

CHAPTER 13

Returns to Human Capital in Spain: A Survey of the Evidence

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1 Introduction

The objective of this survey is to review the evidence for Spain of the effect of different forms of human capital on earnings. In the Spanish case, econometric work on this topic is fairly recent. The first published material appeared in the second half of the 1980s. A lack of adequate data sets is behind this gap with respect to other European countries. The availability of the Household Budget Surveys of 1980/81 and 1990/91 as well as other *ad hoc* data sets during the late 80s and 90s, explains that a considerable amount of work has been published during the last ten years.

A large part of the work done has focused on the analysis of pay differentials by gender and sector. A few papers have covered some other topics like ability, family background, sheepskin and screening effects, overeducation or the effect of unemployment on returns. Some papers have tried to track returns through time but, as we will see later, the data available allows doing this only in a partial way. Additionally, no work has been done to control for the existence of endogeneity of schooling. In spite of the availability of new survey data, the main reason for the lack of work on those topics is related to the limited nature of the information provided in these surveys.

The chapter is organised as follows. Data sets used in the literature are described in the second section. Next, a description is done of the different works, explaining the estimation procedures used. In the following section, an evaluation of the results is made in terms of the topics related to human capital returns. Finally in the last section, some conclusions are drawn in an attempt to obtain some stylised facts on the Spanish case.

2 Data sets

As was explained above, several data sets became available during the 80s and 90s. In what follows a description of each is done. The most widely used surveys are the *Household Budget Surveys* (Encuesta de Presupuestos Familiares, EPF). These surveys, available for 1980/81 and 1990/91¹, give data on family expenditure and income

¹ The period of elaboration of the survey spans from March to March of those years.

for a sample of about 20,000 households. The most detailed one is that of 1990/91 which provides data for all the members of the household on educational attainment (levels) and earnings (net annual earnings²) as well as on labour market status (employed/unemployed, industry, occupation, employee/self-employed). It has no information on working hours but states whether the individual worked more or less than thirteen hours during the period of reference. The 1980/81 survey provides earnings information for all the individuals but detailed information on individual characteristics (including educational attainment) and on labour market status is available only for the head of the household. This means that all the comparative work on returns between 1980/81 and 1990/91 is constrained to the sub-sample of heads of households.

Additionally, since 1985 a *Continuous Household Budget Survey* (Encuesta Continua de Presupuestos Familiares, ECPF) is undertaken on a quarterly basis and with a smaller sample size (3,000 households). This survey has a rotating panel structure in which one-eighth of the sample is rotated every quarter. It includes the same variables as EPF 90/91 but only for the heads of households. Nevertheless, it should be mentioned that the income data provided by the survey is the joint household income.³

Apart from these sources, some authors have used other surveys designed for *ad hoc* purposes. First, the *Living and Working Conditions Survey* (Encuesta de Condiciones de Vida y Trabajo, ECVT). This is a survey conducted in 1985 with a sample size of 60,000 individuals. It provides information on the educational attainment (both years and degrees), labour status and labour history of each individual. This survey was commissioned by the Ministry of Economy to obtain an estimate of the quantitative importance of informal employment. It also contains questions on the perceived skill requirements of the job. The wage definition of the survey is net monthly. However, it has the disadvantage that the wage data are given as intervals, not as a continuous variable. Therefore, studies using this data set take as wage observation the mid point of the interval.

² Net, in this case, refers to take home income, that is after income tax deductions and social security contributions. Hence, there are differences, in some cases large, between this net income and the after tax income.

³ This means that only those households in which the head is the only working member can be used as observations of the sample.

Secondly, the *Pilot Earnings Survey* (Encuesta Piloto de Ingresos, EPI). This is an earnings survey made up of a sub-sample of the Labour Force Survey (LFS) for the second quarter of 1990 (the Spanish LFS does not contain questions on earnings). It was intended as an experimental survey addressing additional earnings questions to 2,000 households out of the 60,000 household sample of the Spanish LFS, but had no continuity afterwards. The wage definition of the survey is gross monthly earnings.

