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Firm-sponsored training in regulated labour markets: evidence from Spain

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Using data from the 1994 European Community Household Panel Survey, the author examines who receives formal firm-sponsored training in Spain. The author finds that the distribution of firm-sponsored training in the work force is uneven and concentrated among more skilled workers in the upper deciles of the wage distribution. The data show that the likelihood of receiving firm-sponsored training for a low education employee is much lower. Also, the better-educated employees in high wage occupations of the largest establishments have higher probabilities of receiving specific training. Spain has a highly regulated labour market, and the labour market frictions and institutions compress and distort the structure of wages. However, the results suggest that the highly compressed wage structure do not provide firms with the incentive to invest in general training.

I. Introduction

The incorporation of Spain to the European Union, the acceleration of technological change, and recent internationalization of Spanish economy have focused the debate on the practical ways that firms can improve the new skills required of employees to succeed in a workplace that has changed dramatically. Historically, Spain has relied on a dichotomized system of formal education. On the one hand, a formal school sector based on general learning that does not satisfy the demand for skills for factories and offices. On the other hand, the vocational education sector capturing those individuals that leave secondary school with a formal learning that is not sufficient to meet the needs of employers. Once in the workplace, workers need to obtain those skills that are not received 'on-the-job'. Thus, some firms throughout the 1990s were concerned with sponsorships training programmes. However, as shown in the following section, there is a perception that the Spanish economy is suffering from a 'training gap', with lower training rates than its major industrialized competitors.

In recent years there have been numerous empirical and theoretical studies of training carried out in order to explain firms' investments in skills. A limited number of studies using microdata sets have taken information from respondents on work-related training courses to study the effects of individual, workplace, and job characteristics on the determinants of receiving training provided by employers. The predictions of standard on-the-job training theories are basically that training increases wage growth, and also lowers the starting wage. The worker pays the full costs of general training, and

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the worker and firm share the cost of specific training. The determinants of who is receiving formal training are linked to the cost and returns of that human capital investment. Therefore, worker characteristics such as age, gender, formal education, occupation, and tenure are linked to the approach to determine who is receiving formal firm-sponsored training. The characteristics of the job are also relevant. For instance the hours per week worked, and the type of contract. Workplace characteristics are also important in determining who is receiving formal training. Consequently, the establishment size, the industry, the participation in monitoring activities, and the geographic location of the workplace are all linked to the likelihood of an employee receiving training.

While most of the evidence in the literature on training is based on US, German, and UK data sets, the empirical evidence presented in this paper is based on data from Spain. In this paper, we examine the distribution among workers of firm-sponsored training in Spain using data from the 1994 European Community Household Panel (ECHP) Survey. Therefore, the analysis of the firm-sponsored training is carried out in the highly regulated Spanish labour market, where the labour market frictions and the institutions compress and distort the structure of wages. The remainder of the paper is organized as follows. Section II briefly presents the data of the ECHP Survey, and describes the incidence and distribution of different types of firm-sponsored training. The intensity and length of training is also considered. Section III analyses the results of the probit estimates of the determinants of receiving training using variables that include all of the worker characteristics plus a set of industry and occupation dummies. Section IV focuses on the interpretation of the results of training incidence for the highly frictional and regulated Spanish labour market from the perspective of non-competitive training model. Finally, Section V concludes the paper.

II. Descriptive Statistics on Firm Sponsored Training

The ECHP survey data

This section describes the characteristics of workers who are receiving firm-sponsored training in Spain. This paper uses data from the Spanish sample of the European Community Household Panel (ECHP) Survey for the initial 1994 wave. The random sample of the 1994 ECHP Survey is around 60 500 nationally representative households interviewed in the 12 Member States of the European Union, and the national matches were administered by the Statistical Office of the European Communities (Eurostat). The National Institute of Statistics of Spain collected the data of the Spanish sample (see INE, 1996). The Spain nationwide random sample totaled some 7206 households – approximately 18 000 individuals aged 16 years and over on 1 January 1994. In early 1994, an interviewer visited each household, and described the survey and the nature of the questions that would be asked. Subsequent, individual interviewing began in October 1994 and was completed in December 1994. The 1994 ECHP Survey asked information about the household and the demographic, cultural and socio-economic current characteristics of the individual in 1994. Once the interviewer had completed the initial current questions, the survey asked retrospective questions on 1993 economic activity.

The 1994 ECHP Survey forms therefore the most closely coordinated component of the European system of social surveys. The microdata collected allows one to study (Eurostat, 1998) income including social transfers, labour, poverty and social exclusions, housing, health, as well as various other social indicators concerning living conditions of private households and persons. The 1994 ECHP Survey represents a unique source of information on many determinants of the probability of receiving formal firm-sponsored training in the workforce that have been identified in the training literature. The key variable of interest for the present study is whether the respondent received any type of firm-sponsored training during the year prior to the survey. However, some recent findings of articles that attempt to match employer and employee responses to identical training questions show that there is a great deal of measurement error in on-the-job training variables. Barron *et al*. (1997), using a 1993 survey funded by the W. E. Upjohn Institute for Employment Research, find that establishments report 25% more hours of training on average than do workers, although establishments and workers report similar incidence rates.[1] Data limitation forced us to consider the responses of employees as direct measures of formal training variables. Indeed, if the individual interviewed had a job in some month of the past year, the survey included a series of retrospective training questions about the firm-sponsored training activities of the

[1] However, the authors find that the correlation between employer and employee measures are less than 0.5, which are much lower than correlation for other variables that have been used in wage equations.

worker during the past 12 months of employment in the year 1993. The training questions asked in the Personal Questionnaire Record in the 1994 ECHP Survey were:

> Q082. Have you been in any education or training, including any part-time or short courses, at any time in 1993?
>
> Q085. Was the course paid for or organized by your employer?
>
> Q086. Is/was this an attendance course or a correspondence course? If attendance course: full-time or part-time?
>
> Q087. What is/was the overall duration of the course or training? Less than 2 weeks? 2–9 weeks? Longer? If less than 2 weeks, how many days? If 2–9 weeks, how many weeks? If longer, how many months?

