



Munich Personal RePEc Archive

# **Education and Inequality: Evidence from Spain**

Budria, Santiago

University of Madeira

20 June 2006

Online at <https://mpra.ub.uni-muenchen.de/1098/>

MPRA Paper No. 1098, posted 11 Dec 2006 UTC

## CHAPTER 12

# Education and Inequality: Evidence from Spain

Santiago Budría Rodríguez

Universidade da Madeira  
Funchal, Portugal

*How do the family and personal characteristics of an individual influence his/her educational attainment? How do the labour market prospects change when he/she receives further education? This article intends to answer these two questions. To that purpose, it reviews the most recent literature for the Spanish case. The goal is to obtain fresh insights into the connection between education and economic inequality.*

## 1 Introduction<sup>1</sup>

Education is a potential source of earnings inequality in at least two respects. First, more educated individuals tend to have lower unemployment rates, are paid higher wages, and enjoy higher earnings growth along their careers. Therefore, returns to education drive a wedge between the earnings profile of high and low educated workers. Second, the probabilities of undertaking further education – and benefiting from better labour market prospects – differ across individuals. Several studies have shown that family and personal characteristics influence the demand for further education. These differences are likely to promote economic inequality, since they give rise to inequality of opportunities among individuals.

This article explores the connection between education and economic inequality along these two dimensions. First, it describes the inequality in educational levels attained in Spain, discusses its recent evolution, and investigates socio-economic determinants of the demand for education. Second, it surveys new evidence on the connection between educational qualification and labour market prospects.

The rest of the article is organised as follows. Section 2 describes the most popular Spanish data sets used in the literature. Section 3 provides some basic facts on educational attainment by age and gender, and discusses socio-economic determinants of the demand for education. Section 4 provides recent evidence on returns to education in Spain. Section 5 presents concluding remarks.

## 2 Data sets

We start by describing the data sets that have been used most frequently in the empirical literature on Spain. The *Household Budget Surveys* (EPF, Encuesta de Presupuestos Familiares) were conducted in 1980 to 1981 and 1990 to 1991 by the Spanish National Statistical Office (INE, Instituto Nacional de Estadística). They contain information on annual net family income, expenditure, educational level, and employment status (hours worked not included) for about 20,000 households. In the

---

<sup>1</sup> I gratefully acknowledge financial support from the European Commission for the project HPSE-CT-2002-00108.

1980/81 survey this information is only available for household heads, while in the 1990/91 survey it covers all household members.

The *Continuous Household Budget Survey* (ECPF, Encuesta Continua de Presupuestos Familiares) is issued by the INE at a quarterly basis since 1985. It is a sample of 3,200 households that report data on a continuous income variable which includes all monetary household income, and a wide range of household socio-economic characteristics. It has a rotating panel structure, in which 1/8 of the sample is rotated every quarter.

The *Survey on Class Structure, Consciousness and Biography* (ECBC, Encuesta de Estructura, Conciencia y Biografía de Clase) was conducted by the Spanish National Institute of Statistics, the Regional Government of Madrid, and The Woman Institute. It dates from 1991, has a sample size of 6,632 individuals, and contains data on personal characteristics and family background as well as on wages and hours of work.

The *Spanish Labour Force Survey* (EPA, Encuesta de Población Activa) is carried out every quarter since 1987, with a sample of about 60,000 individuals. It is designed to be representative of the total Spanish population, and it contains information on the educational status (including the highest educational level attained and the education undertaken in the reference week) and family characteristics (except for family income) of people aged 16 and older.

The *Living and Working Conditions Survey* (ECVT, Encuesta de Condiciones de Vida y Trabajo) is a nation-wide household survey conducted yearly from 1999 to 2001. Its goal was to obtain information about the labour market participation and time allocation of about 60,000 individuals, aged 14 and older, that were working in the week of the survey. They were asked to report their net monthly wage (though using intervals), educational attainment, on-the-job skill requirements, and information on their family environment.

The *Wage Structure Survey* (EES, Encuesta de Estructura Salarial) is an employer survey of 175,000 individuals. It was conducted in 1995 by the National Institute of Statistics (INE, Instituto Nacional de Estadística) among a sample of firms from the manufacturing, construction and service industries. The sample was selected by use of a two-stage method. In the first stage, firms were selected according to their size, economic activity and region, while the number of workers within each group were selected in the second stage. Firms with less than 10 workers are not included. The survey provides on-the-job characteristics such as kind of contract, skill requirements, type of job, sector, firm size, ownership, as well as gross hourly, monthly and yearly wages.

Finally, the *European Community Household Panel* (ECHP) is available from 1994 to 2001 for Spain. It has a sample size of about 8,000 households and 17,000 individuals, who are interviewed over time. They report personal and family characteristics, including marital, educational and occupational status, as well as gross and net monthly wages and worked hours.

### 3 Determinants of educational attainment

Over the last two decades, the human capital level of Spanish workers experienced a significant uprise. Enrolment rates at universities rose from 13 per cent (330,000 students) in 1971 to 44 per cent (1,500,000 students) in 1995. Younger cohorts are much more educated than the older ones. The labour force with a post-compulsory degree rose from 15 per cent in 1980 up to 35 per cent in 1998. Among individuals with secondary education, the number of those aged 25 to 35 is about 2.5 times larger than the number of those aged 45 to 54, and 4.5 times larger than the number of those aged 55 to 64. These proportions are almost identical for higher education.

The skill upgrading experienced by the Spanish population has been leaded by women. The number of female students in universities has doubled over the nineties, yielding a fraction of women relative to men in universities of 52 per cent. In secondary education, the female enrolment rate has risen to 84 per cent, six percentage points higher than for males.

Despite the educational upgrade experienced by the labour force, educational levels in Spain are still low as compared to OECD standards. Only 28 per cent of the population aged 25 to 64 have completed post-compulsory schooling, while the corresponding figures for the EU and the OECD are, respectively, 54 and 62 per cent. The proportion of those who have completed a university degree in the 25–64 age bracket is 16 per cent in Spain, which is far from the OECD average of 22 per cent.<sup>2</sup> Furthermore, Spanish enrolment rates are low: 83 per cent among people aged 16 against 88 per cent for the whole OECD.<sup>3</sup>

---

<sup>2</sup> As a matter of fact, about 3.7 per cent of the adult Spanish population is illiterate, 13.5 per cent have no schooling, 31.2 per cent have a primary education, 32.3 per cent have completed secondary education, 9 per cent have undertaken vocational education, and 20 per cent have acquired a university degree (see CIDE, 1999).

<sup>3</sup> The data presented here is taken from San Segundo (1997), CIDE (1999) and Cantó *et al.* (2000).

In the rest of this section, we review the literature on inequality in access to education. We place emphasis on those variables that primarily determine the level of educational attainment of Spanish youngsters such as gender, parental and family background (education, income and professional status), and regional conditions (regional average income, educational level and unemployment rate). Table 1 summarises the main findings.

### 3.1 Parental education

According to the literature, there is strong evidence that parental education plays a paramount role in the children's access to education (Modrego, 1987; Ginés-Mora, 1996, 1997a, 1997b; Dávila and González, 1998; Peraita and Sánchez, 1998; Aldás and Uriel, 1999; De Dios and Salas, 1999; Albert, 1998, 2000; Beneito *et al.*, 2001; Petrongolo and San Segundo, 2002).

