

## Firm-provided training and temporary contracts

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**Abstract.** This paper analyses the relationship between workers' type of contract and the probability of receiving firm-provided training. In particular, we raise the following question: do workers with temporary contracts face the same probability of receiving training as workers with permanent contracts, once we account for the fact that both types of workers have different probabilities of being employed in a firm providing training? The results from our empirical analysis using data from the Spanish labour market suggest that workers with temporary contracts not only are less likely to be employed in training firms but, once they are in those firms, they also have a lower probability of being chosen to participate in firm-provided training activities.

**JEL Classification:** J23, M53

**Key words:** Temporary contracts, firm-provided training

### 1 Introduction

From a policy perspective, workers' participation in training (independently of their labour status) is viewed as crucial for many different reasons. As it contributes to a country productivity growth, firm-provided training entails a key feature in

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improving economic performance. At the same time, it is considered a salient determinant of individual wages and labour productivity.

Similarly, the importance of training has been argued from different theoretical perspectives, although without explicitly addressing the relationship between firm-provided training and the use of temporary contracts. On the one hand, not only the credentialist theory (Arrow 1973) but also that of labour market segmentation (Doeringer and Piore 1971) point out that on-the-job training provides workers with the qualifications to make the proper performance of their job tasks easy. In addition, the theorists of segmentation also invokes on-the-job training as one of the main mechanisms in order to promote the creation of internal labour markets.

On the other hand, the human capital theory (Becker 1962) draws a basic distinction between general and specific training. One relevant issue is that of the financing either by employers or by workers, what depends more on the probability of making that investment profitable (something that is associated with workers' permanence in the firm) than on the features of the training itself. If a firm invests in training and the worker quits, the firm will not be able to reap the benefits of the investment. And if a worker invests in training with some specific content and he/she is laid off, the worker will suffer a capital loss and will not be able to recover the investment. For those reasons, firms and workers will try to establish mechanisms to reduce the probability of quitting/being laid off once they have carried out such an investment. Those mechanisms can imply the existence of either long-term employment relationships between firms and workers or whatever other sort of strategy in order to favour the stability of workers receiving on-the-job training<sup>1</sup>.

All that means that firms might consider that providing training to a worker in a temporary job does not turn out to be profitable since the probability of that worker remaining in the firm is low. But, at the same time, it is also possible that firms use temporary contracts in entry-level jobs (Alba 1998; Güell and Petrongolo 2000), so they may be interested in providing training to those workers for they to quickly obtain the necessary qualifications to properly perform their work and to be more flexible in performing tasks with frequent contingencies.

The number of empirical studies on training is large (see, for instance, Greenhalgh and Stewart 1987; Lynch 1990; Winkelmann 1994; Royalty 1996). Some of them have tried to determine the influence of certain job and firm characteristics, such as firm size or being working in industries with continuous technological change, and worker characteristics, such as gender and education, on firm-based training (Green 1983; Booth 1991; Altonji and Spletzer 1991).

However, there are few empirical works analysing the relationship between participation on firm-provided training and workers' type of contract. For the Spanish labour market, Alba (1994), using a firm-based survey for 1988, obtains that in the previous year nearly 60 % of large firms (those with more than 200 workers) provided training to at least one of their employees. In terms of workers, the proportion

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<sup>1</sup> In subsequent theoretical works, Acemoglu and Pischke (1998, 1999) predict that firms can have incentives to finance not only the specific training but also the general training of their workforce, when labour markets are imperfectly competitive and present a compressed wage structure. See also Katz and Ziderman (1990) and Stevens (1994) for theoretical studies based on asymmetric information or imperfect competition.

of total workers receiving firm-based training was 16 % . Regarding the type of contract, firms hiring a larger number of workers with training and apprenticeship contracts were also more likely to having provided their workers with training.

Alba and Tugores (2000), using data from the Spanish Labour Force Survey for the period 1987-1998, find that workers with training and apprenticeship contracts are more likely to receive training when compared to workers with other type of temporary contracts, the category of reference. In turn, the coefficient of having a permanent contract is not significantly different from zero<sup>2</sup>.

Oosterbeek (1996) analyses the determinants of workers' training probabilities with a 1992 household-based survey for the Dutch labour market. Interestingly, the author distinguishes two mechanisms affecting the participation on training: the probability that a worker is employed by a firm providing training and the probability that a worker receives training given that the individual works in a training firm. Regarding the type of contract, his results indicate that workers with permanent contracts have higher training probabilities than workers with temporary contracts. This is due to their higher probability to receive training if their employer provides any and not because they are more likely to be employed in firms offering training.

Finally, OECD (2002) tackles the issue of the growing share of temporary employment in a number of countries. One of the key features analysed in the study is whether the temporary workers have less access to training. Using a pooling sample from the European Community Household Panel (ECHP) for 12 European countries in 1997, the finding is that the effect of holding a temporary job is to reduce access to training, after controlling for various individual and job characteristics.

In this paper, we are able to extend the evidence on the relationship between firm-provided training and workers' type of contract for a labour market where the share of temporary employment is stubbornly high: currently (and even since the early 1990s), almost one out of three wage and salary workers has a temporary contract in Spain<sup>3</sup>. We stress that, although the Spanish labour market is the reference case in the analysis, some results may have a general scope. Furthermore, temporary employment has registered a strong rising trend in some other European countries becoming a significant feature in their labour market policy framework. For instance, in the Netherlands the share of temporary employment has grown from 7 % in 1985 to 14 % in 2000; during the same period, the share has increased from 14 % to 21 % in Portugal (see OECD, 2002).

One important issue is usually neglected in the studies on training (and on training and temporary employment as well), but this paper is able to face it. This issue refers to the fact that, when analysing workers participation on firm-provided training activities, it is a necessary condition that the firm in which the worker is enrolled carries out such activities (as noted by Alba 1994). In other words, there are

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<sup>2</sup> There is another study for the Spanish case (Peraita 2000) analysing the determinants of a worker to get firm-based training. But it does not investigate the effect of the type of contract on training since it uses the first wave of the European Community Household Panel which does not contain information on the type of contract.

<sup>3</sup> To examine the composition of temporary employment in Spain during the last two decades, see Dolado et al. (2002).

firms that provide training and firms that do not provide training to their workers. If we are interested in properly analysing workers participation on training, we have to take into account whether firms carry out firm-based training or not. If we do not account for that, we run the risk of getting biased results on the variables influencing the probability of receiving training.