The use of data from the ECHP Survey avoids problems with the data from the 1995 European Labour Force Survey (ELFS) pointed out by McIntosh (1999). The main problem is that the ELFS identifies only those workers who have received training within a four week time period. Thus, the data set is a 'snapshot' of training incidences, and it says nothing about the total amount of training received within long time periods, and hence nothing about the incidence of long-tenured characteristics of workers and their workplaces.

A number of sample selection criteria were used to define a subset of the Spanish sample provided by the 1994 ECHP Survey. First, individuals under the age of 18 and over the age of 64 were excluded from the sampling frame. In addition, individuals who worked in a job or business for less than 15 hours per week during 1993 were excluded. Because information about occupation, industry, and establishment size was reported only for individuals in their current jobs, individuals involved in any change in their main activity during 1993 and 1994 were excluded. The self-employed and unpaid family workers in their main activities, and full-time students (although several full-time college students and vocational students were employed) were also excluded. Also, all respondents were excluded that had not worked during some month in 1993, or in the prior months of 1994. Thus, unemployed individuals and those with turnover situations during 1994 were excluded. This is because this procedure is intended to connect wages and other relevant information with the characteristics of firms who currently employ these workers,[2] and are provided by surveyed respondents in 1994. Of the original Spanish sample of around 18 000 individuals, the number of respondents who completed all relevant parts of the survey was 3670 adults. Because this study focuses on who received firm-sponsored training, workers in Public Administration (including Compulsory Social Security) and Defense, Education, Health, Personal Service Activities, Construction, Agriculture, Forestry and Fisheries, Mining, and Not-for-Profits Institutions were also excluded. Additionally, the sample was limited to those respondents that provided complete information on all of the variables of interest. All these sample selection criteria produced a final working sample of 1946 workers for the Spain subset of the 1994 ECHP Survey.[3] The results presented in the following sections refer to this final subset.

Incidence and distribution of training

The first column of Table 1 reports the unweighted percentage of workers receiving firm-sponsored training by demographic and economic categories. Columns 2 and 3 present the training participants percentages by full-time and part-time types of firm-sponsored training, while columns 4–6 give us the distribution of training participants by overall duration of the course or training. The top row shows that out of the 1946 workers, only 226 received any type of firm-sponsored training (11.6%) during 1993, and 1720 were non-participants. Gender rows show that 12% of male workers received some type of firm-sponsored training, which is about 20% greater than the probability of a female worker received training (10%). A comparison with the gender probabilities of receiving firm-sponsored training reported by Olson (1996) for the USA, also shows no substantial gender differences in training. In any case, the consequences of intermittent participation for woman's training probability is captured by her capacity earnings path (see Table 4), and this relationship can explain why women have only a slightly

[2] Therefore, I can not control for the type of contract.

[3] Our final subset contains only workers with more than 21 months in their current jobs. Unsuccessfully, we undersample recently hired workers and turnover jobs. The problem of tenure variable is because the 1994 ECHP Survey was conducted in the fourth quarter of 1994 and the Survey asks retrospective questions about the training that workers have received in 1993. This suggests that the subset may miss spells of firm-sponsored training because it does not contain newly hired workers (see Barron *et al*., 1997).

Table 1. The percentage of workers in Spain receiving firm sponsored training by groups and the percentual distribution of alternative types of training

		Type of training		Number of training weeks received		
	Any type	Full-time	Part-time	<2	2–9	>9
All workers	11.61	27.4	72.6	43.3	31.9	24.8
Gender						
Males	12.18	29.2	70.8	43.2	31.5	25.3
Females	9.90	20.8	79.2	43.7	33.3	22.9
Age						
18–24	4.83	14.3	85.7	28.6	57.1	14.3
25–34	11.75	29.2	70.8	36.9	33.9	29.2
35–44	15.06	27.2	72.8	33.7	33.7	32.6
45–54	11.38	21.6	78.4	66.7	23.5	9.8
55–64	5.82	54.5	45.5	63.6	27.3	9.1
Educational attainment						
Illiteracy & less than Primary	3.31	13.0	87.0	56.5	21.7	21.7
Primary	7.10	33.3	66.7	43.6	33.3	23.1
Secondary (Academic)	21.24	26.2	73.8	38.5	35.4	26.1
Vocational (Secondary)	18.91	29.0	71.0	44.7	29.0	26.3
Higher (short cycle)	29.70	36.7	63.3	46.7	26.7	26.6
Higher (long cycle)	32.98	22.6	77.4	38.7	38.7	22.6
Economic activity						
Manufacturing	8.52	16.2	83.8	42.7	27.9	29.4
Wholesale & Retail Trade	6.93	36.7	63.3	43.3	36.7	20.0
Finance, Insur. & Real St.	23.25	28.8	71.2	38.4	41.1	20.6
Transport, Comun. & Elect. (a)	17.13	34.7	65.3	51.0	20.4	28.6
Hotels & Restaurants	5.22	33.3	66.7	50.0	33.3	16.7
Occupational category						
Managers	27.69	22.2	77.8	50.0	22.2	27.8
Professionals	24.78	32.9	67.1	43.5	34.1	22.4
Clerical workers	17.45	25.0	75.0	32.7	42.3	25.0
Production workers	7.06	18.5	81.5	50.0	20.4	29.6
Service workers (b)	4.41	46.2	53.9	53.8	38.5	7.7
Unskilled workers	2.22	9.1	90.9	25.0	25.0	50.0
Establishment size						
Less than 100 employees	4.19	31.9	68.1	38.3	36.2	25.5
100-499 employees	15.17	14.3	85.7	32.6	32.7	34.7
More than 500 employees	26.00	30.8	69.2	49.2	30.0	20.8
Wage distribution						
1st Quintile	2.35	33.3	66.7	55.6	33.3	11.1
2nd Quintile	3.85	33.3	66.7	26.7	33.3	40.0
3rd Quintile	7.57	27.6	72.4	55.2	31.0	13.8
4th Quintile	16.06	30.7	69.3	37.1	27.4	35.5
5th Quintile	28.98	24.3	75.7	45.1	34.2	20.7
Tenure						
1–5 years	7.56	35.3	64.7	38.2	23.5	38.3
More than 5 years	12.83	26.0	74.0	44.3	33.3	22.4

