Education mismatch and qualification mismatch:

monetary and non-monetary consequences for workers

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Abstrat

Using Spanish data from European Union Household Panel Survey corresponding to 2001, we find that the incidence and the consequences, monetary and non-monetary, are different for the job-worker qualification and education mismatches. In fact, only 36% of workers have the same type of fit under both criterions of classification. Additionally, the qualification mismatches have worse consequences for workers than education mismatches. Specifically, the monetary consequences are neutrals for overqualified workers, but negatives for underqualified workers, while the wage of educational mismatched workers is not significantly different of those who have similar characteristics and are accurately match in terms of formal education. However, the overeducated workers earn higher wages than their well-matched co-workers and the wage penalization for one year of undereducation is lower than the reward for one year of required education. On the other hand, the analysis of the non-monetary consequences, by means of job satisfaction, shows that the qualification mismatched workers have lower probability of being completely satisfied than those who are accurately match in terms of qualification, while the effects of education mismatch situations on job satisfaction are no significant. However, among similar jobs, the years of educational mismatch can have an effect even positive on job satisfaction.

I. Introduction

The abilities, skills, attitudes and knowledge possessed by workers, which is their qualification, may be lower or higher than those required in their jobs. When this happens, the worker is said to be mismatched in qualification: underqualified, when his/her qualification is below that required in his/her job, and overqualified, when that exceeds the requirement.

In the economic literature, a worker's level of formal education is often used as a proxy for his/her level of qualification because the latter is more difficult to identify and measure. Indeed, a number of papers treat qualification mismatch and education mismatch as equivalent phenomena, as in Hersch (1991, 1995), Groot (1996), Battu, Belfield and Sloane (1999), Ng (2001), and Frenette (2004), among others.

Although education is not the only mechanism that promotes and develops workers qualification, understood as a set of human capital competences, the literature focused specifically on qualification mismatches is rather scarce. Additionally, most papers on labor market mismatches address only the pecuniary consequences of education mismatches, as shown in reviews by Groot and Maassen van den Brink (2000a), Hartog (2000) and Rubb (2003a), while the monetary effects of qualification mismatches, and the non-monetary consequences of both types of mismatches have been seldom explored. For this reason, this paper is aimed at clarifying this issue by analyzing both the monetary and non-monetary consequences for workers of both education and qualification mismatches in the Spanish labor market. By doing this, we will show that the analysis of education mismatches as proxy for qualification mismatches may be not accurate, and may yield misleading results since they are two separate labor-market phenomena.

The rest of the paper is as follows. Section two describes the data and evaluates the incidence of both education and qualification mismatches in the Spanish labor market. In section three, the monetary effects of education and qualification mismatches are estimated using diverse wage equations. In section four, their non-monetary effects are addressed through the estimation of job satisfaction equations. Finally, section five summarizes the main results and develops the conclusions and implications from the analysis.

II. Data and incidence of mismatches in the Spanish labor market

In this investigation we use Spanish data from the European Union Household Survey Panel (EUHSP) corresponding to 2001.

In the sample, we include workers aged 16-65 years, working at least 15 hours per week in their main job, and exclude trainees and all those who are not remunerated, as well as those workers with missing values in the key variables. The sample includes 4,186 valid records for analysis. Table 1 shows the statistical description of the sample used in this investigation.

To determine the incidence of qualification mismatches, we use workers' self-assessments by answering two items within the EUHSP questionnaire:

i) "*Did your studies or your education provide you with the knowledge required to perform your current job?*"

ii) "*Do you think your knowledge or your personal capacities would allow you to perform a more qualified job?*"

As shown in figure 1, respondents answering in the affirmative to both questions are classified as overqualified, those who answer affirmatively to the first question and negatively to the second one are classified as accurately qualified, and finally, those answering negatively to the first question are classified as underqualified, irrespective of their answer to the second question.

To identify workers' situation regarding the education match, we use the so-called 'modal procedure'[1] proposed by Kiker, Santos and De Oliveira (1997). Under this criterion, the level of education required by a given job is the modal level of education among workers with similar jobs. Thus, a worker is accurately matched in education, overeducated or undereducated when his/her own level of education is equal, higher or lower, respectively, than the modal level within his/her occupation.

Table 2 shows that the marginal distributions of education and qualification match differ noticeably, and their joint distribution reveals that both classifications are inconsistent. In fact, only 36% of workers are consistently classified under both criteria.

