

# CAN JOB/WORKER MISMATCHES HELP TO EXPLAIN WAGES AND JOB SATISFACTION DIFFERENCES AMONG COMPARABLE WORKERS?

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## ABSTRACT

The relevance of skill job-worker mismatches is analyzed along with that of education mismatch on Spanish data from the European Community Household Panel (ECHP) survey for the year 2001. Statistical analysis for the prevalence of both types of mismatches, as well as econometric analysis of their wage and job satisfaction consequences has been carried out. Three main findings emerge. First, the degree of statistical association between education and skill mismatches is rather low in the Spanish labour market, suggesting that education mismatch is a rather poor proxy for skill mismatch. Second, both skill and education mismatches appear to have separate, negative effects on wages although skill mismatches show stronger influences. Third, skill mismatches severely reduce workers job satisfaction while the effects of education mismatch weakened when skill mismatches are accounted for. Consequently, skill mismatch is found to be a relevant determinant of wage, as well as a stronger predictor of workers' utility, than education mismatch.

*Key words: education mismatch, skill mismatch, wage, job satisfaction.*

## 1. INTRODUCTION

The abilities, capacities, attitudes and knowledge possessed by workers determine their equipment of professional skill. Job-worker skill mismatches may happen regarding skill level, when workers skills are either too high or too low, being the right type of skills for their jobs, and also in domain, when workers skills are other than those required by their current jobs. Therefore, the perfect match regarding skill, both in level and domain, should be opposed –at least conceptually- to three different types of mismatches: overskill, underskill and domain mismatch. Job-worker skill mismatches are economically relevant since labour productivity, and thus wages, are likely to depend to some extent on the quality of the fit between workers' endowments and the requirements of the jobs they performs.

In the empirical literature, however, a worker's level of formal education is most often used as a proxy for his/her level of professional skill because the latter is presumably more difficult to identify and measure (see Borghans, Green and Mayhew, 2001). Although education is not the only mechanism that promotes and develops workers' skills, the literature focused specifically on skill mismatches is rather scarce. Indeed, a number of papers deal with skill and education job-worker mismatches as perfect equivalents in spite of evidence point out that educational mismatches appear to be weakly related to skill mismatches. Allen and van der Velden, (2001); Di Prieto and Urwin, (2006); Green and McIntosh (2007). Moreover, most papers on job-worker pairing only address the pecuniary consequences of educational mismatches, as it was shown in reviews by Groot and Maassen van den Brink (2000a), Hartog (2000) and Rubb (2003a). The monetary effects of skill mismatches and the non-monetary consequences of both types of mismatches have seldom been explored.

This paper aims at clarifying the issue by analyzing the prevalence of educational and skill mismatches in the Spanish labour market and their effects in terms of wages and workers' job satisfaction. The analysis advances on previous research by considering three dimensions of job satisfaction: overall job satisfaction, satisfaction with pay and satisfaction with the job itself. Another step further taken in this paper is that it examines the consequences of

skill mismatch regarding domain along with two categories of mismatch regarding skill level: overskill and underskill. Although the situation of domain mismatch was already identified in Allen and van der Velden (2001), their subsequent analysis did not deal with domain-mismatched workers as a separate category of skill-mismatched workers.

The most important findings from previous research on the impacts of job-worker mismatches are examined in the two next sections in order to highlight the relevance of treating skill mismatch and education mismatch as two different labour market issues, since neglecting skill mismatches in the analyses on the consequences of job-worker pairing mismatches, as it was done in most previous research, can lead to erroneous interpretations of the facts.

## **2. PREVIOUS FINDINGS ON JOB-WORKER MISMATCHES: WAGE CONSEQUENCES**

A large body of literature related to the wage effects of job-worker mismatches focused only on the effects of the education mismatches. Two main conclusions can be drawn from this literature. The first one is that education mismatches explain part of the observable differences on wages among workers with the same level of education. More precisely, workers with a level of education higher than that required in their jobs (overeducated workers) face wage penalties, while those who have a education level lower than that required in their jobs (undereducated workers) usually earn higher wages than workers with the required education level for their jobs (adequately educated workers). This result was initially reported by Verdugo and Verdugo (1989), and was well discussed by Cohn (1992), and Gill and Solberg (1992). Similar results were found later by Sicherman (1991), Alba-Ramírez (1993), Cohn and Khan (1995), Kiker et al. (1997), Battu et al. (2000), Cohn and Ng (2000), Dolton and Vignoles (2000), Bauer (2002), Rubb (2003), and Frenette (2004) among others.

