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Juan J. Dolado  
Florentino Felgueroso  
Juan F. Jimeno

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**Juan J. Dolado**

*Universidad Carlos III de Madrid, CEPR and IZA, Bonn*

**Florentino Felgueroso**

*Universidad de Oviedo, Spain*

**Juan F. Jimeno**

*Universidad de Alcalá, FEDEA, CEPR and IZA, Bonn*

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IZA

P.O. Box 7240

D-53072 Bonn

Germany

Tel.: +49-228-3894-0

Fax: +49-228-3894-210

Email: [iza@iza.org](mailto:iza@iza.org)

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## ABSTRACT

# Explaining Youth Labor Market Problems in Spain: Crowding-Out, Institutions, or Technology Shifts?\*

This paper examines the empirical evidence regarding the poor performance of the youth labor market in Spain over the last two decades, which entails very high unemployment for both higher and lower educated workers, symptoms of over-education, and low intensity of on-the-job training. It also presents a simple matching model with two types of workers ("educated" and "non-educated") and two types of jobs ("skilled" and "unskilled"), under which educated workers may crowd-out non-educated workers from their traditional entry jobs, showing that a combination of an increase in the relative supply of higher educated worker and rigid labor market institutions harms the training and labor market prospects of lower educated workers, while it raises the proportion of higher educated workers performing low-skill jobs.

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Juan F. Jimeno  
FEDEA  
C/. Jorge Juan, 46  
28001 Madrid  
Spain  
Tel.: +39 91 435 04 01  
Fax: +39 91 577 95 75  
Email: jimeno@fedea.es

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# 1 Introduction

The Spanish labor market is well-known for having displayed one of the highest unemployment rates in the OECD, with an average unemployment rate close to 20% since the mid 1980s (15% nowadays). Another important feature of Spanish unemployment is that it has been and still is very unevenly distributed: female and youth unemployment rates have been about 10 and 20 percentage points higher, respectively, than aggregate unemployment. The fact that the unemployment differentials have remained more or less constant over the 1980s and 1990s constitutes a puzzle given that there has been a very rapid educational upgrading since the mid-1980s which has mostly affected precisely females and young workers.

The educational drive in Spain has taken place at a time when skill biased technological progress and increased competition were leading to a change in the industrial structure and a fall in the demand of lower educated workers. Much has been written about the effects of both factors in explaining the rise in the unemployment rates of lower educated workers in Europe, where labor market rigidities abound, and the rise of wage inequality in the US and the UK, where wage flexibility operates.<sup>1</sup> At the current stage, there seems to be almost widespread agreement that biased technological progress and increased international trade are two of the driving forces of both the unemployment differentials by educational levels and of wage inequality.

As for unemployment of less educated workers, in addition to the explanations just mentioned above there is the less familiar explanation of “crowding out” by workers with a higher education. In some Europe countries, especially in the Netherlands (see Teulings and Koopmans 1989, van Ours and Ridder, 1995, and Muysken and Ter Weel, 1998) some studies are rediscovering the old concept of over-education which is used to explain both the decline in the returns to higher education, the corresponding decrease in educational attainments, and the high unemployment rates for lower educated workers. This is attributed to a change in the composition of labor supply resulting in a rise of average education. In some countries, including Spain, this can be considered as a fairly exogenous process determined by the strong support of governments in providing tertiary/university education at a low relative price.

One of the first models of job competition and crowding-out was by Thurow (1975) where the labor market was not considered as a market of matching demand and supply for various job skills but a market of matching trainable individuals with training ladders. Hence, the marginal product is thought to be associated with jobs rather than with individuals. When there is a fixed amount of jobs with fixed characteristics (including wages) and an excess supply of labor, it is likely that higher educated workers who cannot find a job will accept jobs below their levels at the cost of “crowding out” lower educated workers who become unemployed. The problem with this explanation is why the composition of vacancies does not adjust to the composition of workers. Another model along

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<sup>1</sup>See, for instance, Bound and Johnson (1992), Katz and Murphy (1992), Murphy and Welch (1992), Nickell and Bell (1995), Gottschalk (1997), and Snower (1999).

the same lines is the one by Okun (1981) who suggested that in those situation where it is costly to adjust wages, firms increase their hiring standards instead.

In this paper we follow this line of reasoning by arguing that an alternative explanation for “crowding out” could be given by standard search theory.<sup>2</sup> When it takes time for workers and vacancies to find each other, a possible strategy for higher educated workers is to accept a temporary simple job and to continue searching for a more complex job which pays a higher wage. In this way, we address the issue of whether a simple model with the above characteristics is able to explain the following main facts which seemingly characterize the performance of Spanish youth labor market over the last two decades:

1. The fall in employment rates<sup>3</sup> (rise of unemployment rates) has been primarily concentrated on lower educated workers but it has also taken place for higher educated ones.
2. The effects of educational attainments on the employment rate are not particularly large. For instance, it is only after 30 years of age that workers with a university degree have higher employment rates (lower unemployment rates) than workers with high school or with a college diploma.
3. There is a dramatic downgrading in the entry-jobs market which affects mainly to workers aged between 16 and 26 years of age and all educational attainments. This downgrading seems to have harmed the employability of workers with low levels of educational attainments.
4. There is a deceleration in the returns to schooling. Relative wages for educated workers have, if anything, become stagnant over the last decade.
5. The amount of on-the-job training provided by firms to lower educated workers is seemingly rather low. Thus, these workers hold entry jobs which provide many less opportunities of promotion in the future than they used to do in the past.

For this purpose we develop a simple model of matching, as in Mortensen and Pissarides (1994), with two types of jobs (skilled and unskilled or simple and complex), two types of workers (higher and lower educated) and where on-the-job search is possible, and examine the consequences of an exogenously increasing relative supply of educated workers. We assume that hires take place in a non-segmented labor market where higher educated workers can perform unskilled jobs but less educated workers can not perform skilled jobs.

Our model is related to various papers on the recent literature on matching which allows for heterogeneity in either jobs or workers. First, there is Pissarides (1994), which allows for on-the-job search in a model of good and bad jobs and shows how some workers can get locked in bad jobs due to wage-tenure effects.

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<sup>2</sup>Overeducation in Spain has been studied before by Alba (1995), García-Montalvo (1995) and García-Serrano and Malo (1995). In general, they find evidence that there has been an increase in overeducation during the nineties.

<sup>3</sup>Excluding students from the working-age population.

Secondly, there is Albrecht and Vroman's (1999) model, where only the more educated workers can occupy complex jobs, but both more and less educated workers can fill simple job vacancies such that the former always earn higher wages than the latter and no on-the-job search exists. Third there is Gautier (1999) who shows that under certain constraints the higher productivity of the more educated workers in simple jobs can benefit to the less educated workers. All of these models present a simpler matching technology than ours but, in exchange, they allow for a wage bargaining process under which wages respond to labor market conditions according to a surplus-sharing Nash solution. In our model wages are basically exogenous, a feature that fits well with our objective of explaining changes in the youth labor market over the medium and long-run.

We find that our model can explain some of the stylized facts described above. However, in order to simultaneously explain all of the stylized facts above, we need some further changes in the exogenous variables of the model, besides a pure increase in educational attainments. In particular, both an increase in the separation rate and in the union power are needed. Both facts are not at odds with the recent evolution of the Spanish labor market where the introduction of fixed-term job in 1984 has produced a drastic increase in workers turnover rates and, hence, a rise in the separation rate (see Bentolila and Dolado, 1994). Likewise, it is likely that despite the declining density of the Spanish unions, their coverage and bargaining power has increased over the last two decades.

All in all, we conjecture that the high increase in youth unemployment in the 1970s could have triggered the decision to stay longer in education. Due to the new organizational structures implied by the information technologies, the more educated cohorts have crowded out the older less educated ones from their traditional jobs. That, together with the special characteristics of Spanish collective bargaining, has produced a decline in the returns to higher education. However, educational attainments have kept on increasing since the decision to acquire education is no longer primarily influenced by future higher wages but rather by the probability of getting a job. Thus, while in the Anglo-Saxon labor markets demand seems to have "won the race" to labor supply and the educational premium has increased, the opposite seems to have happened in Spain.

This line of reasoning also has relevant policy implication. From a welfare viewpoint, crowding-out can never be a first best solution since potential productivity is not used. It is therefore argued that policy-makers should stimulate job creation at the top segment of the labor market if crowding out is all that matters, for example by reducing severance payments which are currently among the highest in the OECD. However, if any of the other more traditional explanations also count, then policy-makers could better directly focus at the bottom segment of the labor market, for example by introducing subsidies for low-wage jobs. Finally, a conventional wisdom is that when there is crowding-out, there is no need for extra education of low skilled workers since those workers would occupy unskilled jobs anyway. Nonetheless, if crowding-out is the result of search frictions, better education will lead to the opening of more

skilled vacancies and will lower overall unemployment.