Figure 1. Identification of qualification mismatches

i)

	Yes	**No**
Yes	Overqualified	Underqualified
No	Accurately match	Underqualified

ii)

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[1] The occupational classification used is two-digit ISCO88.

Moreover, Badillo-Amador, Garcia-Sanchez and Vila (2005) found that the statistical association between both types of matches is very low. Consequently, education and qualification mismatches are two different phenomena that coexist in the labor market, and should not be treated as equivalent. This fact motivates that the analysis of the monetary and non-monetary consequences of education and qualification mismatches in the labor market should be developed separately for both types of phenomena.

III. Monetary consequences of labor market mismatches in Spain

A. Background

The analysis of the monetary consequences of educational mismatches has generated a body of recent economic literature; to the contrary, the consequences of qualification mismatches have received much less attention by researchers. This asymmetry in the volume of scientific production is mainly due to the difficulties associated with the identification and quantification of the accuracy of the match between workers and jobs in terms of qualification.

Regarding, the monetary consequences of qualification mismatches, we highlight the papers by Allen and van der Velden (2001) and Green and McIntosh (2002), which find that overqualified workers earn lower wages than workers with similar characteristics who are accurately qualified; however, underqualified workers earn wages neither higher nor lower than well-matched workers. On the other hand, Di Pietro and Urwin (2006) analyses the wage effects of overqualification, but in contrast to the previous

studies this does not use an indicator for the underqualification, but the sign of the effect of the overqualification on wages is the same as in preceding researches[2].

On the other hand, realizing a review of the literature on the monetary consequences of educational mismatches, we draw two main conclusions. The first one is that educational mismatches explain part of the observable differences in wages among workers with the same level of formal education. More precisely, overeducated workers face wage penalties, and undereducated workers earn wage premium compared with well-matched workers with the same level of formal education. This finding, was initially reported by Verdugo and Verdugo (1989), such as that was well discussed and argued by Cohn (1992), and Gill and Solberg (1992). Similar results were found later among others by Sicherman (1991), Alba-Ramírez (1993), Cohn and Khan (1995), Kiker, Santos and De Oliveira (1997), Battu, Belfield and Sloane (2000), Cohn and Ng (2000), Dolton and Vignoles (2000), Bauer (2002), Rubb (2003b), and Frenette (2004). The second conclusion that we draw from the literature on the monetary consequences of educational mismatches is that these explain wage differentials among workers with the same type of job, since the rate of return to one-year education depends on the education match situation. Specifically, the years of overeducation have a positive rate of return, although it is lower than that corresponding to the years of required education, and the years of undereducation have a negative rate of return. These results were found initially by Duncan and Hoffman (1981) and confirmed later by Hartog and Oosterbeek (1988), Sicherman (1991), Alba-Ramírez (1993), Cohn and Khan (1995),

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[2] The terminology used in this piece of research is different of that used in Allen and Van der Velden (2001), Green and McIntosh (2002) and Di Pietro and Urwin (2006). In fact, these utilise the terms over-skill or skill underutilisation and under-skill to refer to the situations that in this study are identified, respectively, as overqualification and underqualification.

Kiker, Santos and De Oliveira (1997), Sloane, Battu and Seaman (1999), Cohn and Ng (2000), Daly, Büchel and Duncan (2000), Groot and Maassen van den Brink (2000b), Ng (2001), Bauer (2002), Rubb (2003a), and Groenelveld and Hartog (2004), among others.

B. Models

In this paper, we begin the analysis of the monetary consequences of qualification and education mismatches examining wage differences among workers with similar characteristics, including the same level of formal education. To do so, we estimate the wage equation 1 related to qualification mismatch, and the equation 2, which is similar to the one proposed by Verdugo and Verdugo (1989), related to educational mismatch:

(1) $$LnW_i = \beta_o + \beta_1 OQ_i + \beta_2 UQ_i + \beta' X_i + \varepsilon_i$$

(2) $$LnW_i = \alpha_o + \alpha_1 OE_i + \alpha_2 UE_i + \alpha' X_i + \mu_i$$

where the dependent variable, lnW_i, is the natural logarithm of the average hourly wage earned by individual i; OQ_i and UQ_i are dummy variables taking a value of 1 if individual i is, respectively, overqualified or underqualified, and a value of 0 otherwise; OE_i and UE_i are dummy variables taking a value of 1 if individual i is respectively overeducated or undereducated, and taking a value of 0 otherwise; vector X_i represents all control variables related to personal characteristics of worker i, his/her human capital, professional status, working career and migratory path, which are indicated in table 1[3]; and ε_i and μ_i are random error terms.