The second conclusion is that education mismatches also explain part of the wage differences among workers with the same type of job, i.e. workers in jobs with the same educational requirements. The years of overeducation have a positive rate of return, although it is lower than that for the years of required education, while the years of undereducation usually have a negative rate of return. These results were initially reported by Duncan and Hoffman (1981), and confirmed later by Hartog and Oosterbeek (1988), Kiker et al. (1997), Sloane et al. (1999), Daly et al. (2000), Groot and Maassen van den Brink (2000b), Ng (2001), and Groenelveland and Hartog (2004), among others.

The effects of education mismatches on wages have been explained in terms of the so-called 'assignment theory' which postulates that the degree of utilization of skill endowments determines a worker's productivity and hence his/her wage (Sattinger (1993)). Under this view, education mismatch would reflect skill mismatch: overeducation involves skill under-utilisation, while undereducation would imply overutilisation of workers' skills.

Consequently, the effects of education mismatch on wages are expected to vanish when controls for skill mismatch are included in the analysis. However, Allen and van der Velden (2001) found on a sample of Dutch workers that education mismatch had a significant impact on wages even after controlling for skill mismatch, which suggests that the wage effects of education mismatches are not due to the degree of utilisation of workers' skill endowments, contrary to what assignment theory suggests. They proposed two alternative explanations for their results. The first one suggests that the asymmetric information about workers' productivity would lead to wages being determined by easily observable institutional factors such as the jobs' educational requirements or the education attained by workers. The second explanation is that workers with the same level of education can have different skill endowments, and, consequently, well-matched workers regarding skill level may still be

mismatched in terms of education. Therefore, individuals with more (less) marketable skills would hold on jobs with higher (lower) educational requirements, thus implying that the size of educational mismatch would be a good predictor of the wage differential among workers. This explanation was later named 'heterogeneous skill theory' by Di Prieto and Urwin (2006) and 'heterogeneous ability' by Green and McIntosh (2007).

### **3. PREVIOUS FINDINGS ON JOB-WORKER MISMATCHES: JOB SATISFACTION CONSEQUENCES**

Job-worker mismatches, either in education or in skills, reflect inefficiencies in the allocation of resources in the economy, since workers' investment in human capital is not adequately used in production when workers' education or skills do not match accurately with those required in their jobs. However, such inefficiencies might have even positive monetary premia for some workers, as reported in the previous section, which highlights the need of analysing whether or not job-worker mismatches have effects on job satisfaction, and which one, education mismatch or skill mismatch, has the most prevalent influence.

Some research has addressed the job satisfaction effects of job-worker mismatches although so far the evidence is rather limited and non-conclusive so far. Papers focused only on education mismatch typically find strong negative effects on job satisfaction. Both overeducation -Tsang et al., (1991); Battu et al., (1999 and 2000); Johson and Johnson (2000) and undereducation -Hersch (1991) have been reported as reducing workers' job satisfaction. Additionally, analyses including simultaneously education and skill mismatches typically conclude that both overskilled and underskilled workers are less satisfied than well-matched comparable workers, while education mismatch often shows neutral effects. Allen and van der Velden (1991); Green and McIntosh (1992).

### **4. DATA AND METHODS**

This paper uses Spanish data from European Community Household Panel (ECHP) survey from the 2001 wave. The survey includes information related to a wide range of topics, such as personal and employment characteristics, education, income, health, job satisfaction, etc. The empirical analyses have been restricted to 3,641 valid records, which include workers between 16 and 64 years old working at least 15 hours per week in their main job, and exclude trainees and those working in non-paid jobs, as well as workers with missing values in the key variables.

