TRADE UNIONS AND TRAINING PRACTICES IN BRITISH WORKPLACES

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The authors use British establishment-level data from the 1991 Employers' Manpower and Skills Practices Survey (EMSPS) and individual-level data from the Autumn 1993 Quarterly Labour Force Survey (QLFS) to investigate the links between training provision and workplace unionization. Both the probability of receiving training and the amount of training received are found to have been substantially higher in unionized than in nonunion workplaces. The authors view these results as showing that trade unions can play an important role in developing and boosting skill formation in Britain.

Many authors have emphasized the role that effective employee training can play in influencing worker productivity, wages, and individual career development. Among the subjects examined by the extensive research on training have been effects on individual performance, workplace and company performance, and macroeconomic performance.[1] Many governments now give high priority to policies thought to stimulate skill formation, either through

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Additional results referred to in the paper can be obtained from David Wilkinson, Office for National Statistics, B3/08, 1 Drummond Gate, London SW1V 2QQ, UK. Social and Community Planning Research is the depositor of the Employers' Manpower and Skills Practices Survey; the Employment Department, the Economic and Social Research Council, the Policy Studies Institute, and the Advisory, Conciliation and Arbitration Service are joint depositors of the Workplace Industrial Relations Survey data; the Employment Department is the depositor of the Quarterly Labour Force Survey data. All data sets are deposited at the ESRC Data Archive, from which the data sets and documentation were obtained.

[1]Much of the research looking at the effects of training on individual performance has focused on wages (for example, Lynch 1992; Veum 1995; Blundell, Dearden, and Meghir 1995) or job mobility (Veum 1997; Dearden et al. 1997). A recent example of a matched plant study examining the effects of training on workplace and company performance is Mason, Prais, and van Ark (1992). Finegold and Soskice (1988) and Crouch (1992) are two of many studies highlighting international training differences and relating them to macroeconomic outcomes.

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direct intervention and subsidies of company training or through support for a "training market" via loan provision, dissemination of information about good practice, and other measures.

Given the importance of skills for economic performance, it seems important to understand what kinds of workplaces provide training for their workers (Green 1993b). In particular, a variety of studies in many countries have demonstrated that the institutional environment in which businesses operate affects the process of skill formation in firms, and may interact with government policies (for example, Streeck 1989; CEDEFOP 1987; Koike and Inoke 1990; Osterman 1995). An important aspect of that environment is the character of employee relations in the organization.

In this paper we provide evidence on this issue using two British data sources: the establishment-level Employers' Manpower and Skills Practices Survey (EMSPS) of 1991 and the individual-level Quarterly Labour Force Survey (QLFS) of autumn 1993. Specifically, we consider the role unions play in skill formation, both on their own and in conjunction with other employee relations features, by examining the link between unions and training. Other studies have revealed a union-training link, but usually as a by-product of the analysis. For example, in a number of studies a union variable has been included in a training equation, but the union link has not been the main focus of the analysis. In this paper, the union-training link is the center of attention.

Unions and Training: Theory and Existing Work

Training and Union Bargaining

In looking for an empirical association between training provision and unionization, the first question one might reasonably ask is the extent to which unions are actually able to bargain about training. Following the major upheavals of the 1980s, British trade unions have been attempting to develop a new agenda for bargaining and consultation. Because of the trend toward the decentralization of bargaining, there has been an especially strong effort to bring within the ambit of bargaining those issues negotiated at the company or establishment level. One key subject in this new agenda is training. By 1990 a number of union officials claimed to be either bargaining or consulting over training matters (Labour Research Department 1990). The late 1980s saw major unions, such as the Transport and General Workers' Union, the National Association of Local Government Officers, and Manufacturing, Science, and Finance, develop their own training initiatives in attempts to encourage their negotiators to discuss training agreements with employers.

Influenced by these major players, and by the belief that improved training and consequent improved productive efficiency were crucial to raising union members' living standards, the Trades Union Congress announced that training should be an important aspect of a new bargaining agenda for trade unions in the 1990s (Trades Union Congress 1991). The strategy involved negotiating minimum levels and standards of training, equal opportunities, and close involvement in training decisions, if possible through workplace training committees. In the absence of favorable legislation, negotiators were to aim for voluntary agreements along the lines of proposed training models.

It is probably too early to tell whether trade unions will successfully place training on the bargaining agenda widely across British industry. Whether unions succeed probably depends on many factors outside their direct control, in particular the attitudes taken by companies themselves and the public policy environment. But through the first half of the present decade, unions did *not* make large inroads. For the most part, managers continued to regard training as an area for their own decision-making, independent of collective bargaining. Evidence of this comes from responses to the third Workplace Industrial Relations Survey of 1990 (Millward et al. 1992:255), which indicated that few managers had

conceded training as a bargaining issue. A subsequent analysis of agreements reached during the 30 months following January 1991 showed that relatively few such agreements contained a provision for formal consultation over training and even fewer provided for bargaining over training levels or content (Claydon and Green 1994).

There is, however, some contrasting evidence that unions may be having an informal role in training matters in some workplaces, and that this role may not always be recognized by management (Heyes 1993; Stuart 1994). While trade unions' direct influence on the extent and nature of training is likely to have been relatively limited in recent years, this does not mean that their impact can be ignored. Potentially as important as unions' direct influence on training is their indirect influence. Even where unions do not bargain directly over training, their presence could condition the whole character of employee relationships in establishments, thereby affecting the extent of training.

In the simplest case, unions could have a negative impact on training through their influence on pay. Empirical evidence for Britain shows that unions raise wages relative to the nonunion sector, especially for manual workers (for example, Blanchflower 1986; Stewart 1987, 1995), which may discourage employers from paying for training courses. One reason unions might push harder for wage gains than for increased training for younger workers, Ryan (1991) argued, is that they cannot easily monitor the quality of training provided, especially when much of the training is on-the-job and uncertified. In addition, Mincer (1983) has argued that the seniority rules imposed by many U.S. unions, which affect promotions to higher grades, reduce workers' incentives to invest in training.