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[3] Working of hours per week is not included in vector X_i.

We estimate also two additional wage equations to explore if the rate of return to one-year education in the Spanish labor market depends on the accuracy of the match regarding workers' education. The first one, equation 3a, is a classical Mincerian wage-equation; whereas the second one, equation 3b, is similar to the one proposed by Duncan and Hoffman (1981):

(3a)
$$LnW_i = \gamma_o + \gamma_1 year\_School_i + \gamma' X_i + \eta_i$$

(3b)
$$LnW_i = \delta_o + \delta_1 year\_Req_i + \delta_2 year\_OE_i + \delta_3 Year\_UE_i + \delta' X_i + \pi_i$$

The main difference between these two equations is that the number of years of formal education attained by worker i (*year_School$_i$*), included as a regressor in equation 3a, are disaggregated in equation 3b into years of required education *(year_Req$_i$)* and years of overeducation (*year_OE$_i$*) or years of undereducation (*year_UE$_i$)*, that is:

$$year\_School_i = year\_Req_i + year\_OE_i - year\_UE_i$$

Consequently,

$$year\_OE_i = year\_School_i - year\_Req_i \quad if\ year\_School_i > year\_Req_i$$

year_OE$_i$ = 0, otherwise

$$year\_UE_i = year\_Req_i - year\_School_i \quad if\ year\_School_i < year\_Req_i$$

year_UE$_i$ = 0, otherwise

The vector X_i in equations 3a and 3b comprises the same control variables that in equations 1 and 2.

Additionally, we also explore which theory explains better the educational returns in the Spanish labor market. This is done by testing the following two null hypotheses from the estimation of equation 3b:

$$H_0: \delta_1 = \delta_2 = -\delta_3$$

$$H_0: \delta_2 = \delta_3 = 0$$

The first one analyses if all years of attained education have the same return, which would suggest that the returns depend only on the number of years of education completed by workers as predicted by human capital theory (Becker, 1962 and 1975; Schultz, 1961). The second one analyses if the returns to the years of overeducation and undereducation are zero, implying that only the education required by the job generates returns as postulated by the job-competition theory (Thurow, 1975).

The estimation of all four wage-equations has been carried out using White's consistent estimators because of the possibility of a heteroscedasticity problem on the error terms. Nonetheless, we consider that heteroscedasticity is not a relevant problem in our sample according to the recommendations of Wallance and Silver (1988)[4].

C. Results

Table 3 shows estimation results for equations 1, 2, 3a, and 3b.

Estimates from equation 1, in the first panel, show that underqualified workers face wage penalties (-10.3%) compared with similar workers who are accurately matched in qualification. This result implies that underqualification explains wage differentials among workers with comparable personal, human capital and job characteristics, and

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[4] The authors recommend to compare the estimated variance of the OLS estimator with that corresponding to White's consistent estimator.

with similar migratory and unemployment trajectory. However, overqualified workers do not obtain higher nor lower wages than those who have similar characteristics and are accurately match in qualification according to equation 1.

Estimates from equation 2 (second panel) show that workers mismatched in education earn as much as comparable well-matched workers. So, we find that neither a situation of overeducation nor of undereducation contribute to explain wage differentials among workers with the same level of formal education in the Spanish labor market.

The third and fourth panels in table 3 show the estimation results corresponding to equations 3a and 3b, respectively. Results reveal that the rate of return to one year of attained schooling differs from that corresponding to one year of required schooling, suggesting that the rate of return depends on the accuracy of the education match. More precisely, the return to one year of overeducation is positive (4.3%) but lower than that corresponding to one year of required education (5.6%), whereas the return to one year of undereducation is negative (-3.5%). However, the penalty for a year of educational deficit is lower than the compensation for one year of required education. Thus, educational mismatches explain some wage differences among workers with similar jobs: overeducated workers would earn higher salaries than their well-matched co-workers, and the opposite would happen to undereducated workers.

Finally, in table 4 we show that the Wald's test rejects at 5% significance level both null hypotheses related to the human capital theory and the job competition theory. By rejecting the first hypothesis, we do not find support to the notion that all years of attained education have the same return, such as the human capital theory postulates. By rejecting the second, we do no find support to the idea that the returns to the years of

overeducation and undereducation are zero, as suggested by the job competition theory. Our results here imply that the returns to education in Spain would depend both on the education supplied by workers and on that required by jobs, predicted by the so-called 'assignment theory' (Tinbergen, 1956; Sattinger, 1975, 1980 and 1993; Hartog, 1981 and 1985).

