

NON-FORMAL EDUCATION, OVEREDUCATION AND WAGES*

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Why do overeducated workers participate in non-formal education activities? Do they not suffer from an excess of education? Using microdata from the Spanish sample of the 2007 Adult Education Survey, we have found that overeducated workers participate more than the rest in non-formal education and that they earn higher wages than overeducated workers who did not participate. This result can be interpreted as evidence that non-formal education allows overeducated workers to acquire new abilities that improve their competence at the job they perform. Our results support the European Commission's view on the need to reinforce lifelong learning among the adult population.

Key words: non-formal education, education-occupation mismatch, returns to schooling.

JEL Classification: J31, I21, C13.

Traditionally, there was a clear separation between two different ways of accumulating human capital: schooling at an early age and on-the-job experience in adulthood. Nowadays, this separation is not so clear. The role of lifelong learning as a way through which individuals can accumulate human capital beyond early adulthood is a central issue in the current European education policy. In fact, while recognising the role of primary, secondary and higher education, the “Strategic framework for European cooperation in education and training – ET2020”, gives priority to lifelong learning as a way to adapt to a rapidly changing world. While there is an abundant literature on the role of schooling, the analysis of trends in lifelong learning and of the returns to education in later adulthood is scarce (see, for instance, Blanden *et al.* 2012).

Although the policy focus has moved from formal education to other learning activities, during recent decades, most OECD countries have experienced an

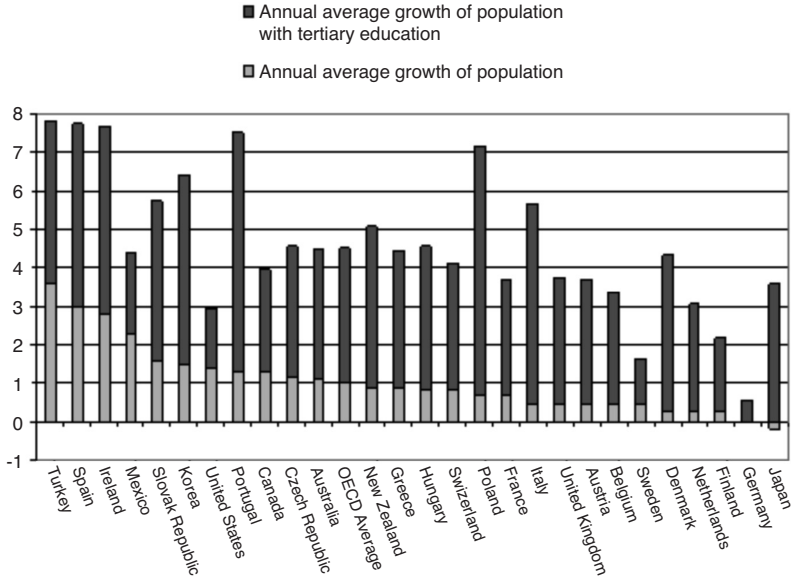
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important increase in the number of graduates (see Figure 1). The annual average growth in graduates across all the OECD countries between 1998 and 2006 was around 4.5%, far above the annual population growth in the same period, which was around 1%. The case of Spain deserves special attention because, in the 1960s and 1970s, because, Spain's population had a very low level of education in comparison with the other OECD countries (Mas *et al.*, 1995) and, over the last decade, it has experienced an annual average growth in the number of graduates of almost 8%, accompanied by an average population increase of approximately 3.5%.

This sharp increase in the number of graduates has led to a situation in which the percentage of highly educated workers in Spain is currently above the OECD average, although the occupational structure of the Spanish economy is clearly dominated by low and medium skill jobs. As a result, Spain is one of the developed countries with the highest incidences of overeducation. A worker is considered to be overeducated if his level of education is higher than that required in his job. As shown in Figure 2, according to the OECD, in 2003-2004 overeducated workers accounted for 25% of total employees in Spain, more than double the OECD average (12%). According to García-Montalvo (2005), this differential could be related to an excessive supply of highly-educated individuals which the job market has been incapable of absorbing because the jobs on offer do not require such a high level of education, but also to the lack of practical competences of the graduates. In fact, recent contributions, such as Sloane (2002), have also argued that workers could be overeducated because they do not have the required skills and competences to perform the job satisfactorily and that these skills probably could not be acquired through formal education, an argument that reinforces the role of lifelong learning through activities different to formal education.

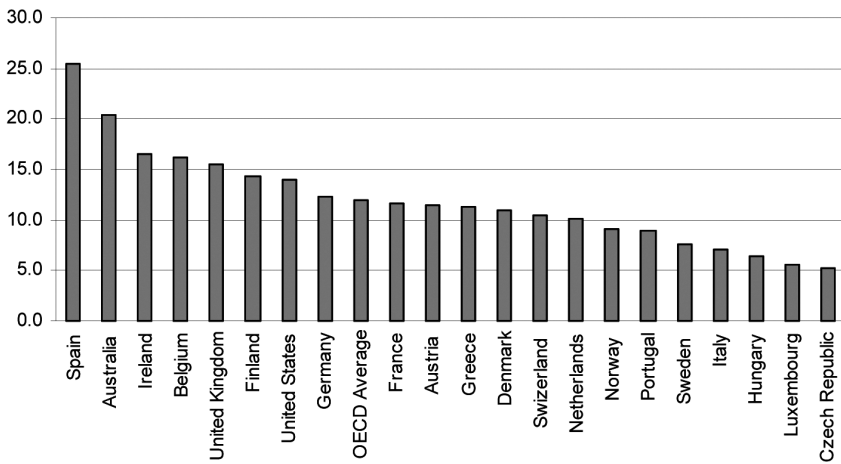
Once a person is overeducated, from the perspective of employment, they only have one way out: move to a job that better matches their level of education (whether that means changing company or through internal promotion). Despite the fact that this solution is complicated, it is the only option since it is clear that there can be no process of removing the "excess" years of education. The problem of knowledge or skills deficit, however, has more possible solutions. One way of reducing the shortfall is through experience at work. In this way, the individual acquires the knowledge necessary to perform the tasks correctly although, until they bring their knowledge up to standard, they are less productive than a worker who has the required skills. Another means of solving the problem is through learning or training, which may be provided by the company or by other organisations. This is one of the ways through which lifelong learning can contribute to improving workers' capabilities in a rapidly changing environment. These learning activities can consist of formal education, non-formal education or informal education. Formal education is that provided by the institutions that make up the education system and leads to recognised qualifications. Non-formal education, in contrast, consists of organised and continuous educational activities that do not lead to a recognised qualification, which can take place at educational institutions or not, and is aimed at people of all ages. Finally, informal learning is defined as those ac-

Figure 1: ANNUAL AVERAGE GROWTH IN 25-64 YEAR-OLD POPULATION BETWEEN 1998 AND 2006



Source: Own elaboration from OECD (2009).