The structure of the rest of the paper is the following. Section 2 documents the stylized facts motivating the paper. Section 3 presents a theoretical framework for analyzing these facts, built upon basic search models (see, for instance, Pissarides, 1990, 1994), which considers non-segmented labor markets for educated and non-educated workers. Section 4 contains some final remarks.

## 2 Facts

### 2.1 Educational attainment by age and gender

Starting in the 1960s from one of the lowest stocks of human capital in the OECD (8% of the population aged 10-14 and 40% of those above 65 were illiterate), Spain has experienced a remarkable improvement in the relative supply of educated workers over the last two decades. The progressive expansion of post-compulsory education, especially during the 1980s, has helped to produce a drastic reduction in the differences between the educational attainments of Spanish youth and those of the corresponding age cohorts in other OECD countries. An important characteristic of this process is that the increase in education has been geared towards the higher educational levels (essentially university/tertiary degrees) and that it has been supported, to a large extent, by a steady rise in the female demand for formal education. In short, that means that: (i) Spanish youth are nowadays much more educated than previous generations; and (ii) significant changes in the educational patterns by gender have taken place over the last two decades.

Both features are illustrated in Tables 1 and 2, and Figure 1. Table 1 presents a cross-country comparison of educational attainments of population aged 25-64 in a representative sample of OECD countries, as of 1995. As can be seen, Spain has one of the largest shares of population with at most upper secondary education (72%), only below Portugal and about twice the average proportion for all countries. Likewise, the fraction of the population stock with higher education is about 75% of the average. Nonetheless, the remaining six columns in parts A and B of Table 1 indicate that, when comparing the relative educational attainments of cohorts aged 25-34 and 55-64, the proportion of people who just complete compulsory upper secondary education in the former cohort is 4.7 times the corresponding proportion in the latter, whereas the proportion of tertiary/ university education in the first group is 4.5 times larger than in the second group. Even if we compare the younger cohort to those born a decade earlier, i.e. those in the 35-44 age bracket, the former have 50% more upper secondary and university education than the latter. Spain, therefore, has experienced one of the most intense educational drives among the set of countries listed in Table 1. A similar picture obtains in Table 2, which shows the educational attainment of new school leavers among the population aged 16-29, as of 1996. Although the share of youth population with just lower education is above average for men, both male and female school leavers with a university/tertiary

education represent one of the largest shares. Indeed, the gender educational gap in Spain, defined as the difference by gender between the proportions of those who leave education after the compulsory level and those who complete a college degree, is the largest in the OECD. This implies that, relative to men, Spanish young women are amongst the most educated in the world.

Figure 1, in turn, depicts the evolution of educational attainments by age and gender over the years 1977, 1987 and 1997. Whereas the overall educational level was low in the 1970s, and men tended to be more educated than women, the 1980s have accounted for a substantial increase in both upper secondary and tertiary education, with the catch-up process of the female population being evident for the higher levels of education (college and above). This process has continued sharply over the 1990s. Even if both men and women present a similar pattern for the upper secondary level until the age of 35, differences at the other two educational levels have widened rapidly: young men are leaving school after the compulsory level relatively more than women (45% vs. 38%) whilst the latter are getting more higher formal education than the former (30% of women aged 25 were at least college graduates vs. 19% of men at the same age). Thus, we conclude that, since the early 1990s, young women are relatively more educated than young men and that, since then, their educational differences have been increasingly growing.

## **2.2 Unemployment/employment rates by age and educational attainment**

Tables 3 and 4 present the unemployment/employment rates by gender and education, using information from the Spanish Labor Force Survey for years 1977, 1985, 1991 and 1997. The employment rates represent the proportion of employees over the population in the corresponding age bracket excluding full-time students and those in the national compulsory military service. In order to examine the correlation between age/education and employment/unemployment rates with some detail we have considered six age brackets and four educational levels. The main conclusions to be drawn from the tables are as follows.

First, for a given level of education, there is a negative (positive) correlation between age and unemployment (employment) rates for male workers. For female workers, however, only the first negative relationship remains. It is noticeable that the employment rates decreased with age in the 1970s, when the participation rates of older women were very low. Later, as their educational attainment has increased, there has been a drastic fall in the participation rates of cohorts up to 20 years old followed by a subsequent increase since the early 1990s in the employment rates of the 25-29 cohort which, as discussed above, is the group with the highest proportion of higher education (31%).

Second, and most importantly, for a given age, there does not seem to be a negative relationship between education level and unemployment. Thus, for example, those in the 25-29 cohort who had an upper secondary level had lower unemployment rates than those with a higher degree. This means that, over the sample period, acquiring a higher education does not improve the transition to



the labor market. Indeed, a negative correlation between unemployment and education only emerges for people over 30 or 35 years of age.

Third, the difficulties in the transition from education to the labor market is not a recent phenomenon. For instance, even in 1977 where the relative supply of higher education was smaller, the unemployment rates of 21-24 and 25-29 cohorts with university degrees were already very large.

Lastly, if we compare the employment rates over the 1980s (between 1977 and 1991) with those over the 1990s (between 1991 and 1998), we can observe a relative deterioration of the fortunes of the 16-20 cohort and, in general, of the workers with lower educational attainments. Conversely, the employment rates of male workers with higher education were close to those in 1977 and even larger for the 25-29 female cohort. More recently, during the 1990s, the employment rates of the younger cohorts have fallen, except for the 18-20 cohort with upper secondary education, whereas the employment rates of educated women have experienced an increase.<sup>4</sup> It is noticeable that for most cohorts with a university first or secondary degree, the employment rates have fallen, except for the 21-24 male cohort with the highest educational level.

In order to identify which of the previous facts remains valid for other OECD countries, Table 5 shows the unemployment rates by age and educational attainment, as of 1995, for the same set of countries contained in Table 1 and 2. In most countries, a negative relationship between education and unemployment arises for all age cohorts, with the exception of Greece, Italy and Spain for the 20-24 and 25-29 cohorts. What is specific about the Spanish case is that the relative differences in unemployment rates increase with the educational level. So, while the unemployment rate for the 20-24 cohort with at most low secondary rate (37.4%) almost doubles the average unemployment rate in the OECD (21.9%), and is even lower than in France (41%), the corresponding rates for the intermediate and higher education levels (41% and 53.1%) are about three and four times larger than OECD averages (15.5% and 15.3%), respectively.

### 2.3 Entry jobs

In the previous section we have documented a relative deterioration of the employment opportunities of the less educated workers with respect to the more educated ones, despite the fact that the latter group has also experienced a fall in their employment rates during the 1990s. In this section we analyze to what extent the above-mentioned features can be explained by a relative demand shift against the traditional jobs occupied by the less educated workers and in favor of those occupied by the more educated ones or, alternatively, by a combination of the previous process together with over-education in the semi-skilled jobs which used to be traditionally occupied by the less educated workers. These workers could be crowded out by the workers with higher educational background

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<sup>4</sup>For further details on the evolution of female labour participation in Spain, see Bover and Arellano (1995) and Bover (1997).

and more versatility in performing the type of tasks demanded by the recent advances in information technologies. In what follows, we will offer descriptive evidence in favor of the plausibility of the second explanation. Thus, we will document how there is a tendency towards the less skilled jobs being occupied by the more educated workers.

To illustrate this phenomenon, we will make use of the occupational structure of the so-called “entry-jobs” into the labor market, namely the type of jobs that youth workers take after completing a given educational level. For that purpose, four age groups and four educational levels (the same as in Tables 3 and 4) have been chosen, in such a way that it allows to analyze the kind of job that young workers were occupying up to four years since they finished their studies. Hence, the 16-20 cohort corresponds to compulsory lower education, 18-22 to upper secondary education, 21-25 to college diploma and 23-27 to university degree. As regards occupations, we have taken five large groups: Professionals/Technicals (P1); Teaching Professionals and Employees in Public Administration (P2); Clericals and Administratives (P3); Manual Crafts and Operators (P4), and Sales Elementary and Hotel & Restaurant Occupations, Unskilled Services and Laborers (P5). The five occupations have been ranked in decreasing order of skill requirements for the job. Thus, P1 represents the more skilled jobs, P3 cover semi-skilled, white-collar jobs, P4 includes blue-collar jobs which need some vocational training qualification, and P5 represents the less skilled job which hardly require any educational level. The composition of P2 requires some further explanation. It includes not only teachers but also employees in Public Administration. The inclusion of the latter category is justified since accession to Public Administration, through several types of competitions, has been a traditional “entry job” for Spanish youth workers, either with a high or an intermediate level of education.