IV. Non-monetary consequences of labor market mismatches in Spain

A. Background

Labor market mismatches, either in qualification or in education, reflect inefficiencies in the allocation of resources in the economy. However, such inefficiencies may have, as we have seen, negative, neutral or even positive monetary consequences for workers, which highlights the need to go any more deeply into consequences of qualification and education mismatches. That is why we analyse in this section its non-monetary consequences. The estimation of the effects of labor market mismatches on job satisfaction, after controlling for earnings, may help to shed light on the issue.

Rather surprisingly, the non-monetary consequences of labor market mismatches have received little attention from researchers. Regarding education mismatches, only Herch (1991), and Battu, Belfield and Sloane (2000) have explored the non-monetary effects. The former finds that overeducated workers and undereducated women are less satisfied than those who have the required level of formal education; and the latter concludes that the adequately educated workers have a premium on job satisfaction. On the other hand, Allen and van der Velden (2001) and Green and McIntosh (2002) analyse the effects of the two types of mismatches considered in this study. These find

that qualification mismatches decrease the probability of being very satisfied, while education mismatches do not affect to job satisfaction of workers. In addition, Cabral (2005) studies the effect of overqualification on four dimensions of satisfaction (pay, job security, type of work and number of hours of work) and concludes that the overqualification affects negatively to the probability of being completely satisfied in all these cases.

B. Models

We analyze the non-monetary consequences of qualification and education mismatches using three different measures of job satisfaction: satisfaction with overall job (SOJ), with the type of job (STJ), and with wage (SW). In each case we estimate the following three models:

$$(4) \qquad Y_i = \Lambda\left(\beta_0 + \beta_1 Year\_School_i + \beta_2 OQ_i + \beta_3 UQ_i + \beta' X_i\right) + \varepsilon_i$$

$$(5a) \qquad Y_i = \Lambda\left(\alpha_0 + \alpha_1 Year\_School_i + \alpha_2 OE_i + \alpha_3 UE_i + \alpha' X_i\right) + \mu_i$$

$$(5b) \qquad Y_i = \Lambda\left(\delta_0 + \delta_1 Year\_Req_i + \delta_2 Year\_OE_i + \delta_3 Year\_UE_i + \delta' X_i\right) + \pi_i$$

where Y_i represents the corresponding level of satisfaction (SOJ, STJ or SW) for individual i measured in an ordered scale from 1 (very dissatisfied) to 6 (completely satisfied), $\Lambda(.)$ is the logistic probability function, and ε_i, μ_i and π_i are random error terms. Specifically, from equations 4 and 5a, we study the effects of mismatched labor situations among comparable workers. This is why equations 4 includes as explanatory two dummy variables, OQ_i and UQ_i, which take a value of 1 when worker i is overqualified or underqualified, respectively, and a value of 0 otherwise. On the other hand, equation 5a comprises two dummy variables too, OE_i and UE_i, these take a value

of 1 when the worker is, respectively, overeducated or undereducated, and take a value of 0 otherwise. Additionally, we analyze the effects of the size of education mismatches among workers of similar jobs. To do so, we estimates the equation 5b, which includes years of required education (Year_Req$_i$), instead of years of completed education (Year_School$_i$) as in previous equations, and the years of overeducation (year_OE$_i$) or the number of years of undereducated (year_OE$_i$) corresponding to worker i. Vector X$_i$ contains control variables related to personal characteristics, human capital, professional status, unemployment and migration of worker i as described in table A1.

All the equations proposed to analyze the non-monetary consequences of education and qualification labor market mismatches are ordered discrete choice specifications, so the signs of coefficient estimates indicate the direction of changes in probability for the extreme levels of satisfaction; however, they show neither the variations in the intermediate categories nor the size of the effects. For this reason, we also calculate the predicted distribution of probabilities for satisfaction corresponding to a reference individual[5] and the predicted distribution when we alter marginally his characteristics regarding qualification match and education match.

C. Results

In table 5, we show the main estimation results from the satisfaction equations related to qualification mismatch, while in table 6 we translate them into predicted probability distributions. From those, we notice that workers who are mismatched in qualification,

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[5] Reference individual is a non-single man, wage-earner with tenure longer than ten years, working full time in the private services industry as a clerck, service worker or shops and market sales worker, has not been unemployed for 12 months in the past five years, was born in Spain and works in the same region where he was born, is well matched, and his formal education (in equations 4 and 5a), the level of required education in his job (in equation 5b), work experience, working hours, hourly wage and number of unemployment episodes are the sample mean values.

both by surplus and by deficit, have lower probability of being completely satisfied with their overall job, with the type of job that they have, and with their wage than comparable workers who are accurately matched in qualification. In addition, these probabilities are lower for underqualified workers.