Finally, the *Survey on Class Structure, Consciousness and Biography* (Encuesta de Estructura, Conciencia y Biografía de Clase, ECBC) is a survey conducted in 1991 and addressed to individuals with questions on labour market status, job characteristics, labour history and family background. The sample, 6,629 individuals, is not representative for the whole country because of the higher than proportional weight of the region of Madrid in the sample.⁴ Moreover, individuals with secondary and higher education have a disproportionate representation in the sample. However, the survey includes a scheme of weighting factors to overcome the two problems.

3 Introduction to the research and estimation procedures

The studies reviewed cover different topics. They are ordered in terms of the main objective. Basically it is possible to distinguish among the following: returns to human capital across gender and sector and change over time, gender wage discrimination, and other topics which include ability and screening, and overeducation.

3.1 Returns to human capital by gender and sector

As different authors have used different data sets we first order the works in terms on the databases used. Afterwards, we describe the main objective of each paper as well as the estimation procedure.

⁴ The regional government of Madrid commissioned the elaboration of this survey jointly with the Institute of Statistics and The Woman Institute.

Calvo (1988) use the EPF 1980/81 while San Segundo (1996), Lassibille (1998) and Oliver et al. (1998) use data from EPF 1990/91. On the other hand, Andrés and García (1991) as well as Cañada (1993) obtain their data from ECVT, and Ullibarri (1996) and García et al. (1997) from ECBC. Finally, Cañada (1993) and Alba and San Segundo (1995) drew their samples from EPI.

Calvo (1988), Andrés and García (1991) and San Segundo (1996) run OLS regressions. Calvo (1988) estimates an equation for a sample of heads of households drawn from EPF 1980/81, including both employed and unemployed. A dummy to control for unemployment is included and agrarians self-employed were excluded from the sample. Andrés and García (1991) study different aspects in relation to the supply side of the Spanish labour market. One of the points they deal with is the possibility of a segmented wage determination process vs. human capital. They use an aggregation of six industries as segments to estimate Mincer equations by sector. San Segundo (1996) uses EPF 1990/91 to estimate earnings equations by gender and sector of employment (self-employment, public and private employment).

Cañada (1993), Alba and San Segundo (1995), Ullibarri (1996), García et al. (1997), Lassibille (1998), and Oliver et al. (1998) introduce some form of self-selection control. Cañada (1993) tests the effect of different types of variables like parental background, tenure, previous spells of unemployment, sector of employment and type of contract on the individual wage. Additionally, the selection bias due to the participation decision is controlled for. But once the decision is made to participate, a second decision is considered: the type of job conditions. This decision is modelled with an ordered probit where the explained variable is a categorical variable ordered according to the degree of employment informality. Alba and San Segundo (1995) estimate OLS models for different samples (self-employed, wage earners, private and public sector and by gender) with data coming from the 1990 EPI. As they contemplate the possibility of a non-random allocation of workers into employment status (self-employed vs. wage earners) and sector (public vs. private), self-selection bias is controlled for by using a two-stage Heckman procedure in the estimation of the corresponding earnings equations. Oliver et al. (1998) estimate a simple Mincerian equation including both employees and self-employed in the sample. Sample selection bias is controlled for.

Afterwards, employment probabilities derived from a profit model are used to weight forecasted earnings from the Mincerian equation. A cost-benefit analysis is applied to those earnings to obtain the internal rate of return.

Finally, Ullibarri (1996), García et al. (1997) and Lassibille (1998) all focus on public/private wage differentials. They estimate earnings functions for public and private sector employees. But, previously, they control for the probability of being employed in one of the two sectors. The idea behind is that there may be correlation between unobserved characteristics that determine the choice of sector and those that determine the wage. If that is the case, OLS estimators are inconsistent. So, at a previous stage, a sector choice model is used to generate a correcting factor to be included in the wage equations. Ullibarri (1996) follows this procedure, estimating separate equations by sector and gender. The results are the basis for an analysis of wage differentials decomposition. Lassibille (1998) carries out a similar analysis. García et al. (1997) address the differential public/private from a different perspective. Two complementary hypotheses are tested. Firstly, the so-called “hypothesis of public wage compression” which states that public/private wage differentials tend to decrease as job skill requirements increase. A second hypothesis would suggest that wage differentials vary along the wage distribution. With respect to the first point, the result shows that differentials of expected wages are lower the higher the reported appropriate level of education for the job. For the second hypothesis, quantile regressions were run. The results of quantile regressions indicate that, firstly, public/private differentials for women are higher than for men along different points of the distribution and, secondly, public/private differentials tend to get reduced as estimations refer to higher deciles.