Figures 2 and 3 present the evolution of the three main occupational shares described above, for a given age cohort and educational attainments, over the period 1977-98 distinguishing by gender. The solid lines represent the proportion of wage earners with a given age and educational attainment which work in a certain occupation. The dotted lines, in turn, represent the share of each occupation in total employment so that deviations between both lines indicate whether a given occupation is over or under-represented for a given group. When looking at the dotted lines we can observe two different trends. First, there is a reduction in the share of P4, for both men and women, and second, there is a rise in the share of P1 and P2, again for both genders. The opposite evolution of P1 and P4 could be explained by shifts in the relative demand of skilled/less skilled labor. As regards P2, a more natural explanation lies upon the increasing share of the public sector in the Spanish economy over the sample period.

Further interesting conclusions arise from observing the evolution of the solid lines. First, youth workers with the two higher levels of education have experienced a slight rise in the share of P1, a dramatic decrease in P2 and a large rise in P3. Thus, there seems to be a shift from skilled jobs in P2, which used to be the main entry job in the 1970s and 1980s, to both more skilled jobs (P1) and to less skilled ones (P3).

Second, youth workers with the two lower educational attainments have been displaced from P3 and P4 (in this case only in the 16-20 male cohort) toward P5. This tendency is particularly evident for workers with upper secondary education for whom P3 used to be a traditional “entry-job” where they used to receive training which enhanced their possibilities of promotion within the firm. Their displacement towards P5 harms those opportunities.

In sum, the more educated workers seem to be increasingly filling the more skilled jobs (P1) and the semi-skilled ones (P3). This process is taking place at the expense of a drastic reduction in (P2), possibly due to the ageing of the Public Administration employees and/or the lack of hirings of young workers. At the same time the less educated workers have been crowded out from their traditional “entry-jobs”, namely semi-skilled jobs (P3) towards those jobs that hardly offer any training and require no educational qualifications (P5). These observations, therefore, are consistent with a phenomenon of over-education produced by technological progress, namely, many persons are working on jobs that require less schooling than obtained and a corresponding crowding out of low skilled workers by high skilled ones. Thus, the employment rates of the former will tend to be lower, whereas those of the latter group may also decrease if the creation of high-skilled jobs does not match the increase in the supply of educated workers.

## **2.4 Changes in employment composition by age and seniority**

In this section we analyze the rate of turnover in the “entry jobs” and examine whether there have been shifts in the age distribution by occupation. Table 6 presents the age distribution of paid employment in each “entry job” by gender, whereas Table 7 shows the mean job tenure (in years) by age, gender and occupational group. In both cases, the comparison is between 1987 and 1997. With regard to the changes in the age distribution, the main conclusions to be drawn are the following. First, there has been an ageing process for the workers in the high skilled jobs (P1 and P2), illustrated by the rise in the share of workers aged 35-49. As for the less skilled occupations, there has been a rejuvenation process, especially among male workers in unskilled services and female workers in Hotels and Restaurants occupations. It is particularly interesting to examine what has happened with the Clerical/Administrative occupations (P3), which, as discussed earlier, has become the pivotal job among the lower and the higher educated young workers. As can be observed, between 1987 and 1997, there has been an aging process in the 25-29 age cohort. This may mean that, at that age, workers are forced to take that sort of job which they tend to withdraw later when seeking for better returns for their educational levels. The increasing turnover in that type of job seems to be reinforced by the evidence presented in Table 7, where the mean job tenure for the 25-29 and 30-34 cohorts has fallen from 6 to 3 years and from 10 to 5 years, respectively. This means that highly educated workers in that type of job have increased their share whilst, at the same time, they are involved in an intensive process of on-the-job search.

## 2.5 Education Wage Premium

Having illustrated the downgrading phenomenon which is taking place in the Spanish youth labor market, we now turn to examine the role of wage-setting in this process. On the one hand, given the increasing proportion of highly educated workers in semi-skilled jobs and less educated workers in unskilled jobs, we should expect the earnings of both types of worker to have fallen, especially if it is the case that skill-biased technological progress has reduced the demand for those kinds of jobs. On the other hand, we may conjecture that the presence of wage floors in the sectorial collective bargaining in Spain, could well be in part responsible for a narrowing in wage differentials, which may have caused an increase in the unemployment rate of both types of worker. In particular, we are interested in providing some evidence about how the education premium has evolved for youth and how the collective bargaining institutions may have affected it.

In this respect there is evidence provided by Alba (1993) and San Segundo (1997) which points out that the return to university-second degree education relative to college diploma has decreased substantially over the present decade. Likewise, Beneyto et al. (1996) find that the returns to education halved (from about 4 points to 2 points) when an overeducated worker performs a simple job.

On top of the above direct evidence on the evolution of the wage premium, there is another stream of studies (see Abellán et al., 1997, Dolado and Felgueroso, 1997 and Dolado et al., 1997) which have obtained conclusive evidence in favor of the hypothesis that minimum wages set at sectorial collective bargain (superimposed on the national statutory minimum wage) are very close to what young workers actually receive in semi-skilled and unskilled entry-jobs. Hence, for workers in those types of job, regardless of their educational attainments, sectorial bargained wage rates provide a good approximation of the actual wages. Conversely, longer job tenure and more skilled jobs entail significant positive wage drifts.

Tables 8 and 9 illustrate these facts. Table 8 provides evidence about the proportion of young workers (18-24 years old) by occupation, education and job tenure who enjoy positive wage drifts. This information has been obtained for 1991 from the Encuesta de Conciencia y Biografía de Clase (ECBC). Table 9, in turn, presents the percentage wage differences in sectorial agreement, corresponding to metal industries (one of the most important in Spain affecting more than one million workers), relative to the agreed wage for laborers in 1982, 1990 and 1997. Several interesting observations arise. First, Table 8 shows that between 70% and 90% of all workers in their first year at an entry-job receive no more than the agreed wage at the collective bargaining. Second, this proportion decreases as they stay longer in the firm, except for workers in unskilled jobs, (P5) and to a lesser extent, in Clerical Administrative jobs (P3) Third, the proportion of highly educated workers with positive wage drifts is smaller than those in Technical/Professional (P1) occupations, a further indication of the downgrading phenomenon.

As for Table 9, we draw the following conclusions. First, there is a strong

narrowing of the wages in entry-job up to Clerks (P3), implying that, since those wages are binding, it could be less costly for a firm to hire a non-experienced educated worker than to extend the contract to a less educated one which happens to be less productive and needs training. This substitution effect may be reinforced by the existence of generous seniority bonuses for workers that stay long in the firm. And second, over the last two decades, relative bargained wage have been kept constant, despite the large changes experienced in educational attainments of the younger cohorts.

Overall, the previous evidence seems to point out that wage floors may have affected the employment opportunities of the less educated workers whereas wage compression, together with downgrading of jobs, may have reduced the education premium for those educated workers who do not get jobs in the high skill sector.

## 2.6 Over-education and training

One possibility could be that the IT revolution has changed so much the education requirements of the occupations we have considered that both over-education and crowding-out of low educated workers are only apparent phenomena. We look at workers' perception of educational requirements for a given occupation First, panel a) of Table 10 shows the proportion of workers under 30 years of age who declare to be overqualified in their current jobs. When we distinguish by educational attainment and occupation, the proportion of workers in P3 with tertiary/university education who declare to be overqualified is close to 75 per cent, while most workers with lower educational attainments declare to be underqualified. Indeed, the pattern of responses for P3 is different from those pertaining to the remaining occupations where under and over-qualification hold for P1 and P2 and for P4 and P5, respectively. This seems to indicate that higher educated workers do have enough human capital to hold P3 jobs, whereas less educated workers do not and thus specific training is needed. Without past observations on workers' perceptions of jobs' educational requirements, we cannot be sure about recent trends in over-education stemming from the IT revolution. However, it seems clear that a significant proportion of higher educated workers in semi-skilled jobs declared to be overqualified for those jobs.