In table 7 and 8, we present, respectively, estimation results from the satisfaction equations regarding education mismatches, and the predicted probability distribution emerging from them. In this way, we find that overeducated and undereducated workers do not differ significantly regarding job satisfaction of similar workers who are accurately matched. However, we find an exception since workers with educational deficit in their job have a higher probability of being completely satisfied with type of job that they develop, than those who have similar characteristics, included the same level of formal education, and are accurately matched. On the other hand, the results show that the years of educational surplus in a job affect negatively the probabilities of being completely satisfied with overall job and, more specifically, with the type of job. These results imply that overeducated workers have lower probability of being fully satisfied with their jobs than their accurately matched co-workers. However, we find that overeducated workers do not differ significantly on the probability of being fully satisfied with wage compared to their accurately matched co-workers. Regarding the years of undereducation, the results show that they increase the probabilities of being completely satisfied with overall job and, more specifically, with the wage. So, in general, undereducated workers appear to have higher probabilities of being completely satisfied with their jobs than co-workers that have the required education. However, the former does not differ from the latter on the probability of full satisfaction with the type of job.

V. Synthesis and Implications

In this paper we have analysed the incidence and the consequences, both monetary and non-monetary, of education and qualification mismatches in the Spanish labor market. Nevertheless, our purpose is not only to study the mentioned matters, but also we want to evince that both types of job/worker mismatches are different phenomena; so, they should not be treated as equivalent, as it has been done in most of the previous literature.

Looking at the joint distribution of education and qualification mismatch job situations, we find that only 36% of workers have the same kind of classification under both criteria, which implies that education and qualification mismatches are different aspects of the so called job/worker match. Moreover, this implication is ratified because the consequences for workers of both types of mismatches are also different.

Regarding monetary consequences, our study shows the following results: 1) underqualification is penalised in wage, so this mismatch would explain wage differential between workers with similar characteristics. However, overqualified workers do not show wage differential with regard to those comparable workers accurately match in qualification; 2) education mismatched workers obtain similar wages in the Spanish labor market compared to those who have the same level of formal education and other similar characteristics, and are accurately matched in education; 3) educational mismatches explain wage differentials among workers with similar jobs; more specifically, the rate of return to one year of overeducation is positive, but lower than the return to one year of required education, while the return to one year of undereducation is negative. This suggests that overeducated workers would earn higher

wages than accurately matched co-workers, while undereducated workers would earn lower wages than well-matched co-workers. However, the penalization for one year of undereducation is lower than the rate of return to one year of required education; 4) the returns to education in Spain are better explained by the assignment theory than by human capital or job competition theories because the rate of return appears to depend on both the supply of and the demand of education in the labor market.

Regarding the non-monetary consequences of job/worker mismatches, our results suggest: 1) qualification mismatches reduce workers' satisfaction, which imply that both overqualification and underqualification are undesirable situations from workers' viewpoint; 2) education mismatches have neutral, in the case of overeducation, or even positive in the case of undereducation, effects on job satisfaction for otherwise comparable workers, including the same level of formal education. For this reason, we conclude that, from comparable workers' perspective, non-monetary consequences of education mismatches are at least as satisfactory as those related to educational accurate match; 3) considering similar jobs, and so analysing jobs with the same required formal education, we observe years of education mismatch have negative, neutral or even positive non-monetary consequences for workers. The magnitude of overeducation has negative effects on job satisfaction, specifically these ones could be explained by the type of job that the workers develop. However, regarding wage, overeducated and accurately educated co-workers have similar levels of job satisfaction. On the other hand, undereducation years have positive effects on job satisfaction, which can be consequence of wage. It should be considered, in this regard, that the undereducated workers have lower wages than those accurately matched co-workers, but wage penalty

for one year of undereducation is lower than the rate of return to one year of required education.

In summary, the general implication of our analysis is that the research strategy of using educational mismatches as proxy for the study of qualification mismatches, as found in the literature, is far from accurate. Moreover, the qualification mismatch emerges as a more relevant problem for workers with similar characteristics than the educational mismatch, since the monetary consequences are neutral for overqualified workers, but negative for underqualified ones, while these consequences are always neutral for those who are educational mismatched. On the other hand, the non-monetary consequences are always negative for qualification mismatched workers, while they could be for educational mismatched comparable workers, and among similar jobs even positive.

