Mismatch in the Spanish Labor Market
Overeducation?

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ABSTRACT

The objective of this article is to explain the job match, which is assessed by comparing attained education and job-required education as reported by workers. We frame our empirical work according to the occupational mobility theory. Using a cross-section of workers from a representative survey of the Spanish labor force, we consider overeducated workers to be those who report that the level of education their jobs require is below the level of education they have attained. Our results indicate that overeducated workers have less experience, decreased on-the-job training and higher turnover than other comparable workers. We also observe an improvement in the job match over age and mobility.

I. Introduction

Overeducation was a central issue captivating the attention of U.S. labor economists during the seventies, when the problem and its implications first became apparent (Freeman 1976, Rumberger 1981).

Overeducation has been characterized as a significant reduction in workers' returns to higher education. This reduction has been attributed to the increased supply of more educated workers in the labor market.

In the context of this study, overeducation is identified through information obtained from workers about the schooling they actually have and the schooling they report as necessary to perform their respective jobs. Overeducated workers are those who report the education required by their jobs to be below the level of education they have attained. According to this definition, we are able to assess that overeducation can exist regardless of an increase in the supply of more educated workers, since even in an economy without a surplus of college graduates, as that of Spain, it is likely that some workers perform jobs for which they are overqualified. In this case, overeducation is present at all levels of schooling.

Since new entrants in the labor market lack experience, they may be assigned to jobs that do not match with their formal education. Nonetheless, they learn skills in entry-level jobs that are useful in performing future alternative jobs. Young workers generally have the greatest difficulty in obtaining a first job. Independent of how unsatisfactory the first job might be to the worker's aspirations, the entry job becomes fundamental to breaking into any professional career.[1]

From the point of view of the occupational mobility theory (Rosen 1972, Sicherman and Galor 1990), overeducation is a temporary mismatch because overeducated workers readily get promoted or move to higher-level jobs. Other theories, however, support the argument that overeducation can be a persistent phenomenon (Spence 1973, Thurow 1975, Tinbergen 1956, Hartog 1981). The pace of adjustment to reduce overeducation might be slower than the neoclassical theory predicts. When overeducation is perceived as persistent, some concern arises about its effects. Duncan and Hoffman (1981), Rumberger (1987), Hartog and Oosterbeek (1988), and Tsang and Levin (1985) describe overeducation as a long-lasting problem with negative effects on productivity.

This study, in addition to identifying overeducated workers, considers adequately educated and undereducated workers as the alternative cases in comparing actual and required schooling for the job. The main objectives of this work are first to explain the job match in terms of education, training, and experience; second, to ascertain the effect of the job match on the returns to education; and third, to study how overeducated workers improve their job match by moving to different jobs. The conceptual framework is based on the occupational mobility theory. In order to address the relationship between education, training, and experience, we use available information on required job training (hereafter RQT), and calculate the potential experience of workers in the labor market. One plausible hypothesis in framing our analysis is that on-the-job training and experience allow workers to perform jobs for which they turn out to be virtually undereducated.

The estimation of wage equations becomes a fundamental basis for the analysis in this work. We discern differences in returns to schooling among adequately educated, overeducated, and undereducated workers. We test the hypothesis that

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1. In Spain, the lack of work experience among entry-level job seekers has often been stressed as one explanation for the high unemployment rate among young workers.

surplus or deficit years of education are rewarded at different rates than are years of adequate education. The returns to years of overeducation are shown to be positive but lower than the returns to years of adequate education.

When investigating the turnover effect of the job mismatch in terms of education, we find evidence to support that overeducated workers have higher mobility than other comparable workers. One reason for this is that they must relocate to improve their job match. In order to test that the relocation is consistent with the predictions of the occupational mobility theory, we look at the transition patterns between previous and current job matches.

The main findings in this study can be summarized as follows:

1. Undereducated workers are more likely to be males and hold jobs associated with higher RQT and experience than overeducated workers.

2. Overeducated workers earn lower wages than do adequately educated workers with the same attained education. The reason for this is that the returns to years of overschooling, though positive, are significantly lower than are the returns to years of adequate schooling.

3. Undereducated workers receive higher wages than do workers with the same education who occupy jobs that require the schooling they have. This is due to the fact that the losses associated with a year of undereducation in those jobs are lower than the returns to a year of adequate schooling.

4. RQT has a positive effect on wages. In addition, workers who have not completed their RQT period earn significantly less than comparable workers who have completed their training.

5. Using a cross-section of workers, we have found a declining trend in the proportion of overeducated workers measured over years of age, hinting a defined pattern in the upgrading process of overeducated workers throughout their working lives.

6. Overeducated workers showed a higher job turnover rate than did adequately educated workers. The transition pattern points to an improvement in the match over time.

These results have been obtained by using data that reflect the status of the Spanish labor force at the end of 1985. Other results consistent with some of those obtained here have been provided by Duncan and Hoffman (1981), Rumberger (1987), Hartog and Oosterbeek (1988), Sicherman (1991), and others.

II. The ECVT and Human Capital Related Questions

The Living and Working Conditions Survey (ECVT) is a Spanish nation-wide representative household survey that was carried out at the end of 1985. It contains a variety of questions concerning the labor market status of more than 60,000 individuals, ages 14 and older.[2]

The responses to two key questions asked in the ECVT provide the substance of the present work. The first question asked of workers is stated as follows: "What kind of education does a person need in order to perform your job?" The

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2. It should be pointed out that the questions were responded to by the workers concerned.

survey response options were coded according to the various levels of formal education in Spain.[3]

The comparison between required and attained education leads to three possible definitions:

1. "Adequately educated" are those workers whose required education coincides with the formal education possessed by them.

2. "Overeducated" are those workers whose education is greater than that required to perform the job.

3. "Undereducated" are those workers whose level of education is less than that required for the job.

