

The Returns to Education in Spain

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Abstract — This article provides microeconomic estimates of the returns to education in Spain. The data used, which supplemented the second quarter of the 1990 Spanish labor force survey, allow to estimate wage equations by sex, class of worker and private/public sectors of employment. In general, the results obtained are consistent with those of the literature for other countries: an additional year of education yields about 8.4% increase in earnings. When distinguishing by class of worker, the rate of return to education is higher for self-employed than for wage and salary workers, particularly so for the rate of return to higher education. By sector of employment, the results indicate that secondary education is better compensated in the private sector, whereas a university degree receives a greater rate of return in the public sector. The returns to university education is higher among women than among men regardless of the class of worker and the sector of employment. [*JEL* I21, J31]

1. INTRODUCTION

LACK OF ADEQUATE data thus far has made it difficult for researchers to estimate the returns to education in Spain. For instance, the figures on Spain which are presented in Psacharopoulos (1985) had been obtained from indirect sources rather than from estimating the classical Mincer equation.¹ In this article we present results of estimating the standard wage equation by using data that have recently become available. This, we hope, will contribute to a better understanding of the relationship between education and earnings in Spain.

The data used were obtained through a first and only inclusion of questions on earnings in the Active Population Survey (EPA) as of the second quarter of 1990. These questions were asked of a 2000 household sample out of the 60,000 which comprises the quarterly EPA survey. Although small, the sample was designed as a nation-wide representation of the labor force.

The inclusion of questions on earnings was an initiative of the Statistical Office of the European Community. The aim was to test the feasibility of collecting individual earnings data through labor

force surveys. The experiments, although highly successful, have not been repeated. Thus, the *Encuesta Piloto de Ingresos* is a unique data set which contains all the usual information provided by the EPA survey of 1851 employed persons, together with information on their wage and salary or self-employment earnings.

The remainder of this article is organized as follows: In section two, we summarize the evolution of the Spanish labor market over the last decade and a half and show the employment and earnings structure of Spain in 1990. In section three, we present earnings equations estimated with the 1990 sample of earnings data. In section four, we discuss some issues regarding self-selection bias. In section five we analyze age-earnings profiles for different employment groups. Finally, in section six we summarize the conclusions and suggest directions for further research on the determinants of earnings in Spain.

2. EMPLOYMENT AND EARNINGS STRUCTURE IN 1990 SPAIN

It is useful to analyze the employment and

earnings structure of 1990 Spain in the context of the evolution of the labor market over the eighties. Spain entered the decade of the 1980s at mid-way of a lingering labor shedding process, when the unemployment rate already reached double-digit proportions. The recovery started around 1985, and continued at the pace of strong output and employment growth up to about 1991. Although the year 1990 marks the end of a phase of steady employment growth in Spain, the unemployment rate remained well over 15% of the labor force.

Unfortunately, we do not have homogeneous data for examining the earnings structure and the returns to education over the 1980s. Instead, we will focus on the changing structure of employment and educational attainment of employed persons. We will then analyze the structure of earnings in 1990 Spain.

Table 1 shows the evolution of employment over the last decade and a half in Spain. Furthermore, it contains the employment structure in 1990 Spain. Almost the same numbers of jobs that were lost from 1976 to 1985 had already been recovered by 1990. The unemployment rate did not fully reflect the substantial employment growth because of a rapidly rising number of women entering the labor force. Nonetheless, a still low participation rate among women implies that they accounted for less than a third of the total employed labor force in 1990.²

Regarding educational attainment among the employed, some results indicated in Table 2 are worth noting:

First, the educational level of the employed population has been improving steadily. From 1980 to 1990, the improvement is more marked among women than among men. However, in 1990, 60% of employed females and 73% of employed males lacked a secondary education.

Second, in the period 1980–1990, the percentage of workers with higher education increased by 60%. In 1990, 17% of women and 10% of men possessed a university degree.