The so-called 'modal' procedure, proposed by Kiker et al. (1997), has been used to identify the educational accuracy of the job-worker pairing. Under this criterion, the level of education required by a given job is defined as the modal education level among workers in jobs within the same occupational category<sup>1</sup>. Thus, a worker is adequately educated, overeducated or undereducated when his/her own level of education is, respectively, equal, higher, or lower than the corresponding educational mode of workers in the same job title. The size of education mismatches has been determined by comparing the number of years of education required by jobs with the number of schooling years linked to the education level actually attained by workers.

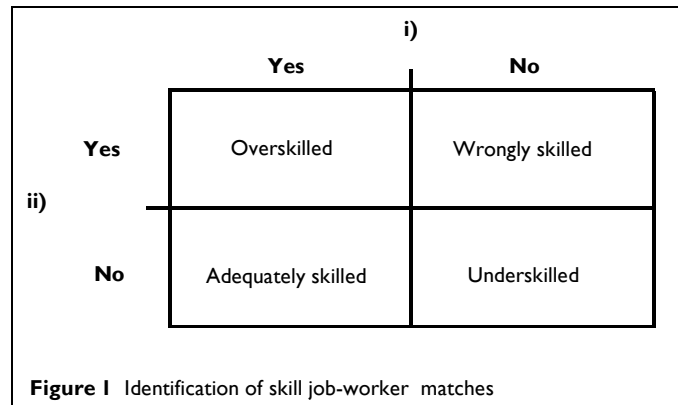
The skill job-worker match has been identified from workers' self-assessment when respondents answered the following two questions included in the ECHP survey:

- "Have your studies or your training provided you with the skills needed for your present type of work?"

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<sup>1</sup> The occupational classification is the International Standard Classification of Occupations (ISCO88) at two-digit level.

- "Do you feel that your skill or your personal capacities would allow you to do a more demanding job than the one you have now?".



As shown in Figure 1, individuals who answered 'yes' to both questions are classified as overskilled workers, because they report a surplus of skills to develop their current job. Workers who answered 'yes' to the first question and 'no' to the second one are classified as adequately skilled workers, since their level of skill is high enough for their current job, although it would not enable them to develop a more demanding job. Those who answered 'no' to both questions are classified as underskilled workers, since they have a shortage of skills to develop their tasks at their current jobs. Finally, respondents who answered 'no' to the first question and 'yes' to the second one are classified as domain-mismatched workers, since they report shortage of skills to develop their current job tasks while, at the same time, they feel they could perform well in a more demanding job, suggesting that their skill endowments are erroneous for their current job. Strictly speaking, domain-mismatched workers can be considered as a special case of underskilled workers since they report that their endowments did not provided them with the skills required to develop their current jobs. Therefore, domain-mismatched workers should be included as underskilled when the association degree between education and skill mismatches is examined. However, they should be treated as a separate group when the wage and job satisfaction consequences of mismatches are analyzed.

With the purpose of examining the relevance of considering education and skill mismatch as two separate phenomena, this piece of research focuses initially on the association degree between education and skill mismatches in order to analyse whether or not both kinds of mismatches reflect the same reality, as most previous literature has suggested. Next, the analysis focuses on the consequences of both kinds of mismatches regarding hourly wages and workers' job satisfaction.

The dependent variable used to estimate the wage effect of mismatches is the natural logarithm of the average hourly wage reported by individuals. The set of explanatory variables, detailed in Table 1, includes job-worker match variables (years of education mismatch, and skill mismatch dummies), human capital indicators (level of formal education, experience, quadratic experience and job tenure), labour market status variables (type of work, type of contract, industry, and unemployment record) and other personal characteristics (gender, marital status). White's consistent estimates of covariances in the presence of heteroskedasticity of unknown type have been obtained.

To examine the job-satisfaction consequences of mismatches, three different measures of job satisfaction have been considered as dependent variables: overall job satisfaction, satisfaction with the type of job, and satisfaction with wage.