Ginés-Mora (1996) uses EPF 1990/91 to explore the relationship between the demand for education and the personal and family background among individuals aged 17 to 25. The author shows that the probability of demanding higher education is greatly influenced by the parental education level. Using a logit model for the probability of accessing university, he finds that having a parent with a university education increases the probability by a factor of about 3, as compared to having a parent with no educational qualification. This evidence is in line with Ginés-Mora (1997a,b). According to the data, about 83 per cent of the families whose household head has a university degree have at least one son enrolled in a university. If the household head has completed secondary education, this percentage falls to 65 per cent, and to 10 per cent if the household head has no formal education. Despite the strong relationship between parental education and university attendance, most university students come from families with average education. This is due to the fact that having a university degree is rather infrequent among older cohorts.

Dávila and González (1998) use EPF 1990/91 to run a logit model for access to university education among 8,651 youths aged between 18 and 24. According to their estimates, having a household head with a higher education increases, by a factor of 23, the probability of demanding university education compared to having a household head without educational qualification. Aldás and Uriel (1999) obtain a sensitively lower effect. They design a logit model to explain the probability of undertaking secondary or higher education, and find that having a

**Table 1. Socio-economic determinants of the demand for education**

Study	Data set	Educational decision	Model	<i>Gender</i>	<i>Family background</i>				<i>Regional variables</i>			
				Female	Father's education	Mother's education	Income	Professional status of the household head	Average education	Average income	Unemployment rate	Town size
Albert (1998)	EPA 1987-1997	Tertiary	Binomial logit	+	++	+++		+ (a)			=	
Albert (2000)	EPA 1977-1994	Post-compulsory, Tertiary	Binomial logit	+	++	++		+ (a)			+	
Dávila and González (1998)	EPF 1990-1991	Tertiary	Binomial logit	+	+++		+ (b)	+ (c)		+	=	+
Aldás and Uriel (1999)	EPF 1990-1991	Post-compulsory, Tertiary	Binomial logit		++	++	+ =	+ (c)	+ =	+	+	+
Petrongolo and San Segundo (2002)	EPA 1987, 1991, 1996	Post-compulsory	Binomial logit, Multinomial logit (d)	+	++	++		+ (c)	+	=	+ for men - for women	=
Peraña and Sánchez (1998)	ECVT 1985	All levels	Multinomial logit	+	++ (e)	++ (e)	+					+ for women
Ginés-Mora (1996)	EPF 1990-1991	Tertiary	Binomial logit	+	++	++	+		+	=		+
De Dios and Salas (1999)	Own design 1995 (f)	5-year against 3-year tertiary degree	Binomial logit	-	++	++	+					+

Notes: '+' indicates small positive effect; '++' indicates moderate positive effect; '+++ indicates strong positive effect; '-' indicates small negative effect; '=' indicates no effect.

(a) In particular, having a working mother, a father who is Director, Department head or an employer has a positive effect on the children's educational attainment.

(b) It also affects positively the probability of enrolling into long-cycle degrees.

(c) Past status can be important as well. It was found that previous unemployment experience of the household head had a negative effect on the access to education.

(d) Three decisions are considered: staying-on at school, working, or being out of work and school.

(e) The ECVT data set does not report information on parental education. To overcome this problem, Peraña and Sánchez (1998) use a proxy called education equipment, which includes the father's occupational status, activity development (such as reading, theatre, cinema), and enjoyment of social and unemployment benefits. The reported effect '++' applies to this variable.

(f) A sample of about 500 students at the University of Granada.

household head with post-compulsory education increases between 4 and 6 times the probability of undertaking post-compulsory education compared to having a household head with no qualification.

Peraita and Sánchez (1998) use the ECVT to explore the impact of family background on the probability of various educational outcomes. They use household data on single individuals aged between 16 and 28, who are living with their parents and, moreover, declare that they have quitted or finished their schooling. Using an ordered logit model to account for the highest schooling level attained by these youngsters, they find that the probability of studying further is primarily governed by the parental level of education. Moreover, this effect is stronger for secondary education than for tertiary education. Additionally, the educational equipment of the family has a positive and significant effect on the children's access to education.<sup>4</sup>

De Dios and Salas (1999) use a binomial logit model to estimate the probability of enrolling into a long-cycle university degree instead of a short-cycle degree. Using a sample from students of economics at the University of Granada, they show that students with more educated parents are more prone to undertake the long-cycle degree. This is in line with the evidence reported in CIDE (1999). Using nation-wide data, this study reports that 58 per cent of the university students whose father has no educational qualification follow long-cycle degrees, while this proportion climbs to 80 per cent among the students whose parents have a higher education.

Albert (2000) uses the EPA from 1977 to 1994 to estimate a two-stage logit model. In the first stage, the probability of completing secondary education is estimated. The second stage estimates the probability of demanding higher education given the probability of completing secondary education. The variables which explain youngsters' educational demand most convincingly over the sample period are the ones related to personal and family characteristics, particularly those concerning parental education. There are two channels through which father's education affects the demand for higher education. On the one hand, it increases the probability of finishing secondary education successfully. On the

---

<sup>4</sup> The ECVT does not contain information on parental education. To overcome this problem, Peraita and Sánchez (1998) construct a variable called educational equipment as a proxy for family educational background. This variable is composed from the father's occupational status, activity development (such as reading, theatre, cinema), and enjoyment of social and unemployment benefits.



other hand, it increases the probability of enrolling into university once the secondary level is completed. These two effects are larger when the mother's educational level is considered. Albert (1998) presents similar evidence. Using the EPA from 1977 to 1997, she finds that those youngsters whose parents have a university degree are more prone to complete higher educational levels. The data is very illustrative. For instance, only 13 per cent of the families with an illiterate household head have one or more members in a university. By contrast, this proportion rises up to 70 per cent if we consider instead household heads with a university degree.

Traditionally, more educated men have married more educated women (Carabaña, 1994). Despite this association, however, some studies have found that the effect of the father's and the mother's education on children's demand for education can be different. Thus in Dávila and González (1998), for example, the father's educational level appears as a major determinant of the demand for higher education, while the mother's education has a significant effect on daughters only. Petrongolo and San Segundo (2002) use data from the EPA and construct a binomial logit model to estimate the probability of continuing in formal education among youngsters aged 16 and 17. The results indicate that this probability is greatly influenced by the parental education level, particularly when the mother's is taken into account.

Related to education, professional and social status are additional determinants of the demand for education. Beneito *et al.* (2002) estimate an equation for household demand for both secondary and university education using the EPF 1991. The results show that the social and economic status of the family has a comparatively greater impact on household expenditure on secondary education than on university education. The opportunity cost associated with the decision to invest in education is also shown to be a decisive variable in the decision to invest in secondary education. The results are less conclusive in the case of university education. Albert (1998, 2000) finds that students from families whose household head belongs to the lowest professional category have a lower probability of accessing to university, while having a working mother, or a father who is a director, department head or an employer, increases this probability. According to Petrongolo and San Segundo (2002), Aldás and Uriel (1999) and Dávila and González (1998), having an unemployed parent has a negative effect on the youngster's educational outcome. The preference for short university careers is also influenced by the father's professional category. As documented in CIDE (1999), 22 per cent of the university students whose father is a director follow short-cycle de-

grees, while this percentage is 42 for those students whose parent is an agricultural worker. Additional evidence shows that students with more educated parents tend to choose technical or health degrees, rather than social science or humanities degrees.