Notes: The numbers of the column 'Any Type' are the percent in each group receiving firm sponsored training.
The numbers in each other cells are percentual distribution (row prcnt.) of the workers receiving the type of training of the column definition by each group of workers.
(a) Include: Transports, storage and comunications and electricity, gas and water supply.
(b) Include: Wholesale & retail trade workers, and hotels & restaurants workers.
Source: Author's calculations from the 1994 ECHP Survey.

lower probability of receiving training than do men. Age rows capture an inverted U relationship between age and the probability of receiving any type of firm-sponsored training; and workers in the 25–44 brackets have the highest participation in long-duration training courses. Table 1 shows a low percentage of 18–24-year-olds receiving firm-sponsored training (4.8%). This fact indicates that only a small

number of Spanish companies invest to improve the work skills of their young employees. The reluctance of companies to invest in their young workers is hard to understand, because turnover rates among Spanish workers are discouragingly low.

Table 1 shows a positive relationship between education and the probability of receiving firm sponsored training. Thus, workers with higher education were four (4) times more likely to receive any type of training from their employer than were workers with primary school education. The poor preparation of primary and secondary school graduates and the good education received by university graduates combine to create a significant factor pushing up firm-sponsored training disparities among Spanish workers. Additionally, the complementarity of formal schooling and post-school investments in training appears as a key feature in firm-sponsored training in Spain. Thus, more skilled employees receive more training even after they attain relatively high skill levels. The low participation rate of disadvantaged employees (low-skilled) in firm-sponsored training programmes indicates that the costs of training workers is likely to depend on their educational attainment, and reflect their likely low return on this activity.

The percentage of workers receiving training within finance, insurance and real state is 23.2%, more than twice the national average; the incidence of any type of training was below the national average within the manufacturing, services, and restaurants and hotels sectors. The occupation rows show that highly skilled workers have the greatest chance of receiving any type of training. In addition, the rate of training within non-skilled workers was five (5) times below the national average. The establishment size rows in Table 1 suggest that employees in small establishments (less than 100 employees) are much less likely to receive any type of firm-sponsored training than employees from larger establishments (over 500 employees). The distribution of workers by type of training (full-time and part-time) is very similar in all categories of establishment size, although those respondents working in an establishment with 100–499 employees have the highest probabilities of receiving part-time training. Additionally, there is variation in the distribution of the overall duration of the course or training by establishment size, with employees in the largest establishments much less likely to be engaged in training courses of duration longer than 9 weeks. Table 1 also shows the training incidence for each quintile of the net monthly wage distribution (using the ECHP respondents). There is a strong positive relationship between the worker position in the wage distribution and the probability of receiving any type of firm-sponsored training. Only 2.3% of workers in the lowest 20% of the wage distribution received firm-sponsored training, while 28.9% of those in the top 20% received some type of training. Finally, the last two rows of Table 1 show that workers with more than five years of tenure have about 70% more probability of receiving some type of sponsored training from their employer than have workers with 1–5 years tenure.

Finally, we present some detailed comparable evidence from other countries. Using the German Socioeconomic Panel (GSOEP) in 1986, Pischke (2000) reports that unconditional incidence of firm sponsored training in Germany was 23%. Similar evidence presented in Olson (1996) from the National Household Education Survey (NHES) for the USA shows that about 25% of the US workforce participated in firm-sponsored training during a 12-month period in the early 1990s. However, this figure is considerably higher than the 17% reported in the 1991 Current Population Survey (CPS) for the USA. Another recent study (Harris, 1999) using the 1995 UK Labour Force Survey (LFS), states that 24.8% of employees had received training provided directly by the employer on site. Information relating to firm-sponsored training obtained from the above surveys is comparable with Spain data, because the percentage of workers receiving formal company training is the concept most closely resembling the ECHP Survey question. The four surveys show that the incidence of training is lower among less educated and blue collar workers. However, the median duration of the full-time training is less than a week in Germany and USA, but around seven days in Spain. Table 2 shows that the bottom 20% of workers in the wage distribution contain 4.0% of all workers that received training, and only 2.3% of workers in the lowest 20% received firm-sponsored training. Comparable figures for the USA are 9.1% and 10.9%, respectively (Olson, 1996).[4] Nevertheless, the distribution of firm-sponsored training in the workforce for Spain and the USA are both uneven and concentrated among more skilled workers in the upper deciles of the wage distribution. In short, Spanish firms sponsor low levels of employees training compared to those in other OECD countries (McIntosh, 1999). We focus on this result in

[4] It must be noted that the comparisons of training incidence differ across countries, and Spain has a different industry mix from that of the USA.