As regards training, a few words about how it is provided in Spain are in order. In general, there are school-based and workplace-based systems, the latter either based on firm skill formation or on government-led programs (see OECD, 1998). The Spanish system is mainly school-based and relies on employer subsidies or tax relief conditional on work-place training through special training/apprenticeship systems aimed at youth. However, apprenticeship employment contracts only accounted for 12 per cent of youth employment in 1995 given the high incidence of fixed-term employment contracts which do not involve any explicit training altogether (see Bentolila and Dolado, 1994). Moreover, despite generous incentives to convert fixed-term into permanent contracts, only 12 per cent of training contracts and 28 per cent of apprenticeship contracts were so converted in 1997. Panel b) of Table 10 gives the proportion of workers

whose training has been provided and paid by the firm, broken down by the worker's educational attainment and occupation, as reported by the European Household Panel Survey (EHPS). It is noteworthy that this fraction in P3 is highest for workers with upper-secondary education and lowest for workers with tertiary/university education. Indeed, though not reported here for the sake of brevity, we find, using individual data from the EHPS, that the probability that a higher educated occupies a job in P3 increases significantly when minimum bargained wages higher educated worker occupies a job in P3 increases with the regional unemployment rates of educated workers and the minimum wages set for those occupations by the provincial/sectoral collective wage bargaining agreements. Moreover, the probability that a lower educated worker receives training when working in P3 decreases significantly when minimum bargained wages are set by collective bargaining agreements at the industry level than when employment conditions are set by firm level collective agreements.

### 3 A matching model

To account for over-education, training and crowding-out, we consider a simple matching model with two types of workers -educated and non-educated, two types of jobs -skilled and unskilled, and on-the-job search for educated workers employed in unskilled jobs.<sup>5</sup> There is a continuum of firms. Unskilled jobs do not require any schooling but skilled jobs can only be filled by educated workers, who also can take unskilled jobs. The supply of non-educated and educated workers is exogenously given and equal to  $L_1$  and  $L_2$ , respectively ( $k = \frac{L_2}{L_1}$  is the ratio of educated to non-educated workers).<sup>6</sup> Training in the firm is required for non-educated workers and is not a substitute for schooling. We assume that firms differ in these training costs,  $t$ , according to a distribution function  $F(t)$ . Firms post vacancies for unskilled and skilled jobs whose nature is determined ex-ante, before a worker shows up. Educated workers will accept offers for unskilled jobs if they do not have offers for skilled jobs and the value from being employed in a unskilled jobs is larger than the valued of being unemployed. Firms will hire educated workers for unskilled jobs as this implies saving of the training costs required for non-educated workers. Firms do not discriminate against educated workers occupying unskilled jobs (there is no a bad signal in an educated worker to take unskilled jobs) and, in equilibrium, will be indifferent between hiring any type of worker for unskilled jobs.

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<sup>5</sup>It departs from other models in the search literature with heterogeneous workers (for instance, Brunello 1996, Saint-Paul 1996, Acemoglu 1997, Mortensen and Pissarides 1998) by assuming that the markets are non-segmented by skills, so that educated workers can be employed in unskilled jobs.

<sup>6</sup>Given the very rapid increase in subsidies for tertiary education which took place in Spain since the early 1980s, this seems an acceptable assumption.

### 3.1 Matching

Hires are given by matching functions which take the number of searchers and job vacancies as arguments. Educated workers search for skilled jobs and fill them according to the matching function  $H_2 = m(u_2 L_2 + e_1^2 L_2, v_2 L_2)$ , where  $H_2$  is the number of hires of educated workers for skilled jobs,  $u_2$  is the unemployment rate of educated workers,  $e_1^2$  is the proportion of educated workers employed in unskilled jobs who are also assumed to be searching for skilled jobs,  $v_2$  is the vacancy rate of skilled jobs (measured with respect to  $L_2$ ), and  $m$  is a constant-returns-to-scale (CRS) matching function with  $m_1, m_2 > 0$ .<sup>7</sup> Unemployed educated workers also match with unskilled job vacancies. Given the matching function for skilled jobs, the number of hires of educated workers for unskilled jobs is  $H_1^2 = m(u_2 L_2, v_1 L_1 + v_2 L_2) - \frac{u_2}{u_2 + e_1^2} m(u_2 L_2 + e_1^2 L_2, v_2 L_2)$ , where  $v_1$  is the vacancy rate of unskilled jobs (measured with respect to  $L_1$ ). Finally for non-educated workers, the number of hires is  $H_1 = m(u_1 L_1 + u_2 L_2, v_1 L_1) - H_1^2 - \frac{u_2}{u_2 + e_1^2} H_2 = m(u_1 L_1 + u_2 L_2, v_1 L_1) - m(u_2 L_2, v_1 L_1 + v_2 L_2)$ , being  $u_1$  the unemployment rate of non-educated workers.

Given the matching process, the probabilities of filling vacancies are given by:

- For a skilled jobs:  $q_2 = \frac{H_2}{v_2 L_2}$ , which under the CRS assumption can be written as  $q_2 = m(\theta_2)$ , with  $\theta_2 = \frac{v_2}{u_2 + e_1^2}$ .
- For unskilled jobs:  $q_1 = \frac{H_1 + H_1^2}{v_1 L_1}$ , which under the same assumption is equal to  $q_1 = m(\theta_1) - \frac{ku_2}{v_1} \theta_2 q_2$ , with  $\theta_1 = \frac{v_1}{u_1 + ku_2}$ .

As for workers, the rates at which they receive job offers are

- Skilled job offers for educated workers (either unemployed or employed in unskilled jobs),  $\tau_2 = \theta_2 q_2$ .
- Unskilled job offers for educated workers,  $\tau_1^2 = \theta_{12} m(\theta_{12}) - \theta_2 q_2$ , with  $\theta_{12} = \frac{v_1 + kv_2}{ku_2}$ .
- Unskilled job offers for non-educated workers,  $\tau_1 = \frac{u_1 + ku_2}{u_1} \theta_1 m(\theta_1) - \frac{ku_2}{u_1} \theta_{12} m(\theta_{12})$ .

Thus, as the skilled jobs market gets tighter ( $\theta_2$  increases), the proportion of educated workers moving to unskilled jobs decreases, and the proportion of non-educated workers finding unskilled jobs increases.

### 3.2 Steady State Equilibrium

In the steady state equilibrium, the flow out of unemployment and the flow into unemployment are equal for both types of workers and the flow of educated

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<sup>7</sup>We are assuming that on-the-job search of educated workers in unskilled jobs is as efficient as the search of unemployed educated workers.

workers into unskilled employment must be equal to the flow of educated workers out of unskilled employment toward unemployment or to skilled employment. Thus, we have:  $s_1 N_1^E = \tau_1 N_1^U$ ,  $s_2 N_2^E = \theta_2 q_2 + \tau_1^2 N_2^U$ , and  $(s_1 + \theta_2 q_2) N_2^{E1} = \tau_1^2 N_2^U$  where  $N_i^E$  ( $N_i^U$ ) is the number of employed (unemployed) workers of type  $i$  ( $i = 1, 2$ ),  $s_i$  is the separation rate for jobs of type  $i$ , and  $N_2^{E1}$  is the number of educated workers in unskilled jobs. Hence, the steady state unemployment rate for each non-educated workers is

$$u_1 = \frac{s_1}{s_1 + \tau_1} \quad (1)$$

the steady state unemployment rate of educated workers is

$$u_2 = \frac{s_2}{s_2 + \theta_{12} m(\theta_{12})} \quad (2)$$

and the proportion of educated workers in unskilled jobs is

$$e_1^2 = \frac{s_2}{s_1 + \theta_2 q(\theta_2)} - \frac{s_2 + \theta_2 q(\theta_2)}{s_1 + \theta_2 q(\theta_2)} u_2 \quad (3)$$

### 3.3 The supply of vacancies

For the determination of the supply of vacancies, we follow Pissarides (1990). Let  $V_i$  be the returns to opening a job position of type  $i$  ( $i = 1, 2$ ),  $J_i$  the asset value of a job of type  $i$  filled by a worker of type  $i$ , and  $J_1^2$  the value of a unskilled job filled by an educated worker. Assuming that  $J_1 = J_1^2$  we have that<sup>8</sup>

$$rV_1 = -\gamma_1 + q_1(J_1 - V_1) \quad (4)$$

while for skilled jobs

$$rV_2 = -\gamma_2 + q_2(J_2 - V_2) \quad (5)$$

The asset values of a filled job, in turn, are given by

$$rJ_1 = y_1 - w_1 - t + s_1(V_1 - J_1)$$

$$rJ_2 = y_2 - w_2 + s_2(V_2 - J_2)$$

where  $r$  is the rate of interest,  $\gamma_i$  is the cost of keeping a job vacancy of type  $i$  unfilled,  $y_i$  is the output produced by a worker of type  $i$  in a job of the same type,  $w_i$  is the wage paid to workers of type  $i$ , and  $t$  is the training cost for unskilled workers performing a simple job which differs across firms according