This issue becomes more relevant when we focus our attention on the relationship between temporary contracts and training provided by firms. Such bias may appear if, for instance, workers with temporary contracts have a larger probability of being employed in firms which do not train their workers (maybe because they are small or work on specific industries). Therefore, taking into account that bias may indicate another source of potential under-representation of temporary workers into training, i.e., that coming from their larger presence in non-providing training firms. The database we use allow us to do that. As far as we know, only Oosterbeek (1996) has performed a similar analysis for the Dutch labour market.

To sum up, the aim of this study consists of trying to answer to the following questions. Given the fact that there are firms providing training and firms not providing training, do workers with temporary contracts face the same probability of being employed in firms providing training than workers with permanent contracts? And once workers with temporary contracts are employed in firms which carry out training activities, do they face the same probability of being chosen to perform firm-based training that their permanent counterparts? For that, we use a dataset providing information on the Spanish labour market: the “Working Conditions Survey-2001” (*Encuesta de Calidad de Vida en el Trabajo-2001* or ECVT). We also make use of other two Spanish data sources in order to underpin the analysis done with the ECVT.

The remainder of this paper is organised as follows. Section 2 presents the characteristics of the dataset to be used in the empirical analysis, describes how it measures training activities provided by firms to their workforce, and compares training incidence across different datasources. Section 3 documents workers participation on firm-based training, distinguishing between training and non-training firms and examining the relationship between firm-based training and temporary employment. Section 4 analyses that relationship in a multivariate setting, explicitly taking into account the probability for a worker of being employed in a firm providing training. Finally, Sect. 5 summarises the main conclusions.

## **2 The measurement of firm-provided training**

In this paper, we use a dataset providing information about firm-based training: the “Working Conditions Survey” (ECVT). The ECVT is a yearly survey first launched by the Spanish Ministry of Labour and Social Affairs in 1999 (we use the third edition of the survey, that referred to 2001). This is a nationally representative random sample survey of all employed individuals aged 16 years and above living in households (Ceuta and Melilla are excluded). Employment means having been working at least one hour during the reference week (that previous to the interview week). Sampling desing takes into account three variables: autonomous community (region), municipality size, and number of inhabitants in the census’s section.

Selection of employed individuals within the households (one per household) is purely random.

This survey contains information on two broad sets of variables. On the one hand, there are workers' individual and socio-demographic characteristics such as gender, age, marital status, number of children, and level of education. On the other hand, individuals also give information on the characteristics of the firm where he/she is working and the job he/she is performing: type of contract, sector, industry, occupation, firm size, working hours, and tenure<sup>4</sup>.

The ECVT also allows to know whether or not the firm in which the individual is working carries out training activities for their workforce and whether or not the individual has participated in those activities. Information about training comes from the following question in the questionnaire: "*During the last year, has the firm in which you work carried out some training activities for their workforce?*". In addition, those who answer to that question in the affirmative are interrogated about the frequency of participation on the activity courses carried out by the firm. All possible answers are the following: never, seldom, sometimes, often, and always.

The questionnaire does not include additional questions to distinguish between formal and informal on-the-job training. What can be assumed from the above-mentioned questions is that they seem to refer to formal training activities. However, there are other features of the training activities which remain less clear. Are they financed either by the firm or by the worker? Are they provided either on the premises or off the premises? Are they really firm-provided or contracted-out to some outside training company? As it is impossible to give an answer to all these questions, we will use "firm-based" and "firm-provided" training as interchangeable terms henceforth.

Using the information on training contained in the ECVT, we can define two variables:

- one indicating whether the firm in which the individual works either trains or does not train their workers (it is constructed using answers to the first question above: yes/no);
- another one indicating whether or not the individual participates on firm-based training (it is constructed combining answers to both questions above); this variable takes on three values: one, if he/she answered 'no' to the first question; two, if he/she answered 'yes' to the first question and 'never' to the second one;

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<sup>4</sup> Regarding the type of contract, we distinguish three categories: permanent contracts, training and apprenticeship contracts, and other type of temporary contracts –mainly, fixed-term contracts. Information on industry has been grouped into eleven categories. In particular, the service sector has been divided into five subsectors: traditional services (wholesale and retail trade, hotels and restaurants, and transports); production services (communications, financial intermediation, real state, renting and business activities); social services (education, health and social work); personal services (recreational, cultural and personal services); and public services (public administration, defence, compulsory social security and public sewage). Finally, occupations have been grouped into four categories according to the type of tasks and qualifications the job requires to properly perform it: white collar high skilled workers (professionals, technicians and managers); white collar low skilled workers (clerks and commerce, sales and services workers); blue collar high skilled workers (agriculture, construction and industry specialized workers); and blue collar low skilled workers (labourers).

and three, if he/she answered ‘yes’ to the first question and otherwise to the second one<sup>5</sup>.

The original ECVT-2001 sample consists of 5,998 employed individuals, of which 4,683 are wage and salary workers. We have dropped those individuals who do not know how is their type of contract, those individuals who do not know whether or not the firm in which they are working carried out firm-based training, and in general those individuals with missing information on basic variables used later in the empirical section. The information we use in this paper is therefore related to 4,183 wage and salary workers.

Table 1 provides the training incidence measured according to the ECVT for different individual and job characteristics. On the whole, 33 % of total wage and salary workers have participated in firm-based training activities during the last twelve months. The training incidence is similar between men and women, and is larger for workers having a permanent contract or working in the public sector than for workers having a temporary contract or working in the private sector. It also increases with workers’ educational attainment and tenure with current employer, and with firm size. In addition, there is a sort of inverse U relationship between incidence rates and age: the incidence grows with age until 44-54 years and then falls. Given that workers tenured less than one year may potentially underestimate training activities taken place in their current firms for the last year, we have also computed training incidence for the sample excluding those workers. As can be seen, total training incidence grows to 36.5 % . But the main findings regarding gender, education, tenure and firm size still hold.

How reliable is the information about firm-based training stemming from the ECVT? One way to check its reliability is to compare training incidence measured by different data sources. The natural database to use in this context is the Spanish “Labour Force Survey” (LFS), whose questionnaire has a good coverage of socio-economic characteristics dealing with economic activity, employment, education and the like, and contains several questions concerning training. In particular, it is possible to construct a dichotomous variable using two of those questions. This variable will take on value one if individuals answer “yes” when they are asked whether they have followed any type of study or training *during the last four weeks* and, at the same time, they say that training has been received either in a firm or using a mixed system (going to a classroom and apprenticeship in a firm). We have used the LFS selecting a sample of wage and salary workers who have been interviewed in the second quarter of years 2000, 2001 or 2002. Then, we have pooled all observations across these years.