Table 2. Percentual distribution of workers receiving types of firm sponsored training by deciles of the wage distribution

Wage distribution decile	Any type	Type of training		Overall duration of the training		
		Full-time	Part-time	Less than 2 weeks	2–9 weeks	Longer than 9 weeks
1st	2.7 [3.1]	4.8 [1.6]	1.8 [1.6]	4.1 [2.1]	1.4 [0.5]	1.8 [0.5]
2nd	1.3 [1.5]	0.0 [0.0]	1.8 [1.5]	1.0 [0.5]	2.8 [1.0]	0.0 [0.0]
3rd	3.1 [3.7]	4.8 [1.6]	2.4 [2.1]	3.1 [1.6]	1.4 [0.5]	5.4 [1.6]
4th	3.5 [4.0]	3.2 [1.0]	3.7 [3.0]	1.0 [0.5]	5.6 [2.0]	5.4 [1.5]
5th	5.8 [7.1]	8.1 [2.7]	4.9 [4.4]	7.1 [3.9]	4.2 [1.6]	5.4 [1.6]
6th	6.7 [7.4]	4.8 [1.5]	7.3 [5.9]	8.2 [4.1]	8.3 [2.9]	1.8 [0.5]
7th	9.7 [11.3]	8.1 [2.6]	10.4 [8.7]	8.2 [4.1]	11.1 [4.1]	10.7 [3.1]
8th	17.3 [20.1]	22.3 [7.2]	15.2 [12.9]	16.3 [8.2]	11.1 [4.1]	26.8 [7.8]
9th	19.5 [22.6]	17.7 [5.6]	20.1 [16.9]	23.5 [11.8]	19.4 [7.2]	12.5 [3.6]
10th	30.5 [35.4]	25.8 [8.2]	32.3 [27.2]	27.6 [13.9]	34.7 [12.8]	30.4 [8.7]

Note: The number in each cell in brackets is the percent of all workers in each decile receiving firm-sponsored training based on the column definition of the type of training.
Source: Author's calculations from the 1994 ECHP Survey.

Section IV because Spain has a highly regulated labour market, where frictions and institutions compress and distort the wage structure and, despite this, Spain has a relative low firm-sponsored training rate.

Table 2 also reports the percentage of workers receiving firm-sponsored training by duration of the training for each decile of the earnings distribution. The results of the classification indicate that most cells had too few workers to meet the purpose of this examination; any implications require caution because the data is not of sufficient sample size. Ideally, we would like to estimate (in Section III) training probabilities for full- and part-time training categories. However, this is not possible because of insufficient sample sizes.

Intensity and length of training

The analysis of the educational gap (human capital stock differences) and the probability of receiving firm-sponsored training is related to the analysis of the differences in earnings between workers due to differences in educational attainment. Furthermore, the relationship between training and wage is a fundamentally linked to the structure of wages. With regard to the concentration of firm-sponsored training among better-educated employees in high wage occupations and economic activities of the largest establishments; Table 2 provides a comprehensive look at firm-sponsored training participation of Spanish employees for each decile of the earnings distribution. Employees that have higher earnings seem more likely to participate in firm-sponsored training compared with other groups. The incidence of training is very low among employees in the bottom deciles. In fact, the figures in Table 2 suggest that employees who have higher earnings are more likely to receive part-time training of long duration. Thus, higher education levels, which are associated with upper earnings deciles, are correlated with more firm-sponsored training, but of part-time type. Likewise, workers are differentiated by personal and workplace characteristics associated with the likelihood that they receive firm-sponsored training. Here, the main argument is that the more willing (more educated with higher wages) will receive firm-training investments and, additionally, the firm can reduce the probability of highly qualified and experienced workers quitting. The figures of Table 2 show that participation in firm-sponsored training is related with significantly higher wages, as human capital theory predicts.

Table 3 summarizes the average number of days of any type of training received among those that received firm-sponsored training in 1993, broken down by different levels of educational attainment and establishment size. The figures show that the duration of any type of training received by employees does not vary significantly by establishment size and educational level. However, the employees in smaller establishments have shorter full-time training courses and longer part-time training courses than those have in larger establishments. For the duration measures, the row of all workers show that the mean for part-time formal training is 58.1 days with a median of 15 days for all workers, while for the full-time formal training, the mean is 17.8 days with a median of 7.5 days. In addition, average educational level is positively related to duration of part-time training. There are important differences in the distribution of part-time training duration among all workers, especially those within higher education.