3.2 Change over time

In San Segundo (1997) the ECPFs for 1985, 1986, 1987, 1989, 1994 and 1995 are used to extend the temporal comparison of returns to education and other forms of human capital for a sample of male wage earners (heads of household). Lassibille and Navarro (1998), and Vila and Mora (1998) compare wage earner regressions by using 1980/81 and 1990/91 EPF data. Vila and Mora include both male and female sub-samples while Lassibille and Navarro only consider males.

3.3 Gender wage discrimination

De la Rica and Ugidos (1995), drawing data from ECBC, estimate factors that contribute to the explanation of the gender wage gap, with the focus on differences in human capital. The method is to estimate the wage function for men by OLS whereas for women they apply Heckman's two-step method in order to control for sample selection bias. They also apply a variant of the Oaxaca decomposition method. Salabarría and Ullibarri (1997), with ECBC data too, analyse the "feminisation" effect (% of female employment in a type of job) on wages, considering feminisation as an endogenous variable. The authors estimate a multinomial logit model in order to control for the endogeneity of the feminisation variable, taking into account five groups of occupations depending on the female employment percentage (group 1 has less than 20% and group 5 with more than 80%). The probability for each individual to choose each one of the five groups according to his/her characteristics is calculated, and then, a certain level of feminisation is assigned to each individual. Estimation is carried out by OLS and by Heckman's method.

3.4 Other topics

Lassibille (1994), using EPF 1980/81, makes an empirical confrontation of human capital and signalling theories through the analysis of income generation for both employees and self-employed. The idea is to compare workers who need to be filtered by the educational system (employees) with those who do not (own employed). Some more work has been done recently about screening and ability. Corugedo (1998), with a sample of economists from the region of Madrid, obtains evidence of the mixed character of wage formation, explained both by the human capital and the signalling approach. Blanco and Pons (1998)⁵ use an approach in which ability is introduced to test for the existence of signalling. They depart from the assumption that there should not be territorial differences in ability but also from the fact that there are territorial differences in average levels of education. So, those individuals with an education

⁵ Blanco and Pons (1998) and Pons (1998) draw their data from ECBC.

above their own regional average should reflect a higher innate ability. Pons (1998) used a different approach to measure ability. She uses the information provided by ECBC on the capacity of understanding the questions of the survey by controlling education. By running a regression which explains that capacity in terms of education level, Pons assumes that the residuals obtained in that regression approach a measure of ability for each individual.

Finally, according to the occupational mobility theory, Alba (1993), with ECVT data, explains the job match by comparing attained education and education job-requirements as reported by workers, to ascertain the effect of the job match on the

for

the Spanish case. The estimation method consists of, first, a multinomial logit model to classify workers; second, estimation of wage equations and calculation of the return to schooling of adequately educated, overeducated, and undereducated workers.

4 Estimation results

The main results that are reviewed below have problems that limit the scope of the following analysis. One difficulty arises because of different wage definitions. Normally, the dependent variable in the studies that use EPF or ECPF is net annual wages, but ECVT and EPI include net gross monthly wages and only those studies that are based on ECBC can use hourly wages. On the other hand, only few of the reviewed studies include the actual number of years of education as an explanatory variable and most of them construct the variable applying the number of years attached to the completion of each degree. In those cases, comparability is not easy because legal changes in the Spanish educational system in the last twenty years generate a different aggregation for each basic level (primary, lower secondary, upper secondary and university studies). In fact, only ECVT and ECBC are the data sets where a question on the number of years of education is made. Also, other forms of human capital like experience are not measured exactly in the same way. Normally, in most studies work experience is measured as potential but those using ECBC and ECVT can approximate actual experience. These papers, along

with Cañada's (1993), who uses an EPI sample, consider also tenure. Finally, other differences could arise from the inclusion of variables like those related to family situation and geographical environment.