Moreover, recent aggregate patterns in the extent of training and unionization in Britain move in opposite directions. Training participation became more widespread during the 1980s, while unionization fell sharply over the same time period (see, for example, Disney, Gosling, and Machin 1995; Millward et al. 1992). Could these opposing trends be related, with the weakening of unions relieving a constraint on skill formation?

On the other hand, not all plausible theoretical approaches unambiguously predict a negative union impact on training; indeed, some predict the opposite. Unions could positively affect training through their influence on channels of communication, managerial behavior, and job tenure, and, through those effects, on the level of employee turnover. Unions provide a "voice" for individual grievances and for contributions toward productive efficiency that would often be unavailable to individual employees (Freeman and Medoff 1984). Insofar as this reduces labor turnover (and there is empirical evidence for such an effect in Britain; for example, see Elias 1994), there is likely to be a longer period to reap the benefits of investments in training, and therefore a larger return. Where unions have an influence in an establishment, employees may also feel more secure, and therefore less threatened by the changes in work practices that often accompany training courses. Furthermore, the formality a union presence engenders may encourage managers to set up more formal procedures for identifying training needs and defining skill levels as required by pay formulas. From all these points of view, it is arguable that the presence of active trade unions in the workplace may lead both to a greater level of training and to a more developed training infrastructure within the establishment and the company. (For more detail, see Claydon and Green 1994; Kennedy et al. 1994.)

Whether positive or negative, any link between trade unions and training is a potentially important one, and future changes in the level of unionization in Britain may have an appreciable impact on skill formation at the workplace.

Existing Work

Existing empirical evidence is, rather like the predictions of different theoretical models, somewhat mixed. Some U.S work (see, *inter alia,* Duncan and Stafford 1980;

Mincer 1983) points to a negative union impact on training. However, even in the United States some more recent work challenges this finding. Lynch (1992), for example, reported a positive coefficient on union variables in probit models of on-the-job training and a negative (and statistically insignificant) union coefficient in an off-the-job training probit; Veum (1995) considered seven different forms of training (two on-the-job, five off-the-job) and obtained positive (and statistically significant) coefficients on a union variable in probit models of the determinants of on-the-job training (company training and apprenticeships)[2] and statistically insignificant (one positive, four negative) coefficients on the union variable in the off-the-job training equations. In establishment-level studies, both Osterman (1995) and Frazis et al. (1995) found a statistically significant positive effect of union presence on formal training; however, Lynch and Black (1995) found no statistically significant impact of unionization on either the provision of formal training or the proportion of workers receiving it.

Existing research for Britain in this area is limited. Green (1993a) reported a positive, statistically significant coefficient for union membership in a training participation equation for workers in small workplaces (those with fewer than 25 employees) and a statistically insignificant coefficient in an equation for workers in larger workplaces. Some other studies that have focused on different or broader issues (for example, Booth 1991; Greenhalgh and Mavrotas 1994; Arulampalam et al. 1995) also have reported positive union effects using individual-level data, but they have not focused in any detail on the union effect.[3]

However, the existing studies have a number of shortcomings in terms of this issue, mainly due to data limitations. The data sources we use allow us to avoid a number of these drawbacks. First, as most existing research concentrates on individual-based data, there is limited information about the nature of industrial relations at workplaces, including what type of union is active (if at all) and whether a closed shop is operating. Moreover, it is also known that some forms of training, in particular apprenticeship, are interpreted differently by employees and employers, so that it will be of interest in our establishment-level work to see whether training, as defined by the employers who actually provide it, is influenced by employee relations systems.

The second shortcoming of previous analyses (with the exception of Booth 1991, Frazis et al. 1995, and Lynch and Black 1995) is that they have taken union membership as their measure of unionism. Membership is only an imperfect measure of the extent and impact of union activity (Disney, Gosling, and Machin 1995). There are many employees for whom pay and conditions are effectively negotiated by a union, but who choose not to become members. Thus a measure of whether a union is recognized for some bargaining purposes is likely to be a superior measure of unionism.

Another limitation of previous studies is that while they have examined union effects on the probability of receiving any training, they have not looked at length of training for those who receive training. Unionism could, for example, reduce the probability of receiving training but increase the quantity of training received.

Data Description

Our first data source, the Employers' Manpower and Skills Practices Survey (EMSPS), was set up to examine aspects of

[2]In some later work (Veum 1997), the positive and significant union coefficient is confined to on-the-job training, which is paid for by the company.

[3]See also Arulampalam and Booth (1997), who used the same data source (the National Child Development Study) as Arulampalam et al. (1995). They reported four models of the determinants of receipt of work-related training (two for men, two for women) in which the estimated coefficients on a union membership variable were all positive but only statistically significant for one of the female specifications.

employers' skill formation, including their skill needs, recruitment practices, and training. It was conducted as a follow-up to the 1990 Workplace Industrial Relations Survey (WIRS3), which is a nationally representative survey of 2,061 British establishments with 25 or more employees in all sectors except agriculture, forestry and fishing, and coal mining. Once establishments with unproductive and out-of-scope responses were excluded, the EMSPS sample consisted of 1,693 establishments, for a response rate of 89%. Face-to-face interviews were conducted by experienced interviewers employed by Social and Community Planning Research (SCPR) between November 1990 and October 1991 using a structured questionnaire. The training we analyze is defined as that provided to employees apart from any initial job training.