According to the evidence presented so far, it can be concluded that parental background appears as a key source of economic inequality, since (i) low educated parents act as a cultural barrier to the youths' demand for education, and (ii) the student's choice of the type and length of his university education is related to his parental background. On the one hand, (i) results in a source of inter-generational persistence of inequality. On the other hand, (ii) gives rise to differences in the labour market performance of individuals with the same education level, insofar different university careers are associated with different wage and employment prospects.<sup>5</sup>

### 3.2 Income and scholarships

Several authors have suggested that family income may act as an important barrier to education. This introduces limitations both on equity and efficiency in the provision of human capital, since (i) poor individuals have little chances to obtain educational qualifications, and (ii) individuals with a higher qualification are not necessarily the ones with more innate ability. Grants to education may improve the system along dimensions (i) and (ii), as long as they are perceived by youths coming from poor families. In the following, we review studies that have explored the impact of family income on the demand for education. We also ask to what extent the Spanish system of grants promotes equity and efficiency in the provision of education.

Peraíta and Sánchez (1998) show that higher family income is associated with higher levels of youngsters' educational attainment. This connection is stronger for female students. Aldás and Uriel (1999) find that family income explains the demand for secondary education better than the parental level of education, while the opposite occurs with the demand for higher education. Dávila and González (1998) find that the probability of enrolling into a university rises by 9 per cent with each additional 600 Euro of family income. This elasticity is somewhat smaller

---

<sup>5</sup> In Section 4 we report the unemployment rates of the four main university branches.

in Ginés-Mora (1996), who estimates that 600 additional Euro of family income increase the probability of accessing university by 6 per cent. This author shows that the percentage of university students increases sharply when moving towards higher income deciles. For instance, the fraction of university students over all individuals aged from 17 to 25 jumps from about 9.5 per cent within the lowest income decile up to 65 per cent within the highest decile. As an additional finding, lower income promotes enrolment into shorter university degrees, which coincides with the findings in Dávila and González (1998) and De Dios and Salas (1999). Albert (1998, 2000) and Petrongolo and San Segundo (2002) do not use family income as an explanatory variable.<sup>6</sup>

Calero (1998), Lassibille and Navarro (1998) and Aldás and Uriel (1999) evaluate to what extent public scholarships promote the equality of opportunities in higher education. Using the EPF, 1980/81 and 1990/91, they conclude that the Spanish system of scholarships helps little in reducing social inequalities. The percentage of students receiving a grant is almost evenly distributed throughout the family income distribution. As a consequence, individuals from middle and high income classes receive practically as many grants as those belonging to the lower deciles. Furthermore, the percentage and the size of the grants devoted to higher education students are larger as compared to other types of grants. Hence, individuals from poor families, who are more likely to have left the education system at earlier stages, benefit to a much lower proportion from public aids to education.<sup>7</sup>

Aldás and Uriel (1999) specify two logit models; one for the probability of receiving a grant, and one for the probability of undertaking secondary or tertiary education. Their goal is twofold. On the one hand, they investigate to what extent family income reduces the probability of receiving a grant. On the other hand, they ask whether or not the probability of demanding secondary or tertiary education is significantly affected by family income. They find that the major determinant of the probability of receiving a grant is family income, both for middle and

---

<sup>6</sup> These studies use the EPA, which does not include family income.

<sup>7</sup> Early displacement from the education system is more frequent among youths from poor families. Aldás and Uriel (1999) report that the percentage of individuals aged between 14 and 18 in secondary education is 39 per cent within the lowest income decile, while it jumps to 74 per cent within the highest decile. If we consider instead higher education, the percentage of individuals aged between 18 and 25 in a university is 6 per cent within the lowest decile, which starkly contrasts with the 42 per cent of the highest decile.

high educational levels. However, a deeper analysis reveals that there exist some limitations on equity. Even though the percentage of students that receive a grant is decreasing in the income decile, the progressivity vanishes when one considers the percentage of students receiving a grant over the total number of potential students in the family. Furthermore, there is a large number of frauds in the provision of grants. About 50 per cent of them are received by individuals whose families exceed the maximum income level that is permitted for a grant. The study shows that the demand for higher education is influenced by family income despite public policies. Hence, it concludes that the public system of grants helps less than expected in reducing social disparities.

Ginés-Mora (1996) reports that the proportion of students with a grant is significantly higher among families from the agricultural sector and/or without a primary education. However, he argues that the public scheme is far from being equitable. His estimates show that the coverage of poor families is relatively low. Thus, for example, 54, 74 and 80 per cent of the university students from the lowest three deciles of the income distribution do not benefit from a grant. In addition, frauds are frequent: 40 per cent of the students with a grant belong to families with higher-than-average income. The large number of frauds of the Spanish system of scholarships has also been highlighted by Jiménez *et al.* (1994).

Lassibille and Navarro (1998) estimate that only 21 per cent of the students with a grant belong to families in the first three deciles of the income distribution, with only 4.6 per cent of them being from the first decile. Surprisingly, the percentage of students with a grant among families belonging to the highest decile is as high as 8 per cent.

The vision of Dávila and González (1998) is somewhat more optimistic. They find that receiving a grant has a large positive impact on the probability of enrolling in university. According to their estimates, 14 per cent of university students would not be at the university had they not received financial aid. These findings lead them to conclude that in Spain, the policy of granting scholarships promotes access to higher education among individuals with poor family conditions.

Further evidence suggests that poor families might intend to overcome the limitations of the Spanish public system of scholarships by making more economic efforts when it comes to the educational investments of their children. Lassibille and Navarro (1998) find that the elasticity of higher education expenditure with respect to income is higher among poor families. That is, poorer families devote a larger fraction of their disposable income to investment in the education of their children,

even though they expend less in absolute terms.<sup>8</sup> Michavila and Calvo (1998) and Sánchez (1996) show that the percentage of students with a grant varies substantially across university careers. In particular, they are under-represented in short-cycle and technical degrees. A candidate explanation is that students from low income families are exposed to a higher cost, in terms of family resources, if they fail in completing their studies. Hence, they tend to choose careers with a higher probability of success and shorter duration.

According to the evidence presented here, the Spanish public system of scholarships presents serious limitations on equity and efficiency. First, the number of frauds is large, and a significant fraction of grants goes to families belonging to the upper deciles of the income distribution. Second, family income appears as a determinant of the demand for education despite public policies. Third, grants fail in providing support to poor families at those stages where the lack of resources is a determinant barrier. Fourth, grants cannot alter the parental education background, which is a major determinant of the youngsters' demand for education. On top of this, the scope of the Spanish system of scholarships is somewhat narrow by OECD standards.<sup>9</sup>

### 3.3 Region

Living in small towns and low-income regions decreases the probability of demanding higher education, according to Aldás and Uriel (1999) and Dávila and González (1998). These effects turn out to be non-significant in Petrongolo and San Segundo (2002) and Ginés-Mora (1996), however.