Traditionally, two procedures have been used to identify the existence of overeducated and undereducated workers. One is through the evaluation of jobs by job analysts. The other is by workers' self-reported information about their jobs.[4] In the United States, the first method is used in the Dictionary of Occupational Titles (DOT), and the second method is used in several waves of the Panel Study of Income Dynamics (PSID).[5]

The second ECVT question that we use in this work was formulated in the following terms: "Considering the job that you do, how long would it take someone with the required education, who begins the job, to do it correctly?" The possible answers were coded as follows: 1) no time, 2) less than one month, 3) 1–3 months, 4) 3–11 months, 5) one year or longer. These periods of time can be interpreted as on-the-job training.[6] At the same time, we can think of the varied responses as dependent upon the complexity of the job held by workers. Individual ability and skills of respondents, however, may affect the workers' perceptions of the difficulties implicated in mastering the job.

Although workers' answers to questions on required education and training are subjective, they depend on the characteristics of the jobs workers hold. As workers move up the occupational ladder, their jobs reflect an increased relation to

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3. The levels of accomplished formal education are: illiterate, <6 years, primary (6 years), presecondary (8 years), secondary (12 years), vocational (12 years), preuniversity (15 years), and university (17 years). For the question on required education, the range of possible answers included all of the above except "illiterate" and "<6 years" options. The lowest amount of required education reported is primary education; therefore, all workers with six or fewer years of education are considered adequately educated if they responded that primary schooling was sufficient to perform the job. Note that this is the reason why mean years of attained education differ from the mean years of required education for adequately educated workers in Table 1.

4. If we begin with the premise that a particular occupation is likely to have different characteristics across industries, regions, firms, etc., it can be concluded that the workers' assessments are more accurate in capturing the characteristics of the jobs than are those of job analysts.

5. In the 1976 and 1978 waves of the PSID, the following question was asked: "How much formal education is required to get a job like yours?" As noted, in the ECVT the question is formulated in terms of required education for performing the job rather than for getting the job. For purposes of this work, the manner in which required education is addressed in the ECVT seems more appropriate.

6. Although RQT is, as Mincer (1988) points out, a blunt measure of the individual training periods, it is still useful. Using the Panel Study of Income Dynamics (PSID) data for information on RQT and information on training from other sources, Mincer (1988) obtains consistent results. It should be mentioned that in the PSID, the question on RQT refers to the "average new person" in place of "someone with the required education." Since the average new person is generally expected to have the adequate education, both questions are comparable.

their work experience. Workers were asked only about their current job at the moment they were questioned. Thus, required education and RQT reveal information about entry-level jobs only for those respondents who were new entrants in the labor market. It is precisely this feature that has made the workers' responses in the survey so useful for this work, as we have obtained information about the characteristics of the jobs different people performed relative to their backgrounds and experience.[7]

The ECVT yields a sample of approximately 20,000 employed workers who responded to the cited questions. Of the entire sample, only wage and salary workers were considered. Having excluded self-employed and family-employed workers, in addition to observations with missing values for relevant variables, we focus on a more homogeneous sample containing 11,597 workers.

III. Education, Required Education, and Required Training in Spain

Table 1 contains the definition of variables and descriptive statistics for the sample used. The greatest percentage of workers, 60 percent, have adequate education. The proportion of undereducated workers is 23 percent, and 17 percent of the sample reported to have more education than necessary for the job.[8]

By splitting the sample into adequately educated, undereducated, and overeducated workers, some preliminary results become apparent in Table 1: Overeducated workers are younger, have less experience, have less tenure in the current job, and report less RQT than adequately and undereducated workers. These findings tend to confirm the hypothesis that experience and on-the-job training allow workers to improve their job match along their working lifetime.

Figure 1 sheds some light on the relationship between the job match and the age of workers. It shows that the percentage of overeducated workers decreases with years of age. On the other hand, the percentages of adequately educated and undereducated categories rise for older workers. The proportion of undereducated workers over age is flatter for lower current tenure workers and for females. One explanation for the relationship between the job match and age can be that a great number of workers enter the labor market occupying jobs for which they are overeducated. As these workers gain experience and are trained, they move

7. In order to test the validity of workers' subjective responses on required education for jobs, we calculated the average attained education within five occupations and cohorts of adequately, over- and undereducated workers, as defined in this article. The occupations were high-level managerial, intermediate-level managerial, clerical, skilled, and unskilled. The results obtained were consistent with workers' self-reported schooling requirements for the jobs they held. Namely, after controlling for occupation and cohort, adequately educated workers show a mean of accomplished years of education at a fairly close rate to the average education of all workers in the sample. Over- and undereducated workers, respectively, exhibit lower and higher education than the two former groups.
8. According to Sicherman (1991), the U.S. figures obtained from the PSID (1976, 1978) are: 40.8 percent of workers showed to have the adequate education, 16 percent were undereducated and 43.1 percent were overeducated. See also Duncan and Hoffman (1981).

Table 1

Variable Definitions and Sample Means (standard deviations)