4.1 Returns to education by years

Table 1 shows the results of the studies using years of education. Despite the differences of databases, estimation procedures, number of

Table 1. Returns to education (years): coefficients (multiplied by 100)

STUDY	DATA SET	WAGE DEF.	SECTOR	RETURN		
				Female	Male	All
Alba (1993)	ECVT (1985)	Monthly net	Pub & Priv			4.2
Andrés & García (1991) ⁴	ECVT (1985)	Monthly net	Pub & Priv	10.2	6.5	7.8
Cañada (1993) ²	ECVT (1985)	Monthly net	Pub & Priv	5.4	4.0	
San Segundo (1996)	E.P.F. 1990/91	Annual net	Public	9.9	6.9	
			Private	10.1	8.5	
Vila & Mora (1998) ¹	E.P.F. 1990/91	Annual net	Pub & Priv	6.7	5.2	5.3
			Public	6.1	4.6	4.8
			Private	5.2	5.2	5.2
Lassibille (1998) ²	E.P.F. 1990/91	Annual net	Public	7.0	4.5	
			Private	11.8	9.3	
Cañada (1993)	E.P.I. (1990)	Monthly gross	Pub & Priv			5.3
Alba & San Segundo (1995) ⁴	E.P.I. (1990)	Monthly gross	Pub & Priv	9.8	7.3	8.1
			Public	7.5	6.1	6.6 (6.3) ²
			Private	8.0	6.4	6.9
Pons (1998)	E.C.B.C. (1991)	Hourly net	Pub & Priv			5.3
			Public			6.3 (4.1) ³
			Private			4.3 (3.2) ³
Blanco & Pons (1998) ²	E.C.B.C. (1991)	Hourly net	Pub & Priv	4.2	5.5	4.9

Notes: ¹ Only heads of households and partners.

² Controls for self-selection (two-step Heckman).

³ Within brackets results when using a switching model.

⁴ Only a simple Mincerian specification (no additional variables).

additional variables and wage definitions, the results seem to reflect some consistency and some regular patterns. Four facts can be highlighted. Firstly, the range of results for the complete samples is not wide, taken into account the above mentioned differences. That is, the range goes from a minimum value of 4.2% in 1985 for a monthly net wage to 8.1% in 1990 for a monthly gross. In spite of this apparent upward trend, most results, as can be seen from the table, fall within a very similar range, around 5–7%. Secondly, the range of results for women is wider than for men in most of cases, with some exceptions. For women, the lower rate is 4.2% (1991, hourly net wage) and the higher one is 10.2% (monthly net wage in 1985). On the other hand, the range for men goes from 4.0% (monthly net wage in 1985) to 7.3% (monthly gross in 1990). Thirdly, in all cases, except in one, the rates of return to education for women are higher than for men. Fourthly, in general the rates of return for the public sector are lower than for the private sector. Finally, when both sector and gender are taken into account the results show that the above patterns do not change.

4.2 Returns to education by levels

It is difficult to compare outputs from the different studies given that these differ in terms of the degree of aggregation used. Tables 2 and 3 show results from studies using different data sets. The criteria used when choosing these studies was to take from each data set that study which uses the most disaggregated scheme of levels. In general terms, it is possible to see that higher levels of education lead to higher returns. The only exception is the case of pre-university, which indicates a lower return than upper secondary in the public sector and for males. In most the cases, like in the case of years of education, female returns are higher than male returns, and private returns are higher than public returns. An exception is Ullibarri (1996), where in most cases private returns are lower than public returns (the work of Ullibarri is the only one that uses hourly wages).

From Figures 1 to 5, which are from San Segundo (1996), it is possible also to see that, in general terms, we can keep as a first approximation the assumption of linearity. The most striking fact can be seen in Figures 3 and 4, where we compare males and females by sector. In the case of females, and contrary to males, there is a

crossing in the profiles when attaining University long cycle level, showing that the public sector is clearly more rewarding than the private sector for higher educated women. This result can explain, at least in part, the strong growth of female higher education demand in Spain in the last twenty years.

