hotels and restaurants industry, 0 otherwise	0.06
Industry: Transport and communication	Dummy variable = 1 if firm in transport and communication industry, 0 otherwise	0.07
Industry: Financial services	Dummy variable = 1 if firm in financial services industry, 0 otherwise	0.04
Industry: Other business services	Dummy variable = 1 if firm in other business services industry, 0 otherwise	0.13
Industry: Public administration	Dummy variable = 1 if firm in public administration industry, 0 otherwise	0.05
Industry: Education	Dummy variable = 1 if firm in education industry, 0 otherwise	0.09
Industry: Health	Dummy variable = 1 if firm in health industry, 0 otherwise	0.13
Industry: Other community services	Dummy variable = 1 if firm in other community services industry, 0 otherwise	0.07
Absence rate	Proportion of work days lost during previous 12 months due to absence	0.13
Quit rate	Proportion of employees resigning from firm during previous 12 months	0.05
Mean composite workplace satisfaction	Mean composite satisfaction measure for workplace, based on individual employee responses (see text for details)	3.57
Amount of time LOG spend in training: None (reference)	Dummy variable = 1 if average amount of time LOG spend in training is none, 0 otherwise	0.01
Amount of time LOG spend in training: Less than 1 day	Dummy variable = 1 if average amount of time LOG spend in training is less than 1 day, 0 otherwise	0.05
Amount of time LOG spend in training: 1 to < 2 days	Dummy variable = 1 if average amount of time LOG spend in training is 1 to less than 2 days, 0 otherwise	0.23
Amount of time LOG spend in training: 2 to < 5 days	Dummy variable = 1 if average amount of time LOG spend in training is 2 to less than 5 days, 0 otherwise	0.39
Amount of time LOG spend in training: 5 to < 10 days	Dummy variable = 1 if average amount of time LOG spend in training is 5 to less than 10 days, 0 otherwise	0.19
Amount of time LOG spend in training: > 10 days	Dummy variable = 1 if average amount of time LOG spend in training is 10 days or more, 0 otherwise	0.13
Proportion of LOG trained: None	Dummy variable = 1 if proportion of LOG trained is none, 0 otherwise	0.11
Proportion of LOG trained: 1-19%	Dummy variable = 1 if proportion of LOG trained is 1-19%, 0 otherwise	0.14
Proportion of LOG trained: 20-39%	Dummy variable = 1 if proportion of LOG trained is 20-39%, 0 otherwise	0.12
Proportion of LOG trained: 40-59%	Dummy variable = 1 if proportion of LOG trained is 40-59%, 0 otherwise	0.10

Proportion of LOG trained: 60-79%	Dummy variable = 1 if proportion of LOG trained is 60-79%, 0 otherwise	0.10
Proportion of LOG trained: 70-99%	Dummy variable = 1 if proportion of LOG trained is 70-99%, 0 otherwise	0.13
Proportion of LOG trained: 100%	Dummy variable = 1 if proportion of LOG trained is 100%, 0 otherwise	0.30
Mean proportion trained at workplace	Mean percentage of employees trained at workplace, based on individual employee responses	8.56

Table A4:

Training probit model, any training since full time education (train1) - 2001 Skills Survey (see Appendix Table A1 for description of variables)

	Male	Female	Public	Private
Age	0.026	-0.006	-0.013	0.017
	(0.90)	(0.19)	(0.30)	(0.70)
Age2	-0.000	0.000	0.000	-0.000
	(0.88)	(0.09)	(0.37)	(0.81)
Single	-0.186	0.012	0.010	0.005
	(1.62)	(0.82)	(0.62)	(0.51)
Married	-0.006	-0.000	-0.000	-0.000
	(0.07)	(0.74)	(0.59)	(0.31)
Tenure	0.006	0.008	0.017	-0.163
	(0.50)	(0.07)	(0.11)	(1.74)*
Tenure2	-0.000	0.049	-0.020	0.037
	(0.56)	(0.56)	(0.17)	(0.50)
Child	0.007	0.135	0.348	-0.055
	(0.08)	(1.44)	(2.87)***	(0.75)
White	0.279	0.155	0.287	0.190
	(1.85)*	(0.91)	(1.52)	(1.35)
Qualifications (reference group = Qual1-no qualifications)				
Qual2	0.295	0.452	0.522	0.293
	(1.95)*	(2.84)***	(2.23)**	(2.35)**
Qual3	0.320	0.599	0.453	0.475
	(2.32)**	(4.44)***	(2.21)**	(4.37)***
Qual4	0.611	0.701	0.466	0.707
	(4.58)***	(4.53)***	(2.09)**	(6.29)***
Qual5	0.796	0.804	0.747	0.834
	(5.55)***	(4.93)***	(3.31)***	(6.86)***
Occupation (reference group = Occ1-Managers and Senior Officials)				
Occ2	0.155	-0.134	-0.061	0.090
	(1.16)	(0.73)	(0.28)	(0.68)
Occ3	0.059	-0.069	0.031	-0.034
	(0.48)	(0.43)	(0.15)	(0.31)
Occ4	0.006	-0.233	-0.280	-0.029
	(0.04)	(1.57)	(1.28)	(0.25)
Occ5	0.315	-0.395	0.129	0.209
	(2.36)**	(1.34)	(0.41)	(1.67)*
Occ6	-0.131	-0.134	-0.115	0.208
	(0.49)	(0.73)	(0.47)	(1.09)
Occ7	-0.044	-0.699	-1.172	-0.323
	(0.19)	(3.82)***	(1.90)*	(2.36)**
Occ8	0.047	-0.374	-0.130	-0.039
	(0.33)	(1.48)	(0.34)	(0.30)
Occ9	-0.269	-0.702	-0.912	-0.279
	(1.74)*	(3.53)***	(3.14)***	(2.08)**
Industry (reference group = Ind9-Other Services)				
Ind1	0.735	-0.328	-0.023	0.430
	(1.67)*	(0.52)	(0.02)	(1.17)
Ind2[i]	0.270	0.551	-	0.360
	(0.77)	(1.37)	-	(1.30)

Ind3	-0.173	0.362	-0.692	0.086
	(0.87)	(1.53)	(1.21)	(0.51)
Ind4	0.185	0.181	0.182	0.359
	(0.83)	(0.46)	(0.36)	(1.81)*
Ind5	-0.225	0.384	-0.494	0.088
	(1.09)	(1.76)*	(1.21)	(0.52)
Ind6	-0.041	0.375	0.327	0.160
	(0.19)	(1.42)	(0.94)	(0.84)
Ind7	-0.032	0.246	0.262	0.152
	(0.16)	(1.16)	(0.79)	(0.91)
Ind8	0.060	0.568	0.264	0.417
	(0.27)	(2.79)***	(1.02)	(2.08)**
Union	0.191	0.160	0.188	0.110
	(2.20)**	(1.71)*	(1.78)*	(1.37)
Alone	0.044	0.120	0.190	0.048
	(0.61)	(1.59)	(1.87)*	(0.80)
Supervision	0.206	0.096	0.085	0.201
	(2.71)***	(1.22)	(0.83)	(3.12)***
Appraise	0.209	-0.043	0.073	0.126
	(2.49)**	(0.48)	(0.59)	(1.79)*
Computer	0.363	0.041	0.109	0.285
	(3.89)***	(0.38)	(0.76)	(3.48)***
Insecure	0.110	0.025	0.198	0.093
	(1.27)	(0.21)	(1.29)	(1.22)
Repeat	0.030	-0.060	0.172	-0.054
	(0.41)	(0.79)	(1.68)*	(0.86)
Choice	0.117	0.210	0.075	0.185
	(1.18)	(2.08)**	(0.57)	(2.20)**
Useskill	0.009	0.149	0.075	0.106
	(0.10)	(1.52)	(0.57)	(1.32)
Overed	-0.121	-0.235	-0.186	-0.184
	(1.51)	(2.72)***	(1.65)*	(2.68)***
Full-time	0.262	0.096	0.069	0.174
	(1.32)	(1.09)	(0.55)	(1.79)*
Noshift	-0.111	-0.120	-0.020	-0.181
	(1.31)	(1.23)	(0.16)	(2.43)**
Small	-0.039	0.040	-0.088	-0.016
	(0.47)	(0.49)	(0.80)	(0.23)
Jwomen	-0.175	0.197	0.340	0.088
	(0.47)	(2.20)**	(2.51)**	(0.77)
Jmen	0.056	0.268	-0.081	0.062
	(0.70)	(0.91)	(0.40)	(0.77)
View	0.057	-0.038	0.088	-0.007
	(0.68)	(0.43)	(0.75)	(0.09)
Circle	0.032	0.112	0.088	0.087
	(0.40)	(1.37)	(0.85)	(1.29)
Targets	0.225	0.216	0.174	0.211
	(2.95)***	(2.68)***	(1.67)*	(3.21)***
Learn	0.196	0.217	0.261	0.169
	(2.47)**	(2.02)**	(2.15)**	(2.25)**
Tension	-0.040	0.041	0.156	-0.080
	(0.54)	(0.52)	(1.50)	(1.27)
New	0.331	0.468	0.437	0.343
	(3.22)***	(4.47)***	(2.71)***	(4.21)***

Risk	0.135	0.168	0.109	0.179
	(1.79)*	(1.90)*	(1.01)	(2.64)***
Easy	0.114	0.087	0.058	0.124
	(1.53)	(1.13)	(0.56)	(1.99)**
Deadline	-0.141	-0.130	-0.091	-0.126
	(1.84)*	(1.54)	(0.85)	(1.90)*
Speed	-0.216	-0.002	0.014	-0.167
	(2.44)**	(0.02)	(0.12)	(2.25)**
Detail	0.112	0.242	0.026	0.210
	(1.55)	(3.02)***	(0.26)	(3.33)***
People	0.087	0.033	0.139	0.044
	(1.16)	(0.39)	(1.27)	(0.67)
Temp	-0.078	-0.098	-0.227	-0.047
	(0.47)	(0.62)	(1.20)	(0.32)
Male	-	-	-0.067	-0.095
			(0.55)	(1.18)
Public	0.005	0.052	-	-
	(0.03)	(0.43)		
Constant	-2.571	-1.646	-1.891	-2.084
	(3.89)***	(2.53)**	(2.02)**	(3.93)***
Observations	1709	1616	1060	2260

Notes to table: Absolute value of z statistics in parentheses, * denotes significant at the 10% level, ** at the 5% level and *** at the 1%. Regression also includes a full set of regional dummies not reported.

[i] The small number of observations on industry 2 predict success perfectly in the public sector and hence are excluded from the regression.