According to the Spanish LFS and using the aforementioned definition of training, the monthly aggregate firm-based training incidence is 0.3 % (see Table 1)<sup>6</sup>. In spite of the large difference between training rates, it is noteworthy that some of the findings encountered using the ECVT still hold with the LFS (the training

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<sup>5</sup> Training incidence does not vary too much if we include those who answer ‘seldom’ as non-trained workers.

<sup>6</sup> This figure coincides with that obtained by Alba and Tugores (2000) who use pooled observations from the LFS for the period 1987–1998.

**Table 1.** Incidence rates of training according to different Spanish datasources

	ECVT (2001)		LFS (2000–2002)		ECHP (1998–2000)	
	All workers	Tenure $\geq 1$ year	All workers	Tenure $\geq 1$ year	All workers	Tenure $\geq 1$ year
Total	33.2	36.5	0.3	0.2	10.0	12.0
Gender						
Men	33.1	36.9	0.3	0.2	9.2	11.1
Women	33.4	35.8	0.4	0.3	11.4	13.8
Age group						
16–24	20.8	24.8	0.7	0.5	2.9	3.1
25–29	28.4	33.1	0.5	0.4	9.4	11.5
30–44	36.8	39.4	0.2	0.2	11.4	13.3
44–54	38.2	39.6	0.1	0.2	12.7	14.0
55–64	33.3	31.8	0.1	0.1	7.2	7.9
Educational level						
Compulsory	19.6	21.1	0.2	0.1	4.2	5.3
Secondary	36.0	40.3	0.4	0.3	11.0	13.5
University degree	54.4	58.6	0.6	0.5	17.0	19.0
Type of contract						
Permanent	40.6	40.5	0.2	0.2	12.8	13.1
Temporary	16.5	21.9	0.5	0.6	4.6	7.1
Tenure						
< 1 year	12.9	–	0.5	–	3.6	–
1–3 years	25.0	25.0	0.3	0.3	7.1	7.1
4–6 years	30.3	30.3	0.2	0.2	9.7	9.7
7–10 years	42.5	42.5	0.2	0.2	13.3	13.3
11–20 years	46.8	46.8	0.2	0.2	18.7	18.7
>20 years	47.0	47.0	0.2	0.2	15.1	15.1
Sector						
Public	60.3	61.4	0.7	0.5	19.0	20.3
Private	26.1	28.9	0.2	0.2	7.5	9.2
Firm size <sup>a</sup>						
Less than 10 workers	13.9	15.4	0.2	0.1	4.6	5.5
From 10 to 25 workers	22.6	24.4	0.2	0.1	5.9	7.9
From 26 to 49 workers	33.1	35.5	0.3	0.3	10.0	12.0
From 50 to 99 workers	33.4	40.0	0.4	0.4	12.4	14.3
From 99 to 249 workers	41.6	43.8	–	–	14.6	17.0
From 250 to 499 workers	46.7	52.2	–	–	–	–
From 500 to 999 workers	60.4	60.2	–	–	17.2	18.2
1000 or more workers	64.8	66.7	0.2	0.1	–	–
Observations	4,183	3,587	153,486	105,363	11,855	8,970

Note: <sup>a</sup> The firm size categories are not comparable across datasets. For the LFS, they are: less than 10, 10–19, 20–49, and 50 or more. For the ECHP, they are: 1–4, 5–19, 20–49, 50–99, 100–499, and 500 or more.

incidence is not very different between male and female workers and increases with workers' educational attainment and with firm size). However, other are reversed, in particular that concerning the type of contract: temporary workers present larger training incidence than permanent workers.

In order to further compare training measures coming from the ECVT, Table 1 also provides information from a different datasource: the European Community Household Panel (ECHP). The ECHP is a large-scale international panel survey collected annually since 1994 and designed to provide fully comparable information on the economic and life conditions of the European population. The survey is targeted at private households, collecting information on several socio-demographic issues. Seven waves are already available (1994 to 2000) in fourteen European countries by Eurostat. The questionnaire contains several questions about training activities carried out by individuals. In particular, two of them are useful for our purposes: "Have you been in vocational education or training *since January last year?*" and "Was that course either paid for or organized by the employer?". As we wish to construct a variable as comparable as possible with that from the ECVT, if the individual answers in the affirmative to both questions, then we will consider that he/she has received firm-based training. We have made use of the last three waves of the ECHP selecting a sample of Spanish wage and salary individuals working at least 15 hours per week who have been interviewed in years 1998, 1999 or 2000<sup>7</sup>.

The training incidence according to the ECHP amounts to 10 % . It increases with workers' educational attainment and with firm size. The training rates are larger for women and for those working in the public sector. Interestingly, they are also higher for workers having a permanent contract than for workers having a temporary contract, coinciding with the results from the ECVT.

To sum up, the levels of training incidence differ across datasets. This might be due to distinct reasons. One is the reference period; for instance, in the case of the LFS it can be argued that four weeks is not long enough to properly pick up training activities, especially if these are in general of short duration. Another reason can be linked to the way the information is elicited from individuals: the LFS is a survey directed to households and it is only one person (the "informer") who provides information regarding all members of the household; this is clearly a potential source of infraestimation for the training activities of the employed people if they are not the household informers. Finally, the samples used to calculate training incidences differ, especially in the case of the ECHP. In spite of all those differences, however, in general the relationships between training and personal and job characteristics (gender, educational level, sector or firm size) are quite similar (and this conclusion also holds when we exclude employees with less than one year of tenure). The most marked distinction is that, while the ECVT and the ECHP provide evidence that

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<sup>7</sup> The restriction of working at least 15 hours per week is necessary since it is impossible to distinguish those individuals regularly working fewer than 15 hours from those out-of-the labour force.

temporary workers receive less training than permanent workers, for the LFS the opposite is true<sup>8</sup>.

### 3 Documentation of workers' participation in training using the ECVT

As commented in the introduction, all previous studies (save for Oosterbeek 1996) analysing the determinants of training using micro data on individual workers only had information on whether the individual has been trained or not, independently of the training status of the firm he/she is working for (in the Spanish case, neither the LFS nor the ECHP allow the distinction between both sources of participation in training). However, this distinction might be important for policy purposes. Therefore, if we wish to analyse workers' participation in firm-provided training, a previous necessary condition is that firms carry out training. In other words, given the fact that there are firms that train and firms that do not train to their workers, there are two steps to follow for a worker to receive training from the firm where he/she is working: first, the worker must be employed in a firm providing training activities; and second, once the worker is employed in that firm, he/she must be chosen to participate in those activities.