	Entire Sample	Adequately Educated	Under-Educated	Over-Educated
MALE = 1 if male	0.6563	0.6227	0.7950	0.5863
AGE = age at survey date	37.2748	38.6808	39.7853	28.9833
	(12.77)	(12.91)	(11.71)	(10.10)
HEAD = 1 if household head	0.6077	0.6048	0.7599	0.4121
EDUCACION = years of schooling	8.2935	8.1198	6.3574	11.5133
	(4.40)	(4.77)	(2.26)	(3.34)
EDUC0 = 1 if <6 years of school	0.2615	0.3405	0.2512	—[a]
EDUC6 = 1 if 6 years of school	0.2461	0.2334	0.4614	—[a]
EDUC8 = 1 if 8 years of school	0.1644	0.0762	0.2139	0.4051
EDUC12 = 1 if 12 years of school	0.1717	0.1710	0.0633	0.3205
EDUC15 = 1 if 15 years of school	0.0748	0.0873	0.0100	0.1187
EDUC17 = 1 if 17 years of school	0.0812	0.0913	—[a]	0.1555
REQEDUC = required education for the job	9.3075	8.9701	11.2869	7.8112
	(3.66)	(3.97)	(2.27)	(2.94)
EXPER = *AGE-EDUCATION-6*	23.9882	25.5638	28.4278	12.5007
	(14.44)	(14.69)	(12.41)	(9.49)
NCHANGES = number of times the worker has changed firms	3.2368	3.2983	3.5139	2.6482
	(3.22)	(3.36)	(3.19)	(2.66)
EMPDURAT = *EXPER/NCHANGES* (average duration of jobs in years)	12.4779	13.3430	13.8391	7.6239
	(11.93)	(12.39)	(12.18)	(8.14)
TENURE = years of tenure in the previous job[b]	5.2854	5.5090	5.9000	3.2936
	(7.14)	(7.52)	(6.83)	(5.55)
LOGDURAT = log (unemployment duration in months + 1)[b]	1.0614	1.1163	.8322	1.2594
	(1.38)	(1.41)	(1.28)	(1.40)
SAMEOCC = 1 if the same occupation after changing firms[b]	0.5571	0.5641	0.5422	0.5546
SENIOR1 = 1 if less than 6 month of seniority in the current job	0.1309	0.1286	0.0618	0.2325
SENIOR2 = 1 if 6 months to 1 year of seniority in the current job	0.0521	0.0515	0.0320	0.0815
SENIOR3 = 1 if 1–2 years of seniority in the current job	0.0674	0.0630	0.0499	0.1061
SENIOR4 = 1 if 2–5 years of seniority in the current job	0.1357	0.1359	0.0991	0.1841
SENIOR5 = 1 if >5 years of seniority in the current job	0.6136	0.6207	0.7569	0.3955
ONGOING = 1 if still undergoing training (having less seniority than required training)	0.0494	0.0498	0.0484	0.0498

Table 1 (*continued*)

$RQT1$ = 1 if no time needed to do the job correctly	0.1973	0.2532	0.0339	0.2234
$RQT2$ = 1 if 1 month	0.1671	0.1710	0.1062	0.2355
$RQT3$ = 1 if 1–3 months	0.1854	0.1687	0.2199	0.1972
$RQT4$ = 1 if 3–11 months	0.1341	0.1153	0.1904	0.1238
$RQT5$ = 1 if ≥1 year	0.3158	0.2916	0.4494	0.2199
NEVERDISP = 1 if never changed firms	0.3775	0.3783	0.3104	0.4655
VOLMOVER = 1 if changed to the current firm from a previous one, for voluntary reasons	0.4362	0.4348	0.5106	0.3407
DISPLACED = 1 if displaced from a previous firm	0.1849	0.1853	0.1777	0.1932
REGFULL = 1 if currently holding a regular full-time job	0.7852	0.7594	0.8963	0.7252
LOGWAGE = log of monthly net earnings	10.7197 (.53)	10.7097 (.55)	10.7937 (.44)	10.6545 (.54)
Years of *UNDERED*			4.3883 (1.82)	
Years of *OVERED*				3.7020 (2.09)
Sample size	11,597	6,927	2,683	1,987
Distribution (%)	100	0.5973	0.2313	0.1713

a. These cases are not possible because of coding.
b. Relevant only to workers who have changed firms.

to better matched jobs or get promoted to higher-level occupations. Under these circumstances, undereducation is not a "bad" job match.[9]

Since the job match is assessed among a cross-section of workers, other explanations are compatible with the observed improvement in the job match over increased age: First, younger workers get more schooling and the quality of education has deteriorated. Second, education is a signal for new entrants in the labor market to a greater degree than it is for experienced workers. Third, the labor market conditions faced by younger workers are different from those faced by older workers. This work gathers evidence to indicate that, although we cannot discard these mentioned factors, the occupational mobility theory helps to explain the job match improvement observed. In order to more precisely ascertain the relationship between the job match, education, RQT, and experience, a multivariate analysis is applied.

Table 2 exhibits the results of a multinomial logit model estimation. The depen-

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9. We also examined the proportions of adequately, over- and undereducated workers according to years of age for specific occupations and years of schooling. The same patterns were observed.
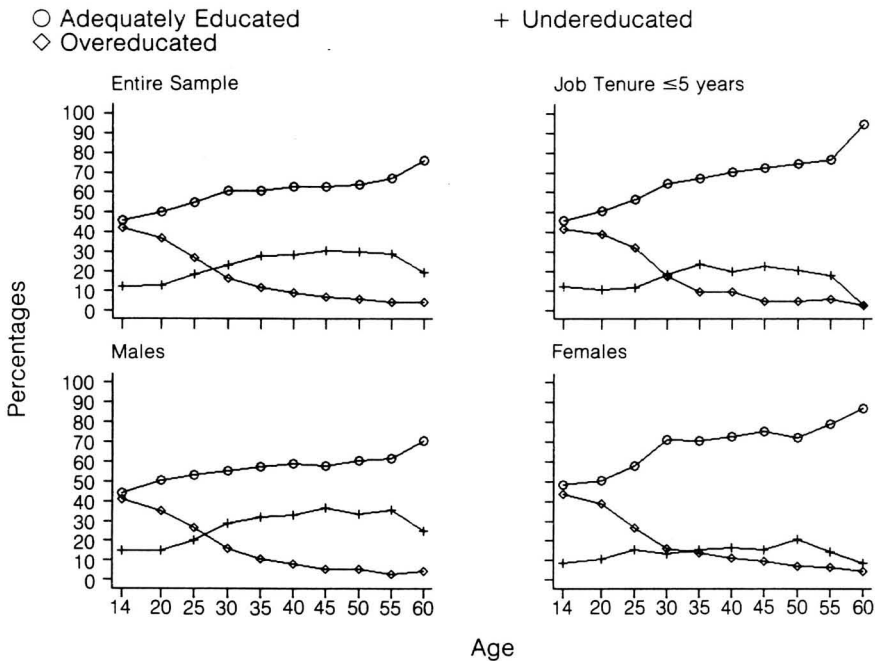
○ Adequately Educated   + Undereducated
◇ Overeducated

Figure 1
Workers' Job Match Over Age

dent variable contemplates three possibilities: adequate education, undereducation, and overeducation. The results indicate that undereducated workers are more likely to be males, have more experience, possess less education, hold a regular full-time job, and report a longer period of RQT than do adequately educated workers. On the other hand, overeducated workers are more likely to have less experience, possess more education, and report lower RQT than adequately educated workers.