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<sup>8</sup>This assumption is consistent with the matching process specified above and, moreover, guarantees an interior solution for  $u_1$  and  $u_2$ .



to the distribution function  $F(t)$ , while the asset value for unskilled jobs filled by educated workers is given by<sup>9</sup>

$$rJ_1^2 = y_1 - w_1 + (s_1 + \theta_2 q_2)(V_1 - J_1^2)$$

In equilibrium all profits opportunities from offering new jobs are exploited so that  $V_1 = V_2 = 0$ , and, hence,

$$J_1 = \frac{y_1 - w_1 - t}{r + s_1}, J_2 = \frac{y_2 - w_2}{r + s_2}, J_1^2 = \frac{y_1 - w_1}{r + s_1 + \theta_2 q_2} \quad (6)$$

Notice that, though workers are assumed to get the same wage in unskilled jobs, regardless of their educational attainment, employers will be indifferent between hiring more or less educated workers as long as the differences between the probability of quitting of the two types of workers is exactly compensated by the training cost of less educated workers. Thus, the condition  $J_1 = J_1^2$  determines a critical value of the training cost,  $t^*$ , such that a share of firms given by  $F(t^*)$  hire only non-educated workers for unskilled jobs and offer on-the-job training, while the rest of the firms hire only educated workers for unskilled jobs.

As for wages, we assume that for educated workers they are equal to a proportion  $\beta$  of the total surplus generated by the match, unless outside options of the firm and of the worker are binding (see Acemoglu, 1995) and that these options are not binding, while for non-educated workers we will assume that the outside option of the workers is binding, being  $z$  the reservation wage of non-educated workers. Thus,

$$w_1 = z, w_2 = \beta y_2 \quad (7)$$

>From equations (4), (5), and (6), after substituting for wages, we get the conditions which represent the supply of vacancies

$$(1 - \beta)y_2 q_2 = \gamma_2(r + s_2) \quad (8)$$

$$(y_1 - z)q_1 = \gamma_1(r + s_1 + \theta_2 q_2) \quad (9)$$

while for the critical level of training costs which make firms indifferent between hiring educated or non-educated workers for unskilled jobs, we get

$$t^* = \frac{\theta_2 q_2}{r + s_1 + \theta_2 q_2}(y_1 - z) \quad (10)$$

Thus, as the skilled job market is less tighter and the separation rate in the unskilled job market increases, the training costs which makes firm indifferent between training non-educated workers and hiring educated ones falls, which means that less firms are eager to supply on-the-job training.<sup>10</sup>

<sup>9</sup>Notice that the quit rate is the same one that we have assumed for the rest of job matches,  $s_1$ , plus the probability of receiving a skilled job offer for the educated worker employed in unskilled jobs, which is equal to  $\theta_2 q_2$ .

<sup>10</sup>Under the assumption that the training costs is distributed uniformly between 0 and 1 (the value which we will assume for  $y_1$ , for normalization),  $t$  can be interpreted as the proportion of firms training non-educated workers.

### 3.4 Simulations

Given a plausible functional form for the matching function, the model is too complex to be solved analytically. Thus, we proceed as follows. We assume a Cobb-Douglas matching function with constant returns to scale, which seems to fit well the evidence on labor market flows (see Blanchard and Diamond, 1989) and gives rise to the following probabilities:

$$q_1 = m(\theta_1) = \theta_1^{-\alpha}, m(\theta_{12}) = \theta_{12}^{-\alpha}, q_2 = m(\theta_2) = \theta_2^{-\alpha}$$

where  $\alpha > 0$  is the elasticity of hires with respect to job searchers. Given the exogenous variables ( $\alpha, r, s_1, s_2, \beta, z, k, y_1, y_2, \gamma_1$  and  $\gamma_2$ ), equation (8) determines  $\theta_2$  and then, equation (9) determine  $q_1$ , while equation (10) determines  $t^*$ . Given  $q_1$  and  $\theta_2$ , equations (1), (2), and (3), together with the definition of  $q_1$ , determine  $u_1, u_2, v_1, v_2, e_1^2$ .

We illustrate the implications of the model by means of the numerical simulations reported in Table 11. The parameter values that we used correspond, with some variations, to those used by Mortensen and Pissarides (1998) in their calibration of unemployment in a representative ‘‘European economy’’. In particular, we increase the replacement rate,  $z$ , to be .5, and decrease the separation rate to be .3 and .1 for unskilled and skilled jobs, respectively. Moreover,  $y_2$  is assumed to be the double of  $y_1$ , and  $k$  is taken to be .1, namely that 9 per cent of the labor force is educated. It should be noticed that we do not try to calibrate the model to yield ‘‘realistic’’ values for the endogenous variables (the model is too simple for that task). We rather aim at evaluating the qualitative implications of the model. In the Table we also report the returns to education, measured by the relative gross expected returns from investing in education,  $R$ , which can be easily computed to be equal to

$$R = \frac{(1 - u_2 - e_1^2)\beta y_2 + (u_2 + e_1^2)z}{z}$$

The first column of Table 11 gives the results for this baseline case: the unemployment rates of non-educated and educated workers are 19.8% and 1.1%, respectively, while 17.3% of educated workers are employed in unskilled jobs, and the training cost threshold is about .21. In the second column we report the effect of skilled-biased technological progress by means of an increase in the productivity of educated workers in complex jobs (from  $y_2 = 2$  to  $y_2 = 2.5$ ). It is found that, since an increase in  $y_2$  raises tightness in the market for skilled jobs, such a change results in a fall in  $e_1^2$ , while  $u_2$  remains more or less constant. Hence, since both the probability of a educated workers holding a skilled job and the relative wages from skilled jobs to wages from unskilled jobs increase, the returns to education go up from 2.2 to 2.7. In any case, overall the standard skilled-biased technological progress, on its own, is not able to explain the whole set of observed facts. Something similar applies to an exogenous increase of educated workers. In the third column it can be observed that an increase in the relative supply of educated workers to  $k = 1$ , corresponding to a situation in

which 50% of the labor force is educated, increases both unemployment rates, decreases the proportion of educated workers employed in unskilled jobs but does not affect either the training cost threshold or the returns to education. By contrast, the fourth column shows that as separation rates of both types of jobs increase and the bargaining power of educated and the reservation wage of lower educated workers rise, then the unemployment rates of both types of workers increase, the proportion of educated workers employed in unskilled jobs also rises, there are less firms willing to supply on-the-job training and the returns to education fall from 2.2 to 1.9, in agreement with the stylized facts discussed above. The intuition behind these results is as follows: the increase in  $s$  and  $\beta$  decreases the tightness in the market for skilled jobs and, therefore,  $u_2$  and  $e_1^2$  increase, resulting in crowding-out less educated workers in the market for unskilled jobs and less on-the-job training by firms.

## 4 Concluding remarks

This paper has analyzed the role of various factors in explaining the poor performance of the Spanish youth labor market during the last two decades. The fact that unemployment rates for lower (primary) educated and higher (tertiary/university) educated workers have quadrupled and tripled respectively over the last twenty years, and all this despite a huge educational drive, can be possibly explained by a combination of three factors: (i) labor market institutional factors (fixed-term employment contracts, wage bargaining, etc.), (ii) skilled biased technological progress, and (iii) over-education and crowding-out of lower educated workers by higher educated ones who replace the former in their traditional entry jobs and engage into on-the-job search. We have provided evidence in favor of the latter, without claiming that the other two factors may not have been important too. To understand the effects of the three factor in explaining the rise in the unemployment rates of lower and higher educated workers and in the fraction of the latter employed in unskilled jobs, we have developed a simple matching model with non-segmented labor market where educated workers can fill unskilled vacancies but not the opposite.

Using this model, for some reasonable parameter values, we have shown that a combination of the first (an increase in the separation rate due to widespread use of fixed-term contracts and a strengthening of the unions' bargaining power) and the third factor (a displacement of young workers with at most primary or secondary education by workers with higher educational attainments from their traditional entry jobs, for example, clerical and administrative occupations) could explain better the observed stylized facts than the conventional explanation based upon the characteristics of the technological progress.