---

<sup>8</sup> From a temporal perspective, the private funding of education and the expenditure per student increased by 22 and 9 per cent, respectively, during the eighties. Other things equal, one would expect that (the lack of) family income became more determinant in the children's access to education during this period. In relative terms, however, the fraction of family educational expenditures relative to total family consumption declined by about 25 per cent. This could be partially due to the improvement of the public system of grants.

<sup>9</sup> Along the following dimensions, the Spanish system is among the bottom four of the European Union: (i) the coverage rate, which measures the percentage of students benefiting from a grant – about 20 per cent in secondary and 14 per cent in university education; (ii) the fraction of public expenditure on grants over total expenditure on higher education – 8 per cent; (iii) the direct financial aid to students as a percentage of the national GDP – 0.06 per cent; (iv) the average public expenditure on financial aid per university student – about 26 Euro. For further evidence, see Ginés-Mora (2001).

These authors find that living in a region with a higher average level of education enhances university enrolment, while the regional average income appears to be irrelevant. In Peraíta and Sánchez (1998), living in a rural region affects negatively the demand for education. This effect is larger for women than for men, which can be a consequence of the traditional separation of tasks among men and women in Spanish rural areas. Lassibille and Navarro (1998) detect that families from smaller cities tend to spend less on education per student, which might affect the educational performance of these students.

### **3.4 Labour market signals**

The human capital of Spanish workers has been steadily increasing over the last two decades. According to Albert (2000) and Dávila and González (1998), this trend has been rather insensitive to labour market signals. Their estimates suggest that the regional employment rate does not influence the demand for education. There is, however, also a set of studies that finds that labour market conditions may be important. The evidence is contradictory, though. Aldás and Uriel (1999) conclude that regional unemployment enhances enrolment into further education. Martínez-Granado and Castillo (2003), in contrast, obtain a negative effect of regional unemployment on the probability of studying. Petrongolo and San Segundo (2002) detect a positive impact of local unemployment on enrolment rates for males, while the effect is negative for females. When differentiating between adult and youth unemployment rates, they find that youth unemployment has a positive impact on educational demand, while the adult rate has a negative impact for both males and females. Hence, youth jobless rates seem to be a proxy for the opportunity cost of studying versus working, thus reducing the incentives for an early entry into the labour market. By contrast, adult rates seem to account for unemployment expectations, thus lowering future returns to education. Fernández and Shioji (2000) differentiate between the unemployment rate of non-graduates and graduates, and find that while the former has a positive impact on enrolment decisions, the latter has a negative impact.

From a temporal perspective, Petrongolo and San Segundo (2002) find that enrolment rates have been rather insensitive to the economic cycles experienced by the Spanish economy during the last two decades. Similarly, in Albert (2000) the demand for higher education responds only mildly to the unemployment rates of the previous five or six years.

### 3.5 Gender differences in access to education

Some of the reviewed studies show that women, relative to men, are more likely to remain in the schooling system at secondary education, and to enrol into universities (Ginés-Mora 1996; Dávila and González, 1998; Albert, 1998, 2000; Petrongolo and San Segundo, 2002). This reflects that, nowadays in Spain, women tend to be more educated and exhibit lower drop-out rates at every educational level as compared to men. Additionally, women tend to choose different university careers. They represent 23, 68, 58 and 66 per cent of the university students following, respectively, a technical, health, social sciences and humanities field of study. These differences hold roughly for both short- and long-cycle careers.

These particularities are likely to affect the labour market performance of the Spanish women. In Section 4 we report some facts on female returns to education.

### 3.6 Access to education of minorities

Traditionally, gypsies have been the most important minority in Spain.<sup>10</sup> In 1993, the Spanish Ministry of Education estimated that the gypsy population was about 400,000 individuals (1 per cent of the total Spanish population), 70 per cent of whom were aged below 25. The adults tend to have low-paid jobs (manual or agricultural workers) and low educational levels. This situation is not likely to revert in the short term, insofar as the educational attainment of the young cohorts is rather poor. The Asociación Secretariado General Gitano estimates that more than 25 per cent of the gypsy children do not attend compulsory school, 20 per cent enrol primary school with at least a one-year delay, 18 per cent are below their corresponding academic year, 21 per cent go to school due to intervention of the social services, 43 per cent are absent from school during more than three months per academic year, and 65 per cent exhibit an academic performance below the average.<sup>11</sup>

---

<sup>10</sup> The gipsy minority has been surpassed in number by the catch-all category Immigrants. In 1995, there were at least half a million immigrants in Spain. They constitute a very heterogeneous group, so that exploring their access to education would require more than allowed here. For some interesting statistics, see CIDE (1999).

<sup>11</sup> Asociación Secretariado General Gitano, 1994, *Evaluación de la incorporación de los niños y niñas gitanos a la enseñanza básica*, cited in CIDE (1999).

## 4 Returns to education

Many studies have explored the returns to different forms of human capital in Spain. For a review of the literature on this issue that appeared during the nineties, see Barceinas *et al.* (2000a).

### 4.1 Some basic results

Most conclusions arising from the previous literature are drawn together in Barceinas *et al.* (2000b), which is probably the most complete work on returns to education in Spain to date. They use three different data sets (EPF, ECPF, EES) and different estimation procedures to describe the returns to education over the sample period 1980 to 1996. Using the basic Mincerian framework as a benchmark (years of education and potential experience and its square as independent variables, and the logarithm of hourly wages as the dependent variable), they estimate the return to education for full-time workers to be about 8 per cent. Despite some variation, this estimation is fairly robust to alternative specifications: (i) among women, the inclusion of a dummy variable for part-time work raises the estimated return by 2 percentage points; (ii) when experience and tenure are accounted for in the wage regression, returns are about 7.5 per cent for men and 8 per cent for women; (iii) introducing additional control variables such as sector and regional dummies has no significant impact on these estimates; (iv) when female sample selection bias problems are corrected for, the return for women drops by about 1 percentage point<sup>12</sup>; (v) when ability bias is corrected for, the estimated returns turn out to be almost identical to those obtained with the standard OLS procedure<sup>13</sup>.

With respect to the sector of employment, the returns to education are between 1 and 1.5 percentage points higher in the private sector than in the public sector, with the gap being larger for women. With respect to

---

<sup>12</sup> They use a modified version of Heckman's two-step procedure. Two probit models are estimated: one for the probability of entering the labour market, one for the probability of being employed. These probabilities are then introduced into the wage regression.

<sup>13</sup> The ability bias arises if more capable individuals complete more years of schooling. Then, the error term in the Mincerian wage regression is correlated with the regressor measuring education, and the corresponding estimate is inconsistent. The authors control for this bias by using age as an instrumental variable for education.



other forms of human capital, the returns to tenure and experience are higher for women than for men, but notably lower – about 4 percentage points on average – than the returns to education.

Barceinas *et al.* (2000b) present results from two additional experiments. First, they test whether the returns to education are linear in the years of schooling. For that purpose, the years-of-schooling variable in the wage regression is substituted by a set of educational level dummies. The estimates reveal some degree of convexity in the return function, with large differentials between lower and upper secondary education, as well as between lower and upper vocational levels.