These results confirm the crucial relationship of the job match with education, RQT, and experience. Also they illuminate the reasons why imperfect matches occur when these are assessed in terms of formal education. The findings that overeducated workers are predominantly more educated young workers who lack work experience, and undereducated workers are older workers (see Figure 1) who perform jobs requiring more training, are consistent with a job competition model in which there are fewer jobs available than applicants. In such a model, the employers choose workers on the basis of schooling achievement, among the pool of those with less or no experience. Workers accept jobs for which they are overeducated if the wage plus the economic value of general skills that can be acquired exceeds the reservation wage. Accumulation of experience and skills leads to promotion or better job opportunities outside the firm. Therefore, older workers are more likely to hold jobs for which they have the adequate education.

Table 2
Multinomial Logit Estimates of Job Match Type (T statistics)

	$\log\left[\dfrac{\text{Prob }(UNDERED)}{\text{Prob }(ADEQUAT)}\right]$		$\log\left[\dfrac{\text{Prob }(OVERED)}{\text{Prob }(ADEQUAT)}\right]$	
	Coefficient	t	Coefficient	t
Constant	−3.423	(−5.50)	−4.486	(−5.72)
MALE	0.276	(3.47)	0.062	(0.82)
HEAD	0.005	(0.07)	−0.113	(−1.40)
EXPER	0.053	(5.29)	−0.051	(−4.56)
EXPER2	−0.001	(−6.68)	−0.000	(−0.11)
EDUCATION	−0.298	(−26.09)	0.326	(27.04)
VOLMOVER	0.029	(0.48)	0.021	(0.30)
DISPLACED	−0.061	(−0.72)	0.072	(0.81)
SENIOR2	0.047	(0.28)	0.023	(0.17)
SENIOR3	0.282	(1.87)	0.036	(0.30)
SENIOR4	0.079	(0.62)	−0.013	(−0.12)
SENIOR5	0.200	(1.74)	−0.024	(−0.22)
REGFULL	0.326	(3.77)	−0.097	(−1.19)
RQT2	1.524	(11.61)	0.027	(0.29)
RQT3	2.301	(17.98)	−0.622	(−6.00)
RQT4	2.661	(19.89)	−0.818	(−6.89)
RQT5	2.828	(22.05)	−1.325	(−12.24)
Log likelihood		−8,030		
Sample size		11,597		

Note: Eight industry and 10 occupation dummies were included in each estimation.

Furthermore, older workers perform jobs for which they are undereducated, as they have been able to substitute formal education with experience and training.

IV. The Returns to Over- and Undereducation in Spain

In the context of the occupational mobility theory "[w]orkers demand learning opportunities and are willing to pay for them since their marketable skill or knowledge and subsequent income are increased" (Rosen 1972, p. 327). This skill acquisition chiefly concerns overeducated workers. Therefore, we would expect that the returns to years of overeducation be lower than the return to adequate education. In this section, we estimate the returns to education in Spain, and the returns to years of adequate, over- and undereducation. Furthermore, we test the differences among those returns. We specify a wage equation

similar to those estimated by Duncan and Hoffman (1981), Hartog and Oosterbeek (1988), and Sicherman (1991). Such a specification has its theoretical grounding in the allocation theory.[10]

The following wage equation is estimated:

$$Ln(W) = \alpha + X\beta + \phi_0 E^r + \phi_1 E^o + \phi_2 E^u + \epsilon$$

In this equation, total education in years (E) has been decomposed into required education (E^r), and the surplus (E^o), or deficit (E^u) education, as related to that necessary to perform the job.

$$E = E^r + E^o - E^u$$

Therefore,

$$E^o = E - E^r \text{ if } E > E^r$$

$$= 0 \text{ otherwise}$$

$$E^u = E^r - E \text{ if } E^r > E$$

$$= 0 \text{ otherwise}$$

The interpretations of the coefficients are the following:

ϕ_0 = The returns to years of adequate education.

ϕ_1 = The returns to years of education that exceed those required, relative to adequately educated workers with the same required education.

ϕ_2 = The loss of earnings due to one year of undereducation, relative to adequately educated workers with the same required education.

We test the following hypotheses:

1) $\phi_1 = \phi_0$: The returns to years of overeducation do not differ from the returns to years of adequate education for workers with the same required schooling.

2) $\phi_0 = -\phi_2$: The loss in wages due to one year of undereducation is not different from the loss in wages resulting from the reduction in one year of adequate schooling.[11]

We wish to calculate the differentials in the returns to education according to over- or undereducation status. Since the job match greatly depends on the way workers are sorted among jobs, we need to control for sectors and occupations in order to estimate the effect of the job match on wages. However, part of the returns to education consist of sorting workers to better jobs. Therefore, when job characteristics are included in the wage equation, the coefficient of years of schooling significantly diminishes. We present results of estimating standard wage equations, as well as of wage equations with dummies for occupations and industries, in addition to other relevant variables. They are recorded in Table 3.

Columns 1 and 2 of Table 3 present estimated wage equations in which only dummies for gender and household status, experience, and experience squared

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10. The allocation theory has been developed by Tinbergen (1956), Sattinger (1980), Hartog (1981), and others. It stresses that earnings reflect the decisions made in allocating workers among jobs, generating what in the literature has been called a hedonic wage equation.