The second data set we use is the autumn 1993 Quarterly Labour Force Survey (QLFS). For the first time in that quarter, respondents were asked a set of questions about whether they worked at an establishment where a union was recognized for bargaining purposes (Corcoran and Wareing 1994). The QLFS covers individuals in a sample of about 60,000 responding households in Great Britain. We restrict our analysis to employees only and exclude the armed forces. Training incidence refers to the standard Labour Force Survey measure, which is any experience of education or training that is deemed by the respondent to be related to the current job (or a potential future job) in the four weeks preceding the survey interview date. More details, including descriptions and means of all the variables used from both surveys, are given in the appendix (see also Green, Machin, and Wilkinson 1995).

Econometric Methodology

Our analysis is at both the establishment level and the individual level. At each level we use both the incidence and intensity of training as dependent variables.

Training incidence. We model the probability that an economic agent (i = establishment, j = individual) provides or receives training with a simple discrete choice framework and estimate probit models of training provision or receipt. Let P_i and π_j be dummy variable indicators of training, U_i be a 0–1 indicator of whether unions are recognized in the workplace, X_i and Z_j be vectors of establishment- and individual-level controls, respectively, and Φ denote the standard normal distribution function. We can define $\Pr[P_i = 1] = -[X_i'\beta + \gamma U_i]$ as the probability that establishment i trains its workers and $\Pr[\pi_j = 1] = -[Z_j'\delta + \lambda U_i]$ as the probability that individual j receives training, and we can obtain the union impact on training (the marginal effect) as follows:

$$(1)\qquad \Pr[P_i = 1 \mid U_i = 1] - \Pr[P_i = 1 \mid U_i = 0] = \Phi[X_i'\beta + \gamma] - \Phi[X_i'\beta]$$

$$\Pr[\pi_j = 1 \mid U_i = 1] - \Pr[\pi_j = 1 \mid U_i = 0] = \Phi[Z_j'\delta + \lambda] - \Phi[Z_j'\delta]$$

As we are interested in a *ceteris paribus* union/nonunion comparison, we evaluate at union means.[4] The control variables included in X and Z are conventional ones found in the literature relating to both individual and job characteristics.

Training intensity. We compute training intensity measures as

$$(2)\qquad \text{Establishment-level intensity} = P_i D_i$$

$$\text{Individual-level intensity} = l_j h_j,$$

where D_i is the average number of days of training received over the last year for workers in establishment i, l_j is whether an indi-

[4]In practice we could choose any values for X_i or Z_j (that is, we face the usual index number issue in comparisons of this kind). We have also considered overall sample means and nonunion means to evaluate these differences, and we find that the overall results are largely unaffected by this choice. Evaluating these probabilities at the mean for unionized establishments provides a simple interpretation of any union/nonunion difference. It can be thought of as the effect of taking away union recognition from a typical establishment that has a recognized union, while holding constant all other factors.

Table 1. Descriptive Statistics.

	EMSPS				*QLFS*			
Statistic	*Variable Definition*	*Union Mean*	*Nonunion Mean*	*Union/ Nonunion Gap (Standard Error)*	*Variable Definition*	*Union Mean*	*Nonunion Mean*	*Union/ Nonunion Gap (Standard Error)*
Manual Workers								
Incidence	P_i	0.755	0.499	.255 (.026)	π_j	.079	.065	.015 (.0001)
Sample Size		822	558			8,568	8,407	
Intensity	$P_i.D_i$	2.318	1.895	.423 (.447)	$l_j.h_j$	.700	.595	.105 (.003)
Sample Size		589	386			8,578	8,503	
Intensity for Trainers	$[P_i.D_i]\|P_i=1$	3.376	3.458	−.083 (.664)	$[l_j.h_{jl}]\|l_j=1$	16.428	14.810	1.617 (.057)
Sample Size		460	213			359	335	
Non-Manual Workers								
Incidence	P_i	0.907	0.721	.185 (.021)	π_j	.217	.125	.091 (.0001)
Sample Size		834	559			17,004	16,954	
Intensity	$P_i.D_i$	3.909	1.973	1.936 (.332)	h_j	1.451	.989	.461 (.003)
Sample Size		594	418			17,056	17,157	
Intensity for Trainers	$[P_i.D_i]\|P_i=1$	4.480	3.196	1.284 (.408)	$[l_j.h_{jl}]\|l_j=1$	12.291	13.365	−1.074 (.025)
Sample Size		529	301			2,004	1,258	

Notes: i denotes establishment, j denotes individual. $P_i = 1$ if provided training in last 12 months, 0 otherwise; $\pi_j = 1$ if received training in the last 4 weeks, 0 otherwise; $l_j = 1$ if received training in the last week, 0 otherwise; D_i = average number of days training received in the last 12 months; h_j = average number of hours training received in the last week. The reported statistics are weighted means across establishments/individuals, using WIRS/QLFS weights. Precise questions from the relevant surveys are reproduced in the appendix.

vidual received training in the last week, and h_j is the hours of training received in that time.[5]

Since some establishments do not provide any training for particular employees and some individuals have zero hours of training, these training intensity measures are censored. We use a Tobit estimator to deal with the censoring. The same set of control variables was used as for the analysis of training incidence, and marginal union/nonunion differences were calculated in a similar manner.[6]

Descriptive Statistics

Table 1 reports a set of descriptive statis-

[5]*One should note that, owing to the QLFS question structure, the individual intensity measure is a weekly measure, while the incidence measure described above corresponds to the last four weeks.*