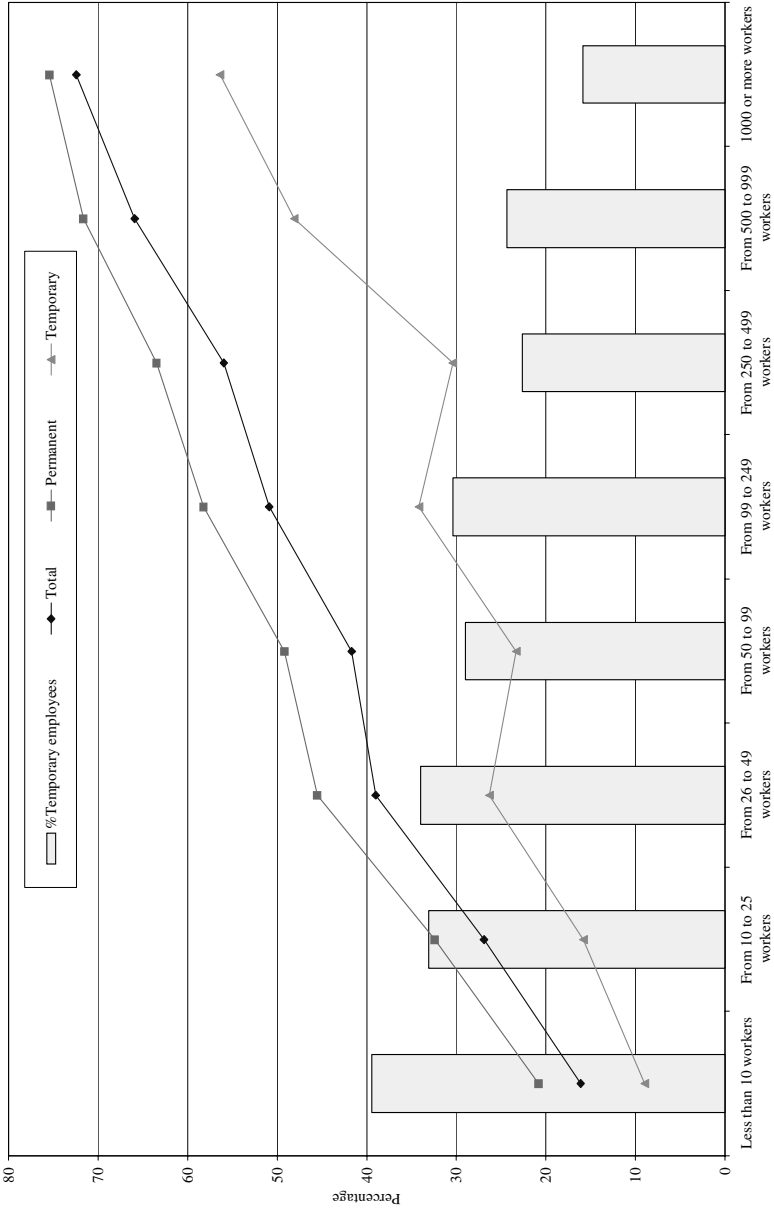
The first piece of information to be considered in relation to firm-based training is that of whether or not the firm in which the worker is employed has carried out training activities during the last year (see Table A.1 in the Appendix for the sample distributions and the characteristics of workers and firms depending on their "training status" according to the ECVT). The proportion of all wage and salary workers employed in training firms is 39 %. But this figure varies dramatically depending upon workers' type of contract: while 46 % of all wage and salary workers with permanent contracts are employed in firms that carried out training activities, that figure is only 22 % for those workers with temporary contracts.

This differential seems to point out that temporary workers are employed in non-training firms to a larger extent than permanent workers. For temporary workers, this is a first source to face lower opportunities to receive firm-based training. Then, which are the characteristics of these firms not providing training to their workforce?

Although the ECVT is a survey collecting information from employed individuals, it is possible to inquire into some firms' characteristics such as size, institutional sector, and industry. Figure 1 display information on the proportion of workers employed in firms that carried out training activities by firm size and differentiated for workers with permanent and temporary contracts. It also shows the proportion of temporary employees over total employees.

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<sup>8</sup> All these surveys are worker-based surveys, i.e. those who offer information on training activities are the employed individuals. Information can also come from firm-based surveys. According to the second "Continuing Vocational Training Survey" (CVTS2) conducted in 2000/2001 in UE members, Norway and nine candidate members, the proportion of total Spanish employees (excluding firms with less than 10 workers) participating in firm-provided training is about 25 %. On the disparity between workers and employers in the answers to identical questions about firm-provided training, see Barron et al. (1997).



**Fig. 1.** Proportion of workers in firms which carried out firm-provided training and proportion of temporary employees over total employees by type of contract and firm size. Spain, ECVT- 2001

**Table 2.** Proportion of temporary employees over total employees by type of firm (providing/not providing training) and various firm characteristics. Spain, ECVT-2001

	Total firms	Non training firms (a)	Training firms (b)	Difference (a) – (b)
Total	30.8	39.4	17.2	22.2
Sector				
Public	17.3	22.8	14.7	8.1
Private	34.4	41.5	18.6	22.9
Firm size				
Less than 10 workers	39.4	42.8	21.9	20.9
From 10 to 25 workers	33.1	38.1	19.4	18.7
From 26 to 49 workers	34.0	41.1	22.9	18.1
From 50 to 99 workers	29.0	38.1	16.2	21.9
From 99 to 249 workers	30.4	40.8	20.4	20.4
From 250 to 499 workers	22.7	35.8	12.3	23.5
From 500 to 999 workers	24.3	37.1	17.7	19.3
1,000 or more workers	15.8	25.1	12.3	12.7
Industry				
Agriculture	63.8	67.6	21.3	46.3
Construction	51.3	55.7	29.6	26.0
Mining and energy	22.0	36.9	15.0	21.9
Chemicals, rubber, plastic	19.3	26.3	9.9	16.5
Machinery and equipment	21.5	30.0	13.7	16.2
Food, textiles and wood	23.2	28.8	10.2	18.6
Traditional services	34.0	38.3	22.6	15.7
Production services	25.9	33.3	19.2	14.1
Social services	21.0	26.2	17.5	8.7
Personal services	49.7	56.4	13.7	42.7
Public services	15.2	20.9	12.3	8.6

Figure 1 suggests that the proportion of workers in firms performing firm-based training grows with firm size, independently of the type of contract. Moreover, whatever the size there is a larger proportion of permanent workers employed in firms performing training when compared to temporary workers. On the one hand, of all workers with permanent contract employed in the smallest firms, over 21 % is employed in firms that carried out training, being that proportion less than 10 % for those workers with temporary contract. On the other hand, of all workers with permanent contract employed in the biggest firms, 75 % is employed in firms that carried out training, being that proportion 56 % for those workers with temporary contract.