Table A5:

Training probit models, training in the last 5 years (train2) - 2001 Skills Survey. (see Appendix Table A1 for description of variables)

	Male	Female	Public	Private
Age	0.038	0.084	0.093	0.063
	(1.12)	(2.45)**	(1.64)	(2.33)**
Age2	-0.001	-0.001	-0.001	-0.001
	(1.67)*	(2.50)**	(1.78)*	(2.69)***
Single	-0.110	0.026	0.002	0.019
	(0.82)	(1.58)	(0.11)	(1.63)
Married	0.091	-0.001	-0.000	-0.001
	(0.89)	(2.16)**	(0.28)	(1.60)
Tenure	0.014	-0.026	-0.052	-0.043
	(1.01)	(0.20)	(0.25)	(0.40)
Tenure2	-0.000	-0.194	-0.134	-0.008
	(0.58)	(1.86)*	(0.85)	(0.10)
Child	-0.124	0.057	0.255	-0.099
	(1.22)	(0.53)	(1.60)	(1.18)
White	0.329	0.136	-0.183	0.377
	(1.89)*	(0.63)	(0.66)	(2.40)**
Qualifications (reference group = Qual1- no qualifications)				
Qual2	0.328	0.281	0.607	0.247
	(2.08)**	(1.58)	(2.21)**	(1.89)*
Qual3	0.447	0.283	0.696	0.306
	(3.06)***	(1.88)*	(2.89)***	(2.66)***
Qual4	0.492	0.524	0.916	0.416
	(3.52)***	(2.96)***	(3.34)***	(3.49)***
Qual5	0.803	0.642	1.214	0.696
	(5.07)***	(3.30)***	(4.26)***	(5.13)***
Occupation (reference group = Occ1- Managers and Senior Officials)				
Occ2	0.236	-0.044	-0.406	0.358
	(1.31)	(0.21)	(1.24)	(2.03)**
Occ3	0.122	0.499	-0.084	0.242
	(0.78)	(2.49)**	(0.26)	(1.76)*
Occ4	0.289	0.563	0.252	0.436
	(1.36)	(3.22)***	(0.76)	(3.09)***
Occ5	0.194	0.182	-0.023	0.195
	(1.27)	(0.54)	(0.05)	(1.39)
Occ6	0.742	0.553	-0.000	0.929
	(2.12)**	(2.49)**	(0.00)	(3.89)***
Occ7	-0.311	0.243	-0.544	0.167
	(1.21)	(1.17)	(0.64)	(1.07)
Occ8	0.078	0.057	0.205	0.106
	(0.48)	(0.21)	(0.40)	(0.74)
Occ9	-0.007	-0.091	-0.521	0.030
	(0.04)	(0.42)	(1.36)	(0.21)
Industry (reference group = Ind9-Other Services)				
Ind1	0.474	-0.016	-0.621	0.444
	(0.98)	(0.02)	(0.59)	(1.04)
Ind2 [i]	0.044	-0.059	-	-0.040
	(0.11)	(0.12)	-	(0.12)

Ind3	0.037	-0.168	-0.782	-0.050
	(0.16)	(0.59)	(1.14)	(0.26)
Ind4	0.119	-0.523	-0.403	-0.053
	(0.48)	(1.14)	(0.61)	(0.24)
Ind5	0.038	-0.148	0.177	-0.064
	(0.16)	(0.56)	(0.35)	(0.33)
Ind6	0.245	-0.554	0.151	-0.101
	(0.97)	(1.78)*	(0.34)	(0.46)
Ind7	0.119	-0.243	0.041	-0.060
	(0.51)	(0.92)	(0.09)	(0.31)
Ind8	0.094	-0.087	0.231	0.008
	(0.35)	(0.33)	(0.67)	(0.03)
Union	0.110	0.050	0.070	0.056
	(1.08)	(0.45)	(0.48)	(0.63)
Alone	-0.222	0.013	-0.050	-0.135
	(2.65)***	(0.15)	(0.37)	(1.97)**
Supervision	0.151	0.125	0.068	0.202
	(1.71)*	(1.33)	(0.50)	(2.75)***
Appraise	0.339	0.293	0.228	0.352
	(3.58)***	(2.93)***	(1.43)	(4.54)***
Computer	0.742	0.226	0.128	0.609
	(7.43)***	(1.91)*	(0.71)	(7.13)***
Insecure	0.076	0.073	0.615	-0.032
	(0.75)	(0.55)	(2.63)***	(0.37)
Repeat	0.118	0.056	0.074	0.068
	(1.38)	(0.63)	(0.54)	(0.96)
Choice	0.120	0.117	0.043	0.113
	(1.10)	(1.04)	(0.25)	(1.26)
Useskill	0.049	0.106	0.031	0.121
	(0.45)	(0.96)	(0.18)	(1.38)
Overed	-0.198	-0.271	-0.171	-0.284
	(2.09)**	(2.53)**	(1.09)	(3.56)***
Full-time	0.243	0.042	-0.126	0.174
	(1.14)	(0.40)	(0.76)	(1.61)
Noshift	0.192	-0.120	-0.140	0.037
	(2.00)**	(1.06)	(0.79)	(0.45)
Small	-0.005	0.029	-0.084	0.034
	(0.06)	(0.30)	(0.57)	(0.44)
Jwomen	-0.474	-0.024	0.274	-0.223
	(1.03)	(0.24)	(1.55)	(1.76)*
Jmen	0.128	-0.179	0.022	0.073
	(1.41)	(0.54)	(0.08)	(0.82)
View	0.201	0.174	-0.017	0.262
	(2.16)**	(1.77)*	(0.11)	(3.43)***
Circle	0.254	0.125	0.447	0.121
	(2.61)***	(1.24)	(3.14)***	(1.48)
Targets	0.088	0.278	0.210	0.155
	(0.97)	(2.87)***	(1.47)	(2.03)**
Learn	0.000	0.125	-0.075	0.102
	(0.00)	(0.92)	(0.46)	(1.14)
Tension	-0.100	0.044	-0.006	-0.073
	(1.13)	(0.47)	(0.05)	(1.01)
New	0.228	0.397	0.724	0.181
	(2.08)**	(3.59)***	(3.75)***	(2.13)**

Risk	0.140	0.043	0.076	0.148
	(1.59)	(0.42)	(0.54)	(1.94)*
Easy	0.113	0.010	-0.260	0.128
	(1.28)	(0.10)	(1.92)*	(1.79)*
Deadline	-0.011	0.013	0.090	-0.070
	(0.12)	(0.13)	(0.62)	(0.92)
Speed	-0.303	-0.088	-0.306	-0.135
	(3.00)***	(0.84)	(2.00)**	(1.62)
Detail	0.005	0.176	0.064	0.078
	(0.06)	(1.90)*	(0.47)	(1.10)
People	0.107	0.119	0.071	0.115
	(1.20)	(1.19)	(0.48)	(1.53)
Temp	0.155	-0.148	-0.533	0.275
	(0.79)	(0.80)	(2.25)**	(1.60)
Male	-	-	0.246	-0.039
			(1.49)	(0.41)
Public	0.193	0.114	-	-
	(1.14)	(0.79)		
Constant	-2.555	-2.585	-2.066	-2.865
	(3.34)***	(3.28)***	(1.60)	(4.67)***
Observations	1665	1479	998	2141

Notes to table: Absolute value of z statistics in parentheses, * denotes significant at the 10% level, ** at the 5% level and *** at the 1%. Regression also includes a full set of regional dummies not reported.

[i] The small number of observations on industry 2 predict success perfectly in the public sector and hence are excluded from the regression.

Table A6:

Random Effects Probit Analysis of the Incidence of Training
BHPS – Dependent Variable: '1' if the individual has received work related training in the previous year, 0 otherwise.

	Waves 1-7	**Waves 8-11**	**Waves 11-14**
Male	-0.167 (3.517)***	-0.110 (2.155)**	-0.137 (2.698)***
Age (Reference group = 16-29)			
30 to 39	-0.445 (4.609)***	-0.473 (4.102)***	-0.445 (3.725)***
40 to 49	-0.380 (3.638)***	-0.489 (3.997)***	-0.392 (3.131)***
50 to 59	-0.481 (4.398)***	-0.490 (3.854)***	-0.380 (2.928)***
More than 50	-0.520 (4.436)***	-0.641 (4.811)***	-0.532 (3.954)***
White	-0.011 (0.102)	-0.101 (0.818)	0.011 (0.089)
Marital Status (Reference Group = Single)			
Married	0.088 (1.733)*	0.000 (0.005)	0.054 (0.987)
Been Married	0.177 (2.419)**	0.001 (0.013)	-0.013 (0.181)
Registered Disabled	-0.175 (3.065)***	-0.042 (0.715)	-0.029 (0.495)
Highest Qualification (Reference Group = No Qualifications)			
Degree	0.553 (7.494)***	1.151 (12.766)***	0.959 (10.327)***
A level	0.510 (6.343)***	0.678 (6.956)***	0.575 (5.607)***
O level	0.350 (4.860)***	0.594 (6.419)***	0.464 (4.705)***
Other qualifications	0.149 (1.682)*	0.403 (3.509)***	0.226 (1.801)*
Job Tenure (Reference Group = Less than 1 year)			
1 to less than 2 years	0.167 (3.279)***	-0.039 (0.755)	0.039 (0.777)
2 to less than 5 years	-0.000 (0.007)	-0.132 (2.759)***	-0.153 (3.290)***
5 to less than 10 years	-0.267 (4.797)***	-0.114 (1.975)**	-0.150 (2.565)**
10 to less than 20 years	-0.233 (3.460)***	-0.186 (2.864)***	-0.249 (3.850)***
20 years or more	-0.268 (2.405)**	-0.253 (2.459)**	-0.348 (3.291)***
Hours worked	0.008 (3.874)***	0.003 (1.048)	0.008 (3.152)***
Industry (Reference Group = Energy & water supplies)			
Agriculture, forestry & fishing	-0.486 (1.742)*	-0.934 (2.849)***	
Extraction of minerals & ores other than fuels; manufacture of metals, mineral	-0.342 (2.303)**	0.024 (0.150)	

products & chemicals			
Metal goods, engineering & vehicles industries	-0.551 (4.370)***	-0.256 (1.816)*	
Other manufacturing industries	-0.641 (5.087)***	-0.380 (2.694)***	
Construction	-0.587 (3.517)***	0.071 (0.424)	
Distribution, hotels & catering	-0.559 (4.336)***	-0.349 (2.481)**	
Transport & communication	-0.296 (2.355)**	-0.305 (2.212)**	
Banking, finance, insurance, business services & leasing	-0.232 (1.897)*	-0.160 (1.199)	
Other services	-0.196 (1.722)*	-0.035 (0.279)	
Establishment size (Reference Group = Less than 25 employees)			
25-49 employees	0.000 (0.004)	0.076 (1.219)	0.027 (0.442)
50-200 employees	-0.046 (0.900)	-0.141 (2.596)***	-0.071 (1.306)
200-499 employees	-0.052 (0.905)	-0.059 (0.968)	0.004 (0.059)
500+ employees	-0.016 (0.297)	-0.053 (0.988)	-0.110 (2.033)**
Permanent Job	0.306 (4.726)***	0.045 (0.548)	0.128 (1.405)
Average Hourly Earnings	0.005 (1.039)	0.003 (0.632)	-0.002 (0.773)
Pay Rise	0.098 (2.684)***	0.082 (2.127)**	0.126 (3.279)***
Bonus Payments	0.101 (2.414)**	0.105 (2.296)**	0.114 (2.437)**
Promotion Opportunities	0.273 (7.516)***	0.135 (3.480)***	0.166 (4.237)***
Managerial Responsibilities	0.206 (3.454)***	0.189 (3.159)***	0.180 (3.086)***
Trade Union Member	0.160 (4.020)***	0.085 (2.076)**	0.048 (1.178)
Occupation (Reference Group = Senior Managers)			
Professional occupations	0.156 (1.913)*	-0.104 (1.292)	0.005 (0.066)
Associate professional & technical occupations	0.232 (2.867)***	0.101 (1.262)	0.254 (3.177)***
Clerical & secretarial occupations	-0.103 (1.275)	0.036 (0.434)	0.033 (0.409)
Craft & related occupations	-0.160 (1.621)	0.048 (0.465)	0.004 (0.034)
Personal & protective service occupations	0.119 (1.319)	0.172 (1.855)*	0.283 (3.141)***
Sales occupations	0.038 (0.331)	-0.158 (1.315)	-0.136 (1.105)
Plant & machine operatives	-0.353 (3.514)***	-0.058 (0.553)	0.121 (1.134)