Third, there are important differences in educational attainment by sector of employment. While 51% of women and 30% of men working in the public sector held a university degree, in the private sector the analogous figures are, respectively, 9.3% and 6.8%. The higher proportion of university graduates in civil servant jobs than in private sector ones is partly attributable to the fact that access to

many government jobs, as those of public sector doctors and teachers, require a higher education degree.

The previous figures on employment structure have been obtained from the Spanish labor force survey (EPA). As indicated above, this same data source provides information on earnings for a sample of 1815 workers. The sample size is reduced to 1740 observations when we focus on employed persons aged 16–64 who reported their earnings as self-employed or salary and wage workers. Furthermore, by excluding observations with missing values for earnings or hours worked, the data sample becomes 1570 workers.

By using this data sample, Table 3 contains the main features of Spain's earnings structure in 1990:

(1) By sector of employment, we find sizeable earnings differentials in favor of public sector employees and self-employed workers relative to private sector employees. The average income of workers employed in the public sector and of those who are self-employed are, respectively, 1.5 and 1.21 times the average income of private sector workers. These earnings differentials are greater for workers who have completed a post-secondary level of education or possess a university degree. Furthermore, it is to be noted that the public–private sector earnings ratio amounts to 1.74 among females and to 1.46 among males; the same differential diminishes with workers' ages.

(2) The earnings differential by sex is greater among the private sector employees than among those of the public sector. In the latter group, females obtain, on average, 86% of male earnings.

(3) Earnings differentials by educational attainment are quite large, especially for the self-employed where the earnings ratio of university graduated persons to those with primary education is 1.67. In the public sector, the corresponding ratio is 1.54 as compared to 1.44 in the private sector.

Of course, the above indicated results should be taken within the limits of crude descriptive statistics. In order to identify the factors which can explain the observed earnings differentials, a detailed analysis of individual data is needed. The earnings gap in favor of the public sector may be due to higher economic returns to human capital in the public sector. Alternatively, the cause may be differences in personal or job characteristics (education, experience or occupations) between private and public sector employees.

Table 1. Employment structure in Spain. Number of workers in millions

	Males	Females	Total	Public s. employees	Private s. employees	Self employed	Family workers	Non classified
1976	8.954	3.729	12.683	1.289	7.327	2.822	1.197	0.048
1980	8.362	3.435	11.797	1.454	6.575	2.693	1.046	0.029
1985	7.700	3.170	10.870	1.736	5.594	2.623	0.876	0.041
1990	8.576	4.003	12.579	2.106	7.167	2.589	0.684	0.031
1990%	68.2	31.8	100	16.7	57.0	20.6	5.4	0.3

Source: Labour Force Survey (EPA).

Table 2. Educational attainment of employed persons by sex, class of worker and sector of employment

	Males					Females				
	Public	Private	Self emp.	Family workers	Total	Public	Private	Self emp.	Family workers	Total
% of workers without secondary education										
1980	66.01	88.4	91.4	88.8	86.1	42.5	87.4	91.9	96.2	83.8
1985	61.4	82.9	88.9	85.5	80.8	36.2	19.3	91.7	93.6	76.9
1990	47.8	75.9	82.9	80.3	73.5	31.8	68.8	83.8	88.5	64.6
% of workers with university degree										
1980	22.6	4.1	4.3	1.8	6.5	44.6	5.1	4.6	1.4	9.6
1985	25.4	5.9	4.9	2.4	8.6	45.7	7.5	4.5	1.8	12.8
1990	30.1	6.8	6.7	3.2	10.1	50.8	9.3	7.6	2.7	16.8

Source: Labor Force Survey (EPA) (2nd quarter).

However, it should be kept in mind that the mean of earnings might not be informative enough about the earnings distribution if the standard deviations are sizeable. Problems are aggravated when these measures are obtained from a small sample. Indeed, as can be observed in Table 3, self-employment earnings are highly variable, particularly among the self-employed with primary education where the standard deviation is greater than the mean.

In the following section, rather than taking further the analysis of the wage differentials, we estimate earnings equations that will shed some light on the returns to education according to some personal and job characteristics.