Table 3. Average number of training days of part-time and full-time training received by group of workers that received firm sponsored training

	Overall duration of the training (number of days)								
	Any type	Full-time training				Part-time training			
Group of workers	Mean	Mean	Percentile 25th	Median	Percentile 75th	Mean	Percentile 25th	Median	Percentile 75th
With Higher Education (short cycle & long cycle)	46.7 (79.9)	10.6 (9.4)	5	10	10	61.8 (91.0)	7	18	110
Without Higher Education	47.2 (80.4)	20.8 (44.5)	4.5	7	15	56.8 (88.2)	7	15	66
Establishment with more than 100 employees	46.3 (76.1)	19.4 (42.7)	5	8	10	55.9 (82.9)	6	15	66
Establishment with less than 100 employees	50.0 (94.5)	12.9 (16.3)	3	7	20	67.4 (110.3)	10	20	66
All workers	47.1 (80.1)	17.8 (38.0)	5	7.5	10	58.1 (88.7)	7	15	77

Note: Standard deviations are in parentheses.
Source: Author's calculations from the 1994 ECHP Survey.

The part-time training duration variable is heavily skewed to the right. The higher education row indicates that 25% of employees received more than 110 days of part-time training during 1993. Thus, the more highly educated seem to undertake longer periods of part-time training, as well as being more likely to receive part-time training. Table 3 shows that the firm-sponsored training gap between the highly educated and the less educated narrows when different types of training are considered, rather than training incidence. Several studies show a negative relationship between intensity and duration (Altonji and Splezter, 1991). Our results also indicate that the correlation between the intensity of firm-sponsored training, as measured by part-time course or full-time course (1 and 2, respectively), and the duration of training, as measured by number of days, is negative (−0.225, and statistically significant).

III. The Determinants of Receiving Training

This section presents a simple probit model used to analyse how the 1994 ECHP Survey detailed information on worker and workplace characteristics, and some other variables all together affect the employees' probabilities of receiving any type of training offered by their employers during 1993. Thus, we have for employee i the following specification:

$$y_i^* = \beta' X_i + \varepsilon_i, \quad (1)$$

where y_i^* is a latent variable, employee i can be observed receiving training if $y_i^* > 0$; X_i is a vector of explanatory variables including the usual range of personal characteristics that influence the likelihood of receiving training, a limited set of workplace characteristics, and other control variables; and ε_i is an error term that satisfies the usual assumptions. Personal characteristics include gender, age, educational attainment, occupation, and position in the wage distribution. Workplace characteristics, as reported by the individual, include establishment size, industry and region.

Table 4 presents probit estimates of training equations for all workers. Derivatives of the probabilities at the mean values of the variables are reported along with the estimated parameters. The dependent variable used in this analysis covers two subgroups of employees: Those who have not training during 1993, and those who received firm-sponsored training in 1993. Splitting those employers receiving training into two subgroups (part- and full-time courses) does not improve the statistical model based on simple dichotomy of received-did not received training. Model 1 is the estimated training equation without occupation and industry controls. In addition, the probit estimation of the model 2 (with occupation and industry controls) also includes a set of region residence dummies as additional control.[5] There is no great difference in the estimated coefficients when the sample is controlled in this way. Of note, is the falling of the coefficients on the education and wage distribution dummy variables. The fact that the marginal effects of education levels are all similar is, therefore, explained by the incorporation of unskilled workers (occupation dummy) and finance sector workers (industry dummy). The last two rows of Table 4 report the values for the Wald test for the significance of the occupation, industry and region effects. The joint hypothesis that the occupation and industry effects are jointly equal to zero is not rejected at the 0.10 level of significance. These result shows poor significant industry and occupation effects on the probability of that an employee receives firm sponsored training. However, the additional inclusion of region effects in the above hypothesis improves lightly the results of the corresponding Wald test (the probability that the occupation, industry and region variables are jointly equal to zero is now rejected at the 0.05 level of significance).

Table 4 reports that the coefficient on gender is not statistically significant in the probability of receiving any type of firm sponsored training. Note that the regressions run here includes education, earnings, occupation, and industry characteristics. The implication is that most of the difference in training rate between the sexes is captured by these variables that account for the statistical non-significance in the gender coefficient. Controlling by other individual characteristics, there is evidence of a lower incidence of training among more aged workers.[6] This one result holds after controlling for

[5] The impact of public sector versus private sector on probabilities of receiving training was also tested in the model. The results present limited evidence that workers in public companies are more likely to participate in firm-sponsored training than private company employees. Overall, this coefficient was not statistically significant.

[6] The ECHP data contain two experience variables; years of experience in current job and worker's age. The years of tenure is a measure of the relevant experience that workers have (as Barron *et al*., 1999, refer to it): experience previously acquired on-the-job training. The statistical significance of the tenure effect is easily rejected for all specifications considered in both models. The measure 'worker's age' is a proxy for general experience, because they accumulate general skills in jobs that are not relevant to their current employment.