Therefore, the distance between temporary and permanent workers as for their presence in firms performing training activities grows with firm size. If we add that the smaller is the firm the more likely is for a worker to have a temporary contract (see the columns in the figure), the conclusion might be that workers with temporary contracts have less probabilities of being employed in firms providing training to their workforce.

Regarding the institutional sector (figures not shown here), the proportion of total workers employed in firms which carried out training is much larger in public-

**Table 3.** Proportion of workers who participated in training over total workers (“total incidence”) and over workers employed in training firms (“conditional incidence”). Spain, ECVT-2001

	Over total workers			Over workers employed in training firms		
	Total workers	Permanent workers	Temporary workers	Total workers	Permanent workers	Temporary workers
Total	33.2	40.6	16.5	85.9	87.8	76.7
Gender						
Men	33.1	40.9	13.3	85.5	87.3	73.8
Women	33.4	40.2	20.8	86.4	88.6	79.4
Age group						
16–24	20.8	26.8	17.1	84.3	85.4	83.2
25–29	28.4	35.3	19.9	85.9	89.1	79.5
30–44	36.8	44.3	14.7	85.9	88.9	66.2
44–54	38.2	42.9	15.9	88.1	87.4	96.8
55–64	33.3	36.5	–	82.3	83.2	–
Education						
Compulsory	19.6	25.0	10.1	79.1	80.4	74.0
Secondary	36.0	43.8	18.2	85.7	88.6	72.9
University degree	54.4	60.1	33.5	91.1	92.3	83.9
Tenure						
< 1 year	12.9	27.8	9.1	77.9	80.1	76.3
1–3 years	25.0	28.7	20.8	82.8	85.9	78.2
4–6 years	30.3	33.4	18.2	85.9	89.0	69.0
7–10 years	42.5	44.6	27.3	89.5	91.9	68.7
11–20 years	46.8	48.5	27.8	89.3	89.7	82.0
> 20 years	47.0	47.9	–	85.4	85.3	–

owned firms and institutions (67 per cent) than in private firms (31 per cent), something that is inversely correlated with the proportion of temporary employees in each sector. When we consider the type of contract, that difference remains. As for industry, we also detect an inverse relationship between the proportion of workers employed in firms that carried out training activities and the proportion of temporary employees over total employees. In other words, workers with temporary contracts are more likely to be employed in industries where firms are not much engaged in providing training to their workforce (agriculture, construction and personal services). In general, the distance between permanent and temporary workers is shorter in the services (save for personal services) than in the manufacturing.

As a further piece of evidence, we present Table 2. It gives the proportion of temporary employees by type of firm (those providing training and those not providing it). As can be seen, there is a huge difference between training firms (17 %) and non-training firms (39 %). Moreover, whatever the firm characteristic considered (size, industry, institutional sector), the group of firms not providing training exhibits the highest share of temporary employees over total employees.

Therefore, the information so far presented suggests that workers with temporary contracts are less likely to be employed in firms providing training. The next step to be investigated would be whether they have the same opportunities than the permanent workers to be chosen to participate in training activities, once they

are employed in firms providing such training. Table 3 portrays some information on this issue. The first three columns provide the proportion of workers who participate in training activities over total workers distinguishing between permanent and temporary workers. This proportion is the “total incidence” of training. One out of three workers has participated in some degree in training activities carried out by firms during the previous twelve months in the Spanish labour market. For permanent workers that proportion raises to 41 % , while for temporary workers it diminishes to 17 % .

Considering various characteristics, there are no differences by gender but the incidence increases with age (although there is a reduction for older workers), with tenure and with educational level. The same is true for permanent workers but not for temporary workers (women exhibit a larger training incidence than men, and there is no clear relationship between age and incidence).

The following three columns provide the proportion of workers who participate in training activities over workers employed in training firms distinguishing between permanent and temporary workers. We can call that proportion the “conditional incidence” of training. As can be seen, 86 % of workers employed in firms that carried out training activities has participated in such activities during the previous year. That proportion is a bit higher for permanent workers and lower for temporary workers. Similar considerations to those commented for total incidence relating to differences by characteristics can be done here.

Therefore, previous information suggests that once a worker is employed in a firm providing training there are some individual characteristics (including the type of contract) that make him/her more or less likely to be chosen to perform firm-based training.

#### **4 Multivariate analysis**

In order to investigate deep further the issue of workers participation in firm-based training, it seems obvious that we have to take into account that the individual characteristics of workers and the individual characteristics of jobs and firms are interrelated. Thus, it is necessary to estimate a multivariate model. In particular, in this section we have estimated a univariate probit model and a bivariate probit model using data from the ECVT. The first one estimates the unconditional probability of a worker to having received training; the second one estimates the conditional probability of a worker to having received training given that he/she is working in a training firm.

We proceed in that way since we have two binary dependent variables: whether the worker is enrolled in a training firm; and whether the worker has participated in a training activity. But one of these variables is censored since we do not observe whether an employee in a non-training firm would have participated in training activities if he/she had worked in a training firm.

For that purpose, we estimate by maximum-likelihood a bivariate probit where we use Heckman’s (1979) specification for taking into account the sample selection bias due to the existence of a censored variable (the so called “heckprobit” model).