Other occupations	-0.597 (5.554)***	-0.218 (2.140)**	-0.030 (0.293)
Industry (Reference group = Electricity, Gas and Water Supply)			
Agriculture, forestry & fishing			0.224 (0.432)
Mining and Quarrying			-0.098 (0.281)
Manufacturing			0.017 (0.046)
Construction			0.335 (0.927)
Wholesale and Retail Trade			-0.215 (0.601)
Hotels and Restaurants			-0.114 (0.299)
Transport, Storage and Communication			-0.114 (0.324)
Financial Intermediation			-0.010 (0.027)
Real Estate, Renting and Business Activities			0.107 (0.301)
Public Administration and Defence Compulsory Social Security			0.104 (0.295)
Education			0.262 (0.742)
Health and Social Work			0.339 (0.962)
Other Community, Social and Personal Service Activities			0.168 (0.465)
Constant	-0.337 (1.499)	-0.616 (2.344)**	-1.257 (2.932)***
Observations	9159	9837	9575

Notes to table: Absolute value of z statistics in parentheses, * denotes significant at the 10% level, ** at the 5% level and *** at the 1%. Regression also includes a full set of regional and wave dummies, not reported. The definition of job related training and therefore the dependent variable is whichever is defined over the sample period indicated.

Table A7:

Location of Training by Industry

Figures indicating percentage of those who have received training (depending of the location where the training took place)

Individuals are asked for details of up to three training events received since September 1 in the previous year. For each of these they were asked about where the training took place. Non-mutually exclusive options: 1 = Current workplace, 2 = Former workplace, 3 = Employer's training centre, 4 = Private training centre, 5 = Job Centre/Job Club, 6 = FE College, 7 = Adult Education Centre, 8 = University, 9 = At or from own home and 10 = Other.

Waves 8-11

Location / Industry	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Agriculture, forestry & fishing	18.60	0.00	13.95	18.60	0.00	34.88	6.98	4.65	0.00	6.98
Energy & water	37.64	1.12	23.03	25.84	0.00	16.85	1.69	5.62	5.06	10.11
Extraction; manufacture of metals, mineral products & chemicals	41.34	1.97	14.17	23.62	0.00	18.90	4.33	4.72	6.69	8.66
Metal goods, engineering & vehicles industries	36.61	1.43	15.21	23.45	0.32	21.55	4.12	3.65	3.80	9.35
Other manufacturing	38.90	2.97	10.07	21.74	0.23	19.22	6.86	3.89	2.29	9.38
Construction	28.98	2.55	14.65	24.84	0.00	30.25	2.55	1.59	1.59	8.60
Distribution, hotels & catering	36.45	2.51	16.34	16.52	0.45	20.83	7.09	3.14	2.87	8.89
Transport & communication	35.71	3.68	24.89	20.35	0.65	10.17	7.14	2.16	4.55	6.49
Finance & business services	31.55	2.84	20.62	23.37	0.25	14.94	5.43	5.59	6.59	9.93
Other services	35.99	2.12	24.14	16.40	0.22	16.74	7.29	10.03	4.30	11.57
All industries	**35.43**	**2.34**	**20.43**	**19.24**	**0.27**	**17.84**	**6.32**	**6.58**	**4.28**	**10.13**

Waves 11-14

Location / Industry	1	2	3	4	5	6	7	8	9	10
Agriculture, forestry & fishing	30.00	2.50	20.00	20.00	0.00	22.50	5.00	2.50	0.00	10.00
Mining and Quarrying	40.82	0.00	22.45	44.90	0.00	10.20	2.04	6.12	2.04	8.16
Manufacturing	38.27	2.28	14.43	21.27	0.38	15.29	6.65	3.61	4.37	9.69
Electricity, Gas and Water Supply	34.78	4.35	28.99	24.64	0.00	8.70	2.90	1.45	5.80	8.70
Construction	28.39	2.60	17.71	22.14	0.00	27.34	4.43	2.34	1.82	9.90
Wholesale and Retail Trade	34.98	2.88	17.83	13.72	0.41	15.91	6.04	2.33	3.84	12.48
Hotels and Restaurants	38.89	3.42	15.81	13.68	0.43	18.80	8.12	2.56	3.42	8.97
Transport and Communication	35.69	2.55	24.08	20.96	0.57	9.35	5.95	1.98	4.25	7.08
Financial Intermediation	44.16	1.52	23.35	17.77	0.00	9.39	3.55	2.03	8.12	9.14
Real Estate, Renting and Business Activities	34.01	1.90	13.27	23.26	0.25	17.83	6.95	5.44	5.94	14.03
Public Administration	36.96	1.08	32.66	17.34	0.24	11.72	5.38	6.70	2.99	9.93
Education	34.07	1.92	22.53	16.12	0.27	17.67	7.51	9.43	4.49	14.56
Health and Social Work	38.96	2.26	19.55	13.43	0.13	16.56	5.19	11.30	4.12	13.70
Other Community, Social Activities	31.36	2.82	18.36	18.93	0.56	15.82	7.63	5.37	5.65	12.71
All Industries	**36.30**	**2.17**	**20.12**	**17.84**	**0.27**	**15.90**	**6.05**	**6.10**	**4.36**	**11.81**

Table A8:

Paying for Training

Percentage of those who have received training.

Waves 8-11	No fees	Self Family	Employer /future employer	New Deal scheme	Training for work/youth/ TEC	Other arrangement
Agriculture, forestry & fishing	11.63	27.91	53.49	0.00	13.95	2.33
Energy & water supplies	21.91	12.36	71.35	0.00	1.12	3.93
Extraction of minerals & ores other than fuels; manufacture of metals, mineral products & chemicals	27.95	18.90	66.93	0.00	0.39	1.57
Metal goods, engineering & vehicles industries	22.82	13.63	67.04	0.79	1.58	3.17
Other manufacturing industries	27.00	16.02	59.50	0.69	3.43	2.75
Construction	20.70	7.01	67.83	0.00	5.73	4.78
Distribution, hotels & catering (repairs)	33.66	18.13	49.64	1.53	2.87	4.76
Transport & communication	30.95	16.23	56.93	0.87	1.30	2.60
Banking, finance, insurance, business services & leasing	26.71	16.69	61.35	0.17	1.75	4.26
Other services	29.45	17.80	62.22	0.53	1.84	5.31
All industries	**28.43**	**16.74**	**60.83**	**0.61**	**2.16**	**4.45**

Waves 11-14	No fees	Self Family	Employer /future employer	New Deal scheme	Training for work/youth/ TEC	Other arrangement
Agriculture, forestry & fishing	37.50	15.00	50.00	2.50	0.00	5.00
Mining and Quarrying	16.33	12.24	73.47	0.00	2.04	2.04
Manufacturing	22.98	15.00	64.29	0.85	1.33	2.94
Electricity, Gas and Water Supply	26.09	11.59	66.67	0.00	1.45	1.45
Construction	20.57	11.46	66.67	0.26	4.17	4.69
Wholesale and Retail Trade	36.90	17.42	46.50	1.10	2.33	3.57
Hotels and Restaurants	34.19	17.09	49.57	2.14	3.85	3.85
Transport, Storage and Communication	32.01	15.58	53.82	0.57	0.85	5.95
Financial Intermediation	33.50	13.71	60.41	0.25	0.51	3.30
Real Estate, Renting and Business Activities	24.02	15.93	65.74	0.25	1.39	4.30
Public Administration and Defence Compulsory Social Security	31.82	12.80	63.28	0.36	0.72	4.43
Education	28.21	12.64	69.05	0.55	1.47	5.22
Health and Social Work	30.72	14.36	63.56	0.47	0.86	5.85
Other Community, Social and Personal Service Activities	25.14	19.21	59.32	0.28	3.39	5.93
All Industries	**28.81**	**14.63**	**62.00**	**0.58**	**1.54**	**4.55**

Table A9:

Training leading to Qualifications

Waves 8-11	**Full Qualification**	**Part Qualification**	**No Qualification**
Agriculture, forestry & fishing	69.77	6.98	27.91
Energy & water supplies	55.62	2.81	54.49
Extraction of minerals & ores other than fuels; manufacture of metals, mineral products & chemicals	48.03	7.48	57.87
Metal goods, engineering & vehicles industries	50.24	6.97	55.31
Other manufacturing industries	52.86	7.09	51.03
Construction	64.01	5.73	39.81
Distribution, hotels & catering (repairs)	58.98	5.83	46.23
Transport & communication	54.55	4.98	50.65
Banking, finance, insurance, business services & leasing	46.99	6.51	59.43
Other services	50.1	7.43	58.23
All industries	**51.95**	**6.72**	**54.79**

Waves 11-14	**Full Qualification**	**Part Qualification**	**No Qualification**
Agriculture, forestry & fishing	67.5	10	30
Mining and Quarrying	46.94	0	61.22
Manufacturing	52.23	5.89	51.66
Electricity, Gas and Water Supply	50.72	1.45	56.52
Construction	60.16	8.33	42.19
Wholesale and Retail Trade	49.11	5.62	52.54
Hotels and Restaurants	68.8	5.13	35.47
Transport, Storage and Communication	50.14	5.67	54.11
Financial Intermediation	37.56	6.6	68.78
Real Estate, Renting and Business Activities	49.56	6.57	54.61
Public Administration and Defence Compulsory Social Security	47.97	4.9	63.64
Education	46.52	6.68	62
Health and Social Work	51.6	8.58	55.12
Other Community, Social and Personal Service Activities	57.06	6.5	48.02
All Industries	**50.61**	**6.55**	**55.25**

Table A10:

Random effects estimates of training incidence and intensity – WERS 2004

Variable	Training incidence (probit)		Training duration (ordered probit)
	Coefficient	Marginal effect	
Male	0.097*** (3.57)	*0.034*	0.113*** (5.55)
Age (Reference Group = 21 or under)			
22-29	-0.066 (1.19)	*-0.023*	-0.102** (2.39)
30-49	-0.223*** (3.99)	*-0.081*	-0.268*** (6.18)
40-49	-0.227*** (3.94)	*-0.082*	-0.284*** (6.36)
50-59	-0.287*** (4.76)	*-0.105*	-0.360*** (7.68)
60-64	-0.399*** (5.14)	*-0.151*	-0.454*** (7.28)
65 or more	-0.482*** (3.63)	*-0.185*	-0.546*** (4.77)
Marital status (Reference Group = Single)			
Widowed	-0.135 (1.40)	*-0.049*	-0.130* (1.68)
Divorced or separated	0.011 (0.23)	*0.004*	-0.007 (0.20)
Married or cohabiting	-0.039 (1.30)	*-0.014*	-0.051** (2.21)
White	-0.030 (0.60)	*-0.010*	0.010 (0.27)
Work limiting disability	-0.162*** (3.31)	*-0.059*	-0.162*** (4.12)
Tenure (Reference Group = Less than 1 year)			
1 to less than 2 years	0.100** (2.41)	*0.035*	0.031 (1.00)
2 to less than 5 years	-0.148*** (4.19)	*-0.053*	-0.152*** (5.63)
5 to less than 10 years	-0.177*** (4.55)	*-0.064*	-0.189*** (6.31)
10 years or more	-0.207*** (5.27)	*-0.075*	-0.231*** (7.64)
Temporary job	-0.189*** (3.46)	*-0.069*	-0.233*** (5.34)
Fixed term job	-0.161*** (2.59)	*-0.059*	-0.085* (1.83)
Total hours	0.007*** (9.23)	*0.003*	0.008*** (12.15)
Union member	0.132*** (4.72)	*0.046*	0.116*** (5.49)
Uses computer in job	0.395*** (12.26)	*0.145*	0.347*** (13.14)
Skills relative to job requirements (Reference Group = about the same)			
Much higher	-0.207***		-0.197***

	(7.32)	*-0.075*	(8.80)
Bit higher	-0.011	*-0.004*	-0.041**
	(0.43)		(2.15)
Bit lower	-0.062	*-0.022*	-0.009
	(1.10)		(0.21)
Much lower	-0.368***	*-0.139*	-0.374***
	(2.80)		(3.35)
Highest academic qualification (Reference Group = No qualifications)			
Other	0.070	*0.024*	0.072*
	(1.51)		(1.95)
CSE or equiv	0.034	*0.012*	0.017
	(0.82)		(0.49)
O level or equiv	0.073**	*0.025*	0.044*
	(2.19)		(1.70)
1 A level or equiv	0.186***	*0.063*	0.134***
	(3.52)		(3.38)
2+ A level or equiv	0.136***	*0.047*	0.101***
	(3.01)		(2.96)
Degree or equiv	0.209***	*0.072*	0.152***
	(5.66)		(5.54)
Vocational qualification	0.182***	*0.065*	0.191***
	(7.62)		(10.16)
Occupation (Reference Group = Managers and senior officials)			
Professional occupations	-0.054	*-0.019*	-0.055
	(1.08)		(1.52)
Associate professional and technical occupations	-0.065	*-0.023*	-0.060*
	(1.47)		(1.89)
Administrative and secretarial occupations	-0.366***	*-0.135*	-0.379***
	(8.53)		(11.72)
Skilled trades	0.339***	*-0.127*	-0.284***
	(6.08)		(6.30)
Personal service occupations	-0.044	*-0.016*	-0.049
	(0.76)		(1.16)
Sales and customer service occupations	-0.127**	*-0.046*	-0.267***
	(2.10)		(5.70)
Process, plant and machine operatives	-0.351***	*-0.131*	-0.375***
	(6.30)		(8.24)
Elementary occupations	-0.356***	*-0.133*	-0.412***
	(6.88)		(9.89)
Number of employees at workplace	-0.000	*0.000*	-0.000
	(1.17)		(0.09)
Organization size (Reference Group = Less than 250)			
250-1999	0.095*	*0.033*	0.065
	(1.91)		(1.57)
2000-9999	0.126***	*0.044*	0.124***
	(2.64)		(3.15)
10000+	0.198***	*0.069*	0.162***
	(4.65)		(4.63)
Establishment age	-0.000	*0.000*	-0.000
	(0.32)		(0.43)
Briefing groups which discuss training	0.121***	*0.043*	0.123***
	(3.53)		(4.33)
Joint Consultative Committees which discuss training	0.133***	*0.046*	0.095***
	(3.42)		(3.00)

Meetings between senior managers/workers about training	0.151*** (4.39)	*0.053*	0.137*** (4.81)
Industry (*Reference Group* = Manufacturing)			
Electricity, gas and water	0.531*** (4.04)	*0.160*	0.507*** (4.79)
Construction	0.246*** (2.92)	*0.082*	0.224*** (3.11)
Wholesale and retail	0.243*** (3.60)	*0.082*	0.157*** (2.72)
Hotels and restaurants	0.379*** (3.61)	*0.120*	0.266*** (3.00)
Transport and communication	0.405*** (5.35)	*0.129*	0.379*** (5.87)
Financial services	0.731*** (8.48)	*0.208*	0.577*** (8.12)
Other business services	0.365*** (5.61)	*0.119*	0.240*** (4.37)
Public administration	0.809*** (10.17)	*0.227*	0.699*** (10.82)
Education	0.697*** (9.93)	*0.207*	0.448*** (7.73)
Health	0.991*** (15.09)	*0.278*	0.735*** (13.70)
Other community services	0.457*** (5.95)	*0.143*	0.384*** (5.92)
Constant	-0.537*** (4.98)		
Observations	19328		19328

Notes to table: Absolute value of z statistics in parentheses, * denotes significant at the 10% level, ** at the 5% level and *** at the 1%.

Table A11:

Ordered probit estimates of average amount of training received by experienced members of largest occupational group during the previous 12 months - WERS 2004

Variable	Number of days	Proportion of employees
Number of employees at workplace	-0.000*	-0.000
	(1.77)	(0.87)
Organization size 250-1999	-0.006	0.191**
	(0.07)	(2.52)
Organization size 2000-9999	0.114	0.319***
	(1.44)	(4.18)
Organization size 10000	0.106	0.334***
	(1.51)	(4.94)
Establishment age	0.000	0.001*
	(0.91)	(1.80)
Proportion aged under 21	0.468**	-0.129
	(2.18)	(0.67)
Proportion aged over 50	-0.370**	-0.455***
	(2.00)	(2.67)
Proportion ethnic minority	0.055	-0.028
	(0.33)	(0.18)
Proportion disabled	0.523**	0.099
	(2.22)	(0.43)
Proportion union members	0.105	0.345***
	(1.05)	(3.50)
Proportion female	0.308**	0.456***
	(2.17)	(3.46)
Proportion part-time	-0.452***	-0.574***
	(3.05)	(4.28)
Proportion on fixed term contracts	-0.246	-0.045
	(1.49)	(0.30)
Proportion agency workers	0.358	0.581*
	(1.21)	(1.92)
Briefing Groups which discuss training	0.093*	0.159***
	(1.66)	(3.01)
JCCs which discuss training	-0.034	0.245***
	(0.53)	(3.82)
Meetings between senior managers & workers re. training	0.265***	0.470***
	(4.68)	(8.82)
Electricity, gas & water	0.393**	0.662***
	(2.08)	(3.45)
Construction	-0.006	0.271**
	(0.04)	(2.14)
Wholesale & retail	-0.089	0.206**
	(0.79)	(2.01)
Hotels & restaurants	-0.183	-0.085
	(1.14)	(0.61)
Transport & communication	-0.121	0.464***
	(0.99)	(3.94)
Financial services	0.279*	0.730***
	(1.89)	(5.06)

Other business services	0.188*	0.356***
	(1.74)	(3.59)
Public administration	0.548***	0.497***
	(3.78)	(3.51)
Education	0.231*	0.556***
	(1.75)	(4.43)
Health	0.472***	0.706***
	(3.80)	(6.02)
Other community services	0.096	0.311**
	(0.73)	(2.53)
Observations	1623	1889

Notes to table: Absolute value of z statistics in parentheses, * denotes significant at the 10% level, ** at the 5% level and *** at the 1%.

Table A12:

Ordered probit job satisfaction regressions – 2001 Skills Survey

	Male	Female	Public	Private
Age	0.011	-0.023	-0.013	-0.023
	(0.29)	(0.81)	(0.36)	(0.92)
Age2	-0.000	0.000	0.000	0.000
	(0.20)	(1.12)	(0.32)	(1.33)
Single	-0.119	0.162	-0.089	0.079
	(1.27)	(1.82)*	(0.75)	(1.05)
Married	-0.069	0.100	0.058	-0.006
	(0.90)	(1.48)	(0.68)	(0.10)
Child	0.139	0.098	-0.020	0.217
	(2.00)**	(1.36)	(0.23)	(3.57)***
White	0.084	0.142	0.143	0.107
	(0.61)	(1.02)	(0.94)	(0.89)
Qual2	-0.197	-0.289	-0.492	-0.162
	(1.51)	(2.20)**	(2.55)**	(1.57)
Qual3	0.044	-0.151	-0.231	-0.010
	(0.33)	(1.27)	(1.30)	(0.10)
Qual4	-0.050	-0.280	-0.342	-0.141
	(0.37)	(1.99)**	(1.75)*	(1.35)
Qual5	0.014	-0.203	-0.325	-0.083
	(0.07)	(1.07)	(1.40)	(0.57)
Occ2	-0.233	-0.117	-0.021	-0.117
	(2.06)**	(0.79)	(0.13)	(1.06)
Occ3	-0.241	-0.246	-0.100	-0.260
	(1.56)	(1.74)*	(0.56)	(2.22)**
Occ4	-0.538	-0.531	-0.120	-0.450
	(1.99)**	(2.71)***	(0.47)	(2.73)***
Occ5	-0.244	-0.657	0.164	-0.278
	(1.00)	(1.97)**	(0.52)	(1.60)
Occ6	-0.129	-0.400	0.088	-0.263
	(0.36)	(1.47)	(0.28)	(1.11)
Occ7	-0.794	-0.699	0.003	-0.509
	(2.56)**	(2.62)***	(0.00)	(2.47)**
Occ8	-0.308	-0.875	-0.226	-0.354
	(1.00)	(2.74)***	(0.57)	(1.68)*
Occ9	-0.370	-0.633	-0.281	-0.325
	(1.03)	(2.07)**	(0.76)	(1.39)
Ind1	0.085	-0.036	-1.361	0.113
	(0.24)	(0.07)	(1.25)	(0.38)
Ind2	-0.350	-0.415	0.197	-0.493
	(1.10)	(1.26)	(0.35)	(2.02)**
Ind3	-0.252	-0.092	0.200	-0.231
	(1.34)	(0.48)	(0.41)	(1.61)
Ind4	-0.018	-0.474	0.455	-0.047
	(0.09)	(1.49)	(1.11)	(0.28)
Ind5	-0.317	-0.151	-0.103	-0.234
	(1.78)*	(0.89)	(0.32)	(1.69)*
Ind6	-0.176	-0.154	-0.063	-0.161
	(0.89)	(0.70)	(0.22)	(0.99)
Ind7	-0.020	0.018	-0.015	-0.041
	(0.09)	(0.10)	(0.05)	(0.27)