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Table 1. Means and Standard Errors of Variables[a] Used in the Analyses

	Mean	Standard Error
Education & qualification match		
OQ	0.35	0.48
UQ	0.45	0.50
OE	0.34	0.47
UE	0.28	0.45
Year_Req	9.63	3.56
Year_OE	1.22	2.14
Year_UE	0.90	1.71
Personal characteristics		
Female	0.35	0.48
Single	0.31	0.46
Human capital		
Experience	22.52	12.51
Tenure shorter than 1 year	0.16	0.36
Tenure between 1 and 5 years	0.38	0.49
Tenure between 6 and 9 years	0.12	0.32
Year_School	9.95	4.03
Laboral status		
Self-employed	0.16	0.37
Working hours per week	42.12	9.85
Part-time job	0.06	0.23
Public sector job	0.18	0.39
Agriculture job	0.06	0.24
Manufacturing job	0.33	0.47
Services job	0.61	0.49
Hourly wage	5.87	3.93
Occupation 1	0.20	0.40
Occupation 2	0.13	0.33
Occupation 4	0.04	0.19
Occupation 5	0.19	0.39
Occupation 6	0.10	0.30
Occupation 7	0.11	0.32
Unemployment & migration		
Unemployed for 12 months	0.17	0.37
Unemployed episodes	0.77	1.63
Regional migration	0.19	0.39
Lived abroad but returned	0.02	0.14
International inmigrant	0.02	0.13
Job satisfaction		
SOJ		
degree 1	0.02	0.15
degree 2	0.06	0.24
degree 3	0.16	0.36
degree 4	0.26	0.44
degree 5	0.38	0.48
degree 6	0.12	0.33
STJ		
degree 1	0.02	0.15
degree 2	0.05	0.23
degree 3	0.13	0.34
degree 4	0.26	0.44
degree 5	0.36	0.48
degree 6	0.17	0.37
SW		
degree 1	0.07	0.26
degree 2	0.15	0.36
degree 3	0.27	0.45
degree 4	0.28	0.45
degree 5	0.18	0.38
degree 6	0.04	0.19

[a] The definitions of the detailed variables are in the appendix.

Table 2. Marginal and Joint Distributions of Qualification and Education Matches

	Overeducated	Undereducated	Accurately educated	*Qualification matches*
Overqualified	13.9	8.1	12.6	*34.6*
Underqualified	13.9	13.7	17.4	*45.0*
Accurately qualified	6.0	5.9	8.5	*20.4*
Educational matches	*33.8*	*27.7*	*38.5*	*100.0*

Table 3. Monetary Consequences of Labor Market Mismatches: Main Estimated Coefficients

	Equation 1		Equation 2		Equation 3a		Equation 3b	
	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.	Coefficient	t-stat.
Experience	0.034 ***	7.614	0.034 ***	7.687	0.034 ***	7.633	0.034 ***	7.686
$(\text{Experience})^2/100$	-0.050 ***	6.201	-0.051 ***	6.252	-0.050 ***	6.130	-0.051 ***	6.241
Tenure shorter than 1 year	-0.610 ***	14.973	-0.617 ***	15.213	-0.618 ***	15.179	-0.616 ***	15.221
Tenure between 1 and 5 years	-0.272 ***	8.225	-0.275 ***	8.349	-0.275 ***	8.299	-0.275 ***	8.359
Tenure between 6 and 10 years	-0.067 **	2.063	-0.071 **	2.196	-0.070 **	2.164	-0.071 **	2.192
Year_School	0.041 ***	8.674	0.049 ***	8.006	0.044 ***	9.298		
OQ	-0.038	1.406						
UQ	-0.103 ***	3.494						
OE			-0.021	0.715				
UE			0.045	1.550				
Year_Req							0.056 ***	7.632
Year_OE							0.043 ***	6.492
Year_UE							-0.035 ***	4.432
Adjusted - R^2	0.351		0.350		0.349		0.351	
Wald-statistic	2556.443		2534.033		2526.261		2531.974	
P-value (Wald-stat.)	0.000		0.000		0.000		0.000	

Notes: absolut value of t-statistic. (*), (**) and (***) indicate, respectively, significance at 10%, 5% and 1%.