3. THE RETURNS TO EDUCATION

Table 4 contains the results of estimating the standard earnings equation (Mincer, 1974). The dependent variable is defined as the natural logarithm of gross monthly earnings and the independent variables are years of schooling or degree completed, potential labor market experience (calculated as age minus years of schooling minus 5), experience squared and the logarithm of hours worked.

Column 1 of Table 4 gives estimates of the returns to education in Spain for the overall sample of

workers. When the schooling variable used is years of education attained, we obtain a rate of return to education of 8.36%. This overall rate of return places Spain somewhere between the "intermediate" and the "advanced" countries studied by Psacharopoulos (1985).

If we consider the schooling variable to be the level of education completed, we find that secondary education (12 years of schooling) and university education (15–17 years of schooling leading to graduation) yield the highest rate of return, at around 8.5%, as compared with primary and pre-secondary education, with a rate of return of about 7%. However, these rates of return are rather indicative. In order to obtain the exact rates of return it would be necessary to use a larger number of dummies to comprise all the different certificates and their required number of years of school. For example, the omitted dummy refers to no degree completed (illiteracy or lack of any certification), meaning that some workers of this group have actually attended school for a certain, although very short, period of time.³

Self-employment and Dependent Employment

Some interesting results emerge when we compare the returns to education among all wage and salary workers with those of self-employed workers.

Table 3. Mean earnings by selected worker characteristics in 1990

	Wage and salary workers							
	Private sector		Public sector		Ratio Pub./priv.	Self-employed		Ratio S.E./priv.
	Mean	S.D.	Mean	S.D.		Mean	S.D.	
Total	96528	53034	144875	64642	1.50	116798	169526	1.21
SEX								
Males	104900	50116	153335	68804	1.46	125082	183361	1.19
Females	76172	54496	132575	56073	1.74	84121	87145	1.10
Ratio F/M	0.72		0.86			0.67		
EDUCATION								
<Primary	87317	55867	91651	43142	1.05	80780	76867	0.92
Primary	94045	49324	118230	46790	1.25	121169	208368	1.28
Pre-second.	80558	38934	117731	40078	1.46	107194	63874	1.33
Secondary	117264	59119	137607	48406	1.17	99193	55241	0.84
University	136262	69094	183136	71414	1.34	202499	140036	1.48
Ratio un/pri	1.44		1.54			1.67		
AGE								
19–29	74798	39061	122258	41198	1.63	74880	39547	1.00
30–49	107677	50358	151190	64759	1.40	138437	226317	1.28
50–64	109652	67582	145844	72855	1.33	100909	85368	0.92

Source: EPA, Encuesta Piloto de Ingresos, 1990.

Table 4. Earnings equations by class of worker and sector of employment. The t statistics are in parentheses

	All workers	Wage earners	Self employed	Private sector	Public sector
Constant	8.242 (38)	7.295 (39)	7.486 (11)	7.897 (35)	7.875 (18)
Primary school	0.222 (4.3)	0.133 (2.6)	0.450 (3.5)	0.112 (2)	0.185 (1.7)
Pre-secondary	0.357 (5.6)	0.248 (4.2)	0.675 (3.5)	0.232 (3.4)	0.268 (2)
Secondary	0.691 (11)	0.635 (10)	0.630 (3.1)	0.617 (8.8)	0.496 (4)
University	1.053 (16)	0.941 (15)	1.410 (6)	0.732 (8.7)	0.811 (6.9)
Experience	0.046 (11)	0.046 (13)	0.046 (2.7)	0.048 (11)	0.031 (5.1)
Experience ²	-0.0006 (-9)	-0.0006 (-9.2)	-0.0006 (-2.5)	-0.0006 (-8.2)	-0.0004 (-3.8)
Ln hours worked	0.587 (11)	0.702 (13)	0.689 (4.3)	0.700 (12)	0.829 (7)
N observations	1570	1214	356	896	318
F	81.4	121.1	8.3	62.7	30.3
R ²	0.26	0.39	0.14	0.33	0.40
Years of schooling	0.083 (20)	0.081 (22)	0.088 (5.7)	0.069 (13)	0.066 (12)

Source: EPA, Encuesta Piloto de Ingresos, 1990.