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Table 1. Educational attainment by age group and country (1995)

	A. Upper secondary Education				B. University degree				
	25-64	25-34/ 35-44	25-34/ 45-54	25-34/ 55-64	25-64	25/34 35-44	25-34/ 45-54	25-34/ 55-64	
US	86	-	-	-	Canada	47	1.1	1.2	1.6
Germany	84	1.0	1.1	1.2	US	33	-	-	-
UK	76	1.1	1.2	1.5	Sweden	28	0.9	1.0	1.5
Canada	75	1.1	1.2	1.6	Belgium	25	1.2	1.5	2.5
Sweden	75	1.1	1.3	1.7	Germany	23	0.8	0.9	1.2
Austria	69	1.1	1.2	1.6	Netherlands	22	1.0	1.2	1.8
France	68	1.2	1.4	2.0	UK	21	1.0	1.1	1.4
Finland	65	1.1	1.4	2.2	Finland	21	1.0	1.2	1.6
Denmark	62	1.1	1.1	1.5	Ireland	20	1.3	1.7	2.5
Netherlands	61	1.1	1.3	1.5	Denmark	20	0.8	1.0	1.4
Belgium	53	1.2	1.5	2.3	France	19	1.3	1.5	2.8
Ireland	47	1.3	1.8	2.4	Greece	17	1.2	1.9	3.3
Greece	43	1.3	1.9	3.0	Spain	16	1.5	2.5	4.5
Italy	35	1.1	1.8	3.3	Portugal	11	1.0	1.4	2.3
Luxemburg	29	1.0	1.1	1.6	Luxemburg	11	0.8	0.9	1.8
Spain	28	1.5	2.6	4.7	Italy	8	0.7	1.0	2.0
Portugal	20	1.3	1.9	3.4	Austria	8	0.8	1.3	2.3
OECD	60	1.1	1.3	1.7	OECD	22	1.0	1.3	1.9

Source: OECD (1997)

First columns in parts A and B, represent the percentage of the population 25-64 who have completed at least Upper secondary education and those who have completed Tertiary education, respectively.

The other columns represent the ratios between proportions for those 25-34 of age and those corresponding to 35-44, 45-54 and 55-64 year-olds. Countries are ranked by the first column in each part.

Table 2: Educational attainment of new school leavers among the population aged 16-29 years (1996)

	Men		Women		(E) Gender gap
	(A) Lower, secondary or less	(B) University level	(C) Lower secondary or less	(D) University level	
Spain	44	25	23	39	35
Portugal	51	15	33	26	29
France	30	26	20	38	22
Belgium	17	37	14	49	16
Italy	34	10	21	12	15
Greece	19	20	9	21	12
Austria	35	11	28	14	10
US	30	41	26	47	10
Ireland	28	31	25	35	7
Denmark	54	11	49	12	6
UK	55	20	50	21	6
Finland	41	6	42	9	2
Germany	42	17	43	17	0
Netherlands	32	16	44	12	-15
Luxembourg	21	32	40	32	-19
Average	36	23	31	26	7

Source: OECD (1998)

(E) The gender educational gap is defined as [(A)-(B)]-[(C)-(D)]

Table 3: Unemployment rates by age, gender and educational attainment

Men																
Age	Lower secondary				Upper secondary				University 1st. degree				University 2nd. degree			
	1977	1985	1991	1998	1977	1985	1991	1998	1977	1985	1991	1998	1977	1985	1991	1998
16-17	10	53	48	38												
18-20	10	54	28	34	16	52	35	33								
21-24	7	38	21	23	12	42	19	28	26	49	24	45				
25-29	2	25	16	18	6	20	11	19	5	29	13	22	15	29	21	21
30-34	2	14	10	14	4	12	6	11	1	7	5	13	4	10	6	8
35-39	2	9	7	11	2	7	5	8	2	4	2	3	2	2	2	3
Women																
Age	Lower secondary				Upper secondary				University 1st. degree				University 2nd. degree			
	1977	1985	1991	1998	1977	1985	1991	1998	1977	1985	1991	1998	1977	1985	1991	1998
16-17	20	63	59	58												
18-20	14	59	37	48	19	62	44	54								
21-24	10	45	38	36	9	43	35	38	15	57	35	41				
25-29	5	32	32	35	5	25	25	26	3	30	20	28	15	43	30	32
30-34	1	18	27	31	2	12	20	21	3	8	11	21	1	15	14	18
35-39	1	21	23	29	0	15	16	19	0	5	7	15	1	8	8	13

Source: Labour Force Survey.



Table 4. Employment rates(out of school) by age, gender and educational attainment(\*)

Men																
Age	Lower Secondary				Upper Secondary				University 1st. degree				University 2nd. degree			
	1977	1985	1991	1998	1977	1985	1991	1998	1977	1985	1991	1998	1977	1985	1991	1998
16-17	89	45	65	58												
18-20	89	44	67	63	83	46	63	68								
21-24	92	62	78	76	87	58	85	80	74	51	74	58				
25-29	97	74	83	80	94	79	91	85	95	71	90	83	84	71	83	83
30-34	98	85	88	83	96	86	93	88	99	91	95	91	94	90	95	93
35-39	97	90	91	86	98	93	93	90	98	96	97	95	96	98	98	96
Women																
Age	Lower secondary				Upper secondary				University 1st: degree				University 2nd. degree			
	1977	1985	1991	1998	1977	1985	1991	1998	1977	1985	1991	1998	1977	1985	1991	1998
16-17	65	24	45	35												
18-20	76	32	56	49	73	34	56	50								
21-24	70	41	50	57	70	48	67	72	76	38	74	64				
25-29	52	43	43	46	62	54	63	72	69	69	79	78	73	53	75	73
30-34	34	41	41	38	41	53	64	59	69	81	83	76	72	71	82	80
35-39	31	31	45	40	47	41	55	57	63	73	83	80	64	70	85	80

(\*) Employment/(Employment + population who are neither attending school, neither employed)

Source: Labour Force Survey.

Table 5: Unemployment rates by educational attainment and age for selected countries (1995)

	20-24 year-olds			25-29 year-olds			25-64 year-olds		
	A	B	C	A	B	C	A	B	C
Austria	7.6	3.9	0.8	7.2	3.1	3.6	5.7	2.9	2.1
Belgium	29.7	19.2	14.5	18.9	11.1	5.7	13.4	7.5	3.6
Denmark	18.4	9.3	9.9	21.7	8.3	7.7	14.6	8.3	4.3
Finland	41.6	26.2	20.6	32.0	18.5	9.4	21.6	16.1	6.2
France	41.3	24.8	14.4	27.6	15.0	13.8	14	8.9	7
Germany	12.5	6.8		15.5	6.9	5.1	13.3	7.9	4.7
Greece	17.8	30.9	42.6	12.6	16.4	21.4	6.3	9	7.1
Ireland	28.7	12.2	9.0	23.5	8.4	5.4	16.4	7.6	3.4
Italy	27.6	37.6	38.5	16.6	17.3	32.7	9.1	7.9	7.3
Luxembourg	9.6	4.8	14.9	5.9	2.8	0.6	3.8	2.1	0.6
Netherlands	13.4	7.4	12.0	9.2	5.5	7.6	7.9	4.8	4.1
Portugal	14.2	20.1	14.5	8.9	9.8	10.3	6.2	6.4	3.3
Spain	37.4	41	53.1	32.3	27.0	33.2	20.6	18.5	13.8
UK	31.8	13.2	12.2	27.8	9.8	3.7	12.2	7.4	3.5
United States	19.4	9.1	3.9	13.3	7.0	3	10	5	2.5
Average	21.9	15.5	15.3	16.9	9.8	8.5	10.1	7	4

Source: OECD (1997)

A = Low secondary education or less; B = Upper secondary education,  
C = University level

Table 6. Age distribution of paid employment in each occupational group by gender

Men																		
Occupations:	16-17		18-20		21-24		25-29		30-34		35-39		40-44		45-49		50-64	
	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997
P1	0	0	1	1	5	4	13	13	15	14	15	17	15	15	11	14	26	22
P21	0	0	0	0	2	1	16	8	21	13	21	18	16	20	10	17	15	23
P22	0	0	1	1	7	4	14	10	13	12	13	16	13	16	10	14	29	27
P3	0	0	2	1	8	7	16	22	15	14	16	15	12	15	8	13	23	21
P4	2	1	3	4	9	10	12	13	13	13	14	13	15	12	11	13	22	21
P51	4	1	7	5	18	17	18	20	14	16	10	13	8	8	5	8	17	13
P52	6	3	12	8	22	16	19	18	13	15	9	13	6	9	5	9	9	11
P53	1	1	3	3	11	12	13	16	10	15	10	14	12	9	10	9	31	22
P54	3	3	8	9	15	18	13	15	11	13	11	9	10	7	8	8	22	16
Women																		
Occupations:	16-17		18-20		21-24		25-29		30-34		35-39		40-44		45-49		50-64	
	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997
P1	0	0	2	2	11	9	25	19	25	18	13	18	8	14	4	10	12	10
P21	0	0	0	0	7	4	23	11	21	17	17	20	13	16	7	14	13	17
P22	0	0	2	1	11	3	22	11	21	21	14	23	10	16	6	11	15	15
P3	1	0	8	3	21	16	23	29	19	16	12	15	7	11	3	8	6	8
P4	6	2	14	7	17	15	20	14	13	12	7	16	7	12	5	11	10	12
P51	6	1	18	9	24	24	18	19	11	13	6	12	5	8	3	6	9	9
P52	2	1	7	8	10	19	12	12	13	13	12	12	12	11	10	8	22	16
P53	3	1	10	3	15	9	11	11	8	12	7	13	9	14	9	13	29	24
P54	7	1	15	11	14	21	18	16	12	12	14	8	9	13	6	9	6	8

Source: Labour Force Survey.