11. The wage variable in the ECVT is coded. To convert it into a continuous variable, we have taken the mid-points of the intervals.

Table 3

Wage Equation Estimates (T statistics), Wage and Salary Workers, Ordinary Least Square

	Dependent Variable = Log Monthly Net Earnings							
	(1)		(2)		(3)		(4)	
Constant	9.4399	(526)	9.3407	(492)	9.5391	(132)	9.4397	(131)
MALE	0.21634	(22.7)	0.21711	(23.3)	0.17483	(18.5)	0.18261	(19.5)
HEAD	0.13619	(12.9)	0.12222	(11.9)	0.07062	(7.3)	0.06642	(6.9)
EXPER	0.03444	(30.8)	0.02936	(26.1)	0.02035	(18.5)	0.01943	(17.5)
EXPER2	−0.00048	(−26.1)	−0.00046	(−24.7)	−0.00030	(−16.9)	−0.00031	(−17.5)
RQT2					0.02880	(2.5)	0.03737	(3.2)
RQT3					0.05428	(4.5)	0.04866	(4.0)
RQT4					0.07556	(5.5)	0.06546	(4.8)
RQT5					0.12572	(10.2)	0.10316	(8.2)
ONGOING					−0.04531	(−2.4)	−0.06790	(−3.6)
EDUCATION	.07386	(72.7)			0.04243	(34.7)		
REQEDUC			0.09209	(78.7)			0.05803	(37.8)
Years of over-education			0.04021	(16.0)			0.02712	(11.5)
Years of under-education			−0.06034	(−30.2)			−0.04735	(−23.4)
Adjusted R-square	0.43		0.46		0.53		0.54	
Sample size	11,597		11,597		11,597		11,597	

Note: Other variables included in estimations 3 and 4 are *VOLMOVER, DISPLAC, REGFULL, SENIORITY* in the current job, 8 industry, and 10 occupation dummies.

were considered, in addition to the education related right-hand side variables. The results are the following: The rate of return to education is 7.4 percent (Column 1). The rate of return to required education is 9.2 percent, and the rates of returns to years of overeducation and undereducation are 4 percent and −6 percent, respectively.[12]

The linear hypotheses that $\phi_0 = \phi_1$ and $\phi_0 = -\phi_2$ were rejected, at the 1 percent signification level, using an F test. To assess whether this result is due to decreasing returns to schooling, education squared was considered in the wage equation; the positive coefficient of education squared told us this was not the case.

Implied in the mentioned results is that overeducated (undereducated) workers earn more (less) than other workers with the same required education, gender, household status, and experience, but earn less (more) than workers with the same attained education, gender, household status, and experience who hold jobs for which they are adequately educated.

Columns 3 and 4 of Table 3 present the rates of returns to education and education match, where the vector of explanatory variables has been extended to consider other job-related characteristics. Most important are dummies for required training periods, sectors, and occupations. By controlling for observed heterogeneity of workers and jobs, we can estimate the returns to adequate, over-, and undereducation in order to know whether they still remain significantly different. If that is the case we must consider additional causes for those distinct returns. For example, unobserved heterogeneity and compensating differentials could be important.

The rate of return to education is 4.2 percent for the whole sample (Column 3). The rate of return to years of adequate education is 5.8 percent. The rate of return to years of education that exceed those necessary for the job is 2.7 percent (Column 4). The penalty for each year of undereducation is a 4.7 percent reduction in wages.[13]

A simple F test showed that, again, the hypotheses $\phi_0 = \phi_1$ and $\phi_0 = -\phi_2$ could be rejected at the 5 percent signification level. However, the differentials have been reduced substantially. The differential between the rate of return to adequate education and the rate of return to overeducation is 5.19 percentage points in the standard wage equation and 3.09 percentage points in the extended

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12. We also estimated the following equation:

$$\text{Ln}(W) = \alpha' + X\beta' + \delta_1(overeduc) + \delta_2(undereduc) + \epsilon',$$

where "*overeduc*" and "*undereduc*" are dummy variables which, respectively, take on 1 if the worker is overeducated or undereducated, and 0 otherwise. Note that, in this regression, X includes attained education. We obtained that overeducated workers earn 17 percent less and undereducated workers earn 12.5 percent more than adequately educated workers with the same attained education, keeping gender, household status and experience constant. When separate wage equations for males and females were estimated, the results did not change significantly. Also, the same results held up when we considered workers of the age range 20–35.

13. Sicherman (1991), using the PSID (1976–78) data and controlling for observed heterogeneity in the earnings equation, showed that the returns to education were 3.8 percent. The returns to required education were 4.8 percent, and the returns to years of over- and underschooling were 3.9 percent and −1.7 percent, respectively.

wage equation. On the other hand, the differential between the rate of return to adequate education and the losses from a year of undereducation is 3.18 percentage points in the standard wage equation and 1.07 percentage points in the extended wage equation.

The persistence of the differential between the returns to adequate, over-, and undereducation in the extended wage equation can be due to unobserved heterogeneity in our sample of wage and salary workers. An alternative explanation is that, if workers are choosing jobs, undereducated workers get a small but significant compensating wage differential for the extra effort. Also, overeducated workers obtain a positive return for skills that are imperfectly measured by the RQT variable. RQT is, nevertheless, highly significant in explaining the cross-section variation of wages. Moreover, we find that workers who are in the process of training earn lower wages than those already trained (see Columns 3 and 4 of Table 3).

The foregoing results on returns to education are consistent with the occupational mobility theory. First, years of overeducation are compensated with lower rewards than years of adequate education. This result is consistent with the prediction of the human capital theory if the skills that overeducated workers acquire are readily transferable to future jobs. Second, we have found some evidence that undereducated workers are not necessarily placed in a bad job match, since they earn more than comparable workers with the same attained education. Undereducated workers offset a deficit of formal schooling by accumulating work experience and on-the-job training. In other words, workers can have the adequate amount of human capital by combining formal education, on-the-job training, and experience.

