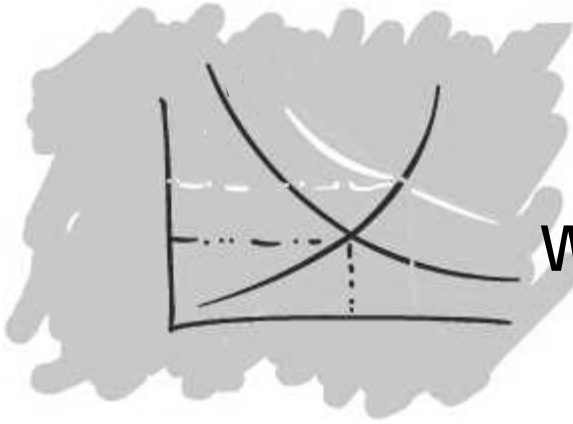


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Low-wage Employment and Mobility in Spain



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# Low-wage Employment and Mobility in Spain

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## Abstract

The issue of low-wage workers has received increased interest during last decades in many European countries. In this paper I analyse the patterns of low-wage employment in the Spanish labour market. Using a sample of Spanish workers extracted from the European Community Household Panel for the period 1995-2001, I first analyse the earnings distribution as a whole, looking at the characteristics of *low*, *medium* and *high* paid jobs. I also look at the evolution of these jobs over the period 1995-2001. Furthermore, I examine the determinants of being in a low-paid job using an analytical framework that is characterised by the ability to account for the endogeneity of initial conditions. Finally, I explore the effects of low pay on job mobility. For this purpose I adopt an approach based on competing risks in order to allow for different risks of failure.

**Key words:** Low-wage employment, job mobility, competing risks.

**JEL Classification:** J31, J50, J60

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## **1 Introduction**

The analysis of the structure of wages and wage inequality has been receiving increased attention in recent years. This interest has been reinforced by the sharp increase in wage inequalities in a number of industrial countries. This widening of earnings differentials has been common in many OECD countries, which has given rise to increased analysis of the so-called “low-paid” jobs.

The extent of low pay at any point in time is a cause of concern as it measures the proportion of workers lagging behind in the wage distribution with negative consequences for their relative living standards and social inclusion. It is also important for the economy as a whole inasmuch as it signals the corresponding extent of low productivity or low paid jobs. The issue becomes even more crucial in a dynamic context, in the case of workers that are trapped in low paid jobs and do not have the prospect of a career that evolves over time.

The growing interest in the development of low-wage employment in Europe in the last twenty years has firstly been due to the prospect of reducing unemployment through the creation of large number of low-paid, low-skill jobs. Among European countries, Spain is well known for having displayed one of the highest unemployment rates, with an average unemployment rate close to 20% since the mid 1980s. Employment creation has been one of the major issues that have confronted Spanish governments since the 1980. In 1984 the tripartite Economic and Social Agreement (AES) introduced a wide range of measures for temporary employment, which have probably been responsible for the good record of labour creation that came about between 1984 and 1991. These measures included fixed-term contracts free of hiring costs and temporary contracts, which were confined to unemployed and to workers under 25 years old. As the protection of permanent workers remained essentially unchanged, this deregulation brought about labour market segmentation. During the period 1992-1994 real wages and unit labour costs had been falling. Nonetheless, the unemployment rate did not experience a noticeable reduction. By 1994 one third of the Spanish workforce was hired under temporary contracts, one of the highest levels in the EU. Furthermore, more than 90% of all new contracts were temporary. The PSOE government then recognised the urgent need for further actions to resolve these

problems and set out to increase the flexibility of the labour market. The 1994 reform put forward specific limits on the use of fixed-term contracts, and it also extended the subsidies and incentives to promote the conversion of fixed-term contracts into permanent ones. However, with this reform the socialist government unsuccessfully attempted to reduce the temporary rate at 34%. The starting point for the 1997 reform was an unemployment rate of 21.49% at the beginning of 1997, and a high level of insecure employment. The main novelty of this reform was the introduction of a new permanent employment contract with lower firing costs in case of unfair dismissals.

As both the 1994 and 1997 labour market reforms in Spain have mainly aimed at undoing the liberalization of fixed-term employment contracts and reducing the incidence of temporary employment, low-wage employment could have been significantly affected by these reforms. In this paper I use panel data on Spanish workers over the period 1995-2001 to shed some light about the incidence of low-wage employment in Spain. First I analyse the overall earnings distribution, including a comparison between low, medium and high paid jobs. Next, I concentrate on low pay and I explore how it has evolved over time, and whether the incidence of low pay has shifted from some groups to others. I then proceed to a more in-depth analysis of the characteristics and factors associated with low-wage employment. For this purpose I estimate a model on the determinants of low-wage employment which is robust to the endogenous selection produced by the so-called “initial conditions problem”. Finally, I exploit the longitudinal aspect of the data to analyse the incidence of “low pay” on job mobility. For this purpose, and in order to distinguish between transitions from job to job and from job to “non-employment”, I adopt a discrete-time competing risks model where unobserved heterogeneity is also taken into account.

The paper is set out as follows. The next section provides a short review of previous research. Section 3 discusses how to define low pay. Section 4 illustrates the data set used, while Section 5 provides a full descriptive analysis of the selected sample. In Section 6 I analyse the determinants of low-wage employment. Section 7 focuses on job mobility, and Section 8 concludes.

## 2 Previous research

In recent years low pay has become one of the key topics of economic and social policy in Europe and the USA. Low-wage employment has been a focus of research and policy interest both at a macro level, and from a micro perspective (OECD, 1996; Asplund et al., 1998; Lucifora and Salverda, 1998; Salverda et al., 2000; Marx and Salverda, 2005). Most of these works have paid particular attention to differences between some European countries and the USA regarding the incidence of low-wage employment. These studies reveal that the United States is perhaps the extreme case where real wages at the lower end of the distribution have actually fallen, although the incidence of low-wage employment is also important in many European countries.

Recently, the European Commission has provided some comparative data about the incidence of low-wage employment among the European countries<sup>1</sup>. The analysis is based on data from the European Community Household Panel (1994-2001), and it reveals that low pay concerns roughly 15% of EU workers in paid employment of 15 hours or more per week. Furthermore, it provides evidence of little variation in the incidence of low pay between 1995 and 2000, with a decrease from 15.6% in 1995 to 14.9% in 1998, rising again but only marginally in 1999 and 2000 to 15.1%. However, there exist wide variations between different Member States, with the highest incidence of low pay in the UK and Ireland (19.4% and 18.7% respectively in 2000), and lowest in Denmark and Italy (8.6% and 9.7% respectively). The analysis also reveals a marked decline on the incidence of low-wage employment in Spain (from 18.9% in 1995 to 15.6% in 2000) and Portugal (from 14.4% to 10.9%), while the Netherlands and Germany have experienced an appreciable increase (from 13.3% in 1995 to 16.6% in 2000 in the Netherlands, and from 13.9% in 1998 to 15.7% in 2000 in Germany).

Previous research has also examined the link between low pay and wage-setting institutions (Blau and Kahn, 1996; Fortin and Lemieux, 1997; Gregory and Sandoval, 1994; OECD, 1996, 1998; Rubery and Fagan, 1993). In a recent work, Lucifora et al. (2005) review the patterns of low pay in Europe and show that union

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<sup>1</sup> European Community: "Labour market transitions and advancement: temporary employment and low pay in Europe", chap 4, in *Employment in Europe*, 2004.

density, collective bargaining coverage and the structure of wage negotiations jointly contribute to reduce the incidence of low pay. Other papers have analysed the relationship between low pay and employment creation, competitiveness, technology and minimum wages (Card and Krueger, 1995; Dolado et al., 1996; Fernie and Metcalf, 1996; Machin and Manning, 1996; Schechter, 1993; and Shaheed, 1994).

A recent examination of countries with national minimum wages found the expected relationship: lower minima were associated with higher aggregate rates of low pay (OECD, 1998). In Spain, a statutory minimum wage is set by the government, but it is combined with weak or uneven collective bargaining. In addition, the minimum wage rates are set at very low levels and have restricted coverage. Furthermore, the rate relative to average earnings has been decreasing over time in Spain, and there is limited protection for younger workers and some non-compliance in keeping to rates at or above the minimum. However, although Spain had weak and uneven system of minimum wages, the presence of the legally binding collective agreements and minimum wages contributed to lower percentages of low pay than in Britain or the USA (see Robson, et al. (1999)).

### **3 Measure of low pay**

Measurement of the incidence of low pay will be sensitive to: i) the way low pay is defined; ii) the earnings concept used; and iii) whether full-time and/or part-time workers are included. However, economic theory does not provide us with any clear evidence on how low pay should be defined. The definition of low pay is in some sense arbitrary and several approaches have been used in the literature (CERC, 1991; OECD, 1996 a). Low pay may be defined in absolute or relative terms. Using a measure such as the lowest decile, quintile or third decile has the effect of accounting for a fixed percentage of all workers. The alternative of defining low pay as a percentage of median earnings allows for variations in the proportion defined as low-paid over time, and therefore is more suitable for studying whether low-employment is a temporary or permanent phenomenon.