Figure 2: PERCENTAGE OF OVEREDUCATED AMONG 15 TO 64 YEAR-OLDS, 2003-2004



Note: No information is available for OECD countries not included in the figures. US data belongs to 2002.

Source: Own elaboration from OECD (2009).

tivities that are carried out with the intention of learning, but are not as organised or structured as educational activities.

According to Bauer (1999), if initial formal education and professional training are substitutable, overeducated workers will be less likely to participate in additional professional training than workers who are properly educated. Likewise, overeducated workers will require less training to carry out their work because their prior formal education already provided them with the additional competences that can compensate for a possible lack of skills. In the case of undereducated workers, the hypothesis that initial education can replace training suggests that they will acquire more training in order to compensate for the lack of formal education. If, in contrast, initial formal education and professional training are complementary, perhaps because workers with higher levels of education learn more quickly, then any initial differences will be amplified by additional training and it is likely that overeducated workers will experience a greater level of promotion than properly educated workers. The fact that overeducated workers undertake more training supports the hypothesis of complementarity between initial formal education and training.

The objective of this paper is twofold: first, to characterize workers participating in non-formal learning activities and to check the relationship between skill mismatches (and, in particular, overeducation) and their participation in this kind of activities and, second, to provide evidence on the returns to learning in early adulthood and to analyse whether this participation permits them to overcome part of the wage penalisation derived from an inappropriate match between their education and their current occupation. As far as we know, no previous study has analysed these aspects. The analysis is carried out using microdata from the Spanish sample of the 2007 Adult Education Survey, a survey that provides detailed information on lifelong learning among the adult population.

According to our results, 33% of workers performed non-formal education activities during 2007 in Spain, a figure that is very similar to the European Union average according to the 2007 Adult Education Survey carried out by Eurostat. We have also found a higher participation of overeducated workers in non-formal learning activities and empirical evidence that non-formal education seems to provide overeducated workers with new abilities that permit them to reduce the wage penalisation derived from their skill mismatch.

The rest of paper is structured as follows: in Section 1 we present the data and the variables used in the analysis. Next, in Section 2, we first describe the people who have undergone non-formal education in Spain and, then, we quantify the incidence of educational mismatch in Spain. That section finishes with an analysis of the profitability of the different types of human capital considered in the study paying special attention to the interactions between non-formal education and skill mismatches. Finally, Section 3 contains some closing remarks.

1. THE SPANISH SAMPLE OF THE 2007 ADULT EDUCATION SURVEY

The most appropriate survey for analysing lifelong learning among adults is the Adult Education Survey (AES). The main objective of the survey is to study lifelong learning, that is, those training and learning activities that the adult popu-

lation performs with the objective of improving or extending their knowledge, skills and competences, from a personal, civil, social or work-related perspective. In this work, we use the Spanish sample of the 2007 AES (*Encuesta sobre la Participación de la Población Adulta en las Actividades de Aprendizaje*; EADA) that was carried out by the Spanish National Institute of Statistics (INE). Annex 1 provides a detailed description of the Adult Education Survey (AES) and its Spanish sample, the EADA dataset.

It is worth mentioning that this is the only survey carried out in Spain that provides a high degree of detail on formal and non-formal education. Previous studies focusing on the analysis of educational mismatch and its impact on wages have used microdata extracted from different surveys, such as: the *Encuesta de Calidad de Vida en el Trabajo* (Quality of Life at Work Survey; ECTV), the *Encuesta de Población Activa* (Labour Force Survey; LFS), the *Encuesta de Estructura, Conciencia y Biografía de Clase* (Class Biography, Conscience and Structure Survey; ECBC), the *Panel de Hogares de la Unión Europea* (European Community Household Panel; ECHP), the *Encuesta de Presupuestos Familiares* (Household Budget Survey; EPF) or the *Encuesta de Estructura Salarial* (Structure of Earnings Survey; SES). However, these sources do not provide information on lifelong learning, with the exception of the LFS, which devotes seven questions to training activities but provides very little detail. For this reason, we choose to use microdata from the EADA survey.

This survey provides information about a sample of 20,009 people aged between 25 and 74 from all over Spain. Although it is a dataset containing cross-sectional data referring to 2007, it provides retrospective information on a series of variables related to the occupation of workers corresponding to the 12 months preceding the survey. Consequently, two samples are considered for the analysis: a first sample consisting of people in work in 2007; and a second sample consisting of those in work in 2006. Once individuals with missing observations were removed, the first sample, relating to 2007, includes 11,748 people while the second sample, corresponding to 2006, consists of 12,558 people.

The variables that are used from the database are related to personal characteristics and to employment status. With respect to the personal characteristic variables, we use information related to monthly earnings, gender, nationality, years of education¹, occupation, economic activity, potential experience (age minus the number of years in education minus six), seniority, the number of household members, non-formal education activities, type of contract, type of working day and number of jobs. With respect to the employment status variables, we use data related to the firm size, the regional population density, and the region where the work is performed. Descriptive statistics for these variables are shown in Annex 2.

(1) The AES provides data on schooling levels. The equivalences applied to calculate the number of schooling years are shown in Annex 3.

2. METHODOLOGY AND RESULTS

In this section we describe the empirical work carried out in order to reach the objectives outlined above. To this end, first, we provide evidence on the number and the characteristics of workers who undertook non-formal education activities during the previous twelve months; next, we describe the different methods for measuring the educational mismatch and we apply them to the Spanish data detailed in the previous section; and, last, we analyse the relationship between non-formal education and skill mismatches and we estimate the effect of non-formal education and skill mismatches on wages.