V. Mismatch, Job Allocation, and Career Mobility

In the previous sections, we first defined the match of workers with their jobs, measured through the comparison between attained and required education as reported by workers. Secondly, we examined some determinants of the job match. Finally, the returns to education were obtained by estimating wage equations that take into account the kind of job match workers had.

In this section, we analyze mobility in the context of jobs' characteristics (required education), workers' characteristics (attained education), and working experience and training. The mobility analysis is aimed at revealing the effect of overeducation on job turnover, and testing the consistency of workers' job changes with the implications of the occupational mobility theory. The principal hypothesis is that overeducated workers buy skills (general human capital) that are adaptable to future jobs ranked at higher levels of the occupational ladder. An alternative approach is offered by the job-matching theory, which considers the process of job shopping as the way workers find a better match (Jovanovic 1979a). The job-shopping theory emphasizes turnover as optimal reassignment based on better information. The job career theory stresses the role of experience and on-the-job training in improving workers' job match. Inter-firm mobility is

not necessarily associated with workers' career paths, as workers can advance in the same firm.[14]

The ECVT survey recorded the number of times workers have changed firms up to the survey date. From this information, it is possible to calculate the average duration of jobs by dividing potential experience by the number of times each worker has changed firms. The average duration of jobs was 13.3 years for adequately educated workers, 13.8 years for undereducated workers, and 7.6 years for overeducated workers. We find, therefore, preliminary support for the hypothesis that overeducated workers have a higher turnover. This method has some limitations that should be kept in mind. By combining completed job durations in previous jobs with uncompleted duration of present job, we can calculate the average duration of jobs. However, we wish to explain this index of workers' job turnover with their over-/undereducation status, where we only observe workers' job match for the present job. If we regress the logarithm of average job durations on the current job match, keeping potential experience constant, we would expect overeducated workers to have shorter average job durations. The reason for this is that the workers who are overeducated in the present job, having had the same length of time to improve their job match as comparable workers who have done so, are expected to have changed jobs more times. There are unobserved characteristics that make it more difficult for these workers to reach a good job match.

To test this, we estimate an equation in which the dependent variable is the logarithm of the average duration of jobs. Since younger workers have less experience and more schooling, hence being more likely to be overeducated than older workers, we control for age and schooling when analyzing the relationship between over-/undereducation and job turnover. In Table 4 (Column 1), it is observed that both over- and undereducated workers are associated with a shorter duration of jobs.[15] More specifically, the average duration of jobs among currently over- and undereducated workers are, respectively, 16.6 percent and 5.5 percent lower than the average duration of jobs among adequately educated workers.

The former results were obtained by regressing past job durations on current job match and other variables. Although these results are illuminating, the analysis is not completely satisfactory for assessing the higher turnover rate of overeducated workers, due to the reasons indicated above. A better way to analyze the relationship between turnover and over-/undereducation is presented in Columns 2 and 3 of Table 4. In Column 2, the dependent variable takes on 1 if the worker has never changed firms, and 0 otherwise. Estimating a logit model we find that the probability of not having changed firms is 4.7 percent significantly lower for overeducated workers than for adequately educated workers, other things being equal.[16] In Column 3, the dependent variable takes on 1 if the worker has more

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14. The job-matching theory predicts a negative relationship between the turnover rate and the investment rate in specific human capital, which, in turn, tends to be greater the better the job match. See Jovanovic (1979b).

15. The higher turnover of undereducated workers can be attributable to undereducation as the final stage of the matching process. Since most workers start out being overeducated, undereducated workers are more likely to have changed jobs more than once if adequate education is an intermediate step in the process of job matching.

16. The derivatives for the probabilities are calculated as $\beta[p(1 - p)]$.

Table 4
Employment Duration Estimates (T statistics)

	OLS		LOGIT		
	Dependent Variable = Log Average Duration of Jobs		Dependent Variable = 1 if Never Changed Firms		Dependent Variable = 1 if in the Current Job for More than 5 Years
	(1)		(2)		(3)
Constant	−0.206	(−1.29)	2.158	(4.74)	−8.029	(−12.77)
MALE	−0.191	(−9.93)	−0.366	(−6.68)	−0.208	(−3.11)
HEAD	−0.096	(−4.85)	−0.293	(−5.11)	0.244	(3.78)
AGE	0.089	(23.97)	−0.147	(−13.58)	0.323	(23.17)
AGE2	−0.0005	(−12.63)	0.002	(13.26)	−0.003	(−17.07)
EDUC6	0.052	(2.46)	0.077	(1.18)	0.274	(3.60)
EDUC8	0.145	(5.47)	0.523	(6.70)	0.494	(5.08)
EDUC12	−0.158	(−5.71)	0.779	(9.65)	0.090	(0.90)
EDUC15	−0.286	(−8.10)	0.837	(8.29)	0.092	(0.72)
EDUC17	−0.378	(−9.87)	1.142	(10.42)	−0.214	(−1.58)
REGFULL	0.285	(15.15)	0.704	(12.25)	1.385	(21.09)
RQT2					−0.004	(−0.05)
RQT3					0.308	(3.57)
RQT4					0.328	(3.42)
RQT5					0.708	(8.15)
OVEREDUC	−0.166	(−7.39)	−0.200	(−3.16)	−0.239	(−3.09)
UNDEREDUC	−0.055	(−2.93)	−0.009	(−0.16)	0.085	(1.21)
Adjusted R-square	0.41					
Log likelihood			−7,010		−5,308	
$\hat{P}$			0.38		0.61	
Sample size	11,597		11,597		11,597	

Note: Eight industry and 10 occupation dummies were included in each estimation.

than five years of seniority in the current job, and 0 otherwise. A logit estimation again indicates that overeducated workers have a higher turnover rate. The probability that overeducated workers, controlling for other characteristics, have remained in the same job for more than five years is 5.7 percent significantly lower than that for adequately educated workers.