Proposed low pay thresholds are typically expressed as some fraction of either the mean or the median. In this paper I define workers in low-paid jobs as those

earning less than two-thirds of the median, while workers in high-paid jobs are defined as those earning one-and-a-half times the median earnings or more<sup>2</sup>. In addition, low pay is measured in terms of hourly gross earnings. Focusing on hourly earnings has a number of advantages. In particular, it allows both full-time and part-time employees to be included and compared on a meaningful basis.

## 4 Data

Longitudinal data are essential to conduct both cross-sectional and dynamic analysis. In this paper I use data from the European Community Household Panel, which forms the most closely co-ordinated component of the European system of social surveys. It occupies a central position in the development of comparable social statistics across Member States on income including social transfers, labour poverty and social exclusion, housing, health, as well as various other indicators relating to the living conditions of private households and persons. It is, therefore, a harmonized longitudinal survey that makes it possible to follow up and interview the same private households and persons over several consecutive years.

The analysis is based on the 1995-2001 waves of the ECHP for Spain, which is a relatively large sample. From these waves, I select a sample of wage and salary workers aged between 16 and 65 years old and working more than 15 hours per week<sup>3</sup>, so that self-employed and unpaid family-employed workers are not included. Hourly earnings are derived from information about monthly gross wages and the number of hours worked in a week. Finally, I use measures of low pay and high pay based on two-thirds and one-and-a-half times the median earnings, respectively.

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<sup>2</sup> Therefore, medium paid jobs are defined as those workers earning between two-thirds and one-and-a-half times the median earnings.

<sup>3</sup> I focus the analysis on the seven latest waves of the survey since the type of contract is not observed in the 1994 survey. Furthermore, people working less than 15 hours per week are not included in the analysis since information on the number of hours worked in a week is not available for them.

## 5 Descriptive analysis

Figure 1 shows the evolution of low, medium, and high-wage employment over the period 1995-2001. As can be observed, low-paid jobs show the lowest participation over total employment during the whole period (between 15 and 20 per cent). And they present a slightly decreasing trend especially after 1998. In contrast, the highest participation rate corresponds to people employed in medium-paid jobs. Furthermore, the proportion of people falling in this type of jobs has increased from about 50 per cent in 1995 to 60 per cent in 2001. Finally, high-paid jobs have an intermediate share and show a slightly decreasing trend.

Table 1 reports the proportions of people falling in these three categories for the initial and final years of the period under study. The descriptive analysis incorporates both personal and job characteristics: gender, age education, on-the-job training, unemployment history, experience with current employer, part-time/full-time, type of firm, type of contract, occupation and industry <sup>4</sup>. A cross-sectional analysis for the first period, 1995, is provided in Table 2. In this table I present the results of estimating separate probit models for the probabilities of being in low, medium, or high-paid jobs. Several points are worthy of mentioning. First, remarkable gender differences become apparent. Males are clearly more likely than females to be employed in either medium or high-paid jobs, while less likely to suffer from low-wage employment.

As age is concerned, the results confirm the general view that youths are much more often found in low-paid jobs than older persons.

Important differences in the earnings distribution are also observed when looking at different levels of education. As expected, higher educational levels are found to be more closely related to better paid jobs, while people with the lower educational attainments tend to be more likely to fall in low-wage employment.

Having a part-time job, receiving on-the-job training and holding a permanent contract exert a negative and significant effect on the likelihood of being low-paid. In

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<sup>4</sup> The classification of occupations follows the one-digit level of the National Classification of Occupations (CNO-94), which is the most recent Spanish adaption of the International Standard Classification of Occupations (ISCO-88).



contrast, the effect of these three explanatory factors is found to be positive and significant when estimating the probability of being high-paid.

Clearly differences are also observed when looking at the type of firm. People employed in small private firms are the most likely to suffer from low-wage employment while the least likely to occupy high-paid jobs.

The individual unemployment history is another important factor that affects the likelihood of being employed in either low, medium, or high-paid jobs. In particular, those workers with previous unemployment experiences exhibit a higher probability of being low-paid while a lower probability of being high-paid.

Finally, the results show how the likelihood of being employed in either low, medium or high paid is significantly affected by occupation and industry. Taking “service workers and shop and market sales workers” as the reference category, I find that people employed as legislators, senior officials and managers, professionals, technicians and associate professionals and clerks are clearly less likely to be low-paid. Furthermore, people employed in industry are found to be less likely to suffer from low-wage employment while more likely to be high-paid than those employed in services.

The remaining part of this section focuses on low pay. In order to examine how low-wage employment has evolved over the period 1995-2001, I present a sequence of graphs for the incidence of low-wage employment by different personal and job characteristics<sup>5</sup>. Among personal characteristics I consider gender, age and education. With respect to job characteristics, I include the type of firm, the type of contract, full-time/part-time job, occupation and industry.

### *5.1 Characteristics of low-paid workers*

Figure 2 presents the evolution of low-wage employment by gender. For both, males and females the figure shows a decreasing trend in the proportion of people employed in this type of jobs. However, females are clearly more likely to suffer from a low pay situation. In 1995, for instance, almost 30% of females were employed in a low-paid job, while the corresponding percentage for males was 15%.

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<sup>5</sup> See the Appendix.

In Figure 3 I report the evolution of low-wage employment for different age groups. In particular, I consider three different age groups: people aged between 16-24 years old, those aged 25-49 years old, and those between 50-65 years old. Comparisons across the age cohorts show a remarkably higher incidence of low-wage employment amongst the youngest cohorts. This is not surprising since the Spanish youth labour market is characterized by low wages relative to adults, as well as high relative rates of unemployment. Furthermore, we observe that the differences between young and adult workers become smaller after 1997. This result can be linked to the substantial rise in the ratio between youth and adult minimum wages that has gone from 40% before 1990 to 77% in 1995 and to 89% in 1997, the latter increase due to the agreement of equalizing teenage minimum wage to the adult level.

These previous results confirm that females and young workers in Spain not only are the most affected by the highest unemployment rates but they also suffer from a higher incidence of low pay. In this sense, we can set out that both females and young workers may be considered as disadvantaged groups in the Spanish labour market.

Finally, Figure 4 shows the evolution of the percentage of people falling below two-thirds of the median earnings by different educational levels: primary, secondary and tertiary education. As expected, individuals with just primary education completed are the most likely of being in a low-paid job, while those with tertiary education completed exhibit the lowest incidence of low pay. In 1995, for instance, around 25% of people with primary education were in a low-paid job, while the corresponding percentage for those with tertiary education was 5%, and these differences remain more or less unchanged over the whole period.

## *5.2 Characteristics of low-paid jobs*

As concerned job characteristics, I first analyse the evolution of low-wage employment by different types of firm. I first distinguish between public and private sector, and then, within the private sector, between small (less than 50 employees), medium (50-500 employees) and large firms (more than 500 employees). As it can be observed in Figure 5, clear differences become apparent between the different types of

firms. Small private firms are clearly the most likely to have a high incidence of low pay. This is not surprising, since small firms are far more likely than the average to have no union recognition and be outside collective bargaining frameworks. In contrast, the lowest incidence of low-wage employment occurs in the public sector<sup>6</sup>. These differences remain quite significant over the whole period. However, one can notice a decrease in the incidence of low-wage employment in small private firms (from 30% in 1995 to 25% in 2001) while for the public sector the percentage remains unchanged (around 5%).

In Figure 6 I distinguish between part-time and full-time jobs. The evolution of low-wage employment among part-time jobs is quite interesting. We start in 1995 with almost 35% of people in part-time jobs being in a low pay situation, while the corresponding percentage for people in full-time jobs was less than 20%. The incidence of low-wage employment among part-time jobs decreases in the following years, with a remarkable decrease from 1998 to 2000, and it increases substantially again from 2000 to 2001. This trend in the incidence of low pay among part-timers could be linked to the profile of this type of wage earners and the effects of the 1994 and 1997 reforms. According to the *Social and Economic Council* report<sup>7</sup>, which was based on data derived from the *Labour Force Survey* (EPA), most of part-time workers are married women over 30 years of age. They also have a low level of education and find employment in the least skilled sectors, mainly domestic services, retail and catering. With the 1994 reform there was an appearance of part-time employment amongst women with a higher level of education. In contrast, male part-time employment is less significant, and male part-time workers tend to be young. Also, the higher the level of education and qualification, the greater is the tendency towards part-time employment among men. Another important change relating to part-time employment was introduced by the “April agreements” of 1997: part-time work has been redefined as “employment in which the number of hours is less than that of comparable full-time workers (i.e. in the same company or covered by the same collective agreement)”.

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<sup>6</sup> A possible explanation for the lowest percentages of low-paid in the public sector is that from 1986 to 1992, Spanish public administration went through a phase of decentralization in which many secure well-paid civil servant jobs were created for both men and women.