2.1. *Non-formal education in Spain*

As we said above, non-formal education consists of those activities that do not lead to a recognised qualification and that people of all ages can embark on. This type of activity can lead to an increase in the competences and skills of those who undertake them. However, non-formal education is not counted when determining the number of years of education a person has received. Thus, in this study, people's level of education is considered to be given by the number of years of formal education they have received, which remains unaltered by participation in non-formal education, although the latter is considered a means of increasing competences and skills.

Table 1 shows the results of the analysis of non-formal education undertaken in 2007, based on the EADA data. As can be seen, more than 33% of people in work undertook at least one non-formal educational activity during the 12 months before the survey was carried out, for both personal motives and questions related to work. This figure is quite close to the European Union average in 2007 according to Eurostat, which was 35%.

With respect to the characteristics of the workers who undertook this type of activity, the results, which are available from the authors on request, are in line with those obtained in other studies such as that of O'Connell (1999)². In relation to gender, 52.8% of the workers who underwent training activities were men, and 47.2% were women; the difference is statistically significant at the 1% level. With regard to age, younger workers were more inclined to take part in this type of activity, although those aged 35 to 44 were even more inclined to do so than those aged 25 to 34. In relation to the level of education, workers with a level equal to or less than the lower stage of secondary education are those who participate least in training activities. This is worrying as it may result in those with the lowest levels of education becoming socially excluded. In fact, one of the objectives of the European Commission's "Memorandum on Lifelong Learning" is to provide everybody with access to lifelong learning activities in order to tackle such a situation. Finally, workers in medium-sized or large companies (more than 10 workers) tended to participate more in training activities.

(2) O'Connell (1999) considers any education or training, without specifying the type.

Table 1: EMPLOYED WHO UNDERTOOK AT LEAST ONE NON-FORMAL EDUCATION ACTIVITY DURING 2007

	Frequency	Percentage
Performed non-formal education activities	3,917	33.34
Not performed non-formal education activities	7,821	66.57
Refuse	9	0.08
No answer	1	0.01
Total	11,748	100.00

Source: Own calculations using the Spanish sample of the 2007 AES.

2.2. *Measurement of educational mismatch*

Several ways of approximating different concepts of educational mismatch have been proposed in the literature, although the most commonly used consists of comparing the level of education successfully completed by an individual with the level required by their job (Rumberger, 1981). From this perspective, a worker is overeducated (undereducated) if their level of education is higher (lower) than their job requires.

Analysis of undereducation is not our primary concern since its consequences on workers and the economy alike are not as serious as those of overeducation. In fact, if workers have to perform tasks for which they are not qualified, companies can train them or expect that they will learn to perform their tasks through the experience acquired at work. Furthermore, previous analysis shows that undereducated workers receive lower wages than their colleagues whose level of education matches their job, although they earn higher wages than they would if they had jobs that matched their level of education (Groot and Maassen van der Brink, 2000). Therefore, undereducated workers have no incentive to change to occupations that match their level of education.

In contrast to undereducation, the phenomenon of overeducation can have negative consequences both for the overeducated workers and for the economy as a whole (Tsang and Levin, 1985). From the point of view of the worker, being overeducated will probably result in frustration and a lack of motivation, which can lead to increased absenteeism and health-related problems such as low self-esteem or depression. There are also different ways in which overeducation can have negative consequences for the economy. Overeducated workers who experience frustration may be less productive than workers with jobs that match their level of education, and their behaviour could lead to problems for the company. Another negative effect on the economy as a whole is through the associated public spending on education, for which greater social returns are expected than those that overqualified workers produce. In order to tackle the negative effects of educational mismatch on workers, companies and the public sector, it is important to know the extent of the mismatch, since the negative effects on a country will be more intense the greater the observed educational mismatch.

There are three methods for measuring educational mismatch: objective, subjective (both direct and indirect) and statistical (in terms of the mean and the mode). However, at present there is no consensus as to which is the best method: each has its advantages and drawbacks (Hartog, 2000). As a consequence, the use of one method or another usually depends on the nature of the data available.

The objective method is based on the opinion of expert analysts who determine what level of education workers should have in order to perform a certain job. A person is then overeducated (undereducated) if their level of education is higher (lower) than the level the analysts determine to be ideal for the occupation.

The subjective method takes into account the perception of the workers to determine the educational mismatch. Direct measurement consists of asking workers if they are overeducated, properly educated or undereducated for the type of work they perform. Indirect measurement, in contrast, compares the level of education of the workers with the level of education they identify as optimum for performing that type of work. In this case, a person is overeducated (undereducated) if their level of education is higher (lower) than their occupation requires (according to them).

Lastly, the statistical method based on the mean (Verdugo and Verdugo, 1989) considers that a person is overeducated (undereducated) if they have a level of education that is higher (lower) by more than one standard deviation than the mean level of education of the workers in that occupation. Nevertheless, Kiker *et al.* (1997) propose the use of the mode instead of the mean; so they consider a person who has a higher (lower) level of education than the mode for the job they perform to be overeducated (undereducated).

It is not possible to use the subjective method with the type of data provided by the AES. For the objective method to be applicable, it would be necessary to have a Spanish classification that was drawn up by expert analysts, approved by some official body and which gave the level (and type) of education required for the different occupations. At present no such classification exists³. Therefore, we use the statistical method to measure the educational mismatch; both the version based on the mean and the version based on the mode. It should be noted that Mendes de Oliveira *et al.* (2000) propose an improvement to the method based on the mode, which consists of only including in the study those occupations for which the most common (mode) level of education of the workers represents at least 60% of all the workers who perform that job. However, the database we use provides information on occupations at 2 digits of the ISCO classification and, not at 3, which would be ideal. So, we cannot use this improved version of the statistical method as in most occupations the mode represents less than 60% of workers because they include a

(3) García-Montalvo (1995) suggests a distribution of levels of education for the occupations that appear in the *Clasificación Nacional de Ocupaciones* (Spanish Occupations Classification; CNO). However, given the time that has elapsed since the publication of the study, we decided not to use this method. The same applies to the International Socio-Economic Index of Occupational Status (ISEI), proposed by Ganzeboom *et al.* (1992) and Ganzeboom *et al.* (1996), despite the fact that the OECD regularly uses it to compare data from different countries.

wide range of jobs. Despite this methodological limitation, as mentioned above, the EADA is the only database for Spain that provides information on lifelong learning activities with a high level of detail.