**Table 4.** Estimates of the univariate probit and heckprobit models on the probability of a worker having participated in firm-provided training. Spain, ECVT-2001

	Univariate probit			Bivariate probit					
				Probability of being employed in a training firm		Probability of being chosen to participate in training			
	Coef.	z	Sig.	Coef.	z	Sig.	Coef.	z	Sig.
Constant	-1.44	-5.70	**	-1.57	-8.11	**	-0.25	-0.31	
<i>Type of contract (permanent)</i>									
Training and apprenticeship contract	0.08	0.49					-0.26	-1.22	
Fixed-term contract	-0.29	-4.26	**				-0.23	-2.30	*
<i>Firm size (less than 10 workers)</i>									
From 10–25 workers	0.24	3.10	**	0.28	3.99	**	0.06	0.45	
From 26–49 workers	0.58	6.88	**	0.63	8.05	**	0.35	2.07	*
From 50–99 workers	0.60	6.73	**	0.72	8.67	**	0.28	1.33	
From 99–249 workers	0.79	8.71	**	0.87	10.36	**	0.49	2.43	*
From 250–499 workers	0.89	8.24	**	1.07	10.39	**	0.58	2.37	*
From 500–999 workers	1.01	8.75	**	1.06	9.53	**	0.72	3.21	**
1,000 or more workers	0.96	11.84	**	1.18	15.35	**	0.71	3.12	**
<i>Industry (agriculture)</i>									
Construction	0.17	0.85		0.34	1.94		-0.34	-0.71	
Mining and energy	0.85	3.49	**	1.32	5.58	**	0.36	0.64	
Chemicals, rubber and plastic	0.44	2.23	*	0.83	4.53	**	0.04	0.07	
Machinery and equipment	0.59	2.84	**	1.04	5.36	**	0.16	0.31	
Food, textiles and wood	0.22	1.12		0.55	3.15	**	-0.21	-0.44	
Traditional services	0.37	1.95		0.70	4.14	**	0.05	0.10	
Productive services	0.67	3.50	**	1.15	6.59	**	0.37	0.73	
Social services	0.64	3.22	**	1.09	6.16	**	0.52	1.08	
Personal services	0.25	1.15		0.39	1.98	*	0.08	0.16	
Public services	0.60	2.90	**	1.01	5.27	**	0.32	0.65	
<i>Institutional sector (public)</i>									
Private	-0.11	-1.35		-0.36	-4.41	**	-0.08	-0.58	
<i>Tenure (&lt; 1 year)</i>									
1–3 years	0.41	4.53	**				0.23	1.71	
4–6 years	0.48	4.42	**				0.25	1.63	
7–10 years	0.65	5.64	**				0.41	2.29	*
11–20 years	0.59	5.61	**				0.29	1.91	
> 20 years	0.54	4.71	**				0.14	0.89	
<i>Working time (full-time)</i>									
Part-time	-0.18	-2.07	*				-0.12	-0.99	
<i>Occupation (white collar high skilled)</i>									
White collar low skilled	-0.19	-2.60	**				-0.23	-2.12	*
Blue collar high skilled	-0.52	-5.78	**				-0.35	-2.51	*
Blue collar low skilled	-0.59	-7.51	**				-0.45	-2.98	**
<i>Gender (Men)</i>									
Women	-0.16	-2.90	**				-0.13	-1.68	
<i>Education (compulsory)</i>									
Secondary	0.18	2.92	**				0.13	1.58	
University degree	0.22	2.73	**				0.08	0.79	
<i>Age (16–24 years)</i>									
25–29 years	-0.07	-0.68					-0.11	-0.82	
30–44 years	-0.07	-0.81					-0.16	-1.19	
45–54 years	-0.08	-0.74					-0.04	-0.27	
55–64 years	-0.28	-2.31	*				-0.26	-1.43	
$\rho$				0.79					
Log-likelihood	-2,016.9			-2,851.1					
Observations	4,183			4,183			1,624		

*Notes:*

Controls for regions (17) were also included in the estimations. Asterisks indicate significance at 1 (\*\*) and 5 (\*) %, respectively. LR test of independence ( $\rho=0$ ):  $\chi^2(1)=3.88$ ; Prob>  $\chi^2=0.049$ .

It has been developed as follows. In the first equation, we have:

$$T = \begin{cases} 1 & \text{if the worker is enrolled in a training firm} \\ 0 & \text{if the worker is not enrolled in a training firm} \end{cases}$$

$$\text{Prob}(T = 1) = \text{Prob}(z\gamma + v > 0) \quad (1)$$

Where  $T$  is the probability of being enrolled in a training firm,  $z$  are the control variables (firm size, institutional sector and industry) and  $v$  the standard error term. We have not included individual worker characteristics since we think that in this first step only firm characteristics have an influence on the decision of a firm to whether provide their workforce with training or not. Among those variables, we ideally should include information on the type of firm's workforce (proportion of skilled/unskilled jobs, proportion of workers with long/short tenure, proportion of workers with permanent/temporary contracts, and so on) but we lack that information<sup>9</sup>.

In the second equation,  $I$  is the probability of being selected to participate in training courses, given that the firm provides with training.  $I$  is a censored variable since we can only observe that a worker participates in a training course if he/she is hired in a firm with training activities.  $x$  refers to control variables including previous firm characteristics, worker's type of contract, gender, age, educational level, region of residence, tenure, working time, and occupational group.  $u$  is the error term.

$$I = \begin{cases} 1 & \text{if the worker is being selected to participate in training courses} \\ 0 & \text{if the worker is not being selected to participate in training courses} \end{cases}$$

$$\text{Prob}(I = 1) = \text{Prob}(x\beta + u > 0) \quad (2)$$

In the heckprobit model, equations (1) and (2) are jointly estimated by maximum likelihood to get unbiased estimates tacking into account the selection bias. Univariate probit estimates will give unbiased estimates just when  $u$  and  $v$  are uncorrelated. So, a test about the significance of  $\rho$ , the correlation between both error terms, will give us a simple test for the need of this bivariate estimation.

Table 4 portrays the estimates of the univariate and the bivariate probit models (univariate probits have also been estimated using data from the LFS and the ECHP including the same set of variables as a means of comparison; see results in Table A.2 in the Appendix)<sup>10</sup>.

In the case of the univariate probit, nearly all variables included in the estimation are significant. Coinciding with the raw data (see Table A.1), the probability of a worker to participate in firm-provided training increases with firm size and is higher in some economic sectors (mining and energy, and machinery and equipment, on the one hand, and productive, social and public services, on the other hand). Moreover,

<sup>9</sup> For a different view see Oosterbeek (1996), who not only includes firm characteristics but also individual worker characteristics (such as the type of contract).

<sup>10</sup> In the univariate probit model (which estimates the probability of having received training, irrespective of the training status of the firm), all previous personal and job characteristics have been included.

workers with higher educational level and in non-manual high skilled jobs are more likely to receive firm-provided training<sup>11</sup>.

Regarding the type of contract, workers holding training and apprenticeship contracts face the same probability than workers holding permanent contracts (the reference category) to be chosen to participate in firm-based training. Yet, workers with other type of temporary contract (fixed-term contracts) have a statistically significant lower probability to participate in training. In particular, workers with other type of temporary contract are a 9 % less likely to participate in training activities in comparison with permanent workers. This result agrees with those obtained using data from the ECHP (see OECD (2002), with the fourth wave –year 1997–, and our Table A.2 in the Appendix, with the latest waves –1998, 1999 and 2000–). However, estimates from the LFS show that temporary workers (either holding training and apprenticeship contracts or other type of temporary contracts) are more likely to participate in training activities. We stress that all these results hold when we use a subsample of workers with tenure of one year or more<sup>12</sup>.