<sup>7</sup> *Social Economic Council* report. “El trabajo a tiempo parcial”. September 1996.

Differences in the evolution of low-wage employment by the type of contract are shown in Figure 7. As it can be observed, workers employed under a non-permanent contract are much more likely to suffer from low pay, than those holding a permanent contract. However, the incidence of low pay among non-permanent contracts exhibits a decreasing trend over the period 1995-2001. Since “non-permanent contract” includes: fixed-term or short-term contracts, casual work with no contract and some other working arrangements, the decreasing trend observed for this type of contracts could be the result of the 1994 and 1997 labour market reforms. The 1994 reform was aimed at reducing the proportion of employees under fixed-term employment contracts. For that purpose, the employment protection legislation was changed widening the conditions for “fair” dismissals and restricting the conditions for the use of temporary contracts. In 1997 the employer confederation (CEOE) and the two major unions (UGT and CCOO) reached an agreement to reform the system of employment contracts and the structure of collective agreements. The main novelty of the reform was the introduction of a new permanent employment contract with lower firing costs in case of unfair dismissals. This amounted to a significant reduction of firing costs, which was thought necessary to promote employment creation and, above all, to reduce the incidence of temporary employment. However, after the reform the temporary rate was at 34%, still three times higher than the EU average and the new permanent contracts only represented 4% of total hiring. Being aware of this, the government introduced a new sort of contract called “permanent employment promotion contracts” (“contrato para el fomento de la contratación indefinida”, CFCI) with low firing costs. It would be implemented for a period of four years with a subsequent evaluation process to decide whether to adopt it, abolish it or reform it. The CFCI applies to young workers (under 30), long-term unemployed (over 12 months) and over-45 unemployed.

Figures 8 a) – c) reveal that the percentages of low-paid vary greatly by occupation. The lowest percentages are found among legislators, senior officials and managers and professionals, with less than 5% of people employed in these occupations suffering from low pay. In contrast, people employed in skilled agriculture and fishery workers; service workers and shop and market sales workers;

and those in elementary occupations show the highest incidence of low-wage employment.

Finally, Figures 9 a) – c) explore industry variations regarding the incidence of low pay. The figures show remarkable sectoral variations in low pay, which is a common feature of countries with deregulated labour markets and uneven collective bargaining. In Figure 9 a) sectors with the highest incidence of low-wage employment are reported. This corresponds to: agriculture, wholesale and retail trade, repair of motor vehicles, motorcycles and personal/household goods; hotels and restaurants; and other community, social and personal service activities, private households with employed persons, extra-territorial organizations and bodies. In contrast low-wage employment is less likely among: financial intermediation; public administration and defense, compulsory social security; and education (see Figure 9 c)).

## 6 The determinants of being in a low-paid job

This section aims to provide a more in-depth analysis on the determinants of low-wage employment. If initial conditions were exogenous, a standard probit model would be applied to estimate the factors affecting the likelihood of being low-paid. However, if being initially employed is not exogenous, the estimated results obtained from a standard probit model would be biased. To account for this selection bias I use a bivariate probit model of the type used by Van de Ven and Van Praag (1981). Thus, the conditional probability of being in a low-paid job given that the individual is employed is given by:

$$\Pr[w_i < \delta | y_i = 1] = \frac{\Phi_2(x_i'\beta, z_i'\gamma; \rho)}{\Phi(z_i'\gamma)} \quad (1)$$

where  $w_i$  denotes the hourly earnings of individual  $i$ ,  $y_i = 1$  if individual  $i$  is employed,  $z_i$  is the vector of factors that influence the probability of being employed,  $x_i$  is the vector of factors that determines the likelihood of low-employment,  $\Phi$  is the

univariate standard normal cumulative distribution function, and  $\Phi_2$  is the cumulative distribution function of the bivariate standard normal.

In the special case where  $\rho = 0$  the conditional probability of being low-paid can be modelled using a standard probit approach. In contrast, if  $\rho$  is non-zero the more general bivariate probit with selectivity, given by equation (1), is required and identification restrictions are needed to make the model credible. The extra variables in  $z_i$  not included in  $x_i$  can be viewed as instruments for the employment selection equation.

The estimation results of this bivariate probit model are reported in Table 3. The dependent variable is dummy variable that takes value 1 if the individual has been low-paid at least once during the period 1995-2001, and takes value 0 if he/she has never been in a low pay situation. The explanatory variables in the main equation include both personal and job characteristics: gender, age, education, on-the-job training, a dummy variable indicating a part-time job, type of firm, type of contract, unemployment history, job duration, and a set of occupational, industry and yearly dummies. The selection equation contains the following explanatory factors: gender, marital status, age, education, a dummy variable indicating whether there are children younger than 14 years old in the household, household size, and two dummy variables indicating the financial situation of the household.

The likelihood ratio test reveals that the correlation coefficient  $\rho$  is significantly different from zero, which indicates the presence of a sample selection problem. Thus, failing to control for this selection bias could then lead to bias results regarding the factors affecting the probability of being in a low-paid job.

The estimation results reveal that females have a higher probability of being low-paid compared with males.

As age is concerned, effects tend to go in the expected direction. The likelihood of being in a low-paid job decreases with age. Workers aged between 16-24 years emerged as having the highest probability of being low-paid. The fact that young workers account for a disproportionately large share of the people in low-paid jobs, of course, reflects low pay being linked to the life-cycle patterns of pay. The important point, however, is whether this is a temporary situation in their working careers. Young workers typically begin their working life in low-paid jobs. If these

low-paid jobs are “entry” jobs then it would be expected that, over time, these workers move to better paid jobs.

Education also exerts a strong influence on the probability of being low-paid. As expected, higher educational levels are related with a lower probability of low pay. Thus, education has a beneficial effect in preventing a low-wage employment situation.

Marginal effects associated to receiving on-the-job training and holding a permanent contract have a negative sign, which reveals that these two factors tend to decrease the likelihood of being in a low-paid job.

As concerns the different types of firms, the results show that low pay probabilities tend to be significantly lower for employees in the public sector and the medium and large private firms compared to small private firms.

Previous unemployment history is another important factor in explaining the probability of being in a low-paid job. Individuals with previous unemployment experience exhibit a higher probability of being low-paid. This result is not surprising since employers may interpret previous unemployment spells as a negative signal, or signals of low-productivity, so that they will be less prone to offer these workers a higher wage.

The results also reveal a negative and significant influence of seniority on the likelihood of being in a low-paid job, which suggests that low pay mainly affects the early stage of a match between a worker and a job. This finding is somehow in line with the Matching Theory, (Jovanovic (1979 b)), which states that a match between a worker and a job can be treated as a pure experience good. The only way to determine the quality of a particular match is to form the match and to "experience it". Thus, it is not surprising that once the employer has realized about the “good quality” of the worker, he/she moves upwards in the earnings distribution.

Finally, I find that both occupational and industry dummy variables are quite significant in determining the probability of being low-paid. This result suggests that low-wage employment is concentrated among certain types of occupations and sectors, as it could be observed in the Figures 8 a) – 9 c).

## 7 Mobility

From a welfare point of view it is important to address the question whether low pay is a transitory phenomenon of a worker's life, as predicted by the human capital theory, or whether it is a more serious and long lasting problem. If low pay is a temporary situation in the working career of individuals, we should expect low-paid workers having a higher probability of changing job.

In this section I explore the effects of low pay on job mobility. I look at both, transitions from job to job and transitions to non-employment<sup>8</sup>, and I investigate whether being low-paid significantly influences the likelihood of an individual to change job or to move towards non-employment. For this purpose I consider a discrete-time competing risks model. The reason of using discrete-time techniques is not only that data are observed in discrete intervals (namely, in years), but also that these techniques are flexible enough for estimating the time-dependence of the hazard rate (see Meyer, 1990).

Competing risks models occur when failure can arise from two or more sources. In this case an employment spell can end with either a new job or with a transition to non-employment. This distinction may be important, since restricting the estimated coefficients of the baseline hazard and the covariates to be the same for all destination states might be an unduly restrictive assumption.<sup>9</sup>

The model can be formulated assuming the existence of two independent random variables  $T_1$  and  $T_2$ , one of each destination, and supposing that the actual destination entered is determined by the minimum of the  $\{T_j\}$ , ( $j=1,2$ ), which is the duration I actually observe. I then define  $\phi_1$  and  $\phi_2$  as the two hazard functions for the two different risks of failure. Thus, when analysing for example the determinants of changing job, the spells which end with a transition to non-employment are treated as censored as the point of exit, and the same applies for the other risk of failure. I will use a logistic distribution to model the hazard rates, following Bover et al. (2002) and García-Pérez (1997), so that the two conditional exit rates can be written as follows:

$$\phi_1(t) = F(\theta_0(t) + \theta_1(t)x(t)) \quad (2)$$

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<sup>8</sup> Within "non-employment" I include unemployment, inactivity and discouraged workers.