To illustrate the consistency of job changes, we have constructed a matrix of transition between the previous job match and the current job match for workers

who have changed firms and were employed at survey date. We defined the previous job match as follows:[17]

a) Overeducated workers are those whose actual years of education are greater than one standard deviation above the mean of required education for their specific occupation.

b) Undereducated workers are those whose actual years of education are less than one standard deviation below the mean of required education for their specific occupation.

c) The remainder of workers in the sample were considered adequately educated.[18]

In Table 5, the transition matrix is constructed by cohorts. It shows a consistent adjustment of the job match over age of workers: the percentage of workers who were overeducated in the previous job and became adequately educated or undereducated is 31.2 for 14–24 year olds, rising to more than 60 percent for workers over 34 years of age. Furthermore, the proportion of workers who were adequately educated in the previous job and who became overeducated after changing jobs, declines steadily to about 1 percent for workers 60 years of age and older. Although the percentage of workers who remain overeducated after changing firms is 68.7 percent for 14–24 year olds, it decreases to around 30 percent for workers older than 35 years of age. The process of matching is not complete given that about 4 percent of workers older than 59 years are overeducated in their current job (see Figure 1),[19] and the likelihood of an improvement in their job match becomes low as they approach retirement. It is also clear from Table 5 that the probability of remaining adequately educated after changing jobs increases with age.[20]

Table 6 presents logit estimates of occupation change and job match improvement for wage and salary workers who have changed firms. In Column 1 the dependent variable takes on 1 if the worker moved to the same two-digit occupation, and 0 otherwise. We wish to test the hypothesis that overeducated workers should be more likely to move to a different occupation. The reason being that they acquire general skills that are transferable to other occupations in which they can find a better match. In contrast, undereducated workers have accumulated more specific human capital—even more than adequately educated workers—and they have to be more conservative about the characteristics of the new job. This hypothesis is confirmed by the results contained in Column 1 of Table 6.

17. See Verdugo and Verdugo (1989) for a similar method to assess the job match.
18. For this definition to mesh with that of the current job match, workers with six or fewer years of schooling are considered adequately educated if they were placed in occupations for which the mean of years of required education minus one standard deviation is six or fewer years.
19. When we consider workers older than 54 years of age who have never changed firms (about 13 percent of all workers are over 54 years of age in the sample used), the fraction of overeducated workers is almost 7 percent, as compared to 2.5 percent for workers of the same age who have changed firms in their lifetime. Those workers who report that they have never changed firms might have changed occupations even while staying in the same firm.
20. When the current job match was defined in the same fashion as the previous one, similar results were obtained. We have opted for the analysis in which the two different but independent measures of the job match are used.

Table 5
Transition Matrix Between Previous Job Match and Current Job Match, by Age (wage and salary workers who have changed firms)

Previous Job	Current Job				N	%	Age
	Adequately	Under	Over	Total			
Adequately	52.45	11.76	35.78	100.00	204	86.08	
Under	82.35	17.65	0.00	100.00	17	7.17	15–24
Over	31.25	0.00	68.75	100.00	16	6.75	
Adequately	53.80	16.96	29.24	100.00	1132	68.94	
Under	61.46	35.61	2.93	100.00	205	12.48	25–29
Over	40.33	1.64	58.03	100.00	305	18.57	
Adequately	60.72	25.03	14.25	100.00	723	65.14	
Under	52.12	47.03	0.85	100.00	236	21.26	30–34
Over	60.93	2.65	36.42	100.00	151	13.60	
Adequately	61.69	28.11	10.21	100.00	676	64.88	
Under	41.98	57.25	0.76	100.00	262	25.14	35–39
Over	65.38	1.92	32.69	100.00	104	9.98	
Adequately	65.70	25.63	8.67	100.00	519	64.63	
Under	50.47	49.53	0.00	100.00	214	26.65	40–44
Over	65.71	5.71	28.57	100.00	70	8.72	
Adequately	69.21	25.86	4.93	100.00	406	64.55	
Under	47.34	52.13	0.53	100.00	188	29.89	45–49
Over	65.71	2.86	31.43	100.00	35	5.56	
Adequately	69.45	26.81	3.74	100.00	455	66.81	
Under	51.37	48.09	0.55	100.00	183	26.87	50–54
Over	62.79	6.98	30.23	100.00	43	6.31	
Adequately	74.71	23.28	2.01	100.00	348	64.68	
Under	51.19	48.81	0.00	100.00	168	31.23	55–59
Over	68.18	0.00	31.82	100.00	22	4.09	
Adequately	83.50	15.15	1.35	100.00	297	73.70	
Under	61.45	38.55	0.00	100.00	83	20.60	≥60
Over	73.91	0.00	26.09	100.00	23	5.71	

Note: See text for manner in which previous job match has been calculated.