As a second experiment, Barceinas *et al.* (2000b) compare the Mincerian approach with the Internal Rate of Return (IRR) approach. Their IRR is based on the private cost (including the opportunity cost) of investing in education and the unemployment risk associated with each educational level. They obtain an IRR that is about 2 percentage points higher than the Mincerian estimate, and show that this gap disappears once employment probabilities are accounted for in the analysis. The intuition is that the opportunity cost of further education falls as the risk of unemployment is taken into account. In addition, the expected wage gap between educated and non-educated workers increases, since the unemployment rate tends to be decreasing in the level of education.<sup>14</sup>

Also Arrazola *et al.* (2001) compare the IRR approach with the Mincerian approach. They find that once the ability bias is controlled for in the Mincerian setting, the estimated returns are almost identical under the two methods. Salas (2002), in turn, uses the IRR approach to estimate the returns to long-cycle university degrees. His estimates, which do not control for the risk of unemployment, are relatively high when compared to the existing literature. According to his results, investing in long-cycle university degrees attracts a 22 per cent premium per year.

Calero (1998), finally, explores the link between returns to education and family educational background. His findings suggest that the academic and professional qualifications of the household head may be of particular importance. The returns to schooling are 3.4 per cent for students whose parents received no education, and 12.8 per cent for students whose parents have attained the highest educational level. This sheds some doubts on the meritocratic principle of wages, as variables other than personal characteristics influence students' labour market performance. However, this evidence can be interpreted in an alternative

---

<sup>14</sup> See Table 2 below.

way as well. If more able individuals attain higher levels of education, then the children of more educated parents possess more ability. Consequently, they end up obtaining higher marginal returns from their educational investments. In that case, observed wages do not reflect discrimination, but a positive interaction between education and ability.

## 4.2 Signalling

Barceinas *et al.* (2000b) explore the existence of signalling effects in education. They compare the returns to education across population groups that differ in tenure. The idea is that as time passes, employers increase their knowledge about the real productivity of their employees. Therefore, wages are likely to reflect differences in productivity rather than in education as tenure increases. Their finding is that the return to education is even increasing in tenure, which is at odds with the signalling theory. As a second test, they compare the returns for self-employed against those of wage earners. The hypothesis is that the self-employed need not signal their ability, so that educational pay-offs must capture returns to human capital. The results show that the returns to education are slightly higher for wage earners, which suggests that there might be some signalling in the determination of wages. As a third test, they compare the returns to education in the public and the private sector. The hypothesis is that in the private sector, returns are more likely to represent additional productivity as it is supposedly more competitive than the public sector. The estimates show that the returns are higher in the private sector, which does not support the signalling theory. The authors conclude that the presence of signalling effects cannot be rejected, even though the major part of the observed wage differentials is accounted for by differences in human capital.

These findings are in line with those reported by Lassibille (1994), Corugedo (1998) and Barceinas *et al.* (2001). The study by Corugedo (1998) allows for interactions between human capital and signalling effects in the determination of wages. In particular, he uses a sample of 1,175 workers who have completed a Bachelor's degree in economics and live in the region of Madrid. The hypothesis is that individuals are screened according to the number of years they spent at the university, and then paid according to their experience and some other personal characteristics. The resulting model exhibits more forecasting power than standard Mincerian models. This suggests that there is an interaction between human capital and signalling effects in the determination of wages.

### 4.3 Employment opportunities

The evidence indicates that education is also related to employment opportunities. Álvarez *et al.* (2001) show that the probability of finding a job and keeping it over time is increasing in education. Lassibille *et al.* (2001) find that the level of education exerts a strong influence on the length of youth unemployment. Cantó (2002) studies the probability of entering or escaping a low income spell. Her results suggest that more educated individuals are less likely to fall into economic deprivation, insofar they exhibit more persistent income profiles.

For illustrative purposes, Table 2 reports unemployment rates and normalised wages for different levels of education. The unemployment rate tends to be decreasing in education.<sup>15</sup> However, Dolado *et al.* (2000) have documented, using the Spanish Labour Survey, that this is not the case for all age cohorts. Thus, for example, those in the 25–29 age group with a lower or upper secondary education are exposed to lower unem-

**Table 2. Education, wages and employment**

	Normalised wage <sup>(a)</sup>		Unemployment rate <sup>(b)</sup>	
	Men	Women	Men	Women
Illiterate	-	-	35	31
No qualification	100	100	22	26
Primary	106	119	16	27
Lower secondary	117	134	21	40
Upper secondary	158	184		
Lower vocational	142	164	8	14
Upper vocational	159	187		
Short university cycle	190	212	10	18
Long university cycle	218	248		

Notes: (a) Hourly wage in 1994. The reference wage (100) corresponds to the 'No qualification' group within each gender; (b) Second semester of 1997.

Source: CIDE (1999) and Barceinas *et al.* (2000b).

<sup>15</sup> The jobless rate is rather high among those with a secondary education, particularly for women. As reported in CIDE (1999), this can be partially explained by the changes in the composition of the labour force that have taken place over the last years. As the population has become more educated, the proportion of those with a secondary education has increased within the jobless population.

**Table 3. University education, employment rate, and women**

University career		Unemployment rate <sup>(a)</sup>	Percentage of women <sup>(b)</sup>
Technical	Long cycle	7.5	24.8
	Short cycle	13.6	22.2
Health	Long cycle	8.9	63.0
	Short cycle	8.7	76.2
Social sciences	Long cycle	21.0	55.3
	Short cycle	16.7	63.3
Humanities	Long cycle	19.5	65.8
	Short cycle	28.9	77.4

Notes: (a) Second quarter of 1995; (b) Academic year 1993/94.

Source: CIDE (1999) and San Segundo (1997).

ployment rates than those with a higher degree. Traditionally, the unemployment rate of young workers with a university degree has been seemingly high in Spain. So, while the jobless rates for the youngest cohorts with, at most, a secondary education almost doubles the average unemployment rate within the OECD (37.4 against 21.9 per cent for the 21–24 age group, and 32.3 against 16.9 per cent for the 25–29 age group, respectively), the corresponding rates for the higher education levels are about four times as large as the OECD averages (53.1 against 15.3 per cent for the 21–24 age group, and 33.2 against 8.5 per cent for the 25–29 age group, respectively).

Apart from the educational level, the type and duration of the degree might influence employment opportunities as well. Table 3 reports unemployment rates for different university branches. The differences across them are large, with technical and health studies exhibiting a much lower jobless rate than social sciences and humanities degrees. Additionally, short- and long-cycle degrees within university branches display different jobless rates. These facts reveal that the educational choice within a particular level of education is an additional source of economic inequality.