Table 4. Test of hypoteses from equation 3b

$H_{0:}$ $\delta_{1=}$ $\delta_2 = -\delta_3$

        Chi-square: 6.609

        P-value: 0. 037

$H_{0:}$ $\delta_{2=}$ $\delta_3 = 0$

        Chi-square: 68.168

        P-value: 0.000

Table 5. Non Monetary Consequences of Qualification Mismatches: Main Estimated Coefficients of Equation 4

	Dependent variable: SOJ		Dependent variable: STJ		Dependent variable: SW	
	Coeffient	Z-stat.	Coeffient	Z-stat.	Coeffient	Z-stat.
Year_School	-0.057 ***	-4.611	-0.035 ***	-2.861	-0.023 *	-1.887
OQ	-0.231 ***	-2.883	-0.339 ***	-4.247	-0.273 ***	-3.484
UQ	-0.659 ***	-7.929	-0.723 ***	-8.672	-0.364 ***	-4.484
LR statistic (29 df)	329.985		394.979		450.774	
P-value (LR-stat.)	0.000		0.000		0.000	

Notes: (*), (**) and (***) indicate, respectively, significance at 10%, 5%, and 1%.

Table 6. Non Monetary Consequences of Qualification Mismatches: Predicted Probabilities from Equation 4

	Dependent variable: SOJ					
	1	**2**	**3**	**4**	**5**	**6**
Reference individual	*0.014*	*0.036*	*0.111*	*0.231*	*0.442*	*0.165*
Year_School + std.e.	0.017	0.042	0.126	0.247	0.424	0.144
OQ	0.018	0.045	0.132	0.254	0.416	0.136
UQ	0.027	0.066	0.178	0.285	0.352	0.093
	Dependent Variable: STJ					
	1	**2**	**3**	**4**	**5**	**6**
Reference individual	*0.012*	*0.029*	*0.084*	*0.216*	*0.416*	*0.243*
Year_School + std.e.	0.013	0.033	0.095	0.232	0.409	0.217
OQ	0.016	0.040	0.111	0.254	0.393	0.186
UQ	0.024	0.057	0.147	0.289	0.349	0.134
	Dependent Variable: SW					
	1	**2**	**3**	**4**	**5**	**6**
Reference individual	*0.058*	*0.132*	*0.278*	*0.312*	*0.184*	*0.036*
Year_School + std.e.	0.063	0.141	0.286	0.305	0.172	0.033
OQ	0.075	0.160	0.300	0.288	0.150	0.028
UQ	0.081	0.170	0.306	0.278	0.139	0.026

Note: std.e. indicates standard error

Table 7. Non-Monetary Consequences of Education Mismatches: Main Estimated Coefficients of Equations 5a and 5b

	Dependent Variable: SOJ				Dependent Variable: STJ				Dependent Variable: SW			
	Equation 5a	z-stat.	Equation 5b	z-stat.	Equation 5a	z-stat.	Equation 5b	z-stat.	Equation 5a	z-stat.	Equation 5b	z-stat.
Year_School	-0.032 **	-2.242			-0.006	-0.427			-0.017	-1.198		
OE	-0.021	-0.282			-0.042	-0.571			0.020	0.277		
UE	0.084	1.061			0.140 *	1.756			0.050	0.639		
Year_Req			-0.023	-1.481			0.004	0.255			-0.015	-0.968
Year_OE			-0.036 **	-2.236			-0.036 **	-2.196			-0.005	-0.317
Year_IE			0.060 ***	2.927			0.016	0.818			0.042 **	2.092
LR statistic (29df)	261.426		263.263		320.844		323.147		430.206		431.872	
P-value (LR stat.)	0.000		0.000		0.000		0.000		0.000		0.000	

'Notes: (*), (**) and (***) indicate, respectively, significance at 10%, 5%, and 1%.

Table 8. Non Monetary Consequences of Education Mismatches: Predicted Probabilities from Equations 5a and 5b

	Dependent Variable: SOJ											
	Equation 5a						Equation 5b					
	1	2	3	4	5	6	1	2	3	4	5	6
Reference Individual	0.021	0.053	0.150	0.265	0.391	0.120	0.021	0.052	0.149	0.264	0.392	0.121
Year_School + std.e.	0.024	0.059	0.164	0.274	0.371	0.107						
OE	-	-	-	-	-	-						
UE	-	-	-	-	-	-						
Year_Req							-	-	-	-	-	-
Year_OE = 1							0.022	0.054	0.153	0.267	0.387	0.117
Year_UE = 1							0.020	0.050	0.143	0.260	0.401	0.128