[6]For a Tobit model of training intensity (I) defined (dropping the subscripts for convenience) as $I^* = X'b + cU + v$, where $I^* = I$ for $I > 0$ and $I^* = 0$ for $I = 0$, the marginal union effect is computed as $\Phi((X'b+c)/\sigma)[X'b+c+\sigma M^u] - \Phi(X'b)/\sigma)[X'b+\sigma M^n]$, where σ is the estimated standard error of the Tobit regression, Φ is the standard normal distribution function, ϕ is the normal density function, and M^k ($k = u,n$) is the appropriate Mills ratio term (u = union, n = nonunion) defined as $M^u = \phi((X'b+c/\sigma)/\Phi((X'b+c/\sigma)$ and $M^n = \phi((X'b)/\sigma)/\Phi((X'b/\sigma)$.

tics on training incidence and intensity from EMSPS and QLFS, broken down by union recognition status in all cases, and reported separately for manual and non-manual employees. Average training incidence is described by P, the mean of P_i, which gives the proportion of establishments that trained any of their (manual or non-manual) workers in the last twelve months; and by π, the mean of π_j, which gives the proportion of individuals who received training in the last four weeks. In the raw data both P and π are higher, at statistically significant levels, in unionized workplaces than in nonunion workplaces: in EMSPS, 76% of unionized workplaces provided training for manual workers, as compared to 50% of nonunion workplaces (comparable percentages for non-manuals are 91% and 72%); in the QLFS, 8% of manual workers in unionized workplaces received training in the last four weeks, as compared to 6.5% in nonunion workplaces (for non-manuals the percentages were 22% and 13%, respectively).

Training intensity, too, is higher (and the gap is statistically significant) in unionized than in nonunion workplaces. Average training intensity in EMSPS, defined as average days trained per worker (the mean of P_iD_i), is 2.3 days for manuals and 3.9 days for non-manuals in the union sector and 1.9 days for manuals and 2.0 days for non-manuals in the nonunion sector. In the QLFS, where training intensity is defined as average hours of training received in the last week, intensity is also higher in the union sector, for both manuals and non-manuals. In sum, these simple descriptive statistics indicate that there is a substantially greater amount of training participation and training intensity in the union sector than in the nonunion sector.

Estimated Models of the Determinants of Training

The Incidence of Training

Estimates of probit models of the determinants of training are reported for manual and non-manual workers separately in models (1) and (2) of Table 2a and models (5) and (6) of Table 2b. The marginal union effect, calculated as described in equation (1) above, is reported in the bottom row of each table. In all the reported models the coefficient on the union recognition variable is estimated to be positive and statistically significant at the 1% level.[7] The establishment-level EMSPS data in Table 2a suggest that unionized establishments are some 17% more likely to provide training for manual workers in the year preceding the survey; they are about 7% more likely to have provided training for non-manual workers. In the individual-level QLFS equations of Table 2b, manual workers in unionized workplaces are about 1.6% more likely than their nonunion counterparts to have received training in the four weeks preceding the survey, and non-manual workers about 5.1% more likely.

In each case we have included as control variables a range of workplace and individual characteristics likely to affect training incidence or intensity.[8] According to the establishment data, training incidence is greater for manual (non-manual) workers where manual (non-manual) workers form a larger proportion of the establishment's work force, greater if managers reported a skill shortage, and greater in larger establishments. For manual workers only, an increase in the proportion of female workers is associated with a lower

[7]This conclusion withstands variations in the specification of the control variables, as well as a more detailed occupational disaggregation of the sample. See Green, Machin, and Wilkinson (1995, 1996). For the QLFS models we also estimated a probit model of training receipt in the week preceding the survey (including the same controls as in models 5 and 6 of Table 2b) and obtained qualitatively similar results. For manual workers, the estimated coefficient (standard error) on the union recognition variable was .150 (.047), with an associated marginal effect of .009; for non-manual workers the coefficient estimate (standard error) was .153 (.025) and the marginal effect was .026.

[8]A full set of descriptive statistics is available from the authors on request.

incidence of training. For non-manual workers, there is evidence of greater training incidence where there were at least five competitors, and where the establishment is part of a multi-site organization. Neither race nor location in the public sector appears to have had a statistically significant effect on training incidence. According to the individual-level data, individuals were more likely to receive training if they had less work experience, if they worked in larger workplaces or in the public sector, if they had higher educational qualifications, and if they were skilled (for manuals) or professionals (for non-manuals). For non-manuals only, training was greater if they worked full-time, if they had less job tenure, and if they were married. These findings are broadly consistent with earlier research on training determinants in Britain (Green 1993b). Indeed, the positive influence of establishment size and of an individual's prior human capital on training incidence appears to be a general finding (see, for example, Lynch and Black 1995).

While the estimated equations have plausible coefficients, there remains a possibility that union effects may be biased due to unobserved heterogeneity. It is possible that an unobserved variable, such as management "style," is correlated both with higher levels of training and with more formal employee relations and hence unionization. Unfortunately, because there are no variables in either of these cross-sectional data sets that could plausibly be argued to have direct effects on unionization but not on training, we cannot use a Heckman-type procedure to separately identify the union impact on training in such a context. Thus, here, as in most of the literature on training determinants, the possible endogeneity of the right-hand-side variables qualifies the findings. The assertion we defend is that unionization is associated with greater training incidence after we control for a rich array of other establishment and individual characteristics, and that the estimated union effect is robust, withstanding many variations in the precise specification used.

The Intensity of Training

Models (3) and (4) in Table 2a and models (7) and (8) in Table 2b are Tobit estimates of training intensity equations for manual and non-manual workers, with the appropriate marginal union effects reported in the last row. The estimated coefficient on the union recognition variable is always positive and statistically significant (at the 1% level). In the EMSPS models, unionized establishments provide about 0.9 days more training than do nonunion establishments over the year before the survey for both manual and non-manual workers. In the QLFS models, manual workers employed in unionized workplaces received about 0.17 hours' more training in the previous week, and non-manuals about 0.34 more hours, than did their counterparts in nonunion workplaces.