Table 2. Returns to levels of education (% premium compared to compulsory level), 1990/91

	Public		Private	
	Male	Female	Male	Female
<i>San Segundo (1996), EPF 1990/91:</i>				
Lower vocational	12.5	11.2	24.9	27.8
Upper secondary	27.1	28.8	31.8	35.8
Pre-University	26.3	35.3	34.5	46.1
Upper vocational	33.3	35.0	41.4	47.3
University (short cycle)	53.4	71.9	66.2	71.9
University (long cycle)	71.4	89.0	81.4	80.7
<i>Ullibarri (1996), ECBC (1991):</i>				
Vocational	21.41	30.18	10.68	16.43
Upper sec.+Pre-univ.	33.14	43.19	33.17	15.54
University (short cycle)	50.82	56.08	37.33	28.94
University (long cycle)	87.09	85.11	75.95	49.43

Table 3. Returns to levels of education (% premium compared to compulsory level)

	Male ¹	Female ¹	Male+Female ²
Vocational	9.5	5.7	3.1
Upper secondary	11.5	18.7	38.3
Univ. (short. cycle)	27.3	38.9	51.1
Univ. (long cycle)	34.3	50.4	63.2

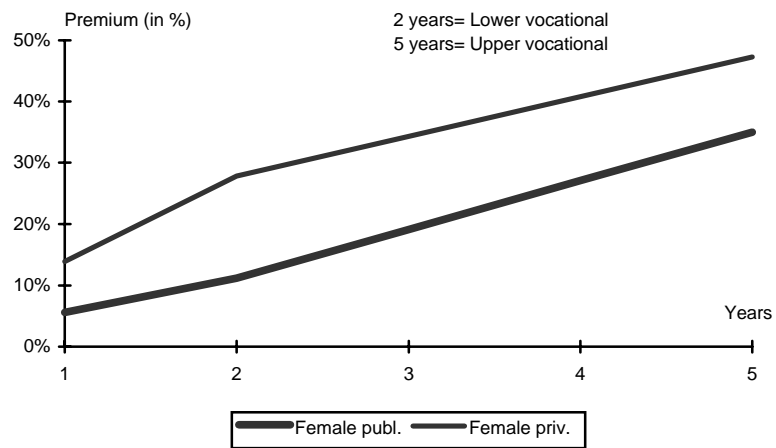
Notes: ¹ Cañada (1993) (data ECVT, 1985). ² Cañada (1993) (data EPI, 1990).

Figure 1. Returns to levels of education (% premium compared to compulsory level). Vocational path, males, 1990/91



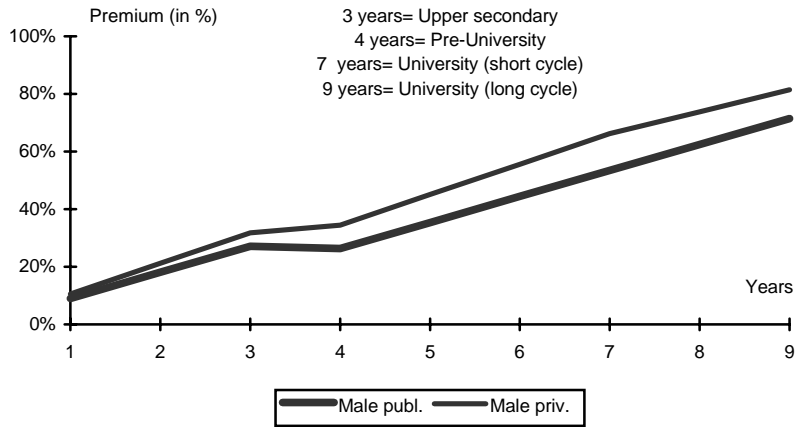
Source: San Segundo (1996), EPF 1990/91

Figure 2. Returns to levels of education (% premium compared to compulsory level). Vocational path, females, 1990/91