Table 2 compares the match between the level of education and occupation for 2006 and 2007, as calculated by the methods based on the mean and on the mode. For both time periods, the educational mismatch varies according to the procedure used. For 2007 and using the method based on the mean, undereducated workers represent 21% of the total number of workers, while almost 20% are overeducated. However, using the method based on the mode, the educational mismatch is greater. Specifically, the percentage of undereducated workers is almost 32% of all workers: more than 10% above the figure obtained using the method based on the mean. Overeducated workers are 24% of the total using the method based on the mode. As is to be expected, using both methods the data for 2006 give very similar results to these.

	Mean (%)		Mode (%)	
	2006	2007	2006	2007
Undereducation	21.52	21.05	31.62	31.98
Required education	58.54	59.41	43.37	43.81
Overeducation	19.94	19.54	25.01	24.21
	100	100	100	100

Source: Own calculations using the Spanish sample of the 2007 AES.

In the same way, comparing the preceding results with those of other studies carried out on Spain (Table 3), significant differences can be seen depending on the method and data used. Notwithstanding, the fact that a larger educational mismatch results from the use of the method based on the mode is quite a common result in the majority of studies that use both versions of the statistical method. This is probably a consequence of the definition of educational mismatch adopted in each of the methods. Specifically, the method based on the mean classifies workers as properly educated if they are within one standard deviation of the mean number of years of education that people in a specific profession have completed, whereas the version based on the mode only counts workers as properly educated when the number of years of education they have completed coincides exactly with the mode. This means that a worker is more likely to be considered properly educated in the version based on the mean than in the version based on the mode. In addition, it should be pointed out that Bauer (1999) observes that the level of educational mismatch given by the statistical method is less than that given by either the objective or subjective method and, therefore, the statistical method is consid-

Table 3: SURVEY OF RESEARCH ON EDUCATIONAL MISMATCH IN SPAIN

Author	Data source and year	Method	Overeducation	Undereducation
Alba-Ramírez (1993)	ECVT, 1985	Subjective (indirect)	17.0	23.0
García-Montalvo (1995)	EPA, 1985	Objective	3.7	30.4
	EPA, 1989	Objective	6.3	31.0
	EPA, 1993	Objective	7.7	27.6
	EPA, 1993	Statistic (mean)	8.9	6.2
García Serrano and Malo (1996)	ECBC, 1991	Subjective (indirect)	28.4	30.0
	ECBC, 1991	Subjective (direct)	29.4	11.0
Beneito <i>et al.</i> (1996)	ECBC, 1991	Statistic (mean)	15.2	15.3
Oliver and Raymond (2002)	EPA, 2001	Statistic (mode)	32.5	n.a.
Ramos and Sanromá (2012)	EPF, 1990-91	Statistic (mean)	14.6	n.a.
	EPF, 2006	Statistic (mean)	13.8	n.a.
Murillo <i>et al.</i> (2010)	EES, 1995	Statistic (mode)	35.3	20.8
	EES, 2002	Statistic (mode)	31.9	25.6
	EES, 2006	Statistic (mode)	37.2	23.0

Note: n.a. = not available.

Source: Own elaboration.

ered to underestimate educational mismatch. In fact, the statistical method takes the ideal level of education for performing a specific occupation to correspond to the mean (mode) number of years of formal education that people who work in that occupation received. Consequently, if the majority of workers in a specific occupation were overeducated, the mean (mode) for that occupation would be higher than it would be if the majority of the workers were not overeducated; therefore, in the former case, overeducation would be underestimated. Analogously, if the majority of workers were undereducated, the mean (mode) would be lowered and undereducation would be underestimated. Finally, Hartog (2000) explains that the method based on the mean tends to produce very similar percentages of overeducation and undereducation, as a consequence of the symmetry of the tails of the normal distribution. As this is exactly what we have found, from here on, we consider only the results obtained using the method based on the mode⁴.

2.3. *Non-formal education and educational mismatch*

As previously explained, undertaking non-formal education could encourage workers to change their occupation or, alternatively, help them to gain promotion within their company. To determine whether workers who have undertaken this type of activities have experienced career development that is different from workers as a whole, Table 4 shows the evolution of the educational mismatch for 2006 to 2007, both for workers in general and for those who undertook non-formal education. Approximately 5% of all workers and 6% of workers who undertook non-formal education changed the match between their level of education and their occupation between 2006 and 2007. Moreover, more than 40% of the people whose degree of educational mismatch changed managed to equate their level of education to that required for the work they perform. However, the change of occupation or internal promotion does not seem to have been due to training activities, since this change can be observed both in those who undertook this type of activity and those who did not. Thus, the fact that both samples present low percentage of workers who have changed their type of match between the level of education and occupation seems to indicate that undertaking non-formal education activities does not have a great impact on the type of mismatch.

In contrast, and in relation to the level of education of the workers and their suitability for the work they perform, Table 5 shows the percentage of undereducated, properly educated and overeducated workers who underwent non-formal education in the previous 12 months. It can be seen that the percentage of overeducated workers who participated in some kind of non-formal education is greater than the percentage of undereducated and properly educated workers who did so.

According to Bauer (1999), if initial formal education and professional training are substitutable, overeducated workers will be less likely to participate in additional professional training than workers who are properly educated. Likewise, overeducated workers will require less training to carry out their work because

(4) When applying the method based on the mean, results are very similar to the ones shown here. These results are available from the authors on request.

Table 4: EVOLUTION OF THE EDUCATIONAL MISMATCH FROM 2006 TO 2007

	Workers		Workers who have undertaken NFE activities	
	Frequency	%	Frequency	%
Mismatch not changed	10.994	94.86	3.625	93.67
Mismatch changed	596	5.14	245	6.33
Total	11.590	100.00	3.870	100.00
Mismatch changed				
From properly to over	57	9.56	24	9.80
From properly to under	203	34.06	76	31.02
From over to properly	253	42.45	115	46.94
Other situations	83	13.93	30	12.24
Total	596	100.00	245	100.0

NFE: Non-formal education.

Note: Common sample of employees is reduced to 11.590 in both years.

Source: Own calculations using the Spanish sample of the 2007 AES.