The estimated coefficients on the control variables follow a pattern broadly similar to that shown in the analysis of training incidence, but there are two differences of some interest. First, while establishment size is positively related to training incidence according to the probit estimator, it has no statistically significant impact on training intensity. Second, training intensity is greater, at statistically significant levels, for temporary non-manual workers than for workers with "permanent" contracts. A likely explanation is that these temporary workers especially need to acquire more human capital because they have lower job security.

More Detailed Estimated Union Effects

The models of Tables 2a and 2b provide strong evidence that unions are associated with both a higher frequency and greater intensity of training in British workplaces. Table 3 reports a set of further tests based on the employer survey that re-specify the training equations in a number of ways, enabling us to consider the nature of the estimated union effects in more detail. The first row of the upper panel of the table simply reproduces the basic union recognition effect from Tables 2a and 2b. We use

Table 2a. Statistical Models of the Incidence and Intensity of Training, from the Employer Survey. (Standard Errors in Parentheses)

	Probit Models of the Incidence of Training		*Tobit Models of the Intensity of Training*	
	(1)	*(2)*	*(3)*	*(4)*
Indep. Var.	*Manual*	*Non-Manual*	*Manual*	*Non-Manual*
Constant	−0.814 (0.277)***	−0.476 (0.285)	−1.373 (1.504)	0.489 (1.325)
Union Recognition	0.488 (0.106)***	0.376 (0.132)***	1.968 (0.599)***	1.378 (0.527)***
Proportion Manual/ Non-Manual	1.650 (0.172)***	1.934 (0.253)***	1.712 (0.938)***	0.647 (0.869)
Public Sector	−0.064 (0.165)	0.175 (0.178)	−1.535 (0.855)	−0.439 (0.741)
Proportion Female	−0.751 (0.259)***	−0.252 (0.290)	−2.224 (1.453)**	0.976 (1.268)
Proportion Part-Time	0.146 (0.224)	0.222 (0.256)	1.399 (1.154)	1.794 (1.065)*
Proportion-Ethnic Minorities	0.080 (0.109)	−0.166 (0.126)	1.501 (0.601)**	0.356 (0.525)
Skill Shortage in Establishment	0.193 (0.094)**	0.282 (0.118)**	0.743 (0.500)	0.928 (0.440)**
Fewer Than Five Competitors	0.064 (0.109)	−0.202 (0.119)*	−0.372 (0.564)	−0.113 (0.502)
Single Site Establishment	−0.056 (0.137)	−0.480 (0.144)***	−0.129 (0.758)	−1.992 (0.700)***
Establishment Size (Omitted Category: 25–49 Employees)				
50–99 Employees	0.244 (0.140)*	0.127 (0.154)	−0.738 (0.813)	0.976 (0.695)
100–199 Employees	0.266 (0.140)*	0.268 (0.162)	−0.832 (0.822)	−0.014 (0.709)
200–499 Employees	0.378 (0.154)**	0.494 (0.179)***	−0.410 (0.860)	0.946 (0.739)
500–999 Employees	0.621 (0.179)***	0.635 (0.212)***	0.775 (0.931)	−0.329 (0.829)
1,000+ Employees	1.145 (0.191)***	1.385 (0.285)***	−0.211 (0.943)	0.001 (0.814)
Industry and Region Dummies[a]	Included	Included	Included	Included
Log-Likelihood	−553.3	−380.8	−2,111.8	−2,418.5
Sample Size	1,217	1,219	869	893
Mean of Dependent Variable	0.612	0.799	2.134	2.747
Marginal Union Effect	0.168	0.070	0.911	0.860

Notes: The dependent variables are: in models (1) and (2)—whether any training was provided for the relevant group of employees in the last year; models (3) and (4)—the proportion of the relevant group of employees receiving training in the last year multiplied by the average number of days training received. Except where stated, all covariates are 0–1 dummy variables.

[a]All models include eight one-digit industry and ten regional dummies.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level (two-tailed tests).

these numbers as the benchmark for comparison purposes in the remainder of Table 3.

We considered two ways of specifying more detailed union effects. Following the theoretical arguments outlined earlier, the first focuses on situations in which one expects the union wage gain to be larger, and the second considers a possibility for union voice effects. Considering the first of these, existing evidence suggests that British unions raise wages by more (that is, achieve a higher union-nonunion wage differential) in the presence of closed shop arrangements (Stewart 1987, 1995) or where there are multiple unions that bargain separately (Machin, Stewart, and Van Reenen 1993). The simple union monopoly approaches discussed above (under "Unions and Training") predict lower training activity in conjunction with higher wage gains; hence, we should expect less training where union recognition is accompanied by a closed shop agreement and where there are multiple unions.

We investigated these possibilities in turn.

Table 2b. Statistical Models of the Incidence and Intensity of Training, from the Individual Survey. (Standard Errors in Parentheses)