**Table 1** Descriptive of variables

Variables	Mean	Std. Dev.	Min	Max
<i>Job-worker mismatches</i>				
Overskilled	.36	.48	0	1
Underskilled	.20	.40	0	1
Wrongly skilled (Base: Adequately skilled)	.24	.43	0	1
Yrs. overeducation	1.13	2.02	0	12
Yrs. undereducation	.90	1.64	0	12
<i>Personal characteristics:</i>				
Women (Base: Men)	.37	.48	0	1
Separated and divorced	.04	.19	0	1
Single (Base: Married)	.34	.47	0	1
<i>Human capital:</i>				
Experience	21.11	11.90	1	56
Quadratic experience/100	5.87	5.97	0	31
Tenure < 1 yr.	.19	.39	0	1
Tenure: 1 - 5 yrs.	.39	.49	0	1
Tenure: 6 - 10 yrs. (Base: Tenure > 10 yrs.)	.11	.31	0	1
Education: Level 3 of ISCED <sup>a</sup>	.23	.42	0	1
Education: Level 4, 5, 6 and 7 of ISCED (Base: ISCED level lower than 3)	.23	.42	0	1
<i>Labour status:</i>				
Self-employed (Base: wage earner)	.02	.13	0	1
Part-time job (Base: Full-time job)	.06	.23	0	1
Public sector (Base: private sector)	.22	.42	0	1
Agricultural sector	.04	.19	0	1
Manufacturing sector (Base: Services industry)	.35	.48	0	1
Episodes of unemployment	.83	1.65	0	24
Natural logarithm hourly wage	1.32	.67	-2	3
<i>Health status:</i>				
Workers' self-assessment <sup>b</sup>	1.95	.67	1	5
<i>Job satisfaction<sup>c</sup>:</i>				
Satisfaction with overall job	4.26	1.19	1	6
Satisfaction with type of job	4.36	1.20	1	6
Satisfaction with wage	3.44	1.26	1	6
N	3641			

<sup>a</sup> International Standard Classification of Education.

<sup>b</sup> Ordered variable in a scale from 1 (very good) to 5 (very bad).

<sup>c</sup> Ordered variable in a scale from 1 (very dissatisfied) to 5 (completely satisfied).

The corresponding levels of satisfaction are assessed by workers in an ordered scale ranging from 1 (very dissatisfied) to 6 (completely satisfied), so estimation of the effects have been specified through ordered probit equations. The set of explanatory variables for job satisfaction is the same included in the wage equations with two additions: both (log) wages and workers' self-assessed health status are well-known determinants of workers' level of job satisfaction and must be included as explanatory. Coefficient estimates in ordered choice models indicate the direction of changes in probability for the extreme categories of the dependent variable when the explanatory variables are altered, but not for the intermediate categories. In addition, the estimates do not show the size of such variations. Accordingly, the predicted probability distributions of satisfaction are calculated for a reference, adequately matched individual, as well as the predicted distributions when the skill match and the education match variables are altered.

## 5. RESULTS

Table 2 presents the statistical distributions of education and skill matches reflecting the prevalence of both types of job-worker mismatches in the Spanish labour market. Regarding the marginal distribution of education match, 34.3% of workers are overeducated, 37.3% are adequately educated, and 28.4% are undereducated. The marginal distribution of skill match shows that 36.4% of workers are overskilled, 19.6% are adequately skilled and 44.0% are underskilled, including here 24.5% classified as skill domain-mismatched. The bivariate distribution of education and skill matches reveals that only 37.7% of workers have the same kind of fit under both criteria, that is, they are simultaneously overeducated and overskilled, or adequately educated and skilled, or undereducated and underskilled. This suggests a weak relationship between education and skill matches, since in the case of perfect association the sum of figures in the main diagonal of Table 2 should approach 100%. Additionally, Cramér's V takes a value of 0.10 evidencing that the degree of statistical association between the marginal distributions is rather weak in spite of Pearson's  $\chi^2$  test allowing for the rejection of the statistical independence hypothesis. Consequently, education and skill mismatches appear to describe different aspects of the quality in the job-worker match coexisting in the Spanish labour market, and should not be treated as equivalent.