Ind8	-0.183	-0.009	0.038	-0.043
	(0.94)	(0.06)	(0.18)	(0.26)
Union	-0.124	0.002	-0.061	-0.075
	(1.78)*	(0.02)	(0.76)	(1.18)
Alone	-0.013	-0.032	-0.071	0.016
	(0.22)	(0.55)	(0.95)	(0.33)
Train	0.042	0.075	0.138	0.068
	(0.68)	(1.15)	(1.60)	(1.30)
Supervision	0.031	0.189	0.148	0.086
	(0.52)	(3.06)***	(1.95)*	(1.63)
Appraise	0.134	-0.095	0.108	-0.019
	(1.92)*	(1.33)	(1.12)	(0.32)
Computer	-0.071	0.017	-0.176	-0.006
	(0.93)	(0.21)	(1.62)	(0.09)
Bonus	0.092	0.014	-0.116	0.111
	(1.45)	(0.19)	(1.10)	(2.00)**
Insecure	-0.312	-0.426	-0.342	-0.364
	(4.40)***	(4.67)***	(2.94)***	(5.76)***
Repeat	-0.150	-0.083	-0.055	-0.145
	(2.51)**	(1.38)	(0.72)	(2.82)***
Choice	0.339	0.569	0.561	0.432
	(4.27)***	(7.31)***	(5.64)***	(6.43)***
Useskill	0.486	0.695	0.540	0.608
	(6.37)***	(8.88)***	(5.41)***	(9.31)***
Overed	-0.058	0.063	0.069	-0.030
	(0.89)	(0.89)	(0.80)	(0.53)
Full-time	-0.172	-0.028	-0.006	-0.105
	(1.08)	(0.40)	(0.07)	(1.31)
Noshift	0.016	-0.033	-0.223	0.073
	(0.24)	(0.44)	(2.36)**	(1.22)
Small	0.127	0.050	0.170	0.084
	(1.23)	(0.65)	(1.75)*	(1.20)
Share	0.149	0.050	0.391	0.071
	(1.95)*	(0.51)	(1.45)	(1.14)
Jwomen	-0.139	0.148	0.270	0.030
	(0.45)	(2.14)**	(2.71)***	(0.32)
Jmen	0.028	-0.038	-0.199	0.053
	(0.43)	(0.16)	(1.26)	(0.80)
View	0.159	0.186	0.223	0.171
	(2.32)**	(2.69)***	(2.47)**	(2.95)***
Circle	0.106	0.144	0.246	0.083
	(1.66)*	(2.22)**	(3.20)***	(1.46)
Targets	0.010	-0.082	-0.072	0.012
	(0.17)	(1.26)	(0.89)	(0.22)
Learn	0.152	-0.030	-0.059	0.163
	(2.36)**	(0.36)	(0.67)	(2.60)***
Tension	-0.257	-0.191	-0.328	-0.198
	(4.19)***	(3.05)***	(4.09)***	(3.80)***
New	0.296	0.111	0.065	0.202
	(3.51)***	(1.34)	(0.49)	(3.05)***
Risk	-0.212	-0.341	-0.258	-0.270
	(3.46)***	(4.97)***	(3.23)***	(4.80)***
Easy	-0.148	-0.231	-0.073	-0.227
	(2.45)**	(3.84)***	(0.95)	(4.43)***

Deadline	0.032	-0.083	-0.109	0.029
	(0.52)	(1.27)	(1.39)	(0.53)
Speed	0.105	-0.049	0.031	0.015
	(1.47)	(0.71)	(0.35)	(0.24)
Detail	0.216	0.243	0.266	0.187
	(3.68)***	(3.89)***	(3.48)***	(3.61)***
People	-0.023	-0.036	-0.043	-0.003
	(0.38)	(0.52)	(0.51)	(0.05)
Male	-	-	0.081	-0.031
			(0.78)	(0.37)
Public	0.036	-0.049	-	-
	(0.33)	(0.52)		
Temp	-0.009	-0.088	-0.030	-0.085
	(0.07)	(0.70)	(0.20)	(0.72)
Dethealth	-0.372	-0.321	-0.432	-0.309
	(5.36)***	(4.44)***	(5.03)***	(5.00)***
Lpay	0.110	0.307	0.227	0.163
	(1.42)	(3.23)***	(1.82)*	(2.37)**
Relw	-0.733	-1.202	-0.630	-0.712
	(1.38)	(2.62)***	(1.33)	(2.10)**
Observations	1569	1508	1002	2075

Notes to table: regression also includes a full set of regional dummies not presented.
* significant at 10%; ** significant at 5%; *** significant at 1%
Absolute value of z statistics in parentheses

Table A13:

Ordered probit with random effects analysis of Job Satisfaction - BHPS

	Waves 1-7	**Waves 8-11**	**Waves 11-14**
Male	-0.195	-0.186	-0.237
	(4.107)***	(3.729)***	(4.518)***
Age (Reference Group = 16-29)			
30 to 39	-0.302	-0.331	-0.117
	(3.388)***	(3.082)***	(1.022)
40 to 49	-0.273	-0.277	-0.132
	(2.791)***	(2.430)**	(1.091)
50 to 59	-0.122	-0.273	-0.150
	(1.179)	(2.306)**	(1.195)
more than 50	-0.091	-0.146	-0.071
	(0.814)	(1.179)	(0.547)
White	0.279	0.000	0.257
	(2.500)**	(0.001)	(1.922)*
Marital Status (Reference Group = Single)			
Married	0.140	0.134	0.213
	(2.807)***	(2.527)**	(3.865)***
Been Married	0.077	0.099	0.096
	(1.054)	(1.379)	(1.295)
Registered Disabled	0.166	-0.020	0.066
	(0.801)	(0.355)	(1.133)
Highest Qualification (Reference Group = No Qualifications)			
Degree	-0.575	-0.322	-0.223
	(7.692)***	(4.237)***	(2.684)***
A level	-0.589	-0.297	-0.189
	(7.212)***	(3.505)***	(2.000)**
O level	-0.415	-0.206	-0.029
	(5.644)***	(2.595)***	(0.324)
Other qualifications	-0.284	-0.027	0.093
	(3.137)***	(0.272)	(0.804)
Job Tenure (Reference Group = Less than 1 year)			
1 to less than 2 years	-0.152	-0.129	-0.171
	(3.487)***	(2.980)***	(3.928)***
2 to less than 5 years	-0.217	-0.365	-0.326
	(5.193)***	(8.829)***	(7.919)***
5 to less than 10 years	-0.357	-0.366	-0.422
	(7.195)***	(7.279)***	(8.043)***
10 to less than 20 years	-0.315	-0.365	-0.428
	(5.059)***	(6.429)***	(7.260)***
20 years or more	-0.220	-0.379	-0.366
	(2.102)**	(4.229)***	(3.914)***
Hours worked	-0.011	-0.013	-0.007
	(5.378)***	(5.715)***	(3.070)***
Industry (Reference Group = Energy & water supplies)			
Agriculture, forestry & fishing	0.447	0.095	
	(1.784)*	(0.376)	
Extraction of minerals & ores other than fuels; manufacture of metals, mineral products & chemicals	0.331	0.070	
	(2.219)**	(0.451)	

Metal goods, engineering & vehicles industries	0.093 (0.728)	-0.147 (1.088)	
Other manufacturing industries	0.216 (1.697)*	0.128 (0.953)	
Construction	0.385 (2.393)**	0.162 (1.023)	
Distribution, hotels & catering	0.166 (1.288)	-0.100 (0.749)	
Transport & communication	0.031 (0.242)	-0.058 (0.435)	
Banking, finance, insurance, business services & leasing	-0.010 (0.077)	-0.088 (0.676)	
Other services	0.345 (2.963)***	0.151 (1.243)	
Establishment size (Reference Group = Less than 25 employees)			
25-49 employees	-0.043 (0.772)	-0.001 (0.022)	0.049 (0.858)
50-200 employees	-0.149 (3.057)***	-0.057 (1.169)	-0.039 (0.773)
200-499 employees	-0.174 (3.215)***	-0.082 (1.540)	-0.028 (0.494)
500+ employees	-0.201 (3.972)***	-0.091 (1.864)*	-0.046 (0.903)
Permanent Job	0.087 (1.484)	0.150 (2.079)**	0.231 (2.783)***
Average Hourly Earnings	0.003 (0.600)	0.009 (2.037)**	0.002 (1.146)
Pay Rise	0.148 (4.487)***	0.168 (5.119)***	0.161 (4.726)***
Bonus Payments	0.137 (3.648)***	0.073 (1.871)*	0.059 (1.427)
Promotion Opportunities	0.381 (11.379)***	0.304 (9.078)***	0.277 (7.840)***
Managerial Responsibilities	0.015 (0.276)	0.055 (1.040)	-0.044 (0.807)
Trade Union Member	-0.144 (3.765)***	-0.105 (2.774)***	-0.084 (2.146)**
Training	0.055 (1.774)*	0.018 (0.592)	0.121 (3.818)***
Occupation (Reference Group = Senior Managers)			
Professional occupations	-0.096 (1.247)	0.002 (0.021)	0.016 (0.205)
Associate professional & technical occupations	0.106 (1.428)	0.072 (0.989)	0.116 (1.543)
Clerical & secretarial occupations	-0.093 (1.263)	-0.050 (0.686)	-0.129 (1.718)*
Craft & related occupations	-0.027 (0.291)	0.060 (0.650)	0.026 (0.264)
Personal & protective service occupations	0.200 (2.303)**	0.365 (4.278)***	0.279 (3.238)***
Sales occupations	-0.184 (1.720)*	-0.098 (0.939)	-0.041 (0.379)
Plant & machine operatives	-0.214 (2.304)**	0.050 (0.547)	-0.059 (0.612)

Other occupations	-0.121 (1.228)	-0.031 (0.347)	-0.127 (1.393)
Industry (Reference Group = Electricity, Gas and Water Supply)			
Agriculture, forestry & fishing			1.181 (2.334)**
Mining and Quarrying			-0.150 (0.420)
Manufacturing			0.012 (0.038)
Construction			0.427 (1.251)
Wholesale and Retail Trade			-0.009 (0.028)
Hotels and Restaurants			0.311 (0.868)
Transport, Storage and Communication			-0.058 (0.174)
Financial Intermediation			-0.056 (0.165)
Real Estate, Renting and Business Activities			0.073 (0.219)
Public Administration and Defence Compulsory Social Security			0.178 (0.536)
Education			0.279 (0.837)
Health and Social Work			0.271 (0.816)
Other Community, Social and Personal Service Activities			0.309 (0.904)
Constant	-3.415 (15.075)***	-3.691 (14.521)***	-3.112 (7.592)***
Observations	8596	9834	9572

Notes to table: Absolute value of z statistics in parentheses, * denotes significant at the 10% level, ** at the 5% level and *** at the 1%. Regression also includes a full set of regional and wave dummies, not reported. The definition of job related training and therefore the dependent variable is whichever is defined over the sample period indicated.