	Probit Models of the Incidence of Training		*Tobit Models of the Intensity of Training*	
	(5)	*(6)*	*(7)*	*(8)*
Indep. Var.	*Manual*	*Non-Manual*	*Manual*	*Non-Manual*
Constant	−1.402 (0.093)***	−1.171 (0.060)***	−51.810 (4.206)***	−34.074 (1.921)***
Union Recognition	0.140 (0.039)***	0.197 (0.022)***	6.505 (1.628)***	3.619 (0.659)***
Skilled Manual / Professional	0.203 (0.037)***	0.057 (0.020)***	6.232 (1.535)***	1.131 (0.623)*
Public Sector	0.085 (0.051)*	0.111 (0.029)***	0.243 (2.148)	2.752 (0.896)***
Female	−0.033 (0.046)	0.010 (0.020)	−2.015 (1.846)	−1.012 (0.590)*
Work Part-Time	−0.005 (0.053)	−0.152 (0.024)***	3.483 (2.084)*	−0.104 (0.707)
Not White	−0.088 (0.095)	−0.060 (0.047)	−4.341 (4.095)	−0.410 (1.393)
Married	−0.061 (0.039)	−0.090 (0.021)***	−1.325 (1.635)	−2.781 (0.621)***
Potential Experience (years)	−0.040 (0.005)***	−0.013 (0.003)***	−1.762 (0.198)***	−0.640 (0.081)***
Potential Experience (years) Squared	0.0005 (0.0001)***	0.0000 (0.0001)	0.022 (0.004)***	0.005 (0.002)***
Temporary Employment	0.041 (0.063)	−0.005 (0.035)	1.370 (2.463)	2.742 (0.974)***
Job Tenure (months)	0.0001 (0.0002)	−0.0004 (0.0001)***	−0.010 (0.009)	−0.010 (0.004)***
Workplace Size > 25 employees	0.073 (0.039)*	0.048 (0.020)**	2.182 (1.601)	0.751 (0.612)
Highest Qualification(Omitted Category is "No Qualifications")				
Degree	0.686 (0.124)***	0.530 (0.042)***	16.357 (5.105)***	10.354 (1.314)***
Further Education	0.766 (0.079)***	0.615 (0.041)***	18.681 (3.384)***	13.126 (1.311)***
A Level	0.524 (0.060)***	0.471 (0.041)***	14.845 (2.503)***	10.210 (1.302)***
Apprenticeship	0.349 (0.050)***	0.253 (0.045)***	9.612 (2.183)***	4.750 (1.428)***
O Level	0.508 (0.054)***	0.323 (0.040)***	14.845 (2.503)***	6.873 (1.249)***
CSE	0.274 (0.063)***	0.120 (0.052)**	7.509 (2.634)***	1.295 (1.651)
Other Qualification	0.251 (0.063)***	0.322 (0.052)***	6.832 (2.766)**	6.608 (1.664)***
Industry and Region Dummies[a]	Included	Included	Included	Included
Log-Likelihood	−3,904.7	−14,329.8	−5,117.6	−21,558.0
Sample Size	16,790	33,306	16,893	33,557
Mean of Dependent Variable	0.071	0.173	0.629	1.222
Marginal Union Effect	0.016	0.051	0.169	0.339

Notes: The dependent variables are: in models (5) and(6)—whether any training was received in the last four weeks; models (7) and (8)—the number of hours training received in the last week. Except where stated, all covariates are 0–1 dummy variables.

[a]All models include nine one-digit industry and ten regional dummies.

*Statistically significant at the .10 level; **at the .05 level; ***at the .01 level (two-tailed tests).

We entered in the equations a term interacting union recognition with a dummy variable indicating whether there were multiple unions present. Then, separately, we entered a term interacting union recognition with a dummy variable indicating a "union membership arrangement" (UMA), where a UMA is defined as the presence of closed shop arrangements or, given the outlawing of the closed shop by 1990, where management recommends union membership.[9] There is no evidence for a reduced training impact in either case. In none of the models can we reject the null hypothesis of equal coefficients for single or multiple union and UMA or no UMA establish-

[9]We view the "management recommends membership" group as *de facto* closed shops: see Machin and Stewart (1996) for more discussion.

Table 3. More Detailed Union Effects on Training Participation and Training Intensity from Employer Survey.

	Probit Models of the Incidence of Training				*Tobit Models of the Intensity of Training*			
	Manual		*Non-Manual*		*Manual*		*Non-Manual*	
Description	*Coefficient (Standard Error)*	*Marginal Effect*	*Coefficient (Standard Error)*	*Marginal Effect*	*Coefficient (Standard Error)*	*Marginal Effect*	*Coefficient (Standard Error)*	*Marginal Effect*
Recognition	0.488*** (0.106)	0.168	0.376*** (0.132)	0.070	1.968*** (0.599)	0.911	1.378*** (0.527)	0.860
Single / Multiple Union								
Single Union	0.474*** (0.117)	0.165	0.311** (0.143)	0.065	1.950*** (0.650)	0.907	1.580*** (0.589)	0.964
Multiple Union	0.511*** (0.133)	0.176	0.496*** (0.171)	0.093	1.998*** (0.734)	0.933	1.123* (0.623)	0.668
χ^2 Test of Equality of Coefficients (p-value)[a]	0.08 (0.773)		1.25 (0.264)		0.01 (0.943)		0.59 (0.443)	
Union Membership Arrangements								
No UMA	0.512*** (0.118)	0.173	0.307** (0.143)	0.062	1.864*** (0.651)	0.873	1.122** (0.568)	0.665
UMA	0.413*** (0.132)	0.144	0.491*** (0.172)	0.090	1.786** (0.702)	0.832	1.862*** (0.649)	1.149
χ^2 Test of Equality of Coefficients (p-value)[a]	0.63 (.428)		1.26 (.262)		0.02 (0.899)		1.66 (0.198)	
Joint Consultative Committee (JCC) and Employee Involvement (EI)								
No Recognition, but either JCC or EI	0.432*** (0.140)	0.169	0.236 (0.150)	0.057	2.789*** (0.870)	1.031	2.349*** (0.683)	1.265
Recognition, but neither JCC nor EI	0.514*** (0.182)	0.199	0.423* (0.223)	0.093	2.761*** (1.042)	1.018	3.099*** (0.926)	1.748
Recognition and either JCC or EI	0.868*** (0.151)	0.316	0.573*** (0.173)	0.116	4.381*** (0.900)	1.836	2.985*** (0.719)	1.672
χ^2 Test of Equality of Recognition Coefficients (p-value)[a]	5.30 (.021)		0.58 (.447)		4.43 (0.036)		0.02 (0.877)	

Notes: See notes to Table 2a.