**Table 2** Percentage joint distribution, independence test, and association degree between education and skill job-worker matches

	Overeducated	Adequately educated	Undereducated	Total
Overskilled	15.6	12.9	8.0	36.4
Adequately skilled	5.9	7.7	6.0	19.6
Underskilled <sup>a</sup>	12.8	16.8	14.4	44.0
Total	34.3	37.3	28.4	100.0
Pearson's $\chi^2$		78.564		
P-value		.000		
Cramér's V		.0104		

<sup>a</sup>The wrongly skilled workers are included, as those are a special case of underskilled workers.

Table 3 presents the main estimates from two different specifications of the wage equation. The first one includes only the years of education mismatch to control for the quality of the job-worker pairing, while the second one includes skill mismatch dummies too. The results show, first, that the latter specification is more accurate to explain wage differentials since both its AIC and BIC goodness-of-fit measures display lower values than those corresponding to the former equation. Second, estimates show that the negative effect of overedu-

cation hardly varies after controlling for skill mismatch, against the prediction of the assignment theory<sup>2</sup>. Consequently, the effect of overeducation does not appear to be linked to a lower degree of skill utilization implicit in surplus education. Indeed, the results suggest that overeducation, on the one hand, and skill mismatches, on the other, have separate, negative significant effects on wages. The estimates of wage penalties for overskilled, underskilled and domain-mismatched workers are 5.4%, 12.9% and 16.0% respectively. Consequently, domain mismatch appears as the skill mismatch situation with the strongest negative effect on wages, followed by skill shortage and, finally, by skill surplus. Regarding education mismatches, the years of overeducation appear to have a negative rate of return, and the years of undereducation show no significant effect, suggesting that overeducation is the only type of education mismatch that helps to explain wage differentials among workers.

**Table 3** Estimates of wage equations by White's consistent estimators in the presence of heteroskedasticity, with control variables<sup>a</sup>

	B	(Robust s.e.)	B	(Robust s.e.)
<i>Natural logarithm of the average hourly wage</i>				
Yrs. overeducation	-.0340***	(.006)	-.029***	(.006)
Yrs. undereducation	.000	(.006)	.001	(.006)
Overskilled			-.054**	(.023)
Underskilled			-.129***	(.028)
Wrongly skilled			-.160***	(.027)
Adjusted R-squared:	.439		.445	
Wald test:	167.71		146.19	
P-value:	.000		.000	
Akaike information criterion	5364.565		5329.050	
Bayesian information criterion	5482.365		5465.450	

\*p<0.100, \*\*p<0.050, \*\*\*p<0.010

<sup>a</sup>Only control variables related to job-worker mismatches are shown. Other controls includes individual characteristics (gender, marital status), human capital (level of formal education, experience, quadratic experience, and tenure), labour status (type of worker, type of contract, sector, episodes of unemployment). Estimates are available on request.

Table 4 shows the estimates for the effects of job-worker mismatches on overall job satisfaction, with the job itself, and with wage. Again, two specifications have been used: the first one includes education mismatches as explanatory variables, while the second one adds skill mismatches as well, along with the set of explanatory variables reported above.

The results show that the three kinds of skill mismatches have strong negative impacts on worker' satisfaction irrespective of the job aspect considered: overskilled, underskilled and domain-mismatched workers are significantly less satisfied with their jobs overall, with the type of job, and with their wages than otherwise comparable well-matched workers. Domain-mismatch displays the strongest negative effect, followed by underskill and overskill, on workers' job satisfaction. To the contrary, the effects of education mismatches vary depending both on the measure of job satisfaction considered and on equation specification. Overeducation reduces overall job satisfaction and satisfaction with the type of job, although the effects are somehow weakened when skill mismatches enter as control variables.

<sup>2</sup> A wage equation considering only the skill mismatch situations as job-worker mismatch control variables was also estimated. The results are not reported since the magnitude and the significance of estimates resulted quite similar to those obtained from the equation that includes both skill and education mismatches as explanatory variables.