<sup>9</sup> See Lancaster (1990) for a detailed description of competing risks models.



$$\phi_2(t) = F(\gamma_0(t) + \gamma_1(t)x(t)) \quad (3)$$

where  $x(t)$  denotes the vector of explanatory variables, which includes personal (gender, age, education, on-the-job training, unemployment history, and experience with current employer), job characteristics (part-time/full-time, type of firm, type of contract, occupation and industry) and a dummy variable indicating low pay<sup>10</sup>. Apart from personal and job characteristics, I also took into account structural circumstances of the labour market by including as an explanatory variable the yearly unemployment rate, and a set of yearly dummy variables<sup>11</sup>. I denote  $\theta_0(t)$  and  $\gamma_0(t)$  as the additive terms of the duration dependence in the hazard rates that I will estimate in the most general way as possible. And finally,  $\theta_1(t)$  and  $\gamma_1(t)$  represent the coefficients for the explanatory factors which in general depend on duration.

I must first consider the question of whether the competing risks model is identified. It is relatively straightforward to demonstrate that if we had two vectors of covariates,  $x_1$  and  $x_2$  with non-identical variables, the model would be identified in the sense that an observationally equivalent independent competing risks model does not exist. However, in many econometric applications, as the one studied in this section,  $x_1 = x_2$ , so that this convenient identifying assumption does not exist. However, Han and Hausman (1988) prove that identification of the bivariate competing risks model is guaranteed so long as at least two covariates are continuous, even if  $x_1$  and  $x_2$  are identical.<sup>12</sup>

Finally, it is well established that failing to control for unobserved heterogeneity in hazard models tends to create spurious duration-dependence in the estimated baseline hazard, as well as bias the parameter estimates for the covariates (see, for example, Flinn and Heckman 1982, Lancaster, 1979; 1990). More particularly, unobserved heterogeneity could be an important consideration when estimating hazard rates from employment (Farber, 1994). Unobserved characteristics, such as motivation, effort, the propensity to take leisure on the job (to ‘shirk’), or

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<sup>10</sup> In addition, a cross dummy between low pay and  $\log(t)$  has been included.

<sup>11</sup> For those individuals making a transition, either from job to job or from job to non-employment, I take the unemployment rate of the year previous to the transition. In contrast, for those individuals who remain in the same job, I take the unemployment rate at year of first interview.

<sup>12</sup> This result generalizes to additional competing risks where the number of continuous variables must be at least as great as the number of competing risks.

strong social or family pressure to remain in work may influence job tenure. Ignoring this unobserved heterogeneity can bias the effect of the covariates. Hence, in order to control for unobserved heterogeneity I formulate the following expressions for the two hazard rates:

$$\phi_1(t, u) = F(\theta_0(t) + \theta_1(t)x(t) + u) \quad (4)$$

$$\phi_2(t, u) = F(\gamma_0(t) + \gamma_1(t)x(t) + u) \quad (5)$$

where  $u$  denotes the unobserved heterogeneity parameter.

I estimate the two hazard rates, given by (4) and (5), simultaneously. Furthermore, I will follow a semi-parametric approach for unobserved heterogeneity based on Heckman and Singer (1984). In particular, I will assume that it follows a two-mass points discrete distribution function and I estimate the model by maximum likelihood. The likelihood contribution of each individual  $i$  in the sample, conditional on  $u$  would take the form:

$$L_i(u) = \left[ \prod_{s=1}^{t_1} (1 - \phi_{1i}(s)) \right]^{(1-d_{1i})} \left[ \phi_{1i}(t_1) \prod_{s=1}^{t_1-1} (1 - \phi_{1i}(s)) \right]^{d_{1i}} \quad (6)$$

$$\left[ \prod_{s=1}^{t_2} (1 - \phi_{2i}(s)) \right]^{(1-d_{2i})} \left[ \phi_{2i}(t_2) \prod_{s=1}^{t_2-1} (1 - \phi_{2i}(s)) \right]^{d_{2i}}$$

where  $t_1$  and  $t_2$  represent observed durations (completed or censored), and  $d_{1i}$  and  $d_{2i}$  define the two indicators that allow to distinguish between censored and uncensored observations for the two risks of failure respectively. Given  $L_i(u)$ , the log likelihood function can be written as follows:

$$\ln L = \sum_{i=1}^N \ln \int L_i(u) dF(u) \quad (7)$$

where  $F(u)$  is a discrete distribution function with two-mass points,  $u_1$  and  $u_2$ . Besides, the probability  $p$  for the variable  $u$  to be equal to its value  $u_1$  is also estimated.

Tables 4 collects the results obtained from estimating equations (2) and (3), while simultaneous estimation results of equations (4) and (5) are reported in Table 5. In both cases the estimated coefficient on the dummy variable “Low pay” results to be positive and very significant when estimating transitions job-to-job. Therefore, as expected, low-paid workers are found to be more likely to change job. This is quite reasonable since job-to-job mobility would be a possible way for these workers to move upwards in the earnings distribution. In such a case, low-wage employment would be a temporary experience of the working career of individuals, and there would be less cause of concern than in a situation where individuals who enter low-wage employment are unlikely to leave it. Nonetheless, the negative and significant coefficient on the variable  $Low\ pay * \ln(t)$  reveals that this effect is reversed the longer the duration of the spell.

The results also reveal that low-paid workers are more likely to move towards non-employment, and in this sense it can be said that these workers face a weaker position in the labour market compared to those earning above the low pay threshold.

The unobserved heterogeneity parameter was found to be quite significant (see Table 5). In particular, the estimated distribution function reveal the existence of two different types of workers: with 84.30 percent probability, there exists a group of workers with a higher hazard rate either for transitions from job to job or to non-employment. Furthermore, as regards the effects of unobserved heterogeneity on the estimated coefficients, a comparison between the results reported in Tables 4 and 5 reveals that, in general, the estimated coefficients (in absolute terms) tend to be larger when unobserved factors are taken into account. However the estimated coefficient on the dummy variable “low pay” results to be positive but lower when accounting for unobserved heterogeneity. Moreover, the introduction of unobserved heterogeneity significantly improves the likelihood values.

Regarding the effects of personal characteristics some points are worthy of mentioning. First, transitions from job to job and from job to non-employment are more likely among young workers (people under 25 years old). This result could be link to the temporary nature of the contracts that they hold. Finally, I find that both types of transitions are more likely among workers with previous unemployment

experience, and that receiving on-the-job training negatively affects the likelihood of moving towards non-employment.

With respect job characteristics, I find, that being employed in small private firms and holding a non-permanent contract increase the likelihood of both changing job and moving towards non-employment.

Apart from the variables on individual and job characteristics, the business cycle and the dummy “low pay”, duration-dependence has been taken into account through the inclusion of a two-degree polynomial in  $\log(t)$  in the specification of the hazard rates. Figures 10 and 11 present the yearly Kaplan-Meier estimates for the two risks of failure both with, and without controlling for unobserved factors. As can be seen, the hazard rate for both risks is declining with employment duration especially between the first and second year. Furthermore, in both cases the hazard rate is found to be higher when unobserved factors are taken into account.

## **8 Conclusion**

In this paper I have analysed the patterns of low-wage employment in Spain using micro data at the individual level extracted from the European Community Household Panel for the period 1995-2001.

First, I analysed how low-wage employment has evolved over the period under analysis, looking at different individual and job characteristics. I also discussed the role of institutional mechanisms and the effects of the 1994 and 1997 labour market reforms on the observed trends in low-wage employment. Second, I proceed to a more in-depth analysis on the determinants of low-wage employment. For that purpose, I followed an econometric approach which is robust to the endogenous selection produced by the so-called “initial conditions problem”. As regards workers’ characteristics the results show that low-wage employment is more likely among females, youth, the low educated, workers who do not receive on-the-job training, workers with previous unemployment experience and workers with shorter experience with current employer. With respect job characteristics, low pay is found to be more likely among small private firms, non-permanent contracts and certain types of occupations and industries.

Finally, I analysed the incidence of low pay on mobility. A competing risk approach with unobserved heterogeneity has been adopted in order to distinguish between transitions from job to job and from job to non-employment. The results reveal that low-paid workers are more likely to either change job or move towards a non-employment situation.