P1: Professional/Technical. P21: Teaching professionals. P22: Employees in Public Administration. P3: Clerical/Administrative. P4: Manual, craft, operators. P51: Sales elementary occupations. P52: Hotels and Restaurants occupations. P53: Other unskilled services. P54: Labourers in Manufact./Construction.

Table 7: Mean job tenure for each occupational group by age, gender and occupational group

		Men																	
		16-17		18-20		21-24		25-29		30-34		35-39		40-44		45-49		50-64	
Occupations		1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997
P1		0	0	1	0	1	1	3	2	6	4	10	8	12	12	16	16	21	21
P21		0	0	0	0	1	1	4	2	6	4	9	8	12	13	16	17	21	23
P22		0	0	1	1	2	1	4	4	7	7	10	11	14	15	18	19	22	22
P3		1	0	1	0	2	1	5	3	10	7	12	12	16	16	18	19	23	24
P4		1	0	1	0	3	1	6	3	8	5	11	9	12	11	15	14	19	17
P51		1	0	1	0	2	1	5	3	8	6	10	10	14	14	14	17	19	17
P52		0	0	1	0	2	1	5	2	5	4	9	10	7	10	12	12	13	18
P53		0	0	1	0	2	1	4	2	6	4	8	6	11	9	13	12	15	16
P54		0	0	1	0	1	0	3	1	5	2	7	4	10	7	14	11	15	16
		Women																	
		16-17		18-20		21-24		25-29		30-34		35-39		40-44		45-49		50-64	
		1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997	1987	1997
P1		0	0	2	0	1	0	4	2	7	5	10	8	12	14	11	16	16	19
P21		0	0	0	0	1	0	3	1	7	4	10	8	13	13	15	17	22	22
P22		0	0	1	0	1	1	3	3	8	6	10	9	13	12	12	15	18	19
P3		0	0	1	0	2	1	5	3	10	5	11	10	14	15	16	18	19	18
P4		1	0	2	0	3	1	7	2	10	5	7	9	10	12	14	13	15	16
P51		0	0	1	0	3	1	6	3	8	5	8	8	8	9	12	9	13	14
P52		0	0	1	0	2	1	3	1	7	3	6	5	6	5	9	7	11	11
P53		0	0	1	0	2	1	4	2	4	3	5	4	5	5	7	6	11	10
P54		0	0	1	1	2	2	6	1	9	4	13	11	13	7	17	14	21	13

Source: Labour Force Survey.

P1: Professional/Technical. P21: Teaching professionals. P22: Employees in Public Administration. P3: Clerical/Administrative. P4: Manual, craft, operators. P51: Sales elementary occupations. P52: Hotels and Restaurants occupations. P53: Other unskilled services. P54: Labourers in Manufact./Construction.

Table 8: Incidence of positive wage drifts among young workers (a)

	All workers	Firm tenure		
		1 year or less	2 years	3 or more years
By occupation:				
Technical/Professional	55	20	43	80
Clerical/Administrative	25	17	33	33
Manual,craft,operative	41	29	37	52
Unskilled jobs	20	13	22	29
By education:				
Lower secondary or less	27	20	29	32
Upper secondary (b)	36	18	30	59
University	44	27	50	55

(a) Percentage share of workers aged 18-29 who were perceiving more than the sectorial agreed wages in 7ve industries (Manufacturing, Construction, Hotels and Restaurants, Transport and Finance)

(b) General and vocational

Source: the shares have been calculated using the Encuesta de Conciencia, Estructura y Biografía de Clase (ECBC, 1991)

Table 9. Wage differences in sectorial collective agreements, (Metal industries) (\*)

	1982	1990	1997
Specialist labourer	2.0	2.0	1.9
Operative 3rd degree/Assistant	3.5	3.5	3.5
Operative 2nd degree/Assistant	6.5	6.4	6.3
Operative 1st degree/Assistant	9.5	9.4	9.3
Office apprentice	2.3	2.2	2.1
Clerk 2nd degree	9.4	9.1	8.8
Clerk 1st degree	15.5	15.1	14.8
Department head (2nd degree)	23.3	22.9	22.5
Department head (1st degree)	29.8	29.4	28.8
Graduate occupations (2nd degree)	45.3	44.9	44.2
Graduate occupations (1st degree)	57.8	57.2	56.3

(\*) Percentage unweighted average differences in hourly wages in relation to bargained wages for unskilled workers (labourers) in provincial collective agreements

Table 10. Overeducation and Training in Spain

Ed. Att./Occup.	P1		P2		P3		P4&P5	
	O	U	O	U	O	U	O	U
a) Workers' perception of over and underqualification (%)								
Lower Education	33.3	66.7	16.7	44.4	12.5	66.7	34.2	31.6
Secondary Education	23.1	46.2	41.2	23.5	17.6	49.0	55.0	23.3
Vocational Training	15.6	71.9	27.0	40.5	15.0	68.3	53.0	33.9
Tert./Univ. Education	23.5	69.1	25.3	60.0	74.5	21.3	80.0	10.0
b) Workers receiving on-the-job training (%)								
Lower Education	0		40		33.3		13	
Secondary Education	33.3		33.3		47.6		9.1	
Vocational Training	68.6		28.6		33.3		27	
Tert./Univ. Education	50.0		25		22.2		11.1	

Note: O: overqualified, U: underqualified. Source: EUROSTAT Household Panel Survey.

Table 11. Numerical Simulations

Parameter values:  $y_1 = 1; y_2 = 2; \rho_1 = .25; \rho_2 = 2; \theta = .5; r = .03;$

	$s_1 = .27; s_2 = .18; \bar{z} = .85; z = .7$		$s_1 = .3; s_2 = .2; \bar{z} = .9; z = .8$	
	$k = 0.1$	$y_2 = 2.5$	$k = 1$	$k = 1$
$u_1(\%)$	19.8	22.5	28.7	32.6
$u_2(\%)$	1.1	1.3	6.0	8.0
$u(\%)$	18.1	20.5	17.3	20.3
$e_1^2(\%)$	17.3	14.2	12.8	20.2
$t(\%)$	21.1	22.4	21.1	11.4
R	2.2	2.7	2.2	1.9