Results from the bivariate probit model suggest that dividing the probability of a worker to participate in training activities into the probability of being employed in a training firm and the probability of being chosen to participate in training activities is relevant. On the one hand, variables approximating demand side factors (such as size, industry, and institutional sector) become even more significant to account for the probability of being employed in firms carrying out training.

On the other hand, these variables (especially, the latter two) are less important in order to explain the probability of a worker to participate in firm-based training activities, given that the firm where he/she is working is a training firm (although a direct relationship between size and that probability remains). Then, the relevant variables are those related to the type of tasks that the worker performs. According to this, the probability of a worker participating in firm-based training is larger if the job is associated to non-manual tasks (white collar jobs) and to the use of specialized skills (high skilled jobs). In other works, the probability of receiving training increases when considering jobs with higher skill requirements, for which firm's control is lower (more difficult), and the associated costs to worker's shirking are higher. This result is similar to that obtained in other studies (for instance, Altonji and Spletzer 1991).

As for the type of contract variable, results are similar to those obtained with the univariate probit. Workers with training and apprenticeship contracts face the same probability than workers with permanent contracts to be chosen to participate in firm-based training, once they are employed in firms carrying out training (in this case, the coefficient is negative but not significant). And workers with other type of temporary contracts (fixed-term contracts) are significantly less likely to participate in training, once they are employed in firms providing training<sup>13</sup>.

<sup>11</sup> This is in line with results from Alba (1994) who, using employer-provided data, obtains that more capital-intensive, foreign-owned firms and those with larger proportions of workers in higher occupational categories are the most likely to provide training.

<sup>12</sup> Estimates are available from the authors on request.

<sup>13</sup> Including the type of contract in the first equation of the bivariate probit model generates a coefficient of the category "fixed-term contracts" being negative and significant, and a coefficient of the category

Other individual characteristics (such as gender, age or educational level) do not influence significantly the probability of receiving training, once the worker is employed in a training firm. Some tenure categories are almost statistically significant (at 5 per cent), suggesting that the probability of being trained increases somewhat with tenure (until 10 years), but not clearly. This result might be due to likely correlation between tenure and age. However, when the censoring of the dependent variable is not considered (in the univariate probit), educational level and tenure (and even gender) are significant at the conventional levels, suggesting that the probability of a worker being trained increases with education and tenure. This indicates that the effect of both variables would be overstated without taking account of the censoring.

Finally, the LR test of independence of equations implies that at the conventional level we can reject the hypothesis that both equations are independent. This means that both features determining whether a worker receives training do not operate independently. Contrary to the result obtained by Oosterbeek (1996), it indicates that using a subsample of employees of training-providing firms does not provide with unbiased estimates of the training probabilities.

To sum up, results derived from the multivariate analysis suggest that, if temporary employment imposes costs in relation to training, in the case of Spain they appear first to be associated to productive structure features that explain why firms not providing training to their workforce are more prone to use temporary contracts to hire workers. Moreover, once workers are employed in firms that train their workforce, those workers holding temporary (fixed-term) contracts are less likely to have access to training activities, when a set of worker, firm and job characteristics is controlled for.

## 5 Conclusions

Which type of relationship exists between temporary contracts and participation in training activities organised by firms? Do the use of temporary contracts refrain firms from providing firm-based training to some of their workers? Are those firms with a larger share of temporary workers less prone to provide any training at all? These are the questions we have sought to address in this paper using information for the Spanish labour market coming from the “Working Conditions Survey-2001” (ECVT). We think these questions are important to analyse since in Spain the proportion of temporary employees remains very high since the early 1990s (one out of three wage and salary workers holds a temporary contract).

Some of our results have turned out to be similar to those obtained in other studies. For instance, it is well established that those workers in jobs with higher skill requirements are more likely to receive firm-based training. Yet, our more interesting results have to do with the type of contract variable. They indicate that workers with temporary (fixed-term) contracts are less likely to receive firm-based training (this is in line with findings using the ECHP, although the LFS does not

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“training and apprenticeship contracts” being non significant. This means that in general temporary workers are less likely to be employed in training firms.

provide the same evidence). These results hold when excluding from the analysis those workers with tenure of less than one year.

Paper's novelty lies in that we have been able to distinguish (thanks to the database we use, the ECVT) two sources for that lower participation in training. First, workers holding temporary contracts are less likely to be employed in firms providing training: the share of temporary employees over total employees is larger in firms that do not train their workforce than in firms that do train it. Non-training firms are characterised by being smaller than training firms and located in certain industries. Second, once workers are employed in firms providing firm-based training, having a temporary (fixed-term) contract also reduces the probability of being chosen to participate in training activities, once other worker, job and firm characteristics are controlled for.

These results make us think that the first negative influence of temporary employment on training is related to the final reason that explains: (i) why there are firms that train and firms that do not train; and (ii) why non-training firms are more prone to use temporary contracts.

We can interpret the observation that there are firms providing training and firms not providing training in terms of the firm model of profit maximization, as suggested by Alba (1994). Thus, it might be possible that in non-training firms the average output per worker is not responsive to expenditures in training. Or maybe it is cheaper for them to hire trained workers than to train their own workforce. Or informal on-the-job training may be a better substitute for formal training<sup>14</sup>.

In addition, the fact that non-training firms are more prone to use temporary contracts is likely to be associated to productive features such as their job structure and the technology they use (and also to their location in the international division of labour and the way they compete for in the product markets). In this sense, OECD (1991) points out that those industries with lower training incidence are associated with a low degree of technological progress and/or a high proportion of small and medium-sized firms.

To sum up, the decision for providing or not providing training seems to respond to a firm "strategy" which is related to the job structure and the form of competition chosen by the firm. In this sense, the use of temporary contracts can be viewed as other element to contribute to that strategy.

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<sup>14</sup> In this sense, information from the Spanish "Continuing Vocational Training Survey" (CVTS2) illustrate the reasons why non-training firms do not provide training to their workforce (firms can give more than one reason): 80 % because their employees' qualifications agree with firms' requirements, 25 % because they hire workers with the required training, and 26 % because the initial training is sufficient.