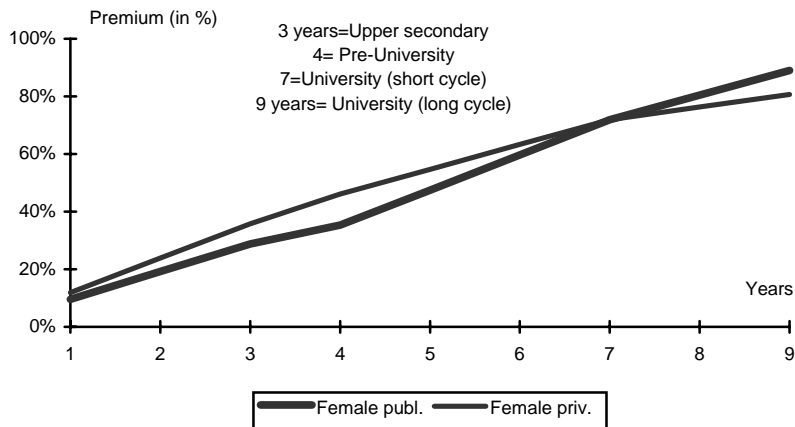
Source: San Segundo (1996), EPF 1990/91

Figure 3. Returns to levels of education (% premium compared to compulsory level). General path, males, 1990/91



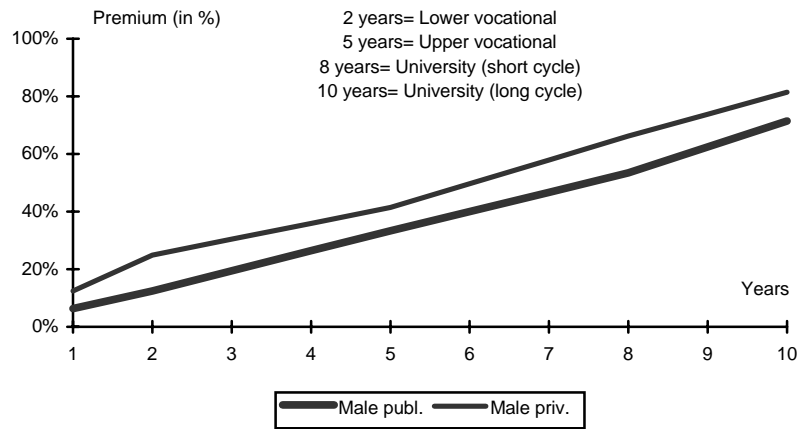
Source: San Segundo (1996), EPF 1990/91

Figure 4. Returns to levels of education (% premium compared to compulsory level). General path, females, 1990/91



Source: San Segundo (1996), EPF 1990/91

Figure 5. Returns to levels of education (% premium compared to compulsory level). Vocational and University, males, 1990/91



Source: San Segundo (1996), EPF 1990/91

All studies comparing 1981 with 1991 (San Segundo (1996, 1997), Vila and Mora (1998), see Tables 4 and 5 below) tend to remark an increase in the returns of upper vocational and short cycle university diplomas. Both are reflecting degrees with easier access to the labour market given that both tend to be designed with a professional profile. Nevertheless, Lassibille and Navarro (1998) find a decrease in returns, except for short cycle university degrees.

Table 4. Returns to levels of education. % premium of University (long cycle) with respect to compulsory and University short cycle

	Univ. L.C. vs. compulsory	Univ. L.C. vs. Univ. S.C.
1981	57.00	20.20
1985	66.70	16.80
1986	60.80	21.30
1987	61.10	20.00
1989	87.40	44.10
1991	73.80	20.50
1994	66.10	16.80
1995	60.00	13.60

Source: San Segundo (1997), EPF 1980/81, EPF 1990/91 and ECPF (1985-1995)

Table 5. Returns to levels of education (% premium with respect to compulsory)

	Male 81	Female 81	Male 91	Female 91
Vocational	8.3		20.42	11.04
Upper Sec.	17.48	18.21	24.52	24.62
Univ.(short cycle)	31.04	24.7	47.33	49.35
Univ.(long cycle)	49.39	35.71	64.4	71.28

Source: Vila and Mora (1998), EPF 1980/81 and EPF 1990/91

4.3 Returns to experience

Table 6 shows those studies that run equations separately by sector and gender. The general pattern seems to reflect higher returns for men than for women and also higher returns in the private sector than in the public sector. Possibly, this pattern reflects the different pay schemes of the two sectors, with public sector wages which are regulated by rigid pay scales and seniority based promotion patterns.