#### 4.4 Change over time

The evidence suggests that during the second half of the eighties and the first half of the nineties wage inequality increased in Spain. This phenomenon is partially accounted for by the evolution of wage differentials

between educational groups. Barceinas *et al.* (2000b) report that the average return to education in Spain exhibited a steady increase from 5.9 per cent in 1980 to 7.6 per cent in 1985, then a decreasing trend down to 6.7 per cent in 1993, and then again a sharp increase to 8.1 per cent by 1996. Cantó *et al.* (1998, 2000) show that the Spanish wage premium for highly educated workers has increased in Spain over the last two decades. As documented in Albert (2000), Ginés-Mora and Vila (1998) and San Segundo (1998), the increasing trend in the returns to education has, somewhat surprisingly, been accompanied by a steady increase in the supply of highly educated workers. A candidate explanation is skill-biased technical change. Technological upgrading increased the demand of high-skilled workers relative to low-skilled workers across most sectors in the economy, which resulted in lower wages and higher unemployment for low-educated workers. This trend has been parallel to an increasing proportion of workers who declare that they are over-educated for their actual jobs. The phenomenon of over-education has had consequences for the labour market prospects of both high- and low-educated workers. In the next sub-section, we analyse this issue more deeply.

Oliver *et al.* (2001) analyse income inequality rather than wage inequality. Using the ECPF, they find that from 1985 to 1996, the Spanish income distribution became more compressed, and that this finding is robust to alternative definitions of income. Education appears as one of the socio-economic variables that are responsible for this trend, insofar as income inequality fell over the sample period both between and within educational groups. This outcome seems to contradict the facts on wage inequality. However, as indicated in Cantó *et al.* (2000), the reduction in income inequality over this time period was basically due to the growing re-distributive role of transfers.

## 4.5 Over-education

Over the last years, the transition from school to work in Spain has involved young workers accepting jobs for which the required level of education is lower than the level they have attained. Alba (2002) uses the ECHP to document this trend towards over-education. In the ECHP, individuals are asked to report whether or not (i) they have skills to do a more demanding job than the one they have, and (ii) their formal education or training provided them with the skills needed to perform their current job. The response to the first question allows the author to split

the sample into over-educated and non-over-educated workers. He finds that over-educated workers tend to have higher educational degrees. Additionally, in an earlier study Alba (1993) notes that over-educated workers have less experience and on-the-job training.

Using the two ECHP categories of job match, the author runs a wage regression to explore whether being over-educated exerts a negative impact on wages. He finds that among those workers whose formal education or training provided them with the skills needed to perform their current job, there are no substantial differences between over-educated and non-over-educated workers. However, over-educated workers whose previous training did not provide them with the skills needed to perform their current job earn significantly less than non-over-educated workers whose previous training provided them with those skills. Rather than absolute levels, Alba (1993) investigates the returns to surplus education. He finds that these returns are about 50 per cent lower than the returns to education when an appropriate job has been obtained.

Garcia-Serrano and Malo (2003) use the ECBC to explore the relationship between educational mis-match and within-firm mobility. Individuals are required to report their (subjective) probability of being promoted in the firm. They also report whether they are overqualified, adequately qualified, or underqualified for their actual jobs. This allows the authors to split the sample into three different categories of job match. As a second measure of fit, the authors use the difference between the individuals' highest educational level and the minimum educational level required for the job.

The main finding is that over-educated workers tend to report a lower probability of being promoted. This can be due to the fact that employers do not see workers' over-education as a good signal for promotions, or that employers observe other non-related characteristics. Garcia-Serrano and Malo (1996) neither detect a positive influence of over-education on external mobility. Therefore, over-education might be a more permanent phenomenon at the individual level than previously thought.

Dolado *et al.* (2000) analyse the occupational structure of the jobs that youth workers take after education. They consider five different occupational groups, ranging from highly skilled jobs (professionals and technicals) to jobs that hardly require any education (unskilled services and labourers). They show that, over the period 1977 to 1998, less educated workers were crowded out from their traditional jobs towards jobs that require no educational qualifications. At the same time, a large proportion of high-educated workers has entered jobs that require less school-

ing than they have obtained. This evidence confirms the arguments in Carabaña (1987), who showed that workers with a secondary or lower education were displaced to lower quality jobs during the seventies and the first half of the eighties. This tendency towards over-education thus appears to offer an explanation to the high unemployment of less educated young workers in Spain.

As a subjective measure of over-education, Dolado *et al.* (2000) report the proportion of under 30 year-old workers that declare to be overqualified in their current jobs. According to this subjective perception, there is no relationship between education and overqualification, nor between overqualification and the occupational category. This is somewhat surprising as one would expect the more educated workers within a given occupational category to declare to be overqualified more frequently than the less educated workers. This turns out to be the case only for the lowest occupational category (unskilled services and labourers).

#### 4.6 Gender differences in returns to education

Several studies have investigated wage discrimination between male and female workers (see De la Rica and Ugidos (1995), Hernández (1995, 1996), Rodríguez *et al.* (1995), Cantó *et al.* (1998), Ugidos (1997), Arrazola and Hevia (2001), García *et al.* (2001), Palacio and Simón (2002), Dolado *et al.* (2002), De la Rica and Felgueroso (2002), De la Rica (2003) and Gardeazábal and Ugidos (2004), among others). According to the reported estimates, the gender wage gap ranges from 20 to 30 per cent, depending on the data set and the procedure used. The typical approach consists of decomposing this gap into (i) one part attributable to (observable) differences in worker characteristics and (ii) another part attributable to differences in the returns associated with these characteristics. Although there is no consensus on whether (i) or (ii) accounts for a larger fraction of the wage differential, the evidence shows that the rewards to both observable and unobservable skills are higher for males than for females.<sup>16</sup> These studies show that there exists wage discrimina-

---

<sup>16</sup> Additional findings reveal that the gender wage gap is increasing in the pay scale. At the same time, the explanatory power of (ii) is increasing as we move towards the upper tail of the wage distribution. Additionally, labour structures with a higher participation of women or a larger proportion of part-time jobs are associated with lower wages.

tion within all educational levels. Some of them suggest that discrimination may affect more directly women with a higher education or with a high professional status.

As Table 2 shows, the gap between the male and the female unemployment rate is substantial for all educational levels. In 1997, the jobless rate for women with a secondary education was 40 per cent, and almost 18 per cent among women with a university degree. For their male counterparts, the corresponding rates were 22 and 10 per cent, respectively. Two observations are worth noting. First, the gap between these two educational levels is much wider for women than for men, which suggests that the employment opportunities improve relatively more for women than for men when they decide to enrol into a university. Álvarez *et al.* (2001) estimate that not only employment opportunities, but also expected earnings increase relatively more for women than for men when they complete university studies. Second, and somewhat surprising to us, the gap between the employment rate of men and women is higher among the population with secondary and university education than among the population with primary education or less. This suggests that, although enrolling into a university improves substantially the employment opportunities of women, high-educated women face much more difficulties in finding a job as compared to men. As a consequence, women are exposed to longer unemployment spells, as shown in CIDE (1999).