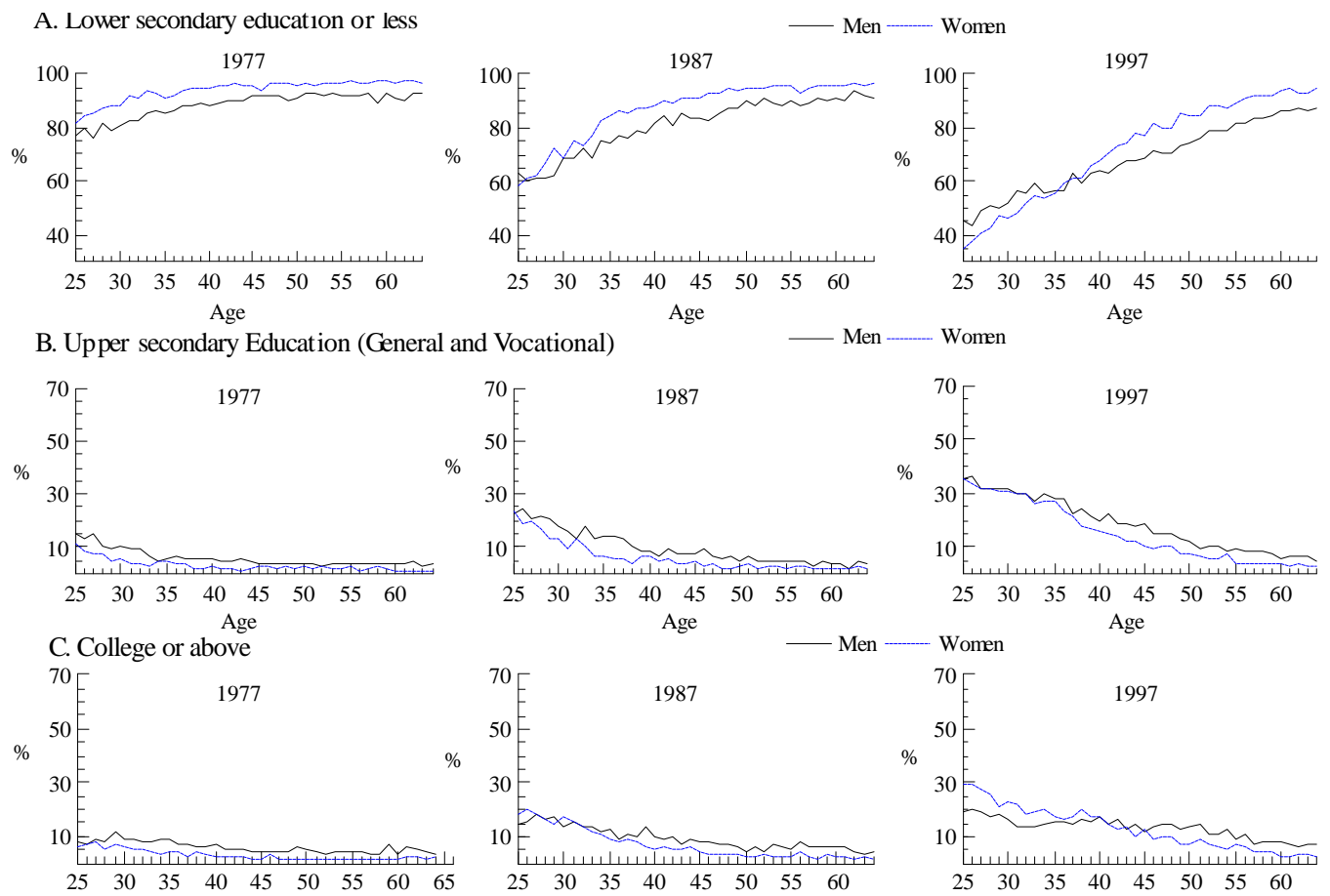
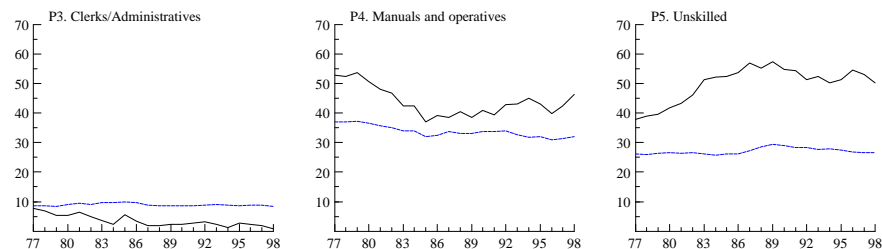
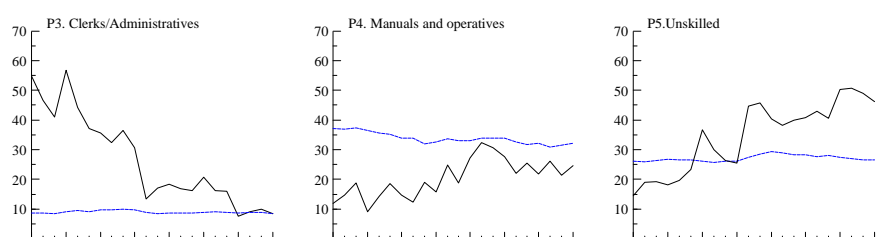


Figure 1. Highest completed degree of education by gender and age.

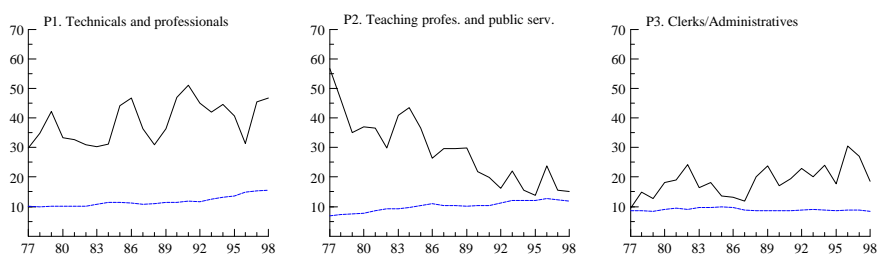
A. Lower secondary education or less, 16-20 year-olds



B. Upper secondary education (except vocational), 18-22 year-olds



C. College diploma/University 1° degree, 21-25 year-olds



D. University (2°) degree, 23-27 year-olds

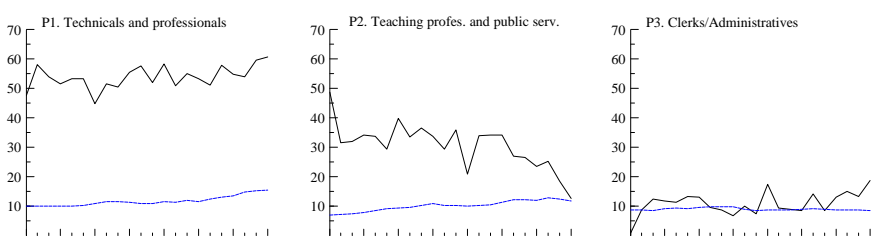
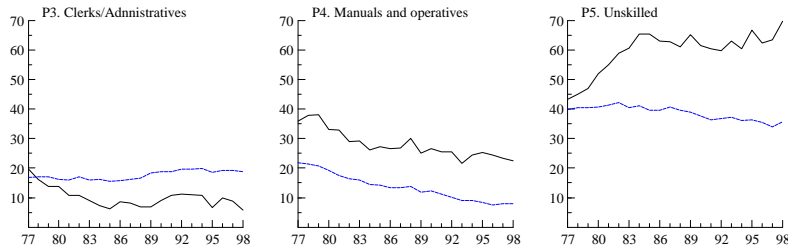


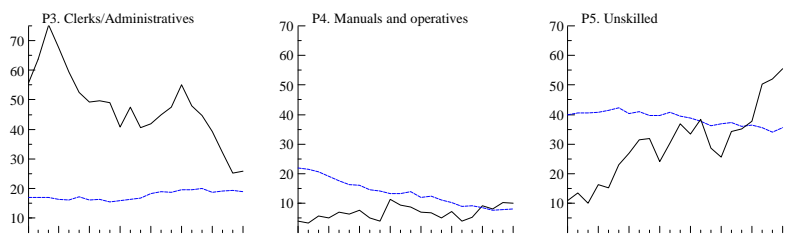
Figure 2. Entry jobs by age and educational attainment, men (1977-98).

Note: Dotted lines represent the proportion of the corresponding occupation in male paid employment

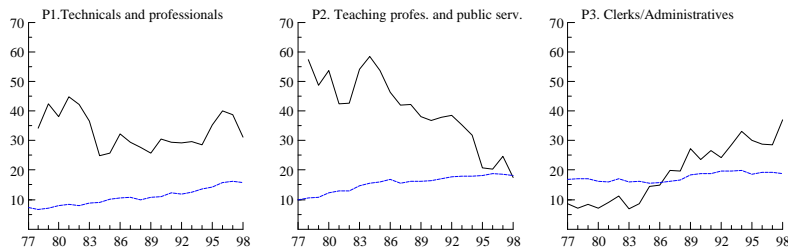
A. Lower secondary education or less, 16-20 year-olds



B. Upper secondary education or less (except vocational) , 18-22 year-olds



C. College diploma/University 1° degree, 21-25 year-olds



D. University (2°) degree, 23-27 year-olds

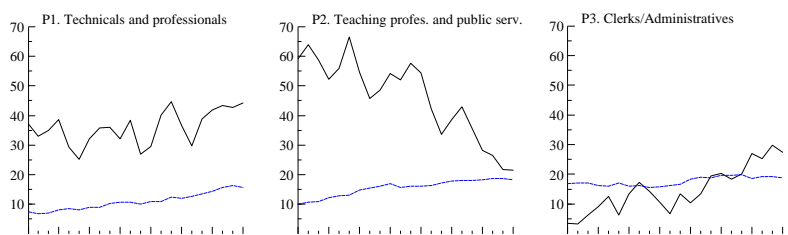


Figure 3. Entry jobs by age and educational attainment, women (1977-98).

Note: Dotted lines represent the proportion of the corresponding occupation in female paid earners.

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