Table 4. Probit estimates of the incidence of firm sponsored training

	(1) Without controls			(2) With controls		
Independent variable	Coeff.	Std. Error	Marg. Eff.	Coeff.	Std. Error	Marg. Eff.
Constant	−2.927*	0.30	−0.378	−3.228*	0.40	−0.391
Male	−0.135	0.11		−0.107	0.12	
100/Age	0.155*	0.07	0.020	0.162*	0.07	0.019
Educational attainment						
Primary school and lower	Omitted			Omitted		
Secondary school	0.601*	0.11	0.077	0.512*	0.12	0.062
Vocational	0.617*	0.13	0.080	0.558*	0.14	0.068
Higher (short cycle)	0.707*	0.16	0.091	0.546*	0.17	0.066
Higher (long cycle)	0.634*	0.17	0.082	0.544*	0.18	0.066
Wage distribution						
1st Quintile	Omitted			Omitted		
2nd Quintile	0.223	0.19		0.229	0.20	
3rd Quintile	0.475*	0.19	0.061	0.479*	0.20	0.058
4th Quintile	0.782*	0.19	0.101	0.741*	0.20	0.090
5th Quintile	1.052*	0.19	0.135	1.014*	0.20	0.123
Establishment size						
1–19 employees	Omitted			Omitted		
20–49 employees	0.315**	0.17	0.041	0.355*	6167	0.043
50–499 employees	0.458*	0.13	0.059	0.561*	3554	0.068
More than 500 employees	0.855*	0.13	0.110	0.902*	9277	0.109
Wald test for Ho (Educational Effects = 0)	45.67*					
Occupation						
Managers				Omitted		
Professionals				0.005	0.20	
Clerical workers				−0.010	0.22	
Production workers				−0.011	0.22	
Service workers				−0.328	0.26	
Unskilled workers				−0.618*	0.32	−0.075
Industry						
Manufacturing				Omitted		
Wholesale & Retail Trade				0.262**	0.15	0.032
Finance, Insur. & Real St.				0.287*	0.13	0.035
Transport, Comun. & Elect.				0.112	0.13	
Hotels & Restaurants				0.224	0.26	
Region Control	NO			YES		
Wald test for Ho (Occup., Indust. & Region effects = 0)	25.45*					
Wald test for Ho (Occup. & Indust. effects = 0)	14.95**					
Log-Likelihood	−547.18			−534.01		
χ^2	303.47			329.81		
Number of observations	1946			1946		

Notes:*Statistically significant at the 5-percent level; **Statistically significant at the 10-percent level.
The set of regions is: Madrid (omitted), Noroeste, Noreste, Centro, Este, Sur, and Canarias.

occupation and industry and, therefore does not confirm the inverted U shape suggested by statistics in Table 1. The simple specification of age used in both models suggests that the predicted probability of receiving training decline with age for the average employee. The education level of employees has been one of the strongest predictors of the receipt of training in the conventional literature. The probability of participation in firm sponsored training activities is greater for employees who already have higher qualifications. More educated employers are more trainable because they have the ability to learn more efficiently. Therefore, educational inequalities tend to cause unequal opportunities for firm-sponsored training. Overall, Table 4 shows a strong positive relationship between education and formal firm-sponsored training. The hypothesis that the education effects are jointly equal to zero controlling for the individual characteristics is rejected at the 0.005 level of significance.[7] A comparison of the marginal effects on educational attainment variables in models (1) and (2) show that the effect of higher education levels on the probability of receiving firm sponsored training is smaller in model (2), which includes a set of occupation, industry and region dummies. This implies that the higher probability of receiving training among better-educated employees is related to the characteristics of their workplaces and jobs. The better-educated workers are sorted into jobs with high-skill requirements that have more likelihood of involving firm-sponsored training. Moreover, employees who have already shown an aptitude to learn new skills by having higher levels of educational attainment are more likely to participate in training provided by their employers. This is because sponsorship-training programmes are costly and firms need to assess the success of their investments in human capital, choosing those workers having higher levels of education to receive their investments in training. These results are consistent with the finding of the on-the-job training literature. For example, Lynch and Black (1995, p. 12) suggest that employer provided training is a complement to rather than a substitute for investment in physical and human capital. There seems to be evidence of a virtuous circle of investment in human capital: employee investments in schooling are further augmented by employer investments in training. Nevertheless, it should be noted that selection bias is likely to be present and will induce an upward bias in the estimated coefficients for the training effects of education and wages.

With regard to the characteristics of the workplace, there is a monotonic increase in the probability of training as establishment size increases.[8] Training incidence is greater in large establishments, because these establishments have an inherent economy of scale advantage in the provision of formal training (and greater opportunities for informal co-worker training), and are more likely to retain their trainees with higher wages and better prospects than small establishments.[9] Receiving firm-sponsored training is more likely in industries incorporating technological changes, and in occupations involved with organizational and management tasks. The financial sector is among the 'high' firm-sponsored training industries, while employees in manufacturing tend to have low probabilities of receiving training. The relationship between industry and training depends upon the specific occupational category. Occupations requiring special skills are those in which employers must learn and apply new technologies and are related to high wages. Employees in jobs with higher skill requirements have more likelihood of receiving firm-sponsored training. On the other hand, occupations with manual skill requirements are negatively related to wages. The results in Table 4 for occupations suggest that employees with lower skill requirements have lower probabilities of receiving firm-sponsored training. The results confirm that occupation and industry effects are mostly as expected.[10] The coefficient for 'clerk' workers is not statistically significant.

[7] The critical chi-squared value at the 0.005 significance level is 29.8 for13 degrees of freedom.

[8] The sample was stratified by establishment size in the following manner: 36.0% of all workers in establishments with 1–19 regular paid employees, 12.5% of workers in establishments with 20–49 employees, 25.5% of workers in establishments with 50–499 employees, and 25.7% of workers in establishments with 500 or more employees.

[9] Black *et al.* (1999) argue that differences in formal training by firm size and establishment size arise from cost advantages for larger firms. Additionally, because unions are more prevalent in firms with a large number of employees, and since training is positively correlated with unionization, these coefficients could be picking up 'collective voice' effects.

[10] These findings point in the same direction as the Krueger and Rouse (1998) study of impact of a workplace education programme at two companies, one in the manufacturing sector, the other in the service sector. They estimate a small positive impact of the training programme on earnings at the manufacturing company but an insignificant impact at the service company.