The latter group benefits from a higher rate of return to their human capital investment (8.8%) than the former group (8.1%). When we look at returns by level of education, two results deserve special attention:

(1) The returns to primary education (45%) and to university education (140%) are much higher among self-employed persons than among wage and salary workers, for whom the returns are, respectively, 13% and 94%.

(2) There is a notable earnings increase associated with secondary education as compared with pre-secondary education for wage earners (about 40 percentage points increase for four more years of schooling), while this additional period of education does not give any rewards to self-employed persons.

Some comments about the indicated results are in order. On the one hand, we would be well advised to bear in mind the problems associated with reporting self-employment income. On the other hand, it must be borne in mind that the self-employed workers are a very heterogeneous group. Of particular relevance for earnings is the size of the firm. By distinguishing between self-employed workers without employees and those with employees in their firms, we learn that the latter are more likely to be better educated and to draw more income from their businesses, partly as a return to

their invested managerial skills (results not shown). These factors contribute to the fact that the human capital equation performs better in explaining earnings of wage and salary workers than earnings of the self-employed, as indicated by the F-statistics in Table 4.

Despite the indicated shortcomings, the estimated returns to education by class of worker shed light on the relationship between education, earnings and entrepreneurship in Spain. The results suggest that there are some self-employed persons who do well enough just with basic education and others, more properly labeled entrepreneurs, who do the best with their university education. The businesses owed by the latter are the most likely to employ other workers and grow over time.

Public and Private Employment

As we have seen in Table 1, dependent employment composition by sector has notably changed in Spain over the period 1976–1990. During the deep and long recession, public employment kept growing, as opposed to the massive destruction of jobs that took place in the private sector. Unfortunately, as indicated earlier, we do not have information on earnings distribution over that period. Yet, we can look at the 1990 returns to education in public as compared to private sector employment.

We have presented descriptive statistics on earnings differential between the public and private sectors. We found that, on average, Spanish workers in the public sector are paid substantially higher wages than those in the private sector. Exploring whether this is due to differences in demographic and job characteristics or, alternatively, to differences in wage determination between both sectors of employment is not the purpose of this paper. Rather, our aim is to examine possible differences between both sectors of employment in their rates of return to human capital, which also may affect the overall differential as the skill composition varies.

By fitting separate earnings equations for dependent employment in the private and public sectors, we obtain similar rates of return per year of schooling: 6.9% and 6.6%, respectively. However, when we consider levels of education as explanatory variables, we observe that all levels show slightly higher returns in the public sector, the exception being the returns to secondary education.

There are two striking results in the estimated returns to education by sector of employment: (1) the very high rate of return to secondary education in the private sector, at 9.6%, as compared with 5.7% in the public sector; and (2), in part as a consequence of the previous result, the very low rate of return to higher education in the private sector, at 3%, in comparison with 7.8% in the public sector.

In this respect, several remarks should be made. First of all, this result differs from the evidence for other countries presented in Psacharopoulos (1985). One possible reason for this may be that public sector employees in the data sample are both civil servants and workers employed in public enterprises. The latter are not so affected by the equalization policy of pay scales. Secondly, special attention should be given to the high rate of return to a university degree in the public sector. As pointed out in section 2, university educated workers are over-represented in the public sector as compared with private sector employment. The relative importance of higher education in the public sector is greater among women than among men.⁴

One possible reason for the low rate of return to education in the private sector for university education may be the existence of under-employment among workers with that level of education, particularly when they hold entry-level jobs.⁵ Under-employment among higher educated workers in the

public sector is less likely because the rules governing public sector employment are highly dependent on possession of educational certificates. For this same reason, it is more difficult for public sector workers with secondary education to make career advancement, whereas in the private sector the internal job market allows for greater ascension on the career ladder by accumulating specific human capital.