## Appendix

**Table A.1.** Descriptive statistics: workers in non-training firms, workers in training firms, non-trained workers and trained workers. Spain, ECVT- 2001

	All workers		Workers in training firms	
	Workers in non-training firms	Workers in training firms	Non-trained workers	Trained workers
No. observations	2,559	1,624	249	1,375
Distribution	61.2	38.8	15.3	84.7
Type of contract				
Permanent contract	61.7	83.1	72.7	84.9
Training/apprentice. contract	2.2	2.0	3.2	1.8
Fixed-term contract	36.1	14.9	24.1	13.2
Firm size				
Less than 10 workers	40.4	11.8	11.2	11.9
From 10 to 25 workers	21.1	11.8	13.3	11.6
From 26 to 49 workers	11.0	11.0	10.8	11.0
From 50 to 99 workers	8.2	10.3	13.3	9.7
From 99 to 249 workers	6.9	11.0	12.9	10.7
From 250 to 499 workers	3.3	7.7	9.6	7.3
From 500 to 999 workers	2.5	7.1	5.6	7.4
1,000 or more workers	6.6	29.2	23.3	30.3
Industry				
Agriculture	5.4	0.7	0.4	0.8
Construction	16.3	4.9	8.4	4.3
Mining and energy	0.8	3.0	4.0	2.8
Chemicals, rubber and plastic	5.9	7.0	10.0	6.5
Machinery and equipment	2.8	5.7	6.8	5.5
Food, textiles and wood	11.8	7.6	12.9	6.6
Traditional services	26.8	16.1	18.5	15.6
Productive services	8.7	15.3	12.0	15.9
Social services	9.9	24.2	13.3	26.2
Personal services	7.1	2.1	1.6	2.2
Public services	4.4	13.4	12.0	13.7
Sector				
Public	11.2	37.1	29.3	38.5
Private	88.8	62.9	70.7	61.5
Tenure				
< 1 year	19.7	5.6	10.0	4.8
1–3 years	32.1	22.8	26.5	22.2
4–6 years	12.2	10.7	10.0	10.8
7–10 years	8.1	11.3	7.6	11.9
11–20 years	15.6	27.2	22.1	28.1
> 20 years	12.3	22.5	23.7	22.3
Working time				
Full-time	87.3	93.7	91.2	94.1
Part-time	12.7	6.3	8.8	5.9

Occupation				
White collar high skilled	19.3	48.4	26.5	52.4
White collar low skilled	22.7	22.0	22.5	21.9
Blue collar high skilled	23.7	11.5	17.3	10.4
Blue collar low skilled	34.2	18.2	33.7	15.3
Gender				
Men	62.3	63.5	63.1	63.6
Women	37.7	36.5	36.9	36.4
Educational level				
Compulsory	55.8	28.4	44.2	25.5
Secondary	28.9	33.7	31.3	34.2
University degree	15.3	37.9	24.5	40.3
Age group				
16–24 years	14.3	7.0	7.6	6.9
25–29 years	16.4	13.2	14.1	13.1
30–44 years	41.6	48.7	47.4	48.9
45–54 years	18.6	22.0	19.7	22.5
55–64 years	9.2	9.0	11.2	8.6

**Table A.2.** Estimates of the univariate probit on the probability of a worker having participated in firm-provided training. Spain, LFS 2000–2002 and ECHP 1998–2000

	LFS			ECHP		
	Coef.	z	Sig.	Coef.	z	Sig.
Constant (a)	−2.38	14.77	**	−2.11	−9.72	**
Type of contract (permanent)						
Training and apprenticeship contracts	1.39	19.80	**			
Fixed-term contracts	0.15	2.67	**	−0.12	−2.09	*
Firm size <sup>b</sup>						
Category1	0.80	1.01		0.17	2.50	*
Category2	0.13	1.80		0.31	4.29	**
Category3	0.23	3.89	**	0.40	5.04	**
Category4	−0.06	0.95		0.47	6.47	**
Category5				0.41	5.55	**
Industry (agriculture)						
Construction	−0.30	2.40	*	−0.02	−0.10	
Mining and energy	−0.12	0.64		0.27	1.38	
Chemicals, rubber and plastic	−0.19	1.46		−0.02	−0.11	
Machinery and equipment	−0.01	0.07		0.23	1.36	
Food, textiles and wood	−0.22	1.74		0.15	0.96	
Traditional services	−0.07	0.62		0.08	0.53	
Productive services	0.02	0.19		0.76	4.52	**
Social services	−0.09	0.74		0.20	1.18	
Personal services	−0.09	0.65		0.22	1.32	
Public services	−0.24	1.84		0.28	1.78	
Institutional sector (public)						
Private	−0.28	4.69	**	−0.10	−1.68	
Tenure (< 1 year)						

1–3 years	0.04	0.75		0.17	2.63	**
4–6 years	0.04	0.45		0.30	3.51	**
7–10 years	0.08	0.89		0.31	3.66	**
11–20 years	0.13	1.70		0.53	6.48	**
> 20 years	0.12	1.29		0.42	4.98	**
Working time (full-time)						
Part-time	–0.16	4.20	**	0.10	1.06	
Occupation (white collar high skilled)						
White collar low skilled	–0.14	2.63	**	–0.10	–1.98	*
Blue collar high skilled	0.01	0.16		–0.31	–4.47	**
Blue collar low skilled	–0.23	3.21	**	–0.40	–6.13	**
Gender (men)						
Women	–0.02	0.60		–0.05	–1.35	
Education (compulsory)						
Secondary	0.17	3.61	**	0.28	5.37	**
University degree	0.20	3.16	**	0.38	7.20	**
Age (16–24 years)						
25–29 years	–0.12	2.29	*	0.09	1.15	
30–44 years	–0.35	6.21	**	0.11	1.45	
45–54 years	–0.45	5.89	**	0.04	0.49	
55–64 years	–0.56	5.26	**	–0.26	–2.40	*
Log-likelihood	–2,691.5			1,100.6		
Observations	153,486			11,855		

*Notes:*

<sup>a</sup> Controls for regions were also included in the estimations. Asterisks indicate significance at 1 (\*\*) and 5 (\*) %, respectively.

<sup>b</sup> The firm size categories are not comparable across datasets. For the LFS, the base category is less than 10 workers; the rest are as follows: cat1 (10–19), cat2 (20–49), cat3 (50 or more), and cat4 (do not know). For the ECHP, the base category is 1–4 workers; the rest are as follows: cat1 (5–19), cat2 (20–49), cat3 (50–99), cat4 (100–499), and cat5 (500 or more).

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