IV. Training in a Highly Compressed Wage Structure

In the standard theory of human capital with competitive labour markets, firms never invest in the general skills of their employees and all costs of general training are borne by workers. However, evidence from a number of European countries with highly frictional and regulated labour markets contradicts this prediction (Acemoglu and Pischke, 1998, 1999a). When labour markets are imperfect and labour market frictions and institutions compress and distort the wages structure, firms may want to invest in the general skills of their employees. Acemoglu and Pischke (1999a) relax the assumption of perfectly competitive labour markets that underlies the human capital theory, and they show that firm-sponsored training arises as an equilibrium phenomenon. Apart from this prediction contrasting with the standard training theory, they show that the distortion in the wage structure turns technologically general skills into specific skills (Acemoglu and Pischke, 1998). The key to their non-competitive training model is labour market imperfections, which imply that trained workers do not get paid their full marginal product when they change jobs, making technologically general skills *de facto* specific (Acemoglu and Pischke, 1999b, p. 540). The kind of institutions and the form of labour market frictions play a major role in this result. Thus, more frictional and regulated labour markets may encourage more firm-sponsored training. Indeed, the Acemoglu–Pischke approach predicts that wage compressions should shift incentives to invest in training from workers to firms. This will increase firm-sponsored general training when workers are unable to invest in training themselves.

There are important differences between labour market institutions of continental European countries and Anglo-Saxon countries, but certainly the Spanish economy is at the top of the ranking of regulated labour markets. For example, Nickell (1997, Tables 4 and 5) presents direct measures of labour market rigidities and summarizes labour statistics drawn up by the OECD over the period 1989–1994 in different countries. Overall, Spain appears to have serious labour market rigidities and presents a very centralized wage determination system. Moreover, Spain has the highest firing costs in the European Union, and the trade unions play a very important role in wage determination, hiring, and firing practices.

Following Acemoglu and Pischke (1999a), the link between labour market distortions and human capital accumulation is useful in evaluating international patterns in training provision, because institutions (e.g. unions) compress the structure of wages and, therefore compress returns to skills. Table 5 shows that the difference between the 90th and the 10th percentiles of the log net monthly wages of distribution in 1994 was 0.49 for Spain, considerably below figures for continental European economies. According to their theory, the above compressed wage structure may induce firms to provide and pay for general training, because labour market distortions turn general skills into *de facto* specific skills. Therefore, Spain would have a high rate of

Table 5. Unemployment and returns to education in Spain

Male unemployment rates by education (%)	1975–1982	1983–1990	1991–1993
(a) Less qualified	10.6	19.6	20.0
(b) Highly qualified	6.2	9.9	9.0
Ratio (a)/(b)	1.7	2.0	2.2
All workers	8.9	16.9	15.1
Difference 90th–10th percentile of the log monthly wage			1993
All workers in 1994 ECHP Survey			0.49
Marginal rates of returns to education by educational levels (%)		1981	1991
Lower Secondary/Primary		8.9	4.2
Upper Secondary/Lower Sec.		4.3	6.0
Vocational/Lower Sec.		3.3	4.8
Higher (short cycle)/Upper Sec.		3.9	7.3
Higher (long cycle)/Higher (short cycle)		10.1	9.3

Sources: Author's calculations from the 1994 ECHP Survey; Nickell and Bell (1996) and Vila and Mora (1998).

workers receiving firm-sponsored training. However, Table 2 shows a different scenario: the distribution of these employees receiving firm-sponsored training was very uneven and was concentrated among the more skilled workers in the upper percentiles of the wage distribution. Focusing on any column of Table 2, the top 20% of workers in the wage distribution represent 50% of all workers that received firm-sponsored training, and 29.0% of those in the top 20% received training.

Acemoglu and Pischke (1999a) suggest that there are complementarities between training systems and regulation regimes in labour markets. They discussed the interaction between training systems and patterns of wage inequality, and showed that wage inequality did not increase in Germany while rising in the USA. The return to schooling figures given in Table 5 show that vocational education has, for Spain, the lowest rate of return, and that during the 1980s the return for a lower secondary education dropped sharply.[11] In contrast, in 1991 there was a pattern of increasing returns for additional years of schooling with long cycle higher education, short cycle higher education and upper secondary education. These figures suggest that new technologies complement skills. The increase in the supply of skills induces a skill-biased technical change that increase the skill premium during the 1980s (Acemoglu, 1998). However, working with the earnings variable on the 1994 ECHP survey (net monthly wage), the difference between the 90th and the 10th percentiles of the log net monthly wages of distribution was 0.49 in Spain, notably below figures of Germany and the USA (Acemoglu and Pischke, 1999a, Table 2).