Table A14:

Summary Statistics for the Log Pay per Hour Regression with all Variables used in the Regressions in Appendix Table A15

Education and outcome variables	Mean
Education variables	
Years of education per worker	12.78
Years of education per workplace	12.75
Interaction own-workplace education	163.78
Squared term: workplace education	163.50
Dispersion of education per workplace	0.62
Training variables	
No training	0.33
Training per worker	0.67
Training per workplace	0.66
Interaction own-workplace training	0.55
Squared term: workplace training	0.54
Dispersion of training per workplace	0.24
Other Independent variables	
Worker Characteristics:	
Male worker	0.54
Female worker	0.46
Tenure of	
less than 1 year	0.15
1 to less than 2 years	0.13
2 to less than 5 years	0.27
5 to less than 10 years	0.19
10 years or more	0.27
Age in years	
16-21	0.05
22-29	0.17
30-39	0.26
40-49	0.27
50-59	0.22
60-65 or more	0.04
Ethnicity	
British	0.90
Non-British	0.10
No Disability	0.95
Work-limiting disability	0.05
Employment	
Permanent	00.95
Temporary	00.02
Fixed	00.03
Overtime or extra hours usually worked each week, whether paid or unpaid	
Do not usually work overtime or extra hours	00.46
Overtime/extra hours per week	00.54
Marital status	
Single	00.23
Widowed	00.01
Divorced/separated	00.08
Married or living with a partner	00.68
Union or staff association membership status	

Union member	0.38
Not a union member	0.17
Firm-level Characteristics	
Workplace size	
< 50	0.32
≥ 50 and ≤99	0.15
≥100 and ≤499	0.34
≥500 and ≤999	0.09
≥1000 and ≤3999	0.09
≥4000	0.01
Ratio of part-time workers	0.19
Sectors	
Manufacturing	0.19
Electricity, gas and water	0.02
Construction	0.06
Wholesale and retail	0.08
Hotels and restaurants	0.02
Transport and communication	0.07
Financial services	0.05
Other business services	0.12
Public administration	0.09
Education	0.11
Health	0.14
Other community services	0.05
Of all the employees participating in the profit-related pay scheme the proportion of non-managerial employees at this workplace who have received profit-related pay in the past 12 months	
All (100%)	0.78
Almost all (80-99%)	0.10
Most (60-79%)	0.04
Around half (40-59%)	0.01
Some (20-39%)	0.01
Few (1-19%)	0.01
None (0%)	0.02
Of all the companies operating employee share schemes for employees at the workplace and employees who are eligible for it, the proportion of non-managerial employees at this workplace who participate in the employee share ownership scheme(s)	
All (100%)	0.82
Almost all (80-99%)	0.05
Most (60-79%)	0.02
Around half (40-59%)	0.03
Some (20-39%)	0.03
Few (1-19%)	0.03
None (0%)	0.02
Ratio of female Workers	0.47
Age of workplace	
Workplace aged < 20 years	0.41
Workplace older than 20 years	0.60
The proportion of the establishment's (sales revenue/operating costs) is accounted for by wages, salaries and other labour costs like pensions and national insurance	
Less than 25%	0.21
25%-49%	0.30
50-74%	0.25
>75%	0.24

During the last 12 months, the number of employees who have sustained	
Injuries	0.26
No injuries	0.74
The proportion, if any, of the largest occupational group at this workplace work in teams	
≥60%	0.76
<60%	0.24
Earnings variable	
Log pay per hour	2.22
Number of workers	11,395
Number of workplaces	1,303

Table A15:

Log Pay per Hour: Individual and Mean Workplace Education and Training Levels (GLS random effects)

	[1] [coeff.]	[2] [coeff.]	[3] [coeff.]	[4] [coeff.]	[5] [coeff.]	[6] [coeff.]
Own years education e_{ij}	0.064 (28.48)	0.065 (24.92)	0.03 (8.87)***	0.29 (11.14)***	0.03 (8.94)***	0.03 (8.87)***
Own training	0.104 (14.94)	0.09 (11.48)	0.03 (2.95)***	-0.10 (-5.03)***	0.03 (3.03)***	0.03 (3.02)***
Gender						
Male	0.15 (22.31)	0.15 (19.69)	0.14 (18.62)***	0.14 (18.93)***	0.14 (18.53)***	0.14 (18.75)***
Female	-0.15 (-22.31)	-0.15 (-19.69)	-0.14 (-18.62)***	-0.14 (-18.93)***	-0.14 (-18.53)***	-0.14 (-18.75)***
Tenure of (Reference Group = < 1 year)						
1 to < 2 years	0.03 (2.78)	0.03 (1.97)	0.02 (1.79)*	0.02 (1.82)*	0.02 (1.86)**	0.02 (1.74)*
2 to < 5 years	0.06 (5.62)	0.05 (4.58)	0.05 (4.43)***	0.05 (4.54)***	0.05 (4.38)***	0.05 (4.42)***
5 to < 10 years	0.08 (7.03)	0.10 (8.24)	0.08 (6.58)***	0.08 (6.52)***	0.07 (6.19)***	0.08 (6.63)***
≥ 10 years	0.14 (12.38)	0.07 (5.92)	0.14 (11.18)***	0.14 (11.32)***	0.13 (10.99)***	0.14 (11.21)***
Age in years (Reference Group = ≥ 60 years)						
16-21	-0.29 (-12.91)	-0.28 (-11.14)	-0.28 (-11.46)***	-0.28 (-11.50)***	-0.28 (-11.54)***	-0.28 (-11.49)***
22-29	-0.07 (-3.94)	-0.07 (-3.34)	-0.08 (-3.98)***	-0.09 (-4.28)***	-0.08 (-4.13)***	-0.08 (-4.03)***
30-39	0.07 (4.22)	0.08 (4.02)	0.07 (3.60)***	0.06 (3.46)***	0.07 (3.49)***	0.07 (3.54)***
40-49	0.10 (5.81)	0.10 (5.45)	0.09 (4.96)***	0.09 (4.78)***	0.09 (4.76)***	0.09 (4.94)***
50-59	0.10 (5.71)	0.11 (5.58)	0.10 (5.29)***	0.10 (5.19)***	0.10 (5.12)***	0.10 (5.29)***
Ethnicity (Reference Group = Non-British)						
British	0.01 (1.11)	0.001 (0.54)	0.01 (1.26)	0.01 (0.90)	0.01 (0.63)	0.02 (1.29)
Work-limiting disability	-0.07 (-5.17)	-0.08 (-4.86)	-0.08 (-5.15)***	-0.08 (-5.00)***	-0.07 (-4.82)***	-0.08 (-5.10)***
Employment (Reference Group = Permanent)						
Temporary	-0.04 (-1.83)	-0.05 (-2.22)	-0.05 (-2.04)**	-0.04 (-1.95)**	-0.05 (-2.15)**	-0.05 (-2.03)**
Fixed	-0.02 (-1.09)	-0.05 (-2.34)	-0.06 (-3.15)***	-0.06 (-2.95)***	-0.06 (-2.95)***	-0.06 (-3.21)***
Overtime or extra hours worker whether paid or unpaid	0.06 (10.16)	0.06 (8.58)	0.05 (7.49)***	0.05 (7.36)***	0.05 (7.36)***	0.05 (7.56)***
Marital status (Reference Group = Widowed)						
Single	0.001 (0.30)	0.04 (1.06)	0.04 (1.03)	0.03 (0.92)	0.03 (0.91)	0.03 (0.97)

Divorced/separated	0.05 (1.48)	0.07 (1.95)	0.07 (1.96)**	0.07 (1.84)**	0.06 (1.79)**	0.07 (1.93)**
Married or living with a partner	0.09 (3.03)	0.12 (3.33)	0.11 (3.26)***	0.11 (3.20)***	0.11 (3.20)***	0.11 (3.22)***
Union or staff association membership status (Reference Group = Non-union member)						
Union member	0.02 (2.60)	0.01 (0.87)	0.01 (0.56)	0.01 (0.77)	0.004 (0.44)	0.01 (0.75)
Firm-level Characteristics						
Workplace size (Reference Group = <50)						
≥ 50 and ≤99		0.01 (0.28)	-0.02 (-0.96)	-0.02 (-0.97)	-0.01 (-0.43)	-0.03 (-1.27)
≥100 and ≤499		0.09 (4.30)	0.04 (2.34)**	0.04 (2.36)**	0.06 (3.04)***	0.03 (1.76)**
≥500 and ≤999		0.10 (3.24)	0.05 (1.90)*	0.05 (1.83)*	0.06 (2.16)**	0.04 (1.31)
≥1000 and ≤3999		0.23 (7.38)	0.16 (5.86)***	0.16 (5.93)***	0.18 (6.14)***	0.14 (5.17)***
≥4000		0.31 (4.82)	0.23 (3.79)***	0.23 (3.83)***	0.26 (4.24)***	0.20 (3.39)***
Ratio of part-time workers		0.72 (3.43)	-0.44 (-11.03)***	-0.43 (-10.98)***	0.22 (1.57)	-0.41 (-10.18)***
Industry (Reference Group = Hotels and Restaurants)						
Manufacturing		0.28 (6.20)	0.14 (3.03)***	0.14 (3.04)***	0.25 (5.50)***	0.16 (3.54)***
Electricity, gas and water		0.51 (7.05)	0.32 (4.57)***	0.31 (4.50)***	0.41 (5.90)***	0.30 (4.41)***
Construction		0.46 (8.88)	0.29 (5.78)***	0.30 (5.92)***	0.40 (7.78)***	0.32 (6.25)***
Wholesale and retail		0.16 (3.29)	0.11 (2.39)**	0.11 (2.48)**	0.15 (3.16)***	0.13 (2.79)***
Transport and communication		0.23 (4.61)	0.11 (2.19)**	0.12 (2.38)**	0.21 (4.10)***	0.13 (2.65)***
Financial services		0.51 (9.07)	0.34 (6.22)***	0.33 (6.24)***	0.46 (8.61)***	0.31 (5.83)***
Other business services		0.47 (10.17)	0.29 (6.40)***	0.29 (6.41)***	0.41 (9.09)***	0.28 (6.22)***
Public administration		0.41 (7.99)	0.23 (4.50)***	0.22 (4.44)***	0.35 (6.89)***	0.20 (3.99)***
Education		0.38 (7.67)	0.23 (4.85)***	0.22 (4.71)***	0.28 (5.82)***	0.19 (3.98)***
Health		0.27 (5.83)	0.16 (3.43)***	0.16 (3.47)***	0.25 (5.46)***	0.14 (3.10)***
Other community services		0.28 (5.70)	0.18 (4.01)***	0.18 (3.92)***	0.23 (4.68)***	0.17 (3.64)***
Of all the employees participating in the profit-related pay scheme the proportion of non-managerial employees at this workplace who have received profit-related pay in the past 12 months (Reference Group = None (0%)						
All (100%)		-0.01 (-0.15)	-0.01 (-0.17)	-0.01 (-0.34)	0.003 (0.01)	-0.02 (-0.57)
Almost all (80-99%)		0.03 (0.88)	0.01 (0.31)	0.01 (0.23)	0.02 (0.64)	0.0003 (0.01)
Most (60-79%)		-0.01 (-0.23)	0.01 (0.15)	0.002 (0.05)	-0.01 (-0.12)	-0.01 (-0.23)