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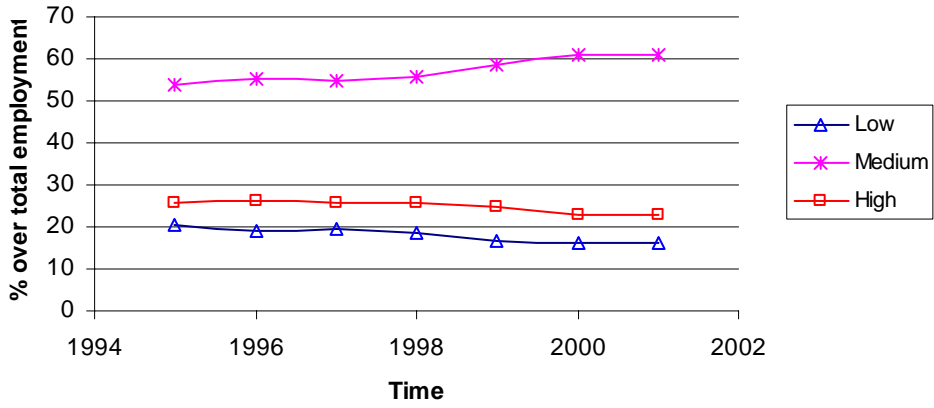
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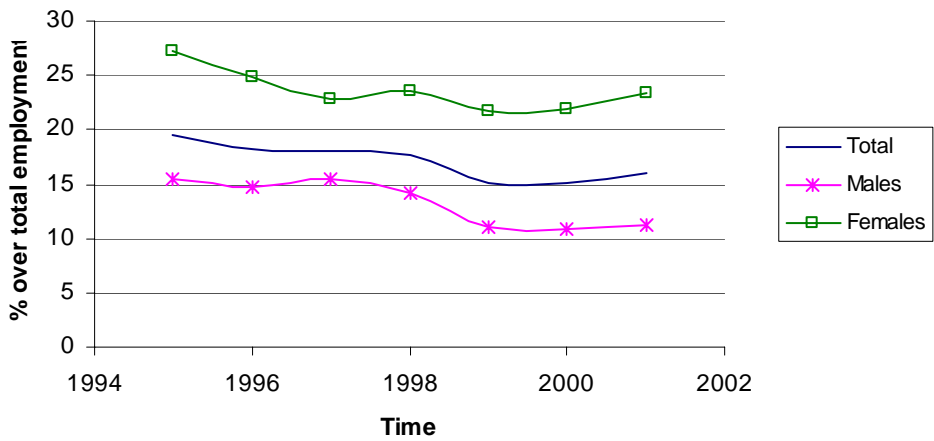


## APPENDIX

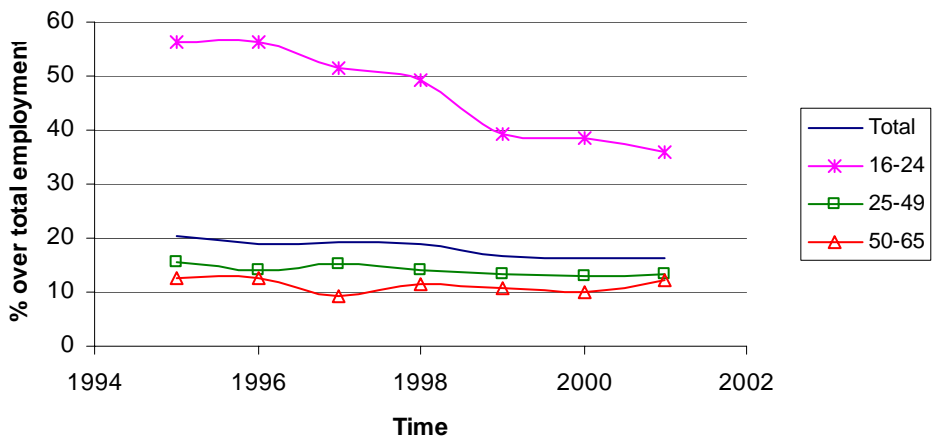
**Figure 1: Evolution of low, medium and high-wage employment**



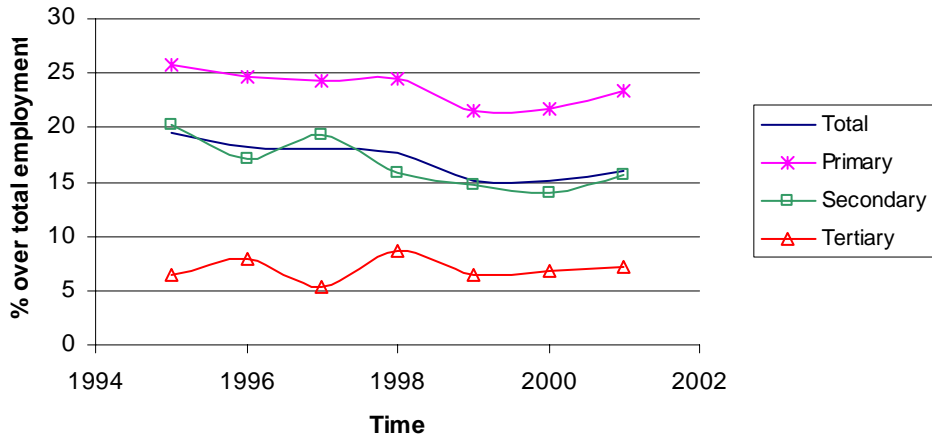
**Figure 2: Evolution of low-wage employment by gender**



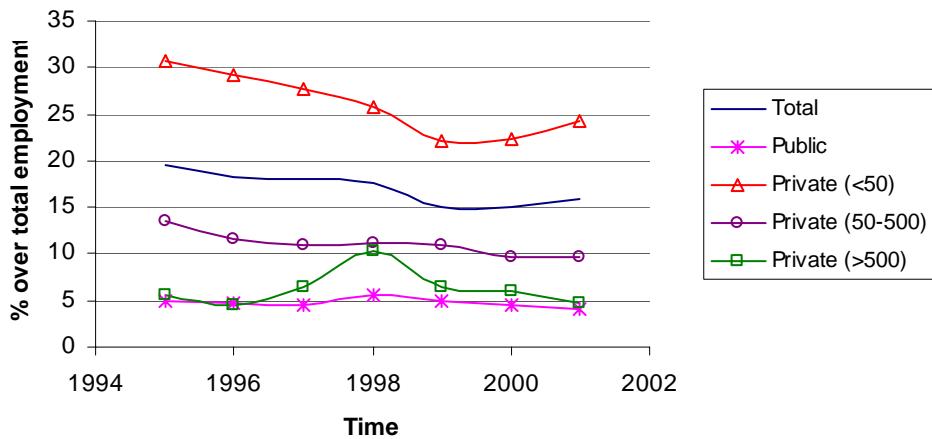
**Figure 3: Evolution of low-wage employment by age groups**



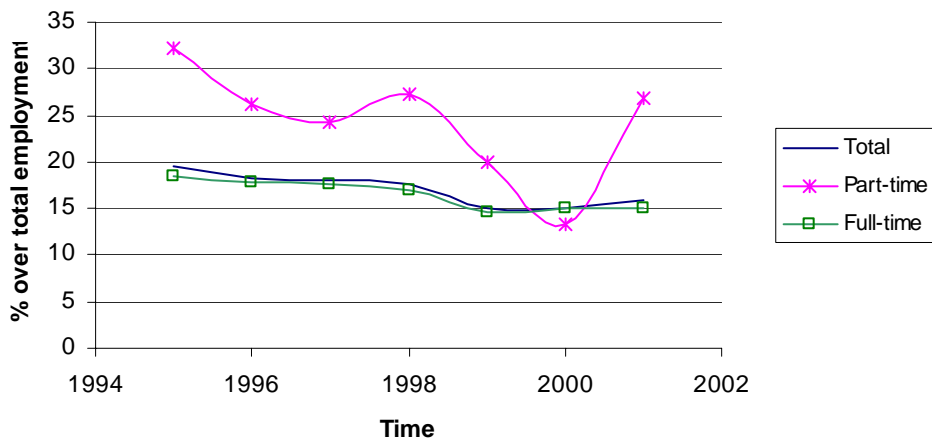
**Figure 4: Evolution of low-wage employment by education**



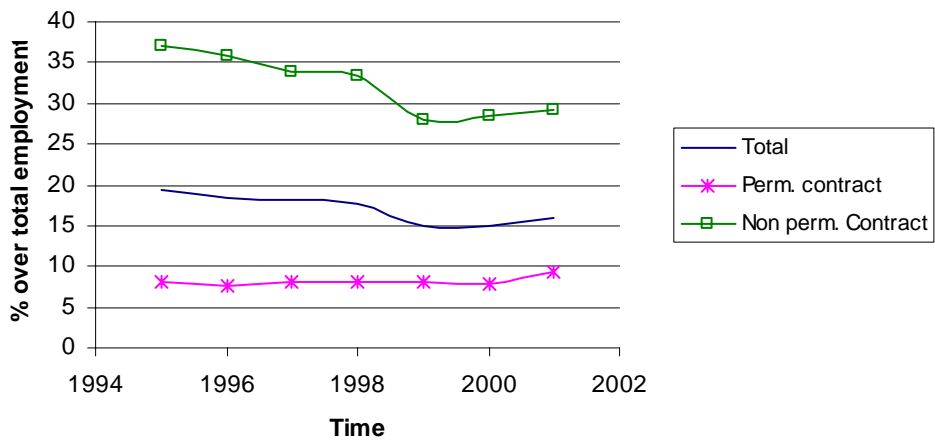
**Figure 5: Evolution of low-wage employment by type of firm**