Table 5: PERCENTAGE OF UNDEREDUCATED, PROPERLY EDUCATED AND OVEREDUCATED WHO HAVE UNDERTAKEN NFE ACTIVITIES IN THE LAST 12 MONTHS

	Workers who have undertaken NFE activities	Workers who have not undertaken NFE activities
Undereducated	24.14	75.78
Properly educated	36.14	63.77
Overeducated	40.44	59.49
Total	33.34	66.57

NFE: Non-formal education.

Source: Own calculations using the Spanish sample of the 2007 AES.

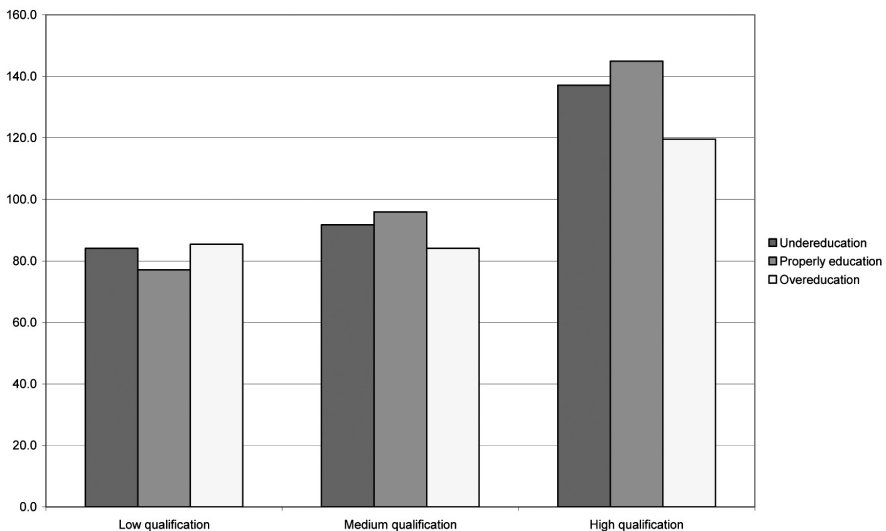
their prior formal education already provided them with the additional competences that can compensate for a possible lack of skills. In the case of undereducated workers, the hypothesis that initial education can replace training suggests that they will acquire more training in order to compensate the lack of formal education. If, in contrast, initial formal education and professional training are complementary, perhaps because workers with higher levels of education learn more quickly, then any initial differences will be amplified by additional training and it

is likely that overeducated workers will experience a greater level of promotion than properly educated workers. Therefore, the fact that overeducated workers undertake more training supports the hypothesis of complementarity between initial formal education and training. In the next section, we analyse whether this complementarity is reflected in the wages workers earn.

2.4. Non-formal education, educational mismatch, and wages

In this section, we analyse the effect of different personal characteristic variables and employment status variables on wages in 2007. Particularly, the study is focused on the analysis of the returns associated with variables related to formal and non-formal education. Nevertheless, before calculating the returns, it is useful to know what the average wages of workers are with respect to their level of qualification and to the match between their level of education and their occupation (Figure 3). If we ignore the educational mismatch, we can see that the average wage increases as the level of qualification increases. However, taking into account the educational mismatch, we can see that overeducated workers with medium and high levels of qualification earn average wages that are far less than those of corresponding properly educated workers; this difference is more than 20% for overeducated graduate workers.

Figure 3: AVERAGE WAGES OF WORKERS ACCORDING TO THEIR QUALIFICATIONS AND THEIR EDUCATIONAL MISMATCH



Note: 100 = average wage of workers equivalent to 1207 euros. Low qualification: primary education; Medium qualification: secondary education; High qualification: tertiary education.

Source: Own calculations using the Spanish sample of the 2007 AES.

Once we know the scale of the problem, which especially overeducated workers with a high level of education suffer from, different wage equations are specified in order to estimate the effect of different variables on wages. Initially, the following specifications of the Mincer wage equation (Mincer, 1974) are estimated:

$$\log(W_i) = \alpha + \beta' \cdot X_i + \delta \cdot S_i + \rho_1 \cdot E_i + \rho_2 \cdot E_i^2 + u_i \quad [1]$$

$$\log(W_i) = \alpha + \beta' \cdot X_i + \delta \cdot S_i + \rho_1 \cdot E_i + \rho_2 \cdot E_i^2 + \rho_3 \cdot NFE_i + u_i \quad [2]$$

$$\log(W_i) = \alpha + \beta' \cdot X_i + \delta \cdot S_i + \rho_1 \cdot E_i + \rho_2 \cdot E_i^2 + \rho_3 \cdot NFE_i + \rho_4 \cdot S_NFE_i + u_i \quad [3]$$

where $\log(W_i)$ represents the logarithm of the monthly wage of worker i ; X_i is a vector of variables related to personal characteristics and employment characteristics; S_i refers to the number of years of formal education; E_i represents experience; E_i^2 represents the square of experience; NFE_i is a dummy variable that takes the value 1 if the worker has partaken in any non-formal education activity and 0 otherwise; S_NFE_i is defined as the interaction of variable S with NFE ; and finally, u_i is the error term with zero mean and constant variance⁵.

Regarding the variables related to personal characteristics and job characteristics⁶, the expected results are obtained in all three specifications. Being a woman and an immigrant are handicaps in terms of wage with regard to men and natives. Working in companies of 10 or fewer workers and living in areas with a low population density also result in lower wages. In contrast, greater potential work experience and a longer time working in a company have positive effects on wages. Finally, workers in high-skilled occupations, with permanent contracts and working full time earn higher wages than workers with few qualifications, with temporary contracts and working part time.

Given that the variables related to education (years of formal education, non-formal education and the interaction between the two) are those that are of primary interest in this study, Table 6 shows the effect of these variables on wages⁷. In accordance with the results of equations [1], [2] and [3], some of which are included in the table, it can be seen that the workers' level of qualification is statistically significant in the three specifications of the Mincer equation and has a positive return of approximately 3%. The results of equation [2] show that people who have undertaken non-formal education earn wages 4.7% ($\exp(0.0457) - 1 = 0.0468$) higher than those of workers who have not done so, independently of their level of education. The results of equation [3] show that the returns on non-formal education are greater if the worker has a higher level of education by just one year. Specifically, the return is 0.7% for each year of formal education.