Around half (40-59%)		-0.11 (-1.23)	-0.02 (-0.20)	-0.02 (-0.26)	-0.06 (-0.69)	-0.01 (-0.12)
Some (20-39%)		0.14 (1.52)	0.11 (1.31)	0.11 (1.26)	0.13 (1.43)	0.10 (1.20)
Few (1-19%)		-0.15 (-1.93)	-0.14 (-1.94)**	-0.15 (-2.03)**	-0.15 (-1.93)**	-0.14 (-1.97)**
Of all the companies operating employee share schemes for employees at the workplace and employees who are eligible for it, the proportion of non-managerial employees at this workplace who participate in the employee share ownership scheme(s) (Reference Group = None (0%)						
All (100%)		-0.01 (-0.16)	0.01 (0.13)	0.002 (0.05)	0.02 (0.47)	0.01 (0.36)
Almost all (80-99%)		0.03 (0.56)	0.03 (0.66)	0.03 (0.59)	0.05 (0.99)	0.04 (0.84)
Most (60-79%)		0.15 (2.16)	0.14 (2.09)**	0.13 (2.04)**	0.14 (2.05)**	0.14 (2.18)**
Around half (40-59%)		-0.03 (-0.41)	0.01 (0.12)	0.002 (0.05)	0.01 (0.16)	0.01 (0.25)
Some (20-39%)		0.06 (0.91)	0.04 (0.76)	0.04 (0.78)	0.07 (1.13)	0.05 (0.89)
Few (1-19%)		-0.03 (-0.47)	-0.01 (-0.26)	-0.01 (-0.27)	0.01 (0.11)	-0.004 (-0.08)
Ratio of female Workers		-0.96 (-3.00)	0.08 (1.97)**	0.07 (1.77)**	-0.15 (-4.25)***	-0.06 (-1.48)
Age of the workplace (Reference Group = >20 years)						
Workplace aged < 20 years		0.02 (1.42)	0.02 (1.34)	0.02 (1.17)	0.02 (1.17)	0.02 (1.18)
The proportion of the establishment's (sales revenue/ operating costs) is accounted for by wages, salaries and other labour costs like pensions and national insurance (Reference Group = <25%)						
25%-49%		0.04 (1.70)	0.03 (1.40)	0.03 (1.34)	0.04 (1.75)*	0.03 (1.72)*
50-74%		-0.001 (-0.01)	0.01 (0.29)	0.01 (0.28)	0.01 (0.40)	0.01 (0.57)
>75%		0.06 (2.44)	0.05 (2.18)**	0.05 (2.15)**	0.05 (2.01)**	0.05 (2.17)**
During the last 12 months, the number of employees who have sustained Injuries (Reference Group = No injuries)		-0.08 (-4.40)	-0.07 (-3.96)***	-0.07 (-3.89)***	-0.07 (-3.99)***	-0.06 (-3.550)***
The proportion, if any, of the largest occupational group at this workplace who work in teams (Reference Group = <60%)						
≥60%		0.06 (3.52)	0.03 (1.94)**	0.03 (1.81)*	0.04 (2.37)**	0.02 (1.30)*
Mean workplace education			0.12 (22.23)***	0.38 (14.48)***	0.77 (11.76)***	0.11 (20.46)***
Mean workplace training			0.18 (11.42)***	0.06 (2.83)***	-0.17 (-3.80)***	0.17 (10.85)***

Interaction: e_{ij}*E_j				-0.02 (-10.17)***		
Interaction: t_{ij}*T_j				0.22 (7.31)***		
Squared term: education					-0.02 (-9.98)***	
Squared term: Training					0.32 (8.37)***	
Dispersion of E_j						0.14 (7.09)***
Dispersion of T_j						-0.18 (-3.54)***
R^2	0.33	0.46	0.55	0.56	0.52	0.56
ρ_j	0.33	0.28	0.26	0.26	0.28	0.26
N_j [N_i]	1,660 [14,665]		1,303 [11,395]			

Notes: z statistics are in parentheses.

Table A16:

Impact of Training on Establishment Survival using only 1998 year independent variables (Probit estimates)

The proportion of experienced workers who have been in receipt of off-the-job training over the past 12 months (Reference Group = 40-59%)	
100%	0.24 (1.62)*
80-99%	0.05 (0.35)
60-79%	0.37 (2.20)**
20-39%	0.05 (0.36)
1-19%	-0.03 (-0.21)
0%	-0.25 (-1.75)
Workplace size (Reference Group = 1000-3999)	
<50	-0.50 (-2.53)***
≥ 50 and ≤99	-0.15 (-0.73)
≥100 and ≤499	-0.20 (-0.99)
≥500 and ≤999	-0.13 (-0.58)
≥4000	-0.15 (-0.24)
Sectors (Reference Group = Other Business Services)	
Manufacturing	-0.91 (-4.09)***
Electricity, gas and water	-1.10 (-4.22)***
Construction	-0.66 (-2.60)***
Wholesale and Retail	-0.52 (-2.35)**
Hotels and Restaurants	-0.30 (-1.13)
Transport and communication	-0.85 (3.52)***
Financial services	-1.10 (-4.20)***
Public administration	-0.67 (-2.95)***
Education	0.10 (0.38)
Health	-0.71 (-3.13)***
Other community services	-0.12 (-0.42)
Workplace aged ≥ 26 years	0.23 (2.87)***
The proportion, if any, of the largest occupational group at this workplace who work in teams	
≥60%	0.20 (0.28)
Pseudo R^2	0.088
Log pseudolikelihood	-722.617
Prob > chi^2	0.0000
N_j	2103

Notes: z statistics are in parentheses.
* significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level

Table A17:

Impact of training on Employment Growth using only 2004 year independent variables with the exception of the 1998 year training independent variable (OLS)

The proportion of experienced workers who have been in receipt of off-the-job training over the past 12 months (reference group 40-59%)	
100%	0.01 (3.50)***
80-99%	-0.001 (-1.07)
60-79%	0.001 (0.83)
20-39%	0.0002 (0.17)
1-19%	0.001 (0.59)
0%	0.01 (2.36)**
Workplace size (Reference Group = 1000-3999)	
<50	0.03 (22.09)***
≥ 50 and ≤99	0.01 (12.49)***
≥100 and ≤499	0.01 (6.60)***
≥500 and ≤999	0.001 (1.14)
≥4000	0.001 (0.67)
Sectors (Reference Group = Other Business Services)	
Manufacturing	-0.004 (-2.42)**
Electricity, gas and water	-0.01(-2.03)**
Construction	0.004 (1.45)
Wholesale and Retail	-0.0004 (-0.19)
Hotels and Restaurants	-0.0002 (-0.07)
Transport and communication	-0.001 (-0.74)
Financial services	-0.004 (-1.14)
Public administration	0.002 (0.96)
Education	0.003 (1.62)
Health	0.001 (0.38)
Other community services	0.01(1.94)**
Workplace aged ≥ 20 years	-0.0004 (-0.40)
The proportion, if any, of the largest occupational group at this workplace who work in teams	
≥60%	-0.001 (-1.03)
R^2	0.56
F (24, 719)	38.63
Prob > F	0.000
N_j	744

Notes: t statistics are in parentheses.
* significant at the 10% level; ** significant at the 5% level; ***significant at the 1% level.

Table A18:

Correlation matrix of direct satisfaction indicators - WERS

	Sense of achievement from work	Scope for using own initiative	Amount of influence over job	Training received	Amount of pay received	Job security	The work itself
Sense of achievement from work	1.000						
Scope for using own initiative	0.639	1.000					
Amount of influence over job	0.592	0.727	1.000				
Training received	0.383	0.383	0.420	1.000			
Amount of pay received	0.272	0.274	0.315	0.334	1.000		
Job security	0.331	0.316	0.356	0.357	0.306	1.000	
The work itself	0.681	0.547	0.537	0.371	0.284	0.352	1.000

Notes: Indicators as described previously.

Table A19:

Weights used in composite satisfaction index

Satisfaction indicator	Scaled Weight
Sense of achievement from work	0.151
Scope for using own initiative	0.151
Amount of influence over job	0.157
Training received	0.150
Amount of pay received	0.131
Job security	0.123
The work itself	0.139

References

Acemoglu D. and Pischke J.S., Why Do Firms Train? Theory and Evidence, *Quarterly Journal of Economics*, Vol. 113, No. 1, 1998, pp 79-119.

Addison J.T. and Belfield C.R., Unions, Training and Firm Performance: Evidence from the British Workforce Employee Relations Survey, IZA Discussion Paper No. 1264, Bonn, August, 2004.

Almeida-Santos F. and Mumford K., 'Employment training and wage compression in Britain', *IZA Discussion Paper*, No. 1197, 2004.

Almeida-Santos F. and Mumford K., Employee Training and Wage Compression in Britain, *The Manchester School*, Vol. 73, No. 3, June, 2005, pp 321-342.

Arulampalam W., Booth A.L. and Bryan M.L., Training in Europe, IZA Discussion Paper No. 933, Bonn, November, 2003.

Arulampalam W., Booth A.L. and Bryan M.L., 'Training in Europe', *Journal of the European Economic Association*, Vol. 2(2/3), 2004, pp 346-360.

Barrett A. and O'Connell P.J., Does Training Generally Work? The Returns to In-Company Training, Centre for Economic Policy Research Paper No. 1879, London, 1998.

Battu H., Belfield C.R. and Sloane P.J., Over-education Among Graduates: A Cohort View, *Education Economics*, Vol. 17, No. 1, 1999, pp 21-38.

Battu H., Belfield C.R. and Sloane P.J., Human Capital Spillovers Within the Workplace: Evidence for Great Britain, *Oxford Bulletin of Economics and Statistics*, Vol. 65, No. 5, December, 2003, pp 575-594.

Battu H., Belfield C.R. and Sloane P.J., Human Capital Spillovers in the Workplace: Evidence for the Service Sector in Britain, *International Journal of Manpower*, Vol 25, No. 1, 2004, pp 123-138.

Bauer T.K., High Performance Workplace Practices and Job Satisfaction: Evidence from Europe, *IZA Discussion Paper*, No. 1265, Bonn, August, 2004.

Baxter J.L., Inflation in the Context of Relative Deprivation and Social Justice, *Scottish Journal of Political Economy*, Vol. 20, 1973, pp 263-282.

Baxter J.L., *Behavioral Foundations of Economics*, Macmillan Press, London, 1993.

Becker B.E. and Huselid M.A., High Performance Work Systems and Performance: A Synthesis of Research and Managerial Implications, *Personnel and Human Resources Journal*, Vol. 16(1), 1998, pp 53-101.

Bender K. and Sloane P.J., Trade Unions, Job Satisfaction and Exit-Voice Revisited, *Industrial and Labor Relations Review*, Vo. 51, No. 2, 1998, pp 222-240.

Booth A.L., 'Private sector training and graduate earnings', *Review of Economics and Statistics*, Vol. 75(1), 1993, pp 164-170.