[a]In each case the tests of equality were Wald tests, in which the number reported is the χ^2 value followed by the p-value in parentheses. In the case of JCC and EI, the test compared the impact of recognition without either a JCC or an EI with the impact of recognition accompanied by either a JCC or an EI (or both).

ments, as indicated by the χ^2 statistics shown in the table.

Second, we investigated whether there was any interaction between union presence and two other plant characteristics: the presence of employee involvement schemes (EI), and the presence of a joint consultative committee (JCC). We view these as indicating improved communication channels and, as such, as a measure of collective voice within the workplace. If collective voice is a means through which unions have an impact on establishments, one would expect any impact of unions on training to be greater where such channels are also present.

Table 4. Measures of Training Infrastructure.

Type of Training Infrastructure	*Sample Size*	*Proportion of Establishments with Training Center/ Budget/Plan*	*Recognition Coefficient (Standard Error)*[a]	*Marginal Effect*[a]
Training Center or School Covering Employees at Establishment	1,225	0.562	0.456 (0.104)	0.178
Training Budget That Covers the Establishment	1,432	0.543	−0.021 (0.099)	−0.008
Training Plan That Covers the Establishment	1,432	0.539	0.215 (0.095)	0.085

Notes:

[a]The coefficient attaches to the recognition dummy in a probit analysis using the same control variables that were used in Table 2a. See the notes to that table. The marginal effects are calculated from the estimated probit equations, as evaluated at the union means.

Union and nonunion weighted means for the three measures of training infrastructure are: Training Center, .636 (union recognized), .445 (union not recognized); Training Budget, .599 (union recognized), .479 (union not recognized); Training Plan, .590 (union recognized), .479 (union not recognized).

According to the specifications in the lower panel of Table 3, for manual workers the union impact on training is higher ($p < .01$) where a union is recognized and there is a JCC or EI. We view this as important evidence of an indirect positive union influence on training via collective voice–type mechanisms. For non-manual workers the impact of recognition is not altered at a statistically significant level by whether there is or is not a JCC or EI.

Finally, a further possibility is that the impact of union recognition interacts with the other variables in our model. To investigate whether such interactions may be affecting our results, we first split the samples, using both data sets, into union and nonunion segments and tested whether the coefficients of the models in each segment were different using standard likelihood ratio tests. Using the EMSPS data, for both probit models and, in the case of manual workers, for the Tobit model, we could not reject the hypothesis that the coefficients for the union and nonunion segments were equal. However, for the non-manual Tobit model of training intensity, and for all the models in the case of the QLFS models, the likelihood ratio χ^2 value indicated that the coefficients in the two segments were different.

To examine whether our results for the mean impact of unions are affected by this interaction, we first included terms interacting recognition with all the other control variables in the models. We then excluded interactions that were not statistically significant, and estimated the models with just statistically significant terms included. Finally, we calculated the marginal impact of union recognition from the coefficients in this parsimonious model. With the EMSPS data, the result for the model of training intensity for non-manual workers was a marginal union impact of 0.82 days, which is not much lower than the estimate of 0.86 from the basic model without interactions as given in Table 2a. In the case of the individual-level data, we carried out the same procedure for all the models. The estimated marginal effects of unions on training incidence were 0.019 (for manuals) and 0.059 (for non-manuals), while the estimated marginal impact on training intensity was 0.169 (for manuals) and 0.369 (for non-manuals). These figures are relatively close to those shown in Table 2b, again suggesting that our conclusions are little affected by the inclusion of interaction terms in the models.

Other Training Measures

Do unions' positive effects on training

stem from their provision of collective voice? A finding that unionization is also positively related to formal training strategies and infrastructures would be consistent with that hypothesis. We are fortunate that the EMSPS survey contains details regarding training practices in British workplaces (see Dench [1993a, 1993b, 1993c] or Green, Machin, and Wilkinson [1995] for more details). We used these rich data in an analysis examining the relationship between unionization and three measures of the degree of formality of the training infrastructure in the establishments. Table 4 reports the basic results from probit models of whether the organization of which the establishment is part has a training center, a training budget, or a training plan covering the establishment. The models, not shown in full here,[10] all include the same controls as are used in the EMSPS equations of Table 2a.

The results provide more evidence for a positive association between the extent of training practices and unionization. The estimated coefficients on the union variable are all positive and differ from zero at statistically significant levels in the training center and training plan equations. The marginal effects suggest that unionized workplaces are 18% and 9% more likely than nonunion workplaces to have a training center and a training plan, respectively.

Concluding Remarks

Using data from the establishment-level Employers' Manpower and Skills Practices Survey of 1991 and the individual-level Autumn 1993 Quarterly Labour Force Survey, we have investigated the relationship between union presence and the incidence and extent of training in Britain. The analysis, which controls for numerous other determinants of training, yields strong evidence that unionized workers, both manual and non-manual, were more likely than nonunionized workers to participate in training, and that among those who received training, the amount of training was higher for workers in unionized establishments than for those in nonunion establishments.

These effects are of large magnitude. Our point estimates suggest that the impact of unionization on average days of training is 0.17 (manual) and 0.34 (non-manual) hours per week, based on the individual-level data, and just under 1 day per year, based on the establishment-level data. These are not inconsiderable effects when compared to existing averages, namely 0.6 (manual) and 1.3 (non-manual) hours per week, or 2.1 (manual) and 2.7 (non-manual) days per year. These findings suggest that the rise in training in Britain beginning in the early 1980s occurred *despite,* not *because of,* the downward trend in unionization.