Males and Females

In Tables 5 and 6, we present separate regressions for females and males in different employment sectors. In all cases, base earnings with little or no schooling are lower for women than for men. Females, however, obtain higher rates of return to higher education than males.⁶ This result has been observed in many countries (see Psacharopoulos, 1985). According to the human capital theory, these differentials in the rate of return should make investments in higher education more attractive for women. This is in fact the case in Spain, where women comprise the majority of the university enrollment since 1986.

We also observe that the returns to potential experience are lower for females than for males. This could be because the use of potential experience as a proxy for actual experience is likely to be overestimated for women, given their more frequent career interruptions as compared with men. Moreover, earnings show a strong positive relation to hours worked only for women.

Table 6 presents earnings equation estimates by sex within the private and public sectors of employment. Consistent with a result noted before, but not for that reason less surprising, it turns out that the rate of return to university education among males in the private sector is almost nil. At face value this finding implies that, in the private sector, investment in higher education is a wastage of resources. However, caution should be used when interpreting this result because of the sample size.

Furthermore, one must take into account the fact that university educated people is a very heterogeneous population and that, as indicated above, many of these persons may be under-employed. Moreover, formal education has not always been considered crucial for male employees to move up the professional ladder. In this context, it is worth noting that, among males, experience is better

Table 5. Earnings equations by class of worker and sex. The t statistics are in parentheses

	All workers		Wage earners	
	Males	Females	Males	Females
Constant	10.50 (30)	7.863 (28)	10.080 (27)	7.850 (28)
Primary school	0.236 (4.2)	0.115 (1.1)	0.134 (2.6)	0.096 (0.8)
Pre-secondary	0.384 (5.4)	0.302 (2.3)	0.221 (3.5)	0.322 (2.6)
Secondary	0.677 (9.3)	0.685 (5.4)	0.610 (9.4)	0.695 (5.6)
University	1.002 (13)	1.118 (9)	0.854 (9.4)	1.103 (9)
Experience	0.048 (10)	0.038 (5.8)	0.047 (11)	0.038 (6.1)
Experience ²	-0.0006 (-8)	-0.006 (-4.7)	-0.0006 (-8.3)	-0.0004 (-4.1)
Ln hours worked	-0.010 (-0.1)	0.688 (9.6)	0.142 (1.5)	0.693 (9.8)
F	42.2	50.6	60.1	54.9
R ²	0.21	0.44	0.34	0.50
N observations	1107	463	823	391
Years of schooling	0.077 (15)	0.097 (14)	0.073 (17)	0.098 (15)

Source: EPA, Encuesta Piloto de Ingresos, 1990.

Table 6. Earnings equations by sector of employment and sex. The t statistics are in parentheses

	Private sector		Public sector	
	Males	Females	Males	Females
Constant	9.691 (23)	8.097 (25)	10.528 (15)	7.040 (13)
Primary school	0.130 (0.1)	0.014 (0.1)	0.115 (1)	0.369 (1.8)
Pre-secondary	0.219 (3.1)	0.220 (1.5)	0.225 (1.5)	0.495 (2.1)
Secondary	0.614 (8.4)	0.596 (3.8)	0.432 (3)	0.710 (3.2)
University	0.638 (6.713)	0.857 (5.1)	0.739 (5.5)	1.065 (4.9)
Experience	0.049 (9.7)	0.037 (4.6)	0.040 (5)	0.018 (2.1)
Experience ²	-0.0006 (-7.5)	-0.0005 (-3.2)	-0.0005 (-4)	-0.0002 (-1.3)
Ln hours worked	0.237 (2.1)	0.635 (7.9)	0.110 (0.6)	1.017 (6.6)
F	34.2	20.6	14.1	24.6
R ²	0.27	0.36	0.35	0.58
N observations	635	261	188	130
Years of schooling	0.064 (11)	0.080 (8)	0.061 (8.7)	0.075 (9.2)

Source: EPA, Encuesta Piloto de Ingresos, 1990.

rewarded in the private sector than in the public sector.