Booth A.L. and Bryan M.L., Testing Some Predictions of Human Capital Theory: New Training Evidence from Britain, *The Review of Economics and Statistics*, Vol. 87, No. 2, May, 2005, pp 391-394.

Brunello G. and Gambarotto F., Agglomeration Effects on Employer Provided Training: Evidence for the UK*, IZA Discussion Paper*, No. 1055, Bonn, 2004.

Bryson A., Unions and Workplace Closure in Britain, 1990-1998, *British Journal of Industrial Relations*, Vol. 42, No. 2, 2004, pp 283-302.

Campbell M. and Garrett R., *The UK Skills and Productivity Agenda: The Evidence Base for the SSDA's Strategic Plan 2005-2008*, Research Report No. 6, SSDA, September, 2004.

Clark A.E., Job Satisfaction in Britain, *British Journal of Industrial Relations*, Vol. 34, 1996, pp 189-218.

Clegg C.W., Psychology of Employee Lateness, Absence and Turnover: Methodology, a Critique and an Empirical Study, *Journal of Applied Psychology*, Vol. 68, 1983, pp 88-101.

Collier W., Green F. and Pierson J., Training and Establishment Survival, *Scottish Journal of Political Economy*, Vol. 52, No. 5, November, 2005, pp 710-735.

Collier W., Green F. and Kim Y. B., *Training and Establishment Survival*, Research Report No. 20, SSDA, 2007.

Cosh A., Duncan J. and Hughes A., *Investment in Training and Small Firm Growth and Survival: An Empirical Analysis for the UK 1987-1996*, DfEE Research brief No. 36, London, 1998.

Cosh A., Hughes A. and Weeks A., *The Relationship between Training and Employment in SMEs*, DfEE Research Report No. 7, London, 2000.

Cosh A., Hughes A., Bullock A. and Potton M., *The Relationship between Training and Business Performance*, Research Report 245, DfEE, London, 2003.

Dearden L., Machin S., Reed H. and Wilkinson D., *Labour Turnover and Work-Related Training,* Institute for Fiscal Studies, London 1997.

Dearden L., Reed H. and Van Reenan J., The Impact of Training on Productivity and Wages: Evidence from British Panel Data, *Oxford Bulletin of Economics and Statistics*, Vol. 68, No. 4, 2006, 397-421.

DTI, *Our Competitive Future: Building the Knowledge Driven Economy*, 1998.

DTI, *UK Productivity and Competitiveness Indicators*, DTI Economics Paper No. 6, 2003.

Forth J. and McNabb R., Innovations in WERS 2004: The Collection of Objective Data on Workplace Performance, WERS 2004 Information and Advice Service, Seminal Paper No. 1, 2007.

Freeman R.B., Job Satisfaction as an Economic Variable, *American Economic Review*, Vol. 68, 1978, pp 135-41.

Green F., 'Sex-discrimination in job-related training', *British Journal of Industrial Relations*, Vol. 29(2), 1991, pp 295-304.

Green F., 'The determinants of training of male and female employees, and some measures of discrimination', in R. McNabb and K. Whitfield (eds.) *The Market for Training: International Perspectives on Theory, Methodology and Policy*, Aldershot: Avebury, 1994.

Green F. and Zanchi L., 'Trends in the training of male and female workers in the United Kingdom', *British Journal of Industrial Relations*, Vol. 35(4), 1997, pp 635-644.

Green F. and Tsitsianis N., An Investigation of National Trends in Job Satisfaction in Britain and Germany, *British Journal of Industrial Relations*, Vol. 43, No. 3, September, 2005, pp 401-429.

Greenhalgh C. and Mavrotas G., 'Workforce training in the Thatcher era: market forces and market failure', in R. McNabb and K. Whitfield (eds.) *The Market for Training: International Perspectives on Theory, Methodology and Policy*, Aldershot: Avebury, 1994.

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

Greenhalgh C. and Stewart M., 'The effects and determinants of training', *Oxford Bulletin of Economics and Statistics*, Vol. 49(2), 1997, pp 171-189.

Hamermesh D.S., Economic Aspects of Job Satisfaction, in Ashenfelter O.E. and Oates W.E. (eds) *Essays in Labor Market Analysis*, John Wiley, New York, 1977, pp 53-72.

Idson T.L. and Kahane L.H., Team Effects on Compensation: An Application to Salary Determinaton in the National Hockey League, *Economic Inquiry*, Vol. 38, 2000, pp 345-357.

Jagger N., Nesta L., Gerova V. and Patel P., *Sectors Matter: An International Study of Sector Skills and Productivity*, Research report No. 14, SSDA, 2005.

Jones M.K., Latreille P.L. and Sloane P.J., Crossing the Tracks? More on Trends in the Training of Male and Female Workers in Great Britain, WELMERC Discussion Paper No. 2004-09, November, 2004.

Jones R.J. and Sloane P.J., Regional Differences in Job Satisfaction, WELMERC Discussion Paper 2004-05, University of Wales Swansea, 2004.

Kersley B., Alpin C., Forth J., Bryson A., Bewley H., Dix G. and Oxenbridge S., Inside the Workplace: *Findings from the 2004 Workplace Employment Relations Survey*, Routledge, London and New York, 2006.

Leitch Review of Skills in the UK: The Long Term Challenge, Interim Report, HM Treasury, December, 2005.

Locke E.A., The Nature and Causes of Job Satisfaction, in Dunnette M.D., editor, *Handbook of Industrial and Organisational Psychology*, Rand McNally, Chicago, 1976.

Machin S.J., The Productivity Effects of Unionization and Firm-size in British Engineering Firms, *Economica*, Vol. 58 (232), 1991, pp 479-490.

Machin S. and Stewart M., Trade Unions and Financial Performance, *Oxford Economic Paper*, Vol. 48, No. 2, 1996, pp 213-241.

Mangioni T.W. and Quinn R.P., Job Satisfaction, Counter-productive Behaviour and Drug Use at Work, *Journal of Applied Psychology*, Vol. 60, 1975, pp 114-8.

O'Mahoney M. and De Boer W., *Britain's Relative Productivity Performance: Update to 1999*, Final Report to the DTI, National Institute of Social and Economic Research, 2002.

Rees A., The Role of Fairness in Wage Determination, *Journal of Labor Economics*, Vol. 11, 1993, pp 243-252.

Siebern-Thomas F., Job Quality in European Labour Markets, in Bazen S., Lucifora C. and Salverda W. (eds) *Job Quality and Employer Behaviour*, Palgrave MacMillan, Basingstoke, Hants, 2005, pp 31-66.

Shields M., Changes in the Determinants of Employer-Funded Training for Full-Time Employees in Britain, 1984-1994, *Oxford Bulletin of Economics and Statistics*, Vol. 60, No. 2, 1998, pp 189-214.

Sloane P.J. and Williams H., Job Satisfaction, Comparison Earnings and Gender, *Labour*, Vol. 14, No. 3, September, 2000, pp 473-502.

SSDA, *Skills for Business Network: Phase 2 Evaluation Main Report*, Research Report No. 10, 2005.

Tamkin P., Giles L., Campbell M. and Hillage J., *Skills Pay: The Contribution of Skills to Business Success*, Skills for Business Research Report No. 5, 2004.

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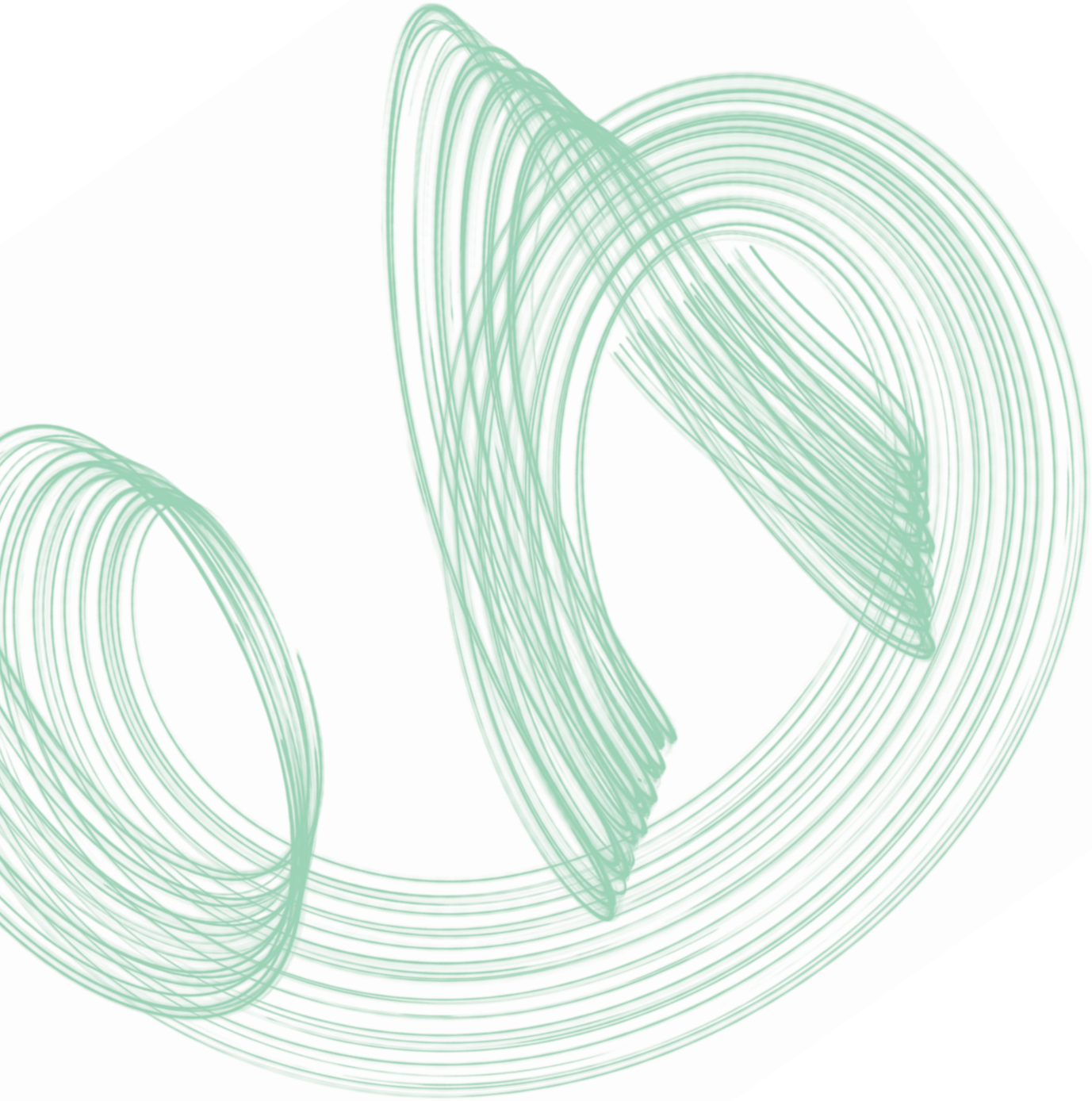
Research Report 20: Training and Establishment Survival

Research Report 21: The Distribution and Returns to Qualifications in the Sector Skills Councils

Working Futures 2: National Report 2003-04



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