(5) Mincer equations have been estimated using ordinary least squares that are robust to heteroscedasticity. Detailed results are available from the authors on request.

(6) Full results are available from the authors on request. Different robustness checks have been carried out in order to analyse the stability of the results to the inclusion/exclusion of different variables related to employment characteristics (such as activity sector or occupation) without any relevant change in terms of the conclusions obtained.

(7) As a robustness check, all models were estimated using sampling weights. The results, which are available from the authors on request, were very similar to the ones presented here.

Table 6: OLS ESTIMATES OF MINCER WAGE EQUATIONS

	(1)	(2)	(3)	(4)	(5)	(6)
Schooling years	0.034*** (0.002)	0.033*** (0.002)	0.031*** (0.002)	0.034*** [0.002]	0.033*** [0.002]	0.031*** [0.002]
Non-formal education		0.046*** (0.009)	-0.039 (0.034)		0.045*** [0.009]	-0.042 [0.034]
Schooling years x NFE			0.007** (0.003)			0.007*** [0.003]
λ -Heckman	0.001**	0.001***	0.001**	[0.000]	[0.000]	[0.000]
Constant	5.986*** (0.039)	5.985*** (0.039)	6.010*** (0.039)	5.981*** [0.040]	5.980*** [0.039]	6.005*** [0.040]
Observations	5181	5180	5180	5180	5180	5180
R-squared	0.533	0.535	0.536	0.533	0.536	0.536

Note: Standard errors in parentheses. *** statistically significant at 1%; ** statistically significant at 5%; * statistically significant at 10%. All models include as additional control variables: gender, nationality, potential experience, squared potential experience, seniority, squared seniority, occupational dummies, qualified occupation, fixed-term contract, part-time contract, more than one job, firm size, area density and regional dummies.

Source: Own calculations using the Spanish sample of the 2007 AES.

However, the Mincer equations specified above have the disadvantage that each additional year of education has the same effect on wages, whatever the educational mismatch of the worker concerned. To resolve this limitation in the specifications, below we estimate the equation that corresponds to the ORU (Over-Required-Undereducated) specification created by Duncan and Hoffman (1981), whose objective is to contrast possible differences in the return on education as a function of the degree to which educational level matches the job performed. In fact, the ORU specification is a variant of the Mincer equation in which the years of education of the worker (S) are separated into years of education required for the job (Sr), years of overeducation (So) and years of undereducation (Su). More specifically, So and Su are defined as:

$$So = \begin{cases} S - Sr & \text{if } S > Sr \\ 0 & \text{on contrary} \end{cases} \quad Su = \begin{cases} Sr - S & \text{if } S < Sr \\ 0 & \text{on contrary} \end{cases} \quad [4]$$

The ORU equation is then defined as:

$$\log(W_i) = \alpha + \beta' \cdot X_i + \delta_1 \cdot Sr_i + \delta_2 \cdot So_i + \delta_3 \cdot Su_i + \rho_1 \cdot E_i + \rho_2 \cdot E_i^2 + u_i \quad [5]$$

Just as in the Mincer equation, X_i is a vector of variables related to personal characteristics and employment characteristics, E_i represents experience and u_i is the error term.

Table 7 shows the results of the ORU wage equation. As previously mentioned, we have used the statistical method based on the mode in order to calculate S_r , S_o and S_u . Column 1 shows that both the years of education required for the job and the years of either overeducation or undereducation have a significant effect on wages. In particular, it can be seen that an additional required year of education has a return of 5.0% while an additional year of overeducation results in a return of 3.7% compared to the wage earned by workers in the same occupation whose actual education matches that required for the job; and, finally, the return of an additional year of undereducation is -2.5% compared to the wage earned by workers with the same level of education for whom the job matches their occupation. We can also see from this table that workers who have undertaken non-formal education earn higher wages than the rest, with a similar value of the coefficient associated with the dummy variable to the one found before.

Table 7: OLS ESTIMATES OF THE ORU WAGE EQUATIONS

	(1)	(2)	(3)	(4)
Required schooling years	0.049*** [0.003]	0.047*** [0.003]	0.048*** [0.003]	0.046*** [0.003]
Years of overeducation	0.036*** [0.003]	0.031*** [0.004]	0.036*** [0.003]	0.031*** [0.004]
Years of undereducation	-0.025*** [0.003]	-0.024*** [0.003]	-0.024*** [0.003]	-0.024*** [0.003]
Non-formal education	0.044*** [0.009]	-0.014 [0.049]	0.044*** [0.009]	-0.016 [0.049]
Required schooling years x NFE	0.004 [0.004]	0.004 [0.004]		
Overeducation x NFE	0.011* [0.006]	0.011* [0.006]		
Undereducation x NFE	-0.002 [0.005]	-0.002 [0.005]		
λ -Heckman	0.001*** [0.001]	0.001*** [0.001]		
Constant	5.797*** [0.047]	5.818*** [0.049]	5.791*** [0.047]	5.812*** [0.048]
Observations	5180	5180	5180	5180
R-squared	0.540	0.541	0.541	0.541

Note: Standard errors in parentheses. *** statistically significant at 1%; ** statistically significant at 5%; * statistically significant at 10%. All models include as additional control variables: gender, nationality, potential experience, squared potential experience, seniority, squared seniority, occupational dummies, qualified occupation, fixed-term contract, part-time contract, more than one job, firm size, area density and regional dummies.

Source: Own calculations using the Spanish sample of the 2007 AES.

Column 2 of Table 7 shows the results of the same ORU specification presented above, but taking into account the interactions between the different variables related to the number of schooling years and skill mismatch and participation in non-formal education. In this way, we can analyse whether workers participating in non-formal education activities receive different returns. Again, the parameters associated with the years of education are statistically significant, although the magnitudes are slightly different in the case of required years and years of overeducation, but perhaps the most relevant result in this column is that once the interaction between non-formal education and the different components of schooling years (required, over and under) is included, the only coefficient which is statistically significant (although at the 10% level) is the one associated with overeducation.

However, the results could mask a problem of sample selection bias or “self-selection” since the sample of workers with reported wages may no longer be random and may not be a suitable representation of workers overall. That is, when it comes to estimating the wage equation, only the characteristics of people who are “at work and with a reported wage” are considered, which could lead to false conclusions about the effect of the different variables on the endogenous variable. For example, if the majority of workers in the sample considered have many years of education, there would be a tendency to underestimate the effect of education on wages.