	Dependent Variable: STJ											
	Equation 5a						Equation 5b					
	1	2	3	4	5	6	1	2	3	4	5	6
Reference Individual	0.019	0.046	0.124	0.266	0.376	0.169	0.018	0.044	0.119	0.260	0.382	0.177
Year_School	-	-	-	-	-	-						
OE	-	-	-	-	-	-						
UE	0.017	0.041	0.111	0.252	0.390	0.190						
Year_Req							-	-	-	-	-	-
Year_OE = 1							0.019	0.045	0.122	0.264	0.378	0.172
Year_UE = 1							-	-	-	-	-	-

	Dependent Variable: SW											
	Equation 5a						Equation 5b					
	1	2	3	4	5	6	1	2	3	4	5	6
Reference Individual	0.076	0.162	0.301	0.286	0.148	0.028	0.077	0.163	0.301	0.285	0.147	0.027
Year_School	-	-	-	-	-	-						
OE	-	-	-	-	-	-						
UE	-	-	-	-	-	-						
Year_Req							-	-	-	-	-	-
Year_OE = 1							-	-	-	-	-	-
Year_UE = 1							0.074	0.158	0.298	0.289	0.152	0.029

Notes: (-) indicates that estimated coefficient corresponding to that is not significative at 10% significant level

Appendix

Table A1. Definition of Variables Used in the Analyses

Education & qualification match

OQ	Dummy variable, 1 if worker is overcompetent, 0 otherwise
UQ	Dummy variable, 1 if worker is undercompetent, 0 otherwise
OE	Dummy variable, 1 if worker is overeducated, 0 otherwise
UE	Dummy variable, 1 if worker is undereducated, 0 otherwise
Year_Req	Number of years of required education in a job
Year_OE	Number of years of overeducation in a job
Year_UE	Number of years of undereducation in a job

Personal characteristics

Female	Dummy variable, 1 if male, 0 otherwise
Single	Dummy variable, 1 if single, 0 otherwise

Human capital

Experience	Number of years of potencial work experience (age-education-6)
Tenure shorter than 1 year	Dummy variable, 1 if tenure is lower than 1 year, 0 otherwise
Tenure between 1 and 5 years	Dummy variable, 1 if tenure is between 1 and 5 years, 0 otherwise
Tenure between 6 and 10 years	Dummy variable, 1 if tenure is between 6 and 10 years, 0 otherwise
Year_School	Number of years of formal education completed

Laboral status

Self-employed	Dummy variable, 1 if self-employed, 0 otherwise
Working hours per week	Average number of working hours per week
Part-time job	Dummy variable, 1 if part-time job, 0 otherwise
Public sector job	Dummy variable, 1 if job in the public sector, 0 otherwise
Agriculture job	Dummy variable, 1 if agriculture job, 0 otherwise
Manufacturing job	Dummy variable, 1 if manufacturing job, 0 otherwise
Services job	Dummy variable, 1 if service industry job, 0 otherwise
LnW	Natural logarithm of hourly wage
Occupation 1	Dummy variable, 1 if job in occupation 01 or 02 of ISCO88, 0 otherwise
Occupation 2	Dummy variable, 1 if job in occupation 03 of ISCO88, 0 otherwise
Occupation 4	Dummy variable, 1 if job in occupation 06 of ISCO88, 0 otherwise
Occupation 5	Dummy variable, 1 if job in occupation 07 of ISCO88, 0 otherwise
Occupation 6	Dummy variable, 1 if job in occupation 08 of ISCO88, 0 otherwise
Occupation 7	Dummy variable, 1 if job occupation 09 of ISCO88, 0 otherwise

Unemployment & migration

Unemployed for 12 months	Dummy variable, 1 if worker unemployed for 12 months in the last 5 years, 0 otherwise
Unemployment episodes	Number of unemployment episodes in the last 5 years
Regional migration	Dummy variable, 1 if worker was not born in the region where he/she lives
Lived abroad but returned	Dummy variable, 1 if worker born in Spain, lived abroad, and come back, 0 otherwise
International inmigrant	Dummy variable, 1 if worker is a foreing inmigrant, 0 otherwise

Job satisfaction

SOJ	Ordered variable from 1 (very dissatisfied) to 6 (completely satisfied) to indicate the satisfaction with overall job
STJ	Ordered variable from 1 (very dissatisfied) to 6 (completely satisfied) to indicate the satisfaction with type of job
SW	Ordered variable from 1 (very dissatisfied) to 6 (completely satisfied) to indicate the satisfaction with wage