Given that the direct role of unions in training matters appears to have been quite limited at the time of the surveys, our results should be interpreted largely as reflecting the indirect influence of unions. The presence of unions is likely to influence channels of communication and management behavior by providing a "voice" both for individual grievances and for contributions to productive efficiency. Unions' presence may also make employees feel more secure and less threatened by changes in work practices that sometimes accompany training. Labor turnover will then be lower in such workplaces, allowing for a longer period over which the benefits of training may be reaped. There may also be a more formal environment in unionized workplaces, allowing for better identification of training needs.

An interesting question that remains is whether the continuing decline in union presence will have an impact on training participation and volume in future years and whether the skills problems regularly cited by British employers will be exacerbated by this decline. The results in this paper suggest that, despite past declines in aggregate membership, unions still have a potentially important role to play in the skill formation process in British work-

[10]These can be obtained from the authors by request.

places. This role could be enlarged if unions succeed in their objectives of playing a more direct role in bargaining over training. As we have seen, the extent of the direct role that unions play in training strategy is unclear. It remains the case that British managers tend to regard training as an area for their own decision-making, but there is some evidence that unions have a direct, though informal, role in training matters in some workplaces (Heyes 1993; Stuart 1994). It is possible that the direct role of unions in training matters will increase in the future, and this is clearly an aim of the Trades Union Congress and several large unions. The findings here suggest that the size of the union sector in the future could potentially have an important influence on the extent of human capital formation in the British economy.

APPENDIX

Variable Definitions and Sources

Variable	*Definition*	*Source*
	Employer Survey Variables (taken from both the 1990 Workplace Industrial Relations Survey [WIRS] and the 1991 Employers' Manpower and Skills Practices Survey [EMSPS])	
Training Receipt	= 1 if a positive percentage of employees in any of the manual/non-manual groups have received training in the past 12 months. Relevant question: "Thinking now about employees who have *completed* an initial job training, about what percentage of them have received any (other) training in the last 12 months?"	EMSPS
Training Intensity	Proportion of manual/non-manual employees receiving training in the past twelve months (as indicated by the answer to the *Training Receipt* question) multiplied by the average number of days they spent receiving training in this period (relevant question: "Among that per cent, how many working days on average did they spend receiving training over the last 12 months?").	EMSPS
Training Center	= 1 if the answer to the following question is yes: "Does your organization have a training center or school which covers employees at this establishment?"	EMSPS
Training Budget	= 1 if the answer to the following question is yes: "Is there a training budget which covers this establishment?"	EMSPS
Training Plan	= 1 if the answer to the following question is yes: "Is there a training plan which covers this establishment?"	EMSPS
Union Recognition	= 1 if the answer to the following question is yes: "Are any unions/staff associations recognized by management for negotiating pay and conditions for any section of the workforce in the establishment?" This question is asked separately for manual and non-manual workers.	WIRS
Single Union	= 1 if there is one union or staff association that has members among the manual/non-manual work force.	WIRS
Multiple Union	=1 if the number of unions/staff associations is greater than one.	WIRS
Union Membership Arrangements	=1 if one of the following is true: (i) all manual/non-manual workers have to be members of unions in order to get or keep their jobs; (ii) some groups of manual/non-manual workers have to be members of unions in order to get or keep their jobs; (iii) management strongly recommends that all manual/non-manual workers become union members; (iv) management strongly recommends, for some groups of manual/non-manual workers, that they become union members.	WIRS

Continued

APPENDIX

Continued

Variable	*Definition*	*Source*
Employer Size	Dummy variables for whether the establishment has 25–49 employees, 50–99 employees, 100–199 employees, 200–499 employees, 500–999 employees, and 1,000 or more employees. (WIRS and EMSPS only cover establishments with 25 or more employees.) In the multivariate analysis the omitted category is 25–49 employees.	EMSPS
Employment Shares	Proportions of employees in the establishment who are manual, non-manual, female, and part-time.	EMSPS
Ethnic Minorities	= 1 if some ethnic minorities are employed at the establishment.	WIRS
Public Sector	= 1 if the establishment operates in the public sector.	WIRS
Fewer Than Five Competitors	= 1 if the establishment is in a market with fewer than five competitors.	WIRS
Skill Shortage	= 1 if the establishment has experienced a "skill shortage" in the last 12 months.	EMSPS
Single Site Establishment	= 1 if the establishment is a single independent establishment and not one of a number of different establishments belonging to the same organization.	WIRS
Industry and Region	Dummy variables for one-digit industries and the standard regions.	WIRS
	Individual Survey Variables (taken from the Sept.–Nov. 1993 Quarterly Labour Force Survey [QLFS])	
Training Receipt	= 1 if in the previous 4 weeks the individual had taken part in any education or any training connected with his or her job, or a job that he or she might be able to do in the future.	
Training Intensity	Number of hours spent on education or training connected with the job, including private study time, in the week prior to the survey.	
Union Recognition	= 1 if unions, staff associations, or groups of unions are present at the workplace and any of them are recognized by management for negotiating pay and conditions of employment.	
Public Sector	= 1 if the individual works in the public sector.	
Female, Part-time, Temporary, Not White, and Married	Dummy variables equal to one if the individual is female, works part-time, works in a temporary job, is not white, and is married.	
Potential Experience	Current age in years of the individual minus the age of the individual when he or she left full-time education.	
Job Tenure	Number of months the individual has worked with his or her current employer.	
Workplace Size	= 1 if the individual works in a workplace that employs 25 or more employees.	
Highest Qualification	Dummy variables equal to one for a range of levels of the highest qualification of the individual. In reverse order by rank, these qualifications are Degree, Further Education, 'A' Level, Apprenticeship, 'O' Level, CSE, Other Qualification, and No Qualification. In all the models estimated, the omitted highest qualification category is No Qualification.	
Industry and Region	Dummy variables for one-digit industries and the standard regions.	

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