Indeed, the sharp skill upgrading of the young female cohorts has been accompanied by an increasing trend in the female unemployment rate. From 1980 to 1994, the female jobless rate rose from 12 per cent up to 30 per cent. This might seem contradictory at first sight. However, it should not be so if we take into account that, over the sample period, female participation in the labour market has increased steadily. From 1983 to 1995, the female participation rate increased from 35 to 47 per cent, and among women aged 25 to 54, it rose from 44 per cent in 1990 to 58 per cent in 1997.<sup>17</sup> Furthermore, the male unemployment rate has also risen, from 11 per cent in 1980 to 20 per cent in 1994. The increase has been somewhat smaller than in the female case, though. This can be partly due to the fact that the participation rate among males has, unlike

---

<sup>17</sup> Higher educational levels are associated with higher participation rates. The female participation rate is 26 per cent among women with primary education, 45 per cent among women with a secondary education, and as high as 75 per cent among those with a university degree.



that of females, declined over the past years, moving from 69 per cent in 1987 to 64 in 1997.<sup>18</sup>

The upgrading in the human capital of women has not resulted in a reduction of the gender wage gap. Dolado *et al.* (2002) document that such a reduction has taken place only among workers with a tertiary education, while it has remained more or less constant for other educational levels. They also find that, in line with the USA and most European economies, female occupational segregation across age cohorts decreased substantially among workers with a tertiary education. De la Rica and Felgueroso (2002) show that female occupational segregation decreased over the last decade, and that the employment gap between males and females also decreased. They find that these two changes were particularly sharp among women with a high education.

Finally, as mentioned in Section 3, women tend to choose different university careers. In particular, they are more prone to avoid technical studies and to enrol into humanities or health studies. This might have additional effects on their labour market results, as technical careers are associated with higher wages and employment rates.

## 5 Conclusions

This survey intends to provide further insight on the connection between education and inequality. From the available evidence, two main conclusions can be established. First, we find that more educated workers benefit from better wages and employment opportunities, relative to less educated workers. Moreover, the most recent evidence shows that both the return to education and the wage premium for high-educated workers have increased over the last decade. Second, there are important differences in the access to education. Individuals with a poor family background and living in small towns and rural areas tend to participate less in education. Somewhat disturbing, the Spanish public system of scholarships helps only moderately to reduce barriers to education, insofar as the number of frauds is large and the degree of coverage among poor families is relatively low. These two conclusions suggest that as long as unequal access to education results in inequalities in labour mar-

---

<sup>18</sup> The evidence reported here is drawn from CIDE (1999), and Petrongolo and San Segundo (2002).

ket outcomes, parental education, social class, and family income appear as major explanatory components of the inter-generational transmission of inequality in Spain.

Despite the available evidence, we identify some knowledge gaps in the Spanish literature. We still know relatively little about the link between education and wage inequality for different cohorts, the social returns to education, the link between cognitive skills (instead of formal schooling) and wages, the impact of school quality upon wages, and whether or not public policies have helped to reduce barriers to education over the last years. Scope for further research includes investigation of these topics. Moreover, evaluation of new policy instruments aimed to improve the equity and efficiency of the funding and scholarship system seems to be in order as well.

## Literature

- Alba, A. (1993), Mismatch in the Spanish Labour Market. Overeducation?, *Journal of Human Resources* 28, 259–278.
- Alba, A. (2002), Types of Job Match, Overeducation, and Labour Mobility in Spain, in Büchel, F., A. de Grip and A. Meitens (eds), *Overeducation in Europe: Current Issues in Theory and Policy*. Edward Elgar Publishing, Cheltenham, UK.
- Albert, C. (1998), *La evolución de la demanda de enseñanza superior en España (The evolution of the demand for higher education in Spain)*. Hacienda Pública Española, Monográfico de Economía de la Educación.
- Albert, C. (2000), Higher education demand in Spain: the influence of labor market signals and family background, *Economics of Education Review* 14(2), 155–166.
- Aldás, J. and U. Uriel (1999), *Equidad y eficacia del sistema español de becas y ayudas al estudio (Equity and efficacy of the Spanish system of scholarships and aids to schooling)*. IVIE Working Paper EC 99-11.
- Álvarez, G., J.M. Da Rocha and F.X. Lores (2001), *El valor de la educación: estimación de perfiles de ingreso de ciclo vital (The value of education: estimation of life-cycle earnings profiles)*. Mimeo.
- Arrazola, M. and J. Hevia (2001), *Rendimiento de la educación en España: nueva evidencia de las diferencias entre hombres y mujeres (Returns to education in Spain: new evidence on the differences between men and women)*. Instituto de Estudios Fiscales Working Paper 24/01.
- Arrazola, M., J. Hevia, M. Risueño and J.F. Sanz (2001), *Estimación y comparación de tasas de rendimiento de la educación en España (Estimation and comparison of rates of return to education in Spain)*. Instituto de Estudios Fiscales Working Paper 2/01.
- Barceinas, F., J. Oliver, J.L. Raymond and J.L. Roig (2000a), Returns to human capital in Spain: a survey of the evidence, in Asplund, R. and P.T. Pereira (eds), *Returns to Human Capital in Europe*. The Research Institute of the Finnish Economy ETLA, Series B156, Helsinki.
- Barceinas, F., J. Oliver, J.L. Raymond and J.L. Roig (2000b), *Private rates of return to human capital in Spain: new evidence*. Fundación de las cajas de ahorro confederadas para la investigación económica y social, Working Paper 162/2000.

- Barceñas, F., J. Oliver, J.L. Raymond and J.L. Roig (2001), Hipótesis de señalización frente a capital humano. Evidencia para el caso español (Hypothesis of signalling against human capital. Evidence for the Spanish case), *Revista de Economía Aplicada* 9(26).
- Beneito, P., P. Ferri, M.L. Molto and E. Uriel (2001), Determinants of the Demand for Education in Spain, *Applied Economics* 33, 1541–1551.
- Calero, J. (1998), *El gasto público en educación superior y la equidad (Public expenditure in higher education and equity)*. Hacienda Pública Española, Monográfico de Economía de la Educación.
- Cantó, O. (2002), Climbing out of poverty, falling back in: low incomes' stability in Spain, *Applied Economics* 34, 1903–1916.
- Cantó, O., A.R. Cardoso and J.F. Jimeno (1998), *Earnings Inequality in Portugal and Spain: Constrasts and Similarities*. FEDEA Working Paper 1998-08.
- Cantó, O., A.R. Cardoso, C. Farinha, M. Izquierdo and J.F. Jimeno (2000), *Integration and Inequality: Lesson from the Accessions of Portugal and Spain to the EU*. FEDEA Working Paper 2000-10.
- Carabaña, J. (1987), Desplazan en el mercado de trabajo español los que tienen más estudios a los que tienen menos? (Do people with more education displace people with less education in the Spanish labour market?), *Revista de Educación* 283, 101–130.
- Carabaña, J. (1994), La constante homogamia educativa (The constant education monogamy), *Economía y Sociedad, Revista de Estudios Regionales de la Comunidad de Madrid* 11, 43–66.
- CIDE (1999), *Las desigualdades de la educación en España II (The inequalities of education in Spain)*. Ministerio de Educación y Cultura, Madrid.
- Corugedo, I. (1998), *Las hipótesis del capital humano y del credencialismo: una comprobación empírica para España (The hypothesis of human capital and credentialism: an empirical investigation for Spain)*. Hacienda Pública Española, Monográfico de Economía de la Educación.
- Dávila, D. and B. González (1998), Economic and cultural impediments to university education in Spain, *Economics of Education Review* 17(1), 93–103.
- De Dios, J. and M. Salas (1999), *Análisis económico de la elección de carrera universitaria. Un modelo logit binomial de demanda privada de educación (Economic analysis of the choice of a higher education degree. A binomial logit model of private demand for education)*. IVIE Working Paper EC 99-03.
- De la Rica, S. (2003), *Decomposing the Gender Wage Gap: The Effects of Firm, Occupation and Job Stratification*. Mimeo.