To correct the possible selection bias, Heckman (1979) proposed a two-stage method that can be interpreted as the incorporation of variables that were omitted from the wage equation. The first stage consists of analysing the factors that determine the probability of being in work, from which Heckman’s lambda is obtained (the inverse of Mills’ ratio). In the second stage, Heckman’s lambda is introduced as an explanatory variable into the wage equation. In this way, when the factors that determine wages are analysed, the uncontrolled characteristics relating to the probability of a person being in work are taken into account. Because of issues of identification, we nearly always want at least one explanatory variable that appears in the selection equation but does not appear in the wage equation. In other words, we need a variable that affects the probability of being in work, but not the salary. As in previous studies, we have used the variable “number of household members” as it can affect the decision to work but it does not affect wages. In particular, people can decide to participate in the labour market depending on how many people they have in their charge but we do not expect employers to consider this variable when setting their wages. We have also tested the quality and the validity of this instrumental variable through the commonly used statistics. In particular, instrumental quality is ensured if there is a strong correlation between the instrument and the probability of employment; to test the joint significance, we have used the criteria suggested by Bound *et al.* (1995). The partial R squared and F statistic on the excluded instrument in the first-stage regression (using OLS) will indicate that the instrument is legitimate⁸. We have also checked the validity of the instrument through the approach of Dolton and Vignoles (2002): a valid instrument must be uncorrelated with the error term of the wage equation and, thus, it will not affect the income conditional on the included explanatory variables. Hence, we have re-

(8) The partial R squared is 0.0117 and the value of the F statistic is 218.53.

gressed the residuals from the wage equation against the instrument, and we have obtained an R squared of 0.0001, which means that the instrument does not explain any significant variation in the residuals. Taken together, these two results indicate that the chosen instrument will be appropriate.

With regard to Heckman's first stage, where the factors that determine the probability of being in work are analysed, it is found that being a woman or an immigrant has a significant and negative effect on the probability of being in work. In contrast, years of education, having undertaken non-formal education during the last year and experience all have a significant and positive effect on the probability of being in work⁹.

As it can be seen in the different specifications of the Mincer equation (Table 6), including Heckman's lambda, self-selection of workers is relevant. The parameter is positive and statistically significant, so we cannot reject that there is a positive selection effect on wages, since it is probably the case that people with a greater probability of being in work earn more than the average for people who are in work and whose wages are reported. The magnitudes of the other parameters are slightly different from those in the first columns of Table 6, but their interpretation is the same. Similar results are obtained when we include Heckman's lambda in both ORU specifications (Table 7), which are significant and positive. Furthermore, the magnitudes of the coefficients associated with the variables of interest do not change much with respect to those obtained before highlighting the relevance of non-formal education activities for overeducated workers.

In conclusion, our results are in line with those of other studies, both international¹⁰ and for the case of Spain¹¹. In particular, it can be seen that the wage that an undereducated worker earns in a specific occupation tends to be less than that of workers with the level of studies required for that job, while the wage of an overeducated worker tends to be greater than that of properly educated workers in the same occupation, although less than they could expect to earn in an occupation that required the higher level of education.

Moreover, the main contribution of this study is that, for overeducated workers, non-formal education represents a means of achieving higher wages than they would earn if they did not undertake such activities. Nevertheless, those wages would continue to be lower than those of workers with the same level of education in matched occupations. Although non-formal education does not increase people's level of schooling, it does contribute to improving the competences and skills of workers and, consequently, allows them to earn higher wages.

3. CONCLUSIONS

Although investment in education at early ages is still a priority of most governments, important efforts are being devoted to promote lifelong learning. Al-

(9) Detailed results are available from the authors on request.

(10) Groot (1993), Kiker *et al.* (1997), Hartog (2000), Bauer (2002).

(11) Alba-Ramírez (1993), Beneito *et al.* (1996), Budría and Moro-Egido (2008), García-Montalvo and Peiró (2009).

though there is a widespread belief that participation in learning activities in early adulthood will permit both individuals and society to better adapt to changes in economic conditions, the available empirical evidence is not conclusive.

The objective of this paper was twofold: first, to characterize participants in non-formal education activities in Spain paying special attention to their particular situation in terms of skill mismatches and, second, to check if participation in this kind of activities permits overeducated workers to overcome part of the wage penalisation derived from an inappropriate match between their education and their current occupation. The empirical analysis has been carried out using microdata from the Spanish sample of the 2007 Adult Education Survey, a recent and very detailed database about the lifelong learning activities of the adult population.

The results obtained permit us to conclude that there is a higher proportion of overeducated workers than of other types of workers (adequately educated and undereducated workers) undertaking non-formal education activities. When we checked the effect that non-formal education activities has on the wages of different types of workers, we found that only overeducated workers who have undergone non-formal education activities receive a wage premium. It seems that this type of training permits overeducated workers to overcome part of the wage penalisation derived from the mismatch between their level of education and occupation.

Our hypothesis, which should be further explored in future research, is that non-formal education activities permit overeducated workers to better adjust their formal education to the requirements of their current jobs. From the point of view of public policy, our results suggest that lifelong learning activities should be promoted in those occupations with a higher incidence of overeducation, i.e. those that experience more trouble to fill their vacancies with suitable candidates. However, although the situation has improved during recent years, nowadays, statistics on vacancies in European countries and, in particular, in Spain are not sufficiently developed to permit a rigorous test of our hypothesis.

4. ANNEXES

Annex 1. The Adult Education Survey

In March 2000, Eurostat launched a task force for measuring lifelong learning (TF MLLL). In its final report (in February 2001), the Eurostat TF MLLL highlighted the importance of improving the knowledge and statistical infrastructure on adult education and learning and to develop a standardized data collection. On this basis, in 2002, Eurostat proposed a comprehensive system of Adult Education Statistics based on two pillars: the Continuing Vocational Training Survey (CVTS) and the planned Adult Education Survey. Subsequently a task force for the development of the Adult Education Survey (TF AES) was created to assist Eurostat to launch such a survey with the definition of the survey subject and the way to approach it being the main focus of its work.