In any event, the former result calls attention to massive higher education in Spain. When the public sector becomes unable to absorb workers with a university certificate, the payoff to that level of education diminishes significantly as compared to secondary education. The private sector may attach a much lower value to university education if the certificate corresponds to a field of study that has little application to the business sector of the economy. These workers' failure to meet their expectations at entering the labor market can hinder their professional development further rather than speeding it up.⁷

4. THE RETURNS TO EDUCATION AND SELF-SELECTION BIAS

For a correct interpretation of our estimates of returns to education, it is to be noted that the data set used does not allow the estimation of the structural human capital model as in Willis and Rosen (1979). Due to the self-selection of individuals into educational groups and the lack of ability measures, our estimates of the rates of return to educational investment may be biased. However, the results would still be useful if, as Griliches (1977) found, ability biases are only about 1% in rates of return estimated through standard wage equations.

Furthermore, another kind of self-selection bias that can be present in the estimated returns to education for specific groups of workers is the

sample selection bias. Fortunately, we can control for this bias by using the method proposed by Heckman (1979). First, we obtain Probit estimates of employment status. Column 1 of Table 7 presents the results when the dependent variable takes on one if the worker is self-employed and zero otherwise. It is found that older workers and those with primary education are the most likely to be self-employed. In addition, column 2 of Table 7 shows the results of estimating the probit model when the dependent variable takes on one if the worker is employed in the public sector. In this case, older workers, males and those with more years of education are the most likely to be employed in the public sector.⁸

Table 8 exhibits the results of estimating earnings equations for self-employed workers by including the inverse Mills ratio among the set of independent variables. The inverse Mills ratio obtains a negative and significant coefficient. This can be interpreted as an indication of negative selection into self-employment. Therefore, the new rate of return to education is slightly higher, at 9%, than the one obtained without controlling for self-selection, at 8.8% (Table 4). This is also reflected in the returns to the different levels of educational attainment. In particular, the return to primary education — which was already very high for the self-employed as compared with wage and salary workers — becomes even higher by 7 percentage points. According to the results shown in Table 8, the self-selection bias in the rates of return appears to be highest for lower levels of education.

Table 7. Probit estimates of employment status

	(1)		(2)	
	Coeff.	t	Coeff.	t
Female	0.009	0.1	-0.310	-2.7
Primary	0.241	1.9	0.307	1.6
Pre-secondary	0.106	0.6	0.492	2.1
Secondary	0.060	0.4	1.050	4.7
University	0.191	1.0	1.350	6.2
Age	0.026	7.4	0.022	4.9
Constant	-1.047	-4.6	-2.226	-6.7
Log likelihood	-740.5		-418.1	
N observations	1740		1313	

Notes: 1. In regression 1, the dependent variable takes on 1 if the worker is self-employed. In regression 2, the dependent variable takes on 1 if the worker is employed in the public sector. 2. Eight industry dummies have been included in the regressions.

Source: EPA, Encuesta Piloto de Ingresos, 1990.

Table 8. The returns to education among self-employed workers after controlling for self-selection

	Coeff.	t	Coeff.	t
Experience	0.043	2.63	0.032	1.84
Experience ²	-0.001	-2.12	-0.000	-1.30
Years of schooling	0.090	5.88		
Primary			0.525	4.03
Pre-secondary			0.789	4.05
Secondary			0.695	3.43
University			1.492	6.45
Ln hours worked	0.604	3.84	0.673	4.25
Mills	-0.147	-2.52	-0.182	-3.07
Constant	7.820	11.24	7.794	11.33
R ²		0.15		0.17
N observations		356		356

Source: EPA. Encuesta Piloto de Ingresos, 1990.