**Table 4** Probability of satisfaction of a reference individual and marginal effects<sup>a</sup> associated to job-worker mismatches<sup>b</sup>

<i>Satisfaction with overall job</i>						
Degree of satisfaction <sup>c</sup>	1	2	3	4	5	6
Probability (Y) <sup>d</sup>	.017	.051	.147	.26	.400	.124
Yrs. overeducation	.001***	.003***	.005***	.003***	-.006***	-.006***
Yrs. undereducation	-.001	-.002	-.003	-.002	.003	.004
Wald test	255.580					
P-value	.000					
Degree of satisfaction <sup>c</sup>	1	2	3	4	5	6
Probability (Y) <sup>e</sup>	.009	.032	.110	.232	.440	.177
Yrs. overeducation	.000*	.001*	.003*	.003*	-.002*	-.005*
Yrs. undereducation	-.000	-.001	-.003	-.003	.002	.005
Overskilled	.004**	.009***	.020**	.018**	-.019**	-.032***
Underskilled	.009***	.020***	.041***	.033***	-.043***	-.059***
Wrongly skilled	.019***	.038***	.071***	.048***	-.084***	-.092***
Wald test	319.680					
P-value	.000					
<i>Satisfaction with type of job</i>						
Degree of satisfaction <sup>c</sup>	1	2	3	4	5	6
Probability (Y) <sup>d</sup>	.017	.044	.129	.270	.374	.166
Yrs. overeducation	.002***	.004***	.007***	.006***	-.007***	-.012***
Yrs. undereducation	-.001	-.001	-.002	-.002	.002	.003
Wald test	244.160					
P-value	.000					
Degree of satisfaction <sup>c</sup>	1	2	3	4	5	6
Probability (Y) <sup>e</sup>	.007	.024	.086	.226	.409	.249
Yrs. overeducation	.001***	.002***	.004***	.006***	-.002	-.011***
Yrs. undereducation	-.000	-.001	-.002	-.002	.001	.004
Overskilled	.005***	.011	.027***	.032***	-.017***	-.058***
Underskilled	.011***	.024	.051***	.053***	-.040***	-.098***
Wrongly skilled	.019***	.038	.076***	.069***	-.069***	-.133***
Wald test	332.860					
P-value	.000					
<i>Satisfaction with wage</i>						
Degree of satisfaction <sup>c</sup>	1	2	3	4	5	6
Probability (Y) <sup>d</sup>	.068	.150	.291	.285	.173	.034
Yrs. overeducation	.002	.002	.002	-.002	-.003	-.001
Yrs. undereducation	-.000	-.000	-.000	.000	.001	.000
Wald test	225.850					
P-value	.000					
Degree of satisfaction <sup>c</sup>	1	2	3	4	5	6
Probability (Y) <sup>e</sup>	.046	.119	.268	.303	.214	.049
Yrs. overeducation	.000	.001	.000	-.000	-.001	-.000
Yrs. undereducation	-.000	-.000	-.000	.000	.000	.000
Overskilled	.023***	.032***	.025***	-.019***	-.044***	-.017***
Underskilled	.013**	.020**	.016*	-.010*	-.027**	-.011*
Wrongly skilled	.043***	.055***	.037***	-.037***	-.072***	-.026***
Wald test	267.650					
P-value	.000					

\*p<0.100, \*\*p<0.050, \*\*\*p<0.010

<sup>a</sup> In dummies variables is shown the discrete change from 0 to 1.

<sup>b</sup> Only marginal effects of control variables related to job-worker mismatches are shown. Other controls includes individual characteristics (gender, marital status), human capital (level of formal education, experience, quadratic experience, and tenure), labour status (type of worker, type of contract, sector, natural logarithm of wage per hour, episodes of unemployment). Estimates and the rest of marginal effects are available on request.

<sup>c</sup> Degree of satisfaction is in a ordered scale from 1 (very dissatisfied) to 6 (completely satisfied).

<sup>d</sup> Probability by satisfaction degree of the reference individual. The reference individual is man, who is adequately match in terms of both education and skill in his job, married, works in the same firm by more than ten years, wage earner, in the private sector, in the services industry, his level of formal education correspond to level of International Standard Classification of Education (ISCED) lower than 3, and his experience, hourly wage, unemployed episodes, and health status are the same mean values.