In June 2004, the Adult Education Questionnaire Development Group was created to prepare the AES questionnaire while the Classification of Learning Activities (CLA) was developed and tested. One year later, the final questionnaire

was ready and, between the second half of 2005 and 2008, the first pilot AES was carried out by the EU, EFTA and candidate countries. The aim of this pilot survey was to collect information on adult participation in education and learning activities (formal, non-formal and informal learning) including job related activities, characteristics of learning activities, self-reported skills as well as social and cultural participation, foreign language skills, IT skills and background variables related to the main characteristics of the respondents. Nowadays, the AES is carried out every five years and it is one of the most relevant components of the system of producing statistics on adult education, together with the Labour Force Survey (LFS) and the Continuous Vocational Training Survey (CVTS). It is worth mentioning that the LFS only provides information on the annual evolution of a limited set of indicators and its coverage is different while the CVTS is much more focused on enterprise activities for employee skill development.

The Survey on Adult Population Involvement in Learning Activities (*Encuesta sobre la participación de la población adulta en las actividades de aprendizaje, EADA*) is the implantation in Spain of this European project. The survey was carried out during 2007 and the final sample comprised 24,030 adults between 25 and 74 years old living in households¹². As in the other participating countries, the survey covered the main structures of lifelong learning such as participation in education and training, non-participation, types of activities, reasons for participation, obstacles to participation and providers of education and training.

From the point of view of this survey, formal education is normally education provided in the formal diploma-based systems of education. Examples are primary and secondary level education and university/college diploma and degree courses. Alongside the formal system there is a range of educational and training activities that are not necessarily diploma-based. Non-formal education and training are normally short courses for all age groups taken within or outside the educational institutions. These courses can be taken for either job or personal reasons and examples are seminars and courses related to jobs, languages, computer and other IT studies, arts and culture. Non formal education also includes guidance on job training. In fact, this training is usually provided by institutions that offer systematic and intentional learning opportunities but which are not necessarily diploma-based.

It is worth mentioning that, according to the first Adult Education Survey, more than a third of the EU population between 25 and 64 years old participated during the 12 months previous to the survey in formal or non-formal education and training. A large majority participated in non-formal education and training and over 80% of the non-formal activities were job-related. About 6% participated in formal education and training. The two most important obstacles to participation in education and training were work schedules and family responsibilities. There were also significant differences across countries in participation rates: Nordic countries and the UK had high rates of participation, while low rates of participation were found in Hungary, Greece, Poland and Italy. Participation in formal or non-formal education activities in Spain was 31%, below the EU aver-

(12) In other EU countries, 64 years old is the upper limit.

age of 36%. More details regarding the results can be found at the Eurostat's website (<http://ec.europa.eu/eurostat>) or in Eurostat (2009), *Statistics in Focus*, 44/2009. Detailed methodological notes are also available on CIRCA (http://circa.europa.eu/Public/irc/dsis/edtcsl/library?l=/public/measuring_lifelong/education_survey&vm=detailed&sb=Title).

Annex 2. Descriptive statistics

Variables	All workers		Workers who have undertaken NFE activities	
	Mean	Std. Dev.	Mean	Std. Dev.
Monthly wage	1204.23	560.06	1339.61	624.41
Woman	0.43	0.50	0.47	0.50
Immigrant	0.07	0.25	0.04	0.20
Schooling years	11.42	3.59	12.76	3.29
Non-formal education	0.33	0.47		
Potential experience	24.40	11.67	21.60	10.42
Squared potential experience	731.29	639.60	575.25	517.51
Seniority	10.61	10.18	10.54	9.73
Squared seniority	216.08	357.77	205.73	326.11
Agriculture	0.05	0.22	0.03	0.17
Construction	0.10	0.30	0.07	0.26
Services	0.38	0.49	0.33	0.47
No sale services	0.29	0.45	0.40	0.49
Qualified occupation	0.30	0.46	0.42	0.49
Permanent contract	0.78	0.41	0.81	0.39
Full-time job	0.89	0.31	0.92	0.28
More than one job	0.05	0.23	0.06	0.24
Firm with 10 workers or less	0.32	0.47	0.24	0.42
High density population area	0.50	0.50	0.50	0.50
Low density population area	0.28	0.45	0.26	0.44
Aragon	0.04	0.20	0.04	0.20
Asturias	0.04	0.19	0.03	0.18
Balearic Islands	0.04	0.19	0.04	0.19
Canary Islands	0.05	0.21	0.05	0.21
Cantabria	0.03	0.18	0.03	0.17
Castilla Leon	0.06	0.23	0.06	0.23
Castilla La Mancha	0.05	0.21	0.06	0.23
Catalonia	0.13	0.33	0.12	0.32

Source: Own calculations using the Spanish sample of the 2007 AES.

Variables	All workers		Workers who have undertaken NFE activities	
	Mean	Std. Dev.	Mean	Std. Dev.
Valencia	0.07	0.26	0.06	0.24
Extremadura	0.03	0.17	0.04	0.18
Galicia	0.06	0.24	0.07	0.25
Madrid	0.11	0.31	0.11	0.32
Murcia	0.04	0.20	0.05	0.21
Navarra	0.04	0.19	0.04	0.20
Basque Country	0.06	0.23	0.06	0.23
Rioja	0.03	0.17	0.04	0.19
Ceuta and Melilla	0.02	0.14	0.02	0.13

Source: Own calculations using the Spanish sample of the 2007 AES.



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RESUMEN

¿Por qué los trabajadores sobreeducados participan en actividades de educación no formal? ¿Acaso no sufren de un exceso de educación? A partir del análisis de los microdatos de la muestra española de la Encuesta sobre la Participación de la Población Adulta en las Actividades de Aprendizaje para 2007, encontramos que los trabajadores sobreeducados participan más en actividades de educación no formal y que aquellos que han participado reciben un salario mayor que los trabajadores sobreeducados que no lo hicieron. Este resultado puede interpretarse como evidencia de que la educación no formal permite a los trabajadores sobreeducados adquirir nuevas habilidades que mejoran sus competencias en su puesto de trabajo. En nuestra opinión, estos resultados apoyan los argumentos de la Comisión Europea para defender la necesidad de reforzar el aprendizaje a lo largo de la vida entre la población adulta.

Palabras clave: educación no formal, desajuste educativo, rendimientos a la educación.

Clasificación JEL: J31, I21, C13.