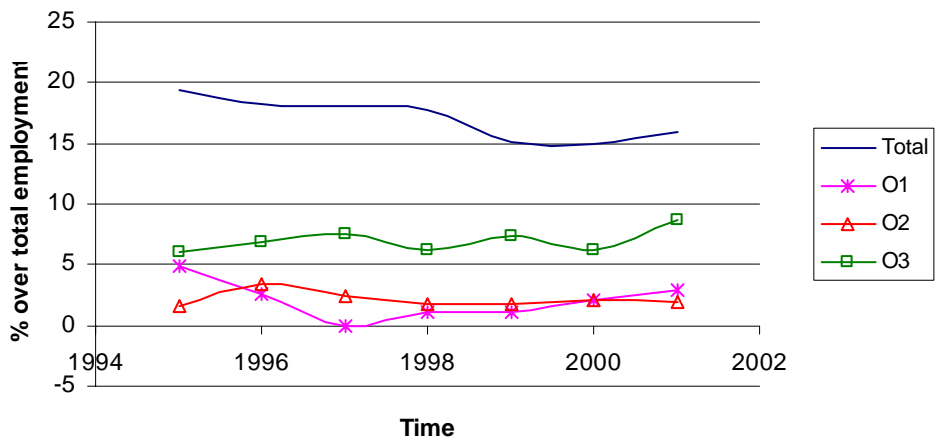
**Figure 6: Evolution of low-wage employment part-time/full-time**



**Figure 7: Evolution of low-wage employment by type of contract**



**Figure 8 a): Evolution of low-wage employment by occupation**



**Figure 8 b): Evolution of low-wage employment by occupation**

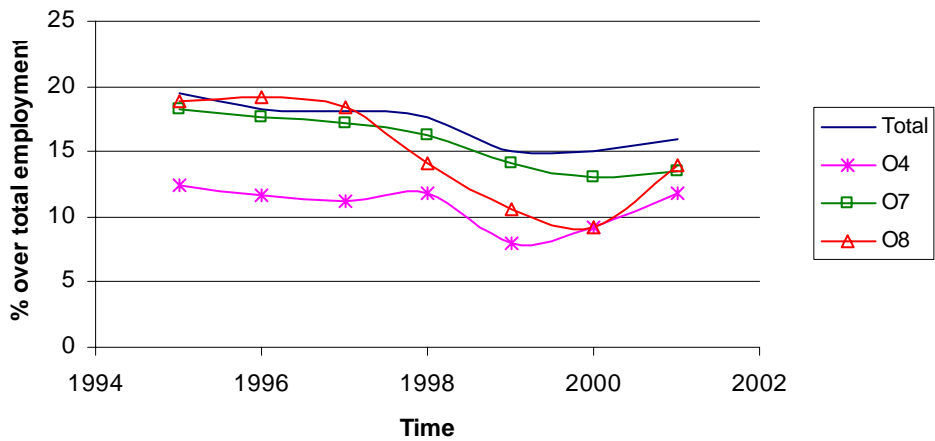


Figure 8 c): Evolution of low-wage employment by occupation

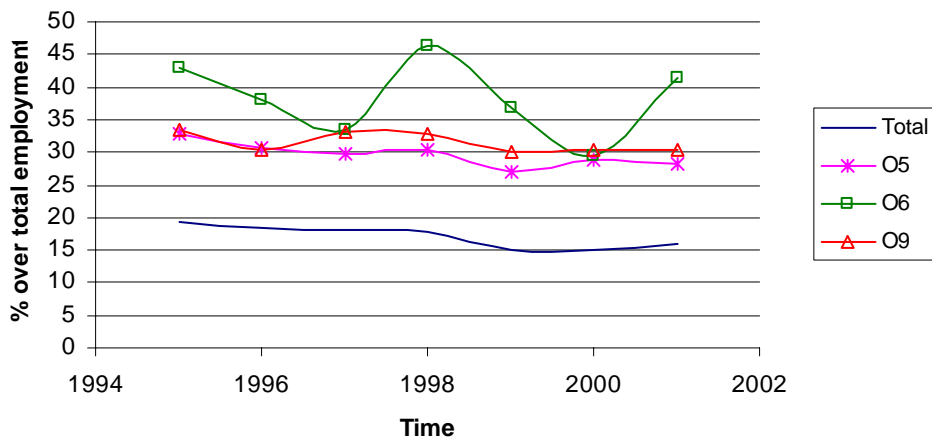


Figure 9 a): Evolution of low-wage employment by industry

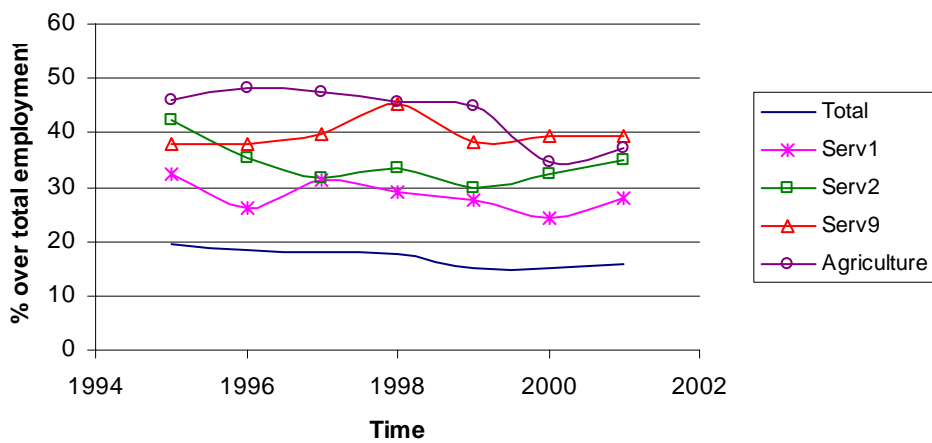
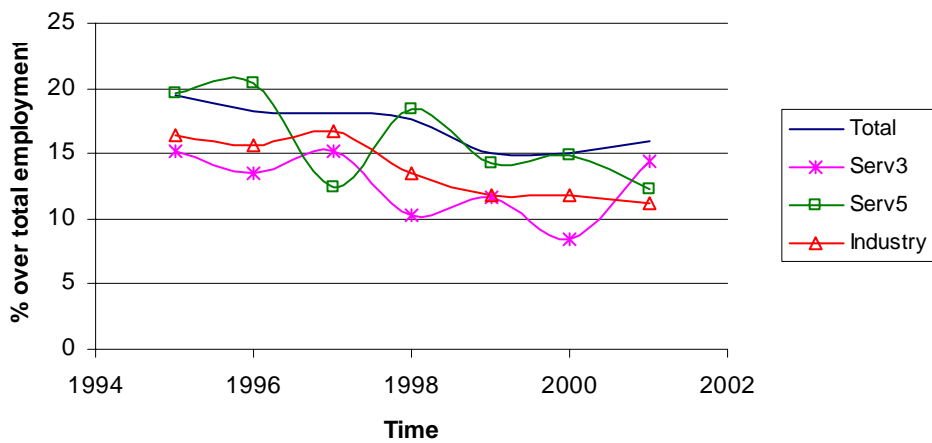
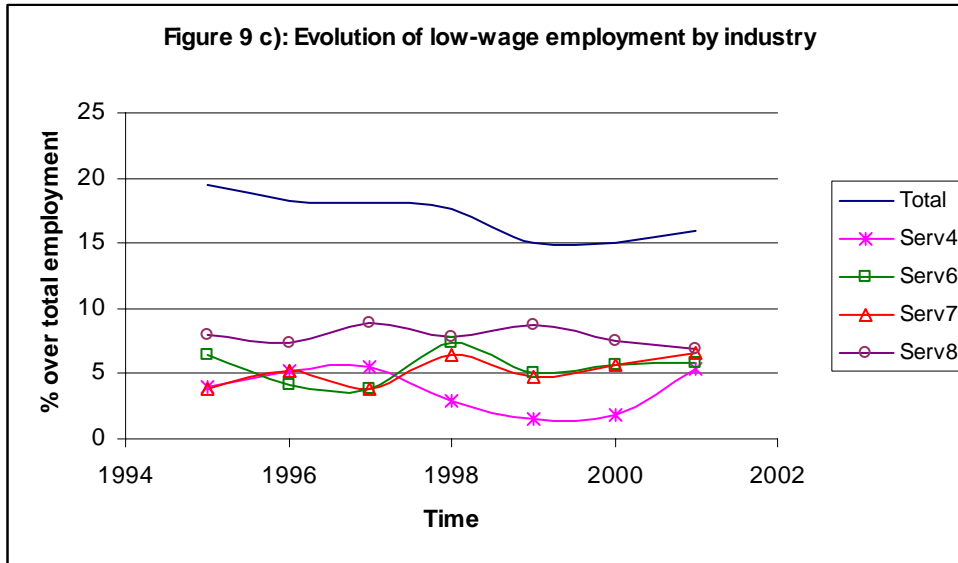


Figure 9 b): Evolution of low-wage employment by industry





**Occupations:**

- O1:** Legislators, senior officials and managers.
- O2:** Professionals
- O3:** Technicians and associate professionals.
- O4:** Clerks
- O5:** Service workers and shop and market sales workers
- O6:** Skilled agricultural and fishery workers
- O7:** Craft and related trade workers
- O8:** Plant and machine operators and assemblers.
- O9:** Elementary occupations.