Table 9. The returns to education among public sector workers after controlling for self-selection

	Coeff.	t	Coeff.	t
Experience	0.032	5.13	0.030	4.52
Experience ²	-0.000	-4.18	-0.000	-3.63
Years of schooling	0.063	8.17		
Primary			0.174	1.65
Pre-secondary			0.243	1.82
Secondary			0.460	3.63
University			0.749	5.75
Ln hours worked	0.789	6.82	0.832	7.05
Mills	0.003	0.58	0.005	1.06
Constant	7.794	17.88	7.927	17.98
R ²		0.42		0.41
N observations		318		318

Source: EPA. Encuesta Piloto de Ingresos, 1990.

Regarding workers employed in the public sector, the results are less noticeable. As Table 9 shows, the inverse Mills ratio obtains a positive but statistically insignificant coefficient. The new rate of return to education is 6.3% as compared to 6.6% without controlling for self-selection. By levels of education attained, the most affected by the inclusion of the inverse Mills ratio among the independent variables are the returns to university education. If university education yields 31.4% increase in earnings according to estimates that do not control for self-selection, after doing so the new returns become 28.9%.

5. AGE-EARNINGS PROFILES

Analyzing age-earnings profiles serves several purposes. First, they allow us to see how earnings

increase with age as a result of experience in the labor market. By using learning opportunities, workers advance in their professional career and eventually obtain higher paying jobs. Secondly, considerations of age-earnings profiles of different groups of workers permit us to compare the associated patterns in career progressions. In some cases, these patterns reflect the conditions under which occupational mobility takes place. Finally, measuring the earnings differential at different ages can indicate the extent to which higher education pays off in terms of more learning opportunities, more stable jobs and therefore steeper wage-earnings profiles.⁹

Figure 1 shows some patterns worth noting:

(1) The age-earnings profile is steeper among self-employed workers than among wage and salary workers. The earnings differential between both

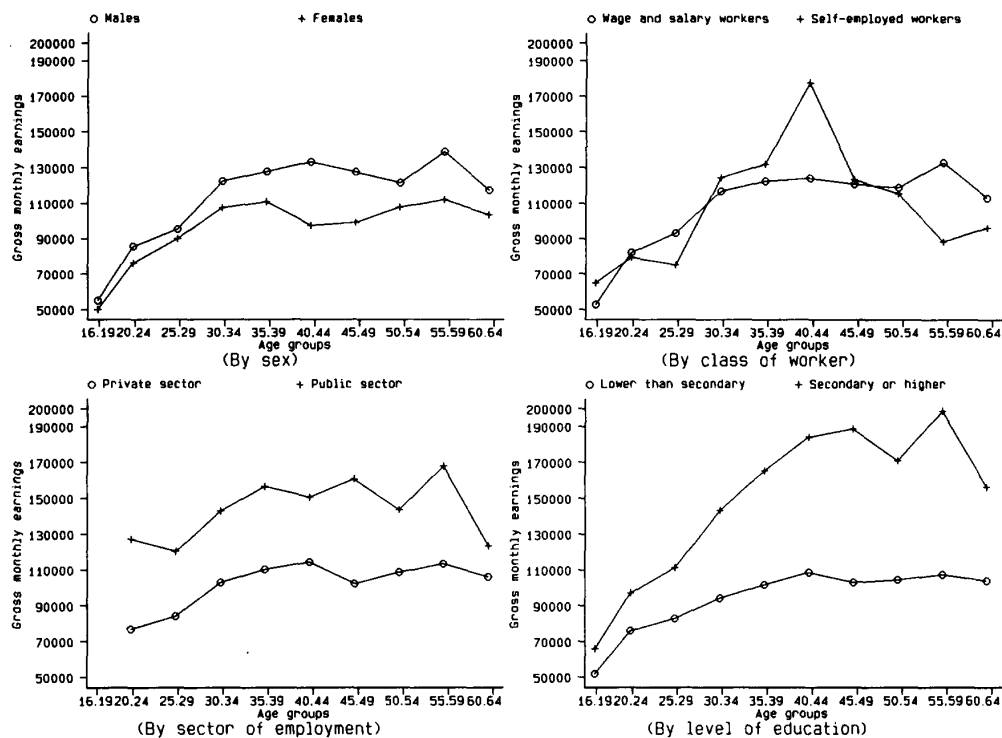


Figure 1. Age-earnings profiles by class of worker, sex, sector of employment and level of education.

types of workers is maximized for those in the age group 40–44, who therefore appear to be the most successful entrepreneurs.