- De la Rica, S. and A. Ugidos (1995), Son las diferencias en capital humano determinantes de las diferencias salariales observadas entre hombres y mujeres? (Are there differences in human capital determinants of the observed earnings differences between men and women?), *Investigaciones Económicas* XIX(3), 395–414.
- De la Rica, S. and F. Felgueroso (2002), *Intrafirm gender wage differences: A worker's matching approach*. Mimeo.
- Dolado, J.J., F. Felgueroso and J.F. Jimeno (2000), *Explaining Youth Labor Market Problems in Spain: Crowding-out, Institutions, or Technology Shifts?*. IZA Discussion Paper 142.
- Dolado, J.J., F. Felgueroso and J.F. Jimeno (2002), *Recent Trends in Occupational Segregation by Gender: A Look Across the Atlantic*. IZA Discussion Paper 524.
- Fernández, R.M. and E. Shioji (2000), *Human Capital Investment in the Presence of Unemployment: Application to University Enrolment in Spain*. Oxford University Working Paper.
- García, J., J. Hernández and A. López-Nicolás (2001), How wide is the gap? An investigation of gender wage differences using quantile regression, *Empirical Economics* 26(1), 149–168.
- García-Serrano, C. and M.A. Malo (1996), Desajuste Educativo y Movilidad Laboral en España (Education Mismatch and Job Mobility in Spain), *Revista de Economía Aplicada* 4, 105–131.
- García-Serrano, C. and M.A. Malo (2003), *Educational Mismatch and Expected Promotions*. Mimeo.
- Gardeazábal, J. and A. Ugidos (2004), Measuring the gender gap at different quantiles of the wage distribution, *Journal of Population Economics* 44, 224–236.
- Ginés-Mora, J. (1996), Equidad en el acceso a la educación superior, para quiénes son las becas? (Equity in the access to higher education: who are the scholarships for?), *Revista de Educación* 309, 239–259.
- Ginés-Mora, J. (1997a), Equity in Financing and Access to Higher Education, *Higher Education in Europe* XXII(2), 145–154.
- Ginés-Mora, J. (1997b), Equity in Spanish Higher Education, *Higher Education* 33, 233–249.
- Ginés-Mora, J. (2001), Los sistemas de ayudas a los estudiantes universitarios: la situación española en el contexto europeo (Aid systems to university students: the Spanish situation in the European context), in Ginés-Mora, J., F. Solá and J.M. Vilalta (eds), *Cambios y ayudas a los estudios universitarios en Europa*. Barcelona, UPC y Generalitat de Catalunya.

- Ginés-Mora, J. and L. Vila (1998), Changes in returns to education in Spain during the 80's, *Economics of Education Review* 17(2), 173–178.
- Hernández, P.J. (1995), Análisis Empírico de la discriminación salarial de la mujer en España (Empirical analysis of wage discrimination against women in Spain), *Investigaciones Económicas* 19(2).
- Hernández, P.J. (1996), Segregación ocupacional de la mujer y discriminación salarial (Occupational segregation of women and wage discrimination), *Revista de Economía Aplicada* 4(11).
- Jiménez, J., D. Moreno and J. Sánchez (1994), *Quiénes se Benefician de las Becas para Cursar Estudios Universitarios en España? (Who Benefits from the Scholarships to Undertake University Education in Spain?)*. Planificación, Evaluación y Financiación de Sistemas Educativos, Oroval Ed., Civitas, Madrid.
- Lassibille, G. (1994), *La distribución de rentas de los asalariados y de los trabajadores por cuenta propia: un test de las teorías del filtro y del capital humano (The distribution of income among wage earners and self-employed: a test of filter and human capital theories)*. Hacienda Pública Española, Monográfico de Economía de la Educación.
- Lassibille, G. and G.L. Navarro (1998), *Los gastos privados de la enseñanza superior en España (Private expenditure of higher education in Spain)*. Hacienda Pública Española, Monográfico de Economía de la Educación.
- Lassibille, G. and G.L. Navarro, R.I. Aguilar and C. de La O Sanchez (2001), Youth transition from school to work in Spain, *Economics of Education Review* 20(2), 139–149.
- Martínez-Granado, M. and J. Ruiz-Castillo (2002), The Decisions of Spanish Youth: A Cross-section Study, *Journal of Population Economics* 15, 305–330.
- Michavila, F. and B. Calvo (1998), *La universidad española hoy. Propuestas para una política universitaria (The Spanish university today. Proposals for a university policy)*. Síntesis Ed., Madrid.
- Modrego, A. (1987), Demanda de Educación: resultados de la estimación de un modelo de demanda de educación superior para la provincia de Vizcaya (Demand for education: results from the estimation of a model of demand for higher education for the province of Vizcaya), *Economía* 14(1), 87–96.
- Oliver, J., X. Ramos and J.L. Raymond (2001), *Recent trends in Spanish Income Distribution: A robust picture of falling income inequality*. Fundación de las cajas de ahorro para la investigación económica y social, Working paper 166/2001.

- Palacio, J.I. and H.J. Simón (2002), *Segregación laboral y diferencias salariales por sexo en España (Labour segregation and earnings differences by gender in Spain)*. FEDEA Working Paper EEE 151.
- Peraita, C. and M. Sánchez (1998), The effect of family background on children's level of schooling attainment in Spain, *Applied Economics* 30, 1327–1334.
- Petrongolo, B. and M.J. San Segundo (2002), Staying-on at school at 16: the impact of labor market conditions in Spain, *Economics of Education Review* 21(4), 353–365.
- Rodríguez, J.M., J. Vera and G. Moreno (1995), La discriminación salarial de la mujer en el mercado de trabajo español (Wage discrimination against women in the Spanish labour market), in Dolado, J.J. and J.F. Jimeno (eds), *Estudios sobre el funcionamiento del mercado de trabajo español*. FEDEA.
- Salas, M. (2002), Estimación de la rentabilidad de la inversión en educación universitaria de ciclo largo (Estimation of the returns to investment in long-cycle university degrees), *Estadística Española* 44(149), 89–112.
- San Segundo, M. (1997), Decentralization and Diversification in Spain, *Higher Education Management* 9(3).
- San Segundo, M. (1998), *Universidad y Economía. Son rentables los Estudios Superiores en España? (University and Education: Are Higher Education Studies in Spain Worthwhile?)*. Política y Reforma Universitaria, J. M. de Luxán Ed., Barcelona, 1998.
- Sánchez, J. (1996), *Los efectos distributivos del gasto público destinado a enseñanza superior en la Universidad de Granada y en España (Distributional effects of public expenditure aimed to higher education in the University of Granada and in Spain)*. Biblioteca CEE, 8, University of Granada Ed.
- Ugidos, A. (1997), Gender Wage Discrimination in the Spanish Labor Market, *Revista Española de Economía* 14(1), 3–21.