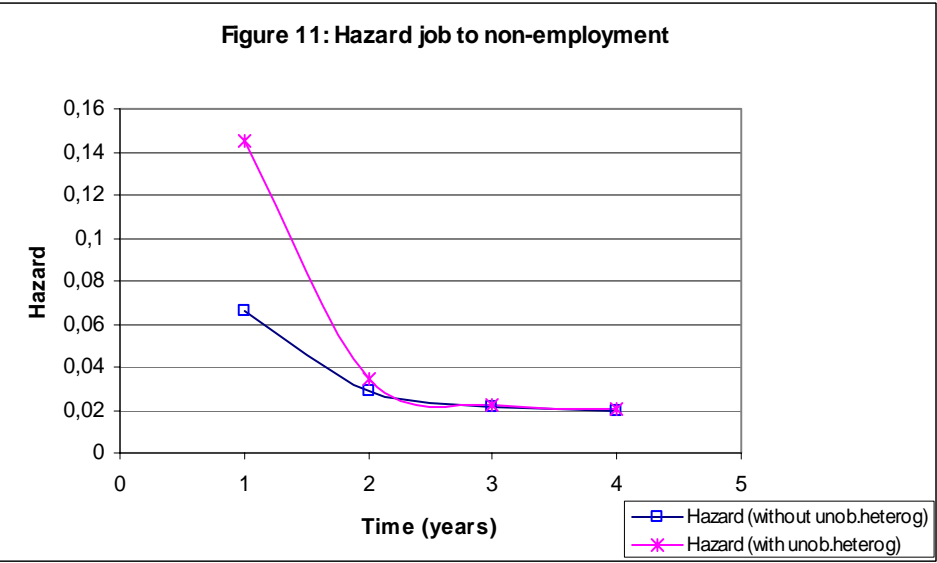
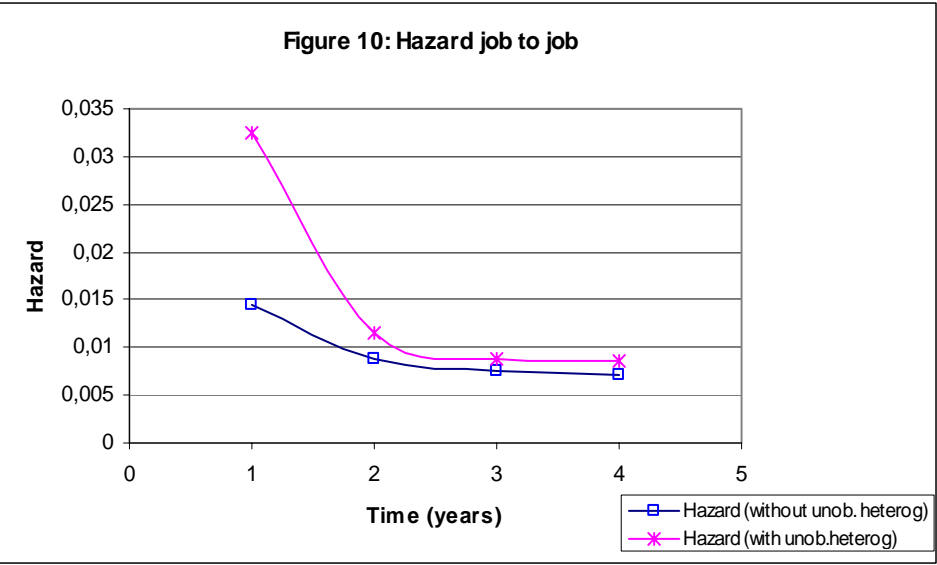
**Industry:**

**Agriculture**

**Industry**

- Serv1:** Wholesale and retail trade; repair of motor vehicles, motorcycles and personal/household goods
- Serv2:** Hotels and restaurants
- Serv3:** Transport, storage and communication
- Serv4:** Financial intermediation
- Serv5:** Real state, renting and business activities
- Serv6:** Public administration and defense; compulsory social security
- Serv7:** Education
- Serv8:** Health and social work

**Serv9:** Other community, social and personal service activities; private households with employed persons; extra-territorial organizations and bodies.



**Table 1: Descriptive Statistics: Distribution of people in low-, medium-, and high-paid jobs**

	<i>LOW</i>		<i>MEDIUM</i>		<i>HIGH</i>	
	<b>1995</b> (20.53%) Mean	<b>2001</b> (16.23%) Mean	<b>1995</b> (53.87%) Mean	<b>2001</b> (60.95%) Mean	<b>1995</b> (25.99%) Mean	<b>2001</b> (22.81%) Mean
Male	0.539	0.426	0.692	0.634	0.687	0.669
<i>Age</i>						
16-24	0.363	0.282	0.098	0.129	0.007	0.005
25-49	0.537	0.6	0.727	0.740	0.776	0.735
50-65	0.098	0.115	0.173	0.130	0.214	0.255
<i>Education</i>						
Primary Ed.	0.712	0.615	0.608	0.483	0.211	0.153
Second. Ed.	0.197	0.225	0.214	0.233	0.181	0.173
Tertiary Ed.	0.091	0.160	0.178	0.283	0.608	0.674
Part-time job	0.096	0.119	0.059	0.070	0.035	0.044
On-the-job training	0.094	0.1	0.228	0.253	0.572	0.608
<i>Type of firm</i>						
Public	0.073	0.051	0.216	0.171	0.519	0.431
Private (<50)	0.789	0.815	0.533	0.571	0.156	0.255
Private (50-500)	0.110	0.119	0.173	0.209	0.133	0.207
Private (>500)	0.028	0.015	0.076	0.048	0.191	0.107
Permanent Contract	0.254	0.387	0.616	0.660	0.915	0.904
Prev. unemployed	0.608	0.453	0.418	0.402	0.189	0.225
<i>Job duration</i>						
<2 years	0.594	0.616	0.295	0.379	0.067	0.123
2 – 5 years	0.166	0.184	0.140	0.213	0.068	0.131
> 5 years	0.239	0.2	0.564	0.408	0.865	0.746
<i>Occupation</i>						
Legislators, senior officials and managers	0.005	0.001	0.017	0.010	0.065	0.082
Professionals	0.010	0.019	0.040	0.060	0.392	0.421
Technicians and associate professionals	0.032	0.067	0.088	0.131	0.191	0.221
Clerks	0.084	0.057	0.142	0.112	0.112	0.055
Service workers and shop and market sales workers	0.257	0.279	0.159	0.147	0.057	0.059
Skilled agricultural and fishery workers	0.039	0.040	0.015	0.014	0	0
Craft and related trade workers	0.180	0.160	0.240	0.240	0.103	0.086
Plant and machine operators and assemblers	0.083	0.081	0.106	0.120	0.060	0.064
Elementary occupations	0.308	0.294	0.192	0.165	0.018	0.011
<i>Type of industry</i>						
Agriculture	0.092	0.089	0.032	0.034	0.002	0.007
Industry	0.285	0.237	0.382	0.414	0.250	0.242
Services	0.623	0.673	0.585	0.552	0.748	0.750