Table 6

Logit Estimates of Occupation Change and Job Match Improvement (T statistics) (wage and salary workers who have changed firms)

	Dependent Variable = 1 if Moved to the Same Occupation (1)		Dependent Variable = 1 if a Better Match in New Job (2)		(3)	
Constant	0.013	(0.08)	−3.002	(−13.9)	−8.834	(−12.7)
MALE	−0.388	(−5.29)	0.285	(3.10)	−0.107	(−0.55)
HEAD	−0.017	(−0.23)	0.193	(2.03)	−0.046	(−0.23)
EDUCATION	0.082	(8.55)	0.086	(9.87)	0.449	(13.91)
EXPER	0.001	(0.07)	0.045	(4.03)	0.177	(2.25)
EXPER2	0.000	(−0.05)	−0.001	(−4.16)	−0.009	(−2.52)
TENURE	−0.015	(−1.73)	−0.017	(−1.66)		
TENURE2	−0.000	(−0.49)	0.0002	(0.87)		
VOLMOVER	−0.355	(−5.83)	0.275	(3.58)	0.141	(0.77)
LOGDURAT	−0.089	(−4.45)	−0.056	(−2.20)	0.038	(0.60)
NCHANGES	0.086	(3.39)	−0.087	(−2.74)	0.154	(1.81)
NCHANGES2	−0.002	(−2.00)	0.003	(1.86)	−0.008	(−1.80)
REGFULL	−0.040	(−0.58)	0.489	(5.10)	0.138	(0.65)
OVEREDUC	−0.981	(−9.28)				
UNDEREDUC	0.660	(9.78)				
Log likelihood	−4,251		−3,207		−522	
P̂	0.56		0.22		0.08	
Sample size	6,429		6,429		2,804	

Note: In estimation 1, the dependent variable is obtained by comparing the previous job occupation with that of the current one. 19 occupations were used. Over-/undereducation applies to the previous job. In estimations 2 and 3, the dependent variables are defined in the text. In estimation 3, only workers between 20 and 35 years of age are considered.

In Column 2 of Table 6, the dependent variable takes on 1 if the worker was overeducated in the previous job and became adequately educated or undereducated after changing firms, or if the worker was adequately educated in the previous job and became undereducated after changing firms; 0 otherwise applies. In Column 3 of the same Table, the dependent variable takes on 1 if the worker shifted from being overeducated to being adequately educated or undereducated, and 0 otherwise. We find that male, more educated, as well as more experienced workers have a higher probability of improving their match as they move from one job to another.[21] Furthermore, the positive effects of experience and the

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21. Although overeducated workers are associated with a higher turnover, which leads to a better job match, such an improvement is not solely attributable to workers' inter-firm mobility. The reason for this is that some of the overeducated workers are likely to be promoted within the firm.

number of firm changes take place at a decreasing rate. That means that older workers have problems in improving their job match when they switch jobs.

VI. Summary and Conclusion

In this work we have sought to show that the education that workers reported to be necessary for their jobs can be useful in testing some predictions of the occupational mobility theory. First, we have tested the trade-off between experience, on-the-job training, and education. Second, we have shown the relevance of the job match between the characteristics of workers and the characteristics of jobs in estimating the returns to education. Third, we have revealed some evidence showing that overeducated workers have less experience, lower on-the-job training, and higher turnover than other comparable workers. Finally, we have found that patterns among the proportions of adequately educated, undereducated, and overeducated workers are consistent with the occupational mobility theory.

In light of these results, it can be asserted that overeducation is a rather short-term problem in the working lives of the majority of Spanish workers. Such a conclusion is consistent with the still low rate of enrollment of Spaniards in higher education. In our sample the proportion of workers holding pre-university and university degrees is still as low as 15 percent, and more than 65 percent of workers only have achieved eight or fewer years of schooling. These figures correspond to the representative sample of wage and salary workers that we have used (see Table 1).

The current existence of many young overeducated workers in Spain indicates that formal schooling is not sufficient to perform the jobs they think of as matching their education. Our results support the hypothesis that on-the-job training and experience can provide overeducated workers with the qualifications that match their job market expectations based on possessed years of schooling. It is well known that overeducation adversely affects job satisfaction and productivity.[22] If overeducation is a status that workers can overcome by acquiring skills, we need to foster an educational system that educates a flexible labor force, adaptable to a changing workplace. Concurrently, the workplace should be designed to fully utilize people's education.

References

Duncan, Greg J., and Saul D. Hoffman. 1981. "The Incidence of Wage Effects of Overeducation." *Economics of Education Review* 1(1):75–86.

Freeman, Richard B. 1976. *The Overeducated American*. New York: Academic Press.

Hartog, Joop. 1981. *Personal Income Distribution, a Multicapability Theory*. Leiden/ Boston: Martinus Nijhoff.

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22. See Tsang and Levin 1985.

Hartog, Joop, and Hessel Oosterbeek. 1988. "Education, Allocation and Earnings in the Netherlands: Overschooling?" *Economics of Education Review* 7(2):185–94.

Jovanovic, Boyan. 1979a. "Job Matching and the Theory of Turnover." *Journal of Political Economy* 87(5):972–90.

———. 1979b. "Firm-specific Capital and Turnover." *Journal of Political Economy* 87(6):1246–60.

Mincer, Jacob. 1988. "Job Training, Wage Growth, and Labor Turnover." NBER Working Paper No. 2690.

Rosen, Sherwin. 1972. "Learning and Experience in the Labor Market." *Journal of Human Resources* 7(3):326–42.

Rumberger, Russell W. 1981. *Overeducation in the U.S. Labor Market*. New York: Praeger Publishers.

Sattinger, M. A. 1980. *Capital and the Distribution of Labor Earnings*. Amsterdam: North-Holland.

Sicherman, Nachum. 1991. "Over-Education in the Labor Market." *Journal of Labor Economics* 9(2):101–22.

Sicherman, Nachum, and Oded Galor. 1990. "A Theory of Career Mobility." *Journal of Political Economy* 98(1):169–92.

Spence, Michael. 1973. "Job Market Signaling." *Quarterly Journal of Economics* 87(August):355–74.

Thurow, Lester C. 1975. *Generating Inequality*. New York: Basic Books.

Tinbergen, Jan. 1956. "On the Theory of Income Distribution." *Weltwirtschaftliches Archiv* 77:155–73.

Tsang, Mun C., and Henry M. Levin. 1985. "The Economics of Overeducation." *Economics of Education Review* 4(2):93–104.

Verdugo, Richard R., and Naomi Turner Verdugo. 1989. "The Impact of Surplus Schooling on Earnings: Some Additional Findings." *Journal of Human Resources* 24(4):629–43.