Table 6. Returns to experience. Coefficients * 100 for the first year of experience

	Men		Women	
	Private	Public	Private	Public
Alba & San Segundo (1995), 1990	4.8	4.0	3.7	1.8
Garcia et al. (1997), 1991	2.3	4.9	2.4	3.7
Ullibarri (1996), 1991	2.2	2.5	1.8	0.6
Lassibille & Navarro (1998), 1990/91	5.5	2.8	6.2	4.0
San Segundo (1996), 1990/91	7.6	5.4	5.3	3.9

4.4 Others topics

With respect to signalling, the work done so far is not very conclusive, as happens in most cases. In general terms, we should accept that some degree of signalling exists (Pons, 1998; Blanco and Pons, 1998) and probably it takes place during the process of education, which acts as a first filter for employers. Afterwards, accumulation of human capital from experience and, maybe, continuous training, explains the returns of human capital. Thus, the weak hypothesis of screening seems to be confirmed by the Spanish evidence.

Alba (1993) addresses the problem of overeducation by using ECVT, where workers are asked about the required education for the job they hold. He finds a trade-off between education, experience and on-the-job training. Overeducated workers seem to have less experience, lower on-the-job training, and higher turnover than other comparable workers. Additionally, his evidence on occupational mobility shows a trend towards improved job match. That is, male, more educated as well as more experienced workers have a higher probability of becoming adequately educated in the new job but this has a non-linear effect with firm changes and experience. Thus, Alba concludes that overeducation is a short-term problem. However, other studies not using wage data (García and Malo, 1996) have found evidence of over/undereducation as a rather permanent phenomenon in the Spanish labour market in finding lower turnover among overeducated workers.

5 Conclusions

The literature on wage functions has basically focused on the analysis of returns within a framework of OLS regressions. No work has been done trying to instrument education and control for bias except for self-selection in the case of women and sector choice. Few studies have introduced ability or family background effects, partly because the limitations of the available data sets. No work has taken employer's characteristics into account.

From the reviewed literature the conclusions can be ordered into the following items: returns to education by years, returns to

education by levels, other forms of human capital and, finally, other topics. Returns to education by years for the whole sample of wage earners seem to range around 5% to 7%, taken into account the disparity of data sets, samples, additional variables and wage definitions. In temporal terms, the results for the longest samples, with the same specification, show a scarce variability in the rate of return of education. The analysis by gender and sector tends to show a general pattern of higher returns for women than for men and also for the private sector as compared to the public sector.

The estimations using levels of education obtain results for the rate of return that tend to show linearity, keeping the same patterns by sector and gender. Nevertheless, it must be stressed that, in the case of women, a certain concavity appears at the highest levels of education in the private sector. When a temporal comparison is made most of the analysed work shows a pattern of widening differentials between the compulsory and the highest level. Nonetheless, this widening is compatible with a reduction of differences between the lowest and also between the highest levels of education. That is, the premium between compulsory and upper secondary has tended to decrease, and so has also the difference between University short and long cycle.

With respect to experience the observed behaviour mirrors that of returns by sector and gender. A clear pattern appears with a higher return to experience in the male case and also in the private sector. This result must be interpreted with caution because experience is measured only in terms of potential experience which, in the case of women, may not be as good an approach as in the case of men.

Finally, the work done in signalling and sheepskin tends to show that the human capital approach can explain a large part of the variation of wages with education. Nevertheless, signalling cannot be rejected. In conclusion, the Spanish evidence suggests that both the human capital and the signalling approach must be taken into account when explaining wage determination. Nonetheless, we should keep in mind the intrinsic difficulties in this kind of testing.

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