**Table 2: Probit Model for the probability of being low-, medium-, and high pay (1995)**

	<i>LOW</i>		<i>MEDIUM</i>		<i>HIGH</i>	
	Coeff.	t	Coeff.	t	Coeff.	t
Male	-0.526	-8.80	0.099	2.15	0.438	6.57
<i>Age</i>						
16-24	-	-	-	-	-	-
25-49	-0.724	-10.76	0.607	9.59	0.522	3.05
50-65	-0.757	-7.67	0.535	6.66	0.650	3.58
<i>Education</i>						
Primary Ed.	0.254	2.74	0.191	3.02	-0.548	-6.77
Second. Ed	0.109	1.12	0.220	3.38	-0.294	-3.69
Tertiary Ed.	-	-	-	-	-	-
Part-time job	-0.320	-3.30	0.023	0.27	0.522	3.48
On-the-job training	-0.304	-3.83	-0.202	-4.08	0.325	5.47
<i>Type of firm</i>						
Public	-0.736	-8.62	-0.088	-1.55	0.822	11.01
Private (<50)	-	-	-	-	-	-
Private (50-500)	-0.417	-5.46	0.105	1.76	0.442	5.23
Private (>500)	-0.554	-4.46	-0.415	-5.67	0.960	10.72
Permanent Contract	-0.478	-7.01	0.134	2.32	0.598	6.49
Prev. unemployed	0.157	2.71	0.059	1.29	-0.379	-5.64
<i>Job duration</i>						
<2 years	-	-	-	-	-	-
2 – 5 years	-0.141	-1.85	0.156	2.29	0.117	0.96
> 5 years	-0.335	-4.24	-0.020	-0.30	0.404	3.88
<i>Occupation</i>						
Legislators, senior officials and managers	-0.560	-2.32	-0.630	-4.69	1.254	8.01
Professionals	-0.995	-5.62	-0.971	-10.40	1.698	14.30
Technicians and associate professionals	-0.617	-4.88	-0.245	-3.00	0.868	8.04
Clerks	-0.448	-4.39	0.207	2.72	0.329	3.08
Service workers and shop and market sales workers	-	-	-	-	-	-
Skilled agricultural and fishery workers	0.462	2.33	0.045	0.24	-	-
Craft and related trade workers	-0.051	-0.52	0.160	2.01	0.109	0.93
Plant and machine operators and assemblers	-0.026	-0.24	0.059	0.67	0.168	1.31
Elementary occupations	0.038	0.46	0.107	1.48	-0.431	-3.06
<i>Type of industry</i>						
Agriculture	0.256	1.94	-0.376	-3.08	-0.591	-1.48
Industry	-0.380	-5.23	0.068	1.25	0.180	2.36
Services	-	-	-	-	-	-
Constant	0.815	6.51	-0.561	-5.68	-2.943	-14.19
N	4,516		4,516		4,516	
Log likelihood	-1,535		-2,770		-1,368	
Predicted probability	0.197		0.542		0.265	

**Table 3: Probit Model (with sample selection) for the probability of being low-paid**

	Coef.	t
Male	-0.496	-15.08
<i>Age</i>		
16-24	-	-
25-49	-0.669	-16.99
50-65	-0.751	-13.51
<i>Education</i>		
Primary Ed.	0.304	6.64
Second. Ed.	0.167	3.48
Tertiary Ed.	-	-
Part-time job	-0.232	-4.47
On-the-job training	-0.348	-8.46
<i>Type of firm</i>		
Public	-0.741	-15.49
Private (<50)	-	-
Private (50-500)	-0.498	-11.81
Private (>500)	-0.551	-7.86
Permanent Contract	-0.474	-13.53
Prev. unemployed	0.075	2.48
<i>Job duration</i>		
<2 years	-	-
2 – 5 years	-0.127	-3.03
> 5 years	-0.381	-9.53
<i>Occupation</i>		
Legislators, senior officials and managers	-0.573	-3.53
Professionals	-0.496	-5.94
Technicians and associate professionals	-	-
Clerks	-0.073	-1.14
Service workers and shop and market sales workers	0.414	7.39
Skilled agricultural and fishery workers	0.498	4.31
Craft and related trade workers	0.296	4.75
Plant and machine operators and assemblers	0.334	5.03
Elementary occupations	0.478	8.24
<i>Type of industry</i>		
Agriculture	0.504	6.68
Industry	-0.375	-9.36
Services	-	-
<i>Year dummies</i>		
Y95	-	-
Y96	-0.453	-11.27
Y97	-0.528	-11.99
Y98	-0.433	-9.30
Y99	-0.466	-8.82
Y00	-0.648	-10.52
Constant	1.147	10.58
$\rho$	0.259	1.94
N	16,623	
Log likelihood	-15,178	
LR test ( $\rho=0$ ):	$\chi^2(1)=3.38$ , Prob >	$\chi^2(1) = 0.066$

**Table 4: Competing risks model WITHOUT unobserved heterogeneity**

	Failure 1: Change job		Failure 2: Transitions to non-employment	
	Coeff.	t	Coeff.	t
ln(t)	-0.940	-15.12	-1.530	-44.60
ln(t) <sup>2</sup>	0.313	18.82	0.438	44.70
Male	-0.054	-1.10	-0.017	-0.60
<i>Age</i>				
16-24	-	-	-	-
25-49	-0.192	-2.50	-0.302	-7.25
50-65	-0.329	-3.61	-0.519	-10.03
<i>Education</i>				
Primary Ed.	-	-	-	-
Second. Ed.	-0.006	-0.10	0.046	1.29
Tertiary Ed.	-0.044	-0.65	0.070	1.78
Part-time job	-0.111	-1.09	-0.021	-0.37
On-the-job training	-0.019	-0.37	-0.057	-1.85
<i>Type of firm</i>				
Public	-0.127	-2.12	-0.130	-3.58
Private (<50)	-	-	-	-
Private (50-500)	-0.082	-1.30	-0.063	-1.72
Private (>500)	-0.083	-1.01	-0.108	-2.13
Permanent Contract	-0.225	-4.02	-0.441	-13.70
Prev. unemployed	0.241	5.09	0.229	8.27
Low pay	0.806	8.18	0.591	11.43
Low pay * ln(t)	-0.483	-9.39	-0.410	-13.94
<i>Occupation</i>				
Legislators, senior officials and managers	0.118	0.81	0.060	0.67
Professionals	-0.022	-0.25	0.014	0.26
Technicians and associate professionals	-	-	-	-
Clerks	0.016	0.18	-0.022	-0.41
Service workers and shop and market sales workers	0.068	0.78	0.056	1.08
Skilled agricultural and fishery workers	0.256	1.29	0.052	0.41
Craft and related trade workers	0.119	1.31	0.055	1.01
Plant and machine operators and assemblers	0.016	0.16	0.086	1.46
Elementary occupations	0.127	1.36	0.101	1.84
<i>Type of industry</i>				
Agriculture	0.064	0.48	0.084	1.04
Industry	-0.028	-0.47	0.023	0.65
Services	-	-	-	-
<i>Year dummies</i>				
Y95	-	-	-	-
Y96	0.402	8.64	-0.116	-3.78
Y97	0.532	11.31	-0.189	-6.03
Y98	0.675	12.52	-0.347	-8.91
Y99	1.128	15.61	-0.698	-11.36
Y00	1.325	14.16	-0.958	-11.71
Unem. Rate	0.213	13.36	-0.199	-16.61
Constant	-8.877	-23.88	2.377	8.65
N Spells		206,214		
Log likelihood		-40,350		

**Table 5: Competing risks model WITH unobserved heterogeneity**

	Failure 1: Change job		Failure 2: Transitions to non-employment	
	Coef	t	Coef	t
ln(t)	-2.074	-23.41	-3.036	-59.09
ln(t) <sup>2</sup>	0.784	25.61	1.086	60.16
Male	-0.091	-1.71	-0.027	-0.78
<i>Age</i>				
16-24	-	-	-	-
25-49	-0.138	-1.62	-0.429	-7.86
50-65	-0.378	-3.76	-0.847	-13.12
<i>Education</i>				
Primary Ed.	-	-	-	-
Second. Ed	0.003	0.05	0.009	0.21
Tertiary Ed.	0.050	0.67	0.137	2.89
Part-time job	-0.118	-1.05	-0.015	-0.22
On-the-job training	-0.030	-0.55	-0.081	-2.24
<i>Type of firm</i>				
Public	-0.169	-2.57	-0.238	-5.61
Private (<50)	-0.109	-1.58	-0.122	-2.81
Private (50-500)	-0.091	-1.02	-0.132	-2.20
Permanent Contract	-0.259	-4.10	-0.696	-17.64
Prev. unemployed	0.344	6.55	0.435	12.77
Low pay	0.647	6.38	0.533	8.50
Low pay * ln(t)	-0.443	-8.45	-0.414	-12.02
<i>Occupation</i>				
Legislators, senior officials and managers	0.109	0.70	-0.061	-0.61
Professionals	-0.066	-0.68	-0.050	-0.82
Technicians and associate professionals	-	-	-	-
Clerks	0.018	0.19	-0.048	-0.78
Service workers and shop and market sales workers	0.102	1.07	0.073	1.17
Skilled agricultural and fishery workers	0.429	2.01	0.117	0.74
Craft and related trade workers	0.162	1.62	-0.003	-0.04
Plant and machine operators and assemblers	0.063	0.57	0.059	0.85
Elementary occupations	0.195	1.89	0.088	1.33
<i>Type of industry</i>				
Agriculture	-0.003	-0.02	-0.013	-0.13
Industry	-0.034	-0.51	0.032	0.73
Services	-	-	-	-
<i>Year dummies</i>				
Y95	-	-	-	-
Y96	0.374	7.32	-0.274	-7.48
Y97	0.556	10.82	-0.345	-9.13
Y98	0.685	11.67	-0.498	-10.77
Y99	1.244	15.52	-0.848	-11.37
Y00	1.502	14.23	-1.110	-11.43
Unem. Rate	0.275	15.40	-0.169	-11.58
Constant	-9.992	-24.04	2.608	7.72
u <sub>i</sub>	0.833	24.78	0.833	24.78
pr	0.843	156.44	0.843	156.44
N Spells		206,214		
Log likelihood		-32,800		