(2) The age-earnings profiles of both men and women increase at the same rate up to the age of 30. For workers older than 30, earnings keep growing for men but diminish for women. This may be related to the fact that many women re-enter the labor market between the ages of 30 and 40 after being absent for a certain period of time. This implies that they slip off the traditional career track and are deprived from the returns to employment experience.

(3) The comparison of age-earnings profiles among private and public sector employment indicates that the wage differential is almost constant for each age group except for workers of ages 60 to 64 years.

(4) The age-earnings profiles by levels of education document the well known fact that earnings

grow much faster for workers with higher educational attainment. This implies that the wage differential by educational attainment increases with age. The reason is that higher levels of education provide more learning opportunities and therefore facilitate consistent occupational mobility.

6. CONCLUSION

In this article we have presented estimates of the returns to education in 1990 Spain. We have been able to accomplish this task by using a unique data set which, despite the limited size of the sample, is representative of the entire Spanish labor force. Many of the results are consistent with those obtained for other industrialized countries. Therefore, the study is a modest contribution to the abundant literature that deals with estimates of returns to education and, at the same time, fills the gap for Spain.

It is clear that educational attainment has significantly increased in Spain over the 1980s. However, the percentage of workers with education lower than secondary education is still very high — more than two-thirds of the employed population. In contrast, the proportion of higher educated workers is in line with other industrialized countries. Similarly, the overall rate of return to education, at 8.4%, is close to that obtained for advanced countries. Most striking is the low returns to education for university educated workers in the private sector. Because of the reduced sample size, caution should be used in interpreting this result. Estimations of rates of returns by using larger data

samples are necessary to test the robustness of the results presented here.

Among the issues that this article has touched upon but did not treat with the necessary depth are the wage differentials observed by sex, sector of employment and kind of worker. Of particular interest is the finding that the average wage is higher in the public sector than in the private sector, even after controlling for education. Further work and a larger sample of data are required to shed more light on this wage differential, which seems to be at odds with the common assumption that private sector jobs in Spain are better paying than those of the public sector.

NOTES

1. See Quintás (1983).
2. See section four for the relationship between class of worker/sector of employment and gender in the context of a multivariate analysis.
3. To generate a continuous variable for years of education and for calculating the rates of return to primary education we have considered that workers who have not completed primary education (six years of school required) have spent three years in school.
4. Many women have found in the public sector the kind of jobs that best suit their needs for making more compatible child rearing with work outside the home.
5. As indicated earlier, high unemployment is a serious problem in Spain. Youth, even those with high levels of education, are especially hit by the hardship of unemployment. In a labor market where finding work is so difficult, many university educated workers are obliged to accept jobs for which they are over-educated. This is just a first stepping-stone to employment. Later on, they can improve their job match by moving to other jobs. See Alba-Ramírez (1993) for an analysis of mismatch in the Spanish labor market.
6. This estimated returns to education for women may be underestimated because we are not controlling for women's self-selection into the labor force. It is a well known fact that more educated women are more likely to be in the labor force. The data sample that we use does not allow to control for self-selection because it is composed only of employed persons.
7. According to the Spanish labor force survey (EPA), the unemployment rate and the incidence of long-term unemployment among university educated youth are equally high or even higher than for young workers with lower levels of education. Education starts to make a clear difference in terms of employment opportunities for people who are well in their thirties.
8. In both probit equations on employment status, industry dummies obtained very significant coefficients.
9. Following Dougherty and Jimenez (1991), we have tried earnings equations with interactions of schooling and experience and obtained very poor results. One reason for this may be the drastic reduction in the degrees of freedom imposed by increasing the number of independent variables, given the small sample size.

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