<sup>e</sup> Probability by satisfaction degree of the reference individual. The reference individual is man, who is adequately educated, married, works in the same firm by more than ten years, wage earner, in the private sector, in the services industry, his level of formal education correspond to level of International Standard Classification of Education (ISCED) lower than 3, and his experience, hourly wage, unemployed episodes, and health status are the same mean values.



Undereducation does not show significant effects on overall job satisfaction and on satisfaction with the type of job, and neither overeducation nor undereducation influence satisfaction with wage, irrespective of the inclusion of skill mismatches in the equation. In brief, the results suggest that skill mismatches are more relevant than education mismatches to explain differentials in workers' levels of job satisfaction<sup>3</sup>. On the one hand, the negative effects of overskill, underskill and domain-mismatch are highly significant and reach all measures of satisfaction considered; on the other hand, only overeducation influences negatively overall job satisfaction and satisfaction with the type of job, although part of the effects vanish when skill mismatch variables are included as additional explanatory.

## **6. CONCLUSIONS**

This paper analyzes the prevalence of diverse types of job-worker mismatches and their consequences on wages and on three different measures of job satisfaction in the Spanish labour market. Skill mismatches and education mismatches and its effects are discussed simultaneously by means of statistical and econometric methods.

Statistically, the marginal distributions of both types of mismatches appear to be only weakly associated, and the bivariate distribution of education and skill mismatches reveals that only 37.7% of workers were similarly classified under both criteria, implying that education and skill mismatches reflect rather different aspects of the accuracy of the job-worker pairing in the labour market.

Econometric analyses of the consequences of job worker mismatches are carried out in terms of its effects as determinants of wages and job satisfaction differentials. The former accounts for the influence of mismatch situations on the pecuniary rewards workers obtain from their effort at work, whereas the latter proxies for the effects on total rewards from work including the non-pecuniary ones.

The results on the wage effects of mismatches show, first, that wage differentials among otherwise comparable workers are better explained when skill mismatches are taken into account along with education mismatches; and second, that overskilled, underskilled and domain-mismatched workers face significant wage penalties, while the returns to overeducation are negative and undereducation has neutral effects on wages. The negative impact of overeducation on wages hardly varies after controlling for skill mismatches, against the predictions from the assignment theory, so the effect of overeducation does not appear to be linked to a lower degree of skill utilization implicit in surplus education. Indeed, the results suggest that overeducation, on the one hand, and skill mismatches, on the other, have separate, negative significant effects on the wages earned by Spanish workers.

Regarding job satisfaction, the results lead to two main conclusions. The first one is that all kinds of skill mismatches have strong negative effects on the three measures of job satisfaction considered. Skill mismatches appear to reduce severely workers' overall job satisfaction, satisfaction with the type of job and satisfaction with pay, which implies that overskill, underskill and domain-mismatch are undesirable situations from workers' viewpoint since they reduce workers' evaluation of total rewards.

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<sup>3</sup> It was also estimated the three kinds of job satisfactions considered by this paper through models which included the skill mismatches as explanatory variables and excluded the education mismatch variables. Comparing these estimations with those got when it is controlled by both types of mismatches, it was found the marginal effects associated to skill mismatches from both models are quite similar.

The second conclusion is that overeducation is negatively valued by workers in terms of overall job satisfaction and satisfaction with the type of job, but not in terms of satisfaction with wage, while undereducation does not influence workers' job satisfaction.

To summarize, the general implications of the analysis point out that the research strategy that uses education mismatches as a proxy for the study of skill mismatches, as it is done in most previous literature, may not be adequate because skill and education mismatches appear to capture different aspects of the accuracy the job-worker pairing, and, therefore, they have different consequences for workers, both in monetary and non monetary terms. Generally speaking, skill mismatches are perceived by workers as a more relevant problem than education mismatches. The wage and job satisfaction consequences of skill mismatches are strongly negative for both level-mismatched and domain-mismatched workers, the latter facing greater monetary and non-monetary penalties than the former. To the contrary, education mismatches show much weaker effects both on wages and on job satisfaction.

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