The central explanation offered by Acemoglu and Pischke (1999a) for the different patterns of wage inequality is that the labour market institutions which compress wages do not allow new technologies to wide the gap between skilled and unskilled workers wages in these economies with highly regulated labour markets. Consequently, if labour market institutions push unskilled wages, firms would substitute skilled workers for the unskilled and unskilled unemployment increase relative to skilled unemployment. The unemployment data for Spain shown in Table 5 indicate that the unemployment rate of the less qualified workers is substantially higher than that of the highly qualified group. Furthermore, unemployment rates in both groups have tended to rise over the period 1975–1990, with insignificant increases over the period 1991–1993. These increments are similar in the European Community countries, including also the significant rises in highly educated unemployment. The explanation offered by Acemoglu and Pischke (1999a) for the unresolved puzzle why wage inequality did not increase in economies with non-competitive labour markets is that firms in these economies (i.e. Germany) have a greater incentive to train unskilled and less educated workers. However, Tables 1 and 2 show that the likelihood of receiving firm-sponsored training for a low education employee is dramatically reduced. The same pattern fits for employees in the bottom deciles of the wage distribution. In contrast, the firm-sponsored training is concentrated among better-educated employees in the upper deciles of the wage distribution. This result is similar to the obtained in the USA, where highly educated workers also receive more training (Olson, 1996; Peraita, 2001). Additionally, in our compressed wage structure, the log wage gap is wide among the employees without higher education (about 0.13), but the differential is 0.05 when comparing the more skilled workers.[12] Figure 1 shows that firms do not make greater profits from low-skilled workers receiving firm-sponsored training, therefore the firm will not find it more profitable to invest in their training.[13] Therefore, the firm-sponsored training patters observed in Spain are hardly reconciled with the stylized non-competitive model of training.

V. Conclusions

This paper examines the issue of who receives firm-sponsored training in Spain, using data from the 1994 European Community Household Panel (ECHP) Survey. The first major finding is that there is evidence in the Spanish data that the overall incidence of firm-sponsored training is low, and seems to be intensively concentrated on certain groups of employees. The distribution of firm-sponsored training in the workforce is uneven and concentrated skilled workers in the upper deciles of

[11] See Acemoglu and Pischke (1999b), Tables 2 and 3 in comparison with our Table 5.
[12] Booth and Zoega (2000) suggest that better-than-average firms (with monopsony power due to a high quality workforce) can offers higher wages to its well-trained workforce while enjoying monopsony profits due to the complexity of tasks performed within its ranks. Thus, in the presence of monopsony power, firms are willing to pay for training, which is specific to the task performed but general to the industry.
[13] Fig. 1 may be compared with the corresponding Fig. 1 in Acemoglu and Pischke (1999c).

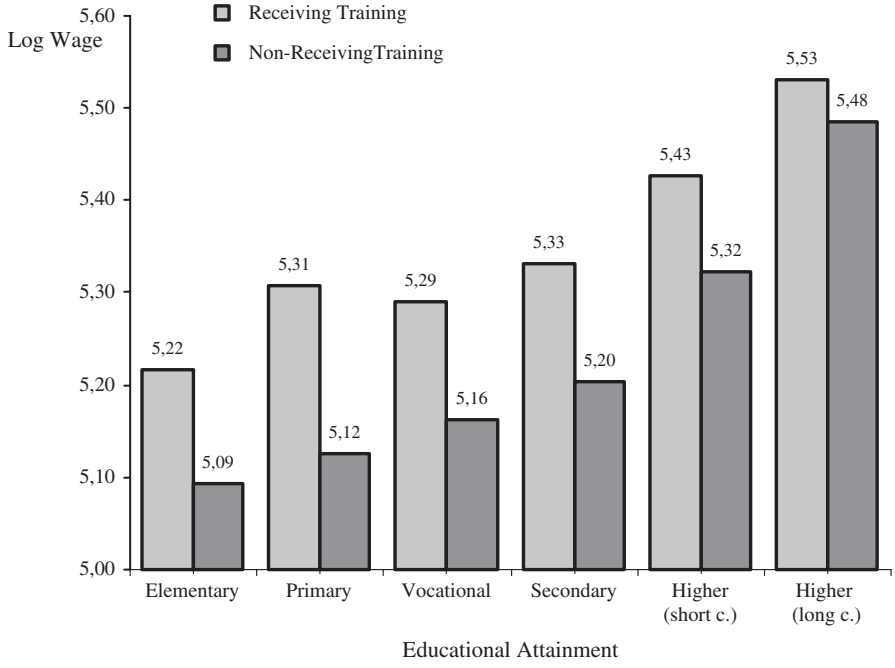

Fig. 1. Log wages of trained and non-trained workers by education level

wage distribution. Better-educated employees in high wage occupations and in industries with large establishments receive the most training paid by firms. Most Spanish non-college workers have very low training propensity, suggesting that this sample of workers without technical or university degrees have significant employment and wages disadvantages compared to those with degrees. Moreover, the data suggests that in Spain the original defects of the education system are not remedied by firms' investment in workplace training. The benefits of sponsored training programmes are conferred on employees who have already received the highest education investment before entering the job market. This pattern is exactly the opposite of that in Germany, where firm investments in apprenticeship training are heavily concentrated on the majority of German employees, who do not go on to college. As a consequence, the pattern of firm-sponsored training in Spain is largely determined by the actual system of education, which determines the access to training offered by firms.

The non-competitive training model is consistent with a number of economies with compressed wage structures. For example, this occurs in Germany; where apprenticeship programs provide industry-specific skills and firms have a greater incentive to train unskilled and low educated workers. The results indicate that, in Spain and in the USA, unskilled and less educated workers have similar training rates. Therefore, the data suggest that the highly compressed wage structure in Spain does not induce firms to pay for training on the two types of workers. When the Spanish firms pay for training, they offer sponsored training to the privileged, because highly educated workers are more productive. Nevertheless, several organizational factors have been ignored, and the analysis is not exhaustive. Thus, the training incidence differences may not only reflect differences in industry composition, but also differences in occupational characteristics of high and low education employees in Spain and the USA. However, the evidence for Spain indicates that high wage compression has a poor effect on the incentives for firms to invest in firm-sponsored training.

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