LOW-WAGE EMPLOYMENT AND MOBILITY IN SPAIN

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Very preliminary version

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 and high pay on job mobility. For this purpose I adopt an approach based on competing risks in order to allow for different risks of failure.

1. Introduction

The incidence of the scale and nature of low-wage employment has been receiving increased attention in recent years. In most European countries the distribution of earnings has become more dispersed giving rise to increased analysis of the so-called "low-paid" jobs.

Recent studies in the literature have paid particular attention to differences between some European countries (France, Germany, the Netherlands, and the United Kingdom) and the USA regarding the incidence of low-wage employment. These studies reveal that the American has a much higher incidence of low pay than the Continental countries, but there has been relatively limited growth in this segment. Furthermore, it is found that the groups at risk of low-pay emerge as quasi universal across the countries and occupying very similar positions in the national pay structure. Furthermore, the rise of earnings inequality experienced in these countries has stressed the need for dynamic analytical approaches to address the question whether there exists a type of "poverty trap", with some workers persisting in low-paid jobs for a long period of time.

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[1]. First I analyse the

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[1] The analysis is based on the seven latest waves of the survey since the type of contract is not observed for the 1994 survey.

earnings distribution as a whole, including a comparison between low, medium and high paid jobs. I then concentrate on low pay and I explore how this has evolved over time, and whether the incidence of low pay has shifted from some groups to others. I am also interested in investigating which groups of the labour force are more likely to be in low-paid jobs, and which are the characteristics of either individuals and jobs that are associated with low wage rates. 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 different types of transitions, mainly transitions into and out of employment and earnings mobility (earnings mobility for low paid).

The paper is set out as follows. The next section discusses how to define low-pay. Section 3 illustrates the data set used, while Section 4 provides a full descriptive analysis of the selected sample. In Section 5 I analyse in some detail the determinants of low-wage employment. Section 6 gives the results concerning mobility, and Section 7 concludes.

2. Measure of low-pay

The definition of low pay is in some sense arbitrary and several approaches have been used in the literature to define and measure low-pay (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 also 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[2]. In addition, low-pay is measured in terms of hourly gross wages, in such a way that we can control for the (increasing) role of part-time work. With this approach both, full-time and part-time workers can be included in the analysis.

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[2] I also define workers in high-paid jobs as those earning equal or more than three-halves the median wage. Finally, medium-wage employment is defined for workers earning equal or more than two-thirds but less than three-halves the median wage.

3. Data

Longitudinal data are essential to conduct both cross-sectional and dynamic analysis on incomes. 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.

For the analysis I extract from the ECHP a sample of wage and salary Spanish workers aged between 16 and 65 years old and working more than 15 hours per week[3]. Thus, self-employed and unpaid family-employed workers are not considered. The ECHP provides information on monthly gross wages. Furthermore, on the working time side, the survey reports the number of hours worked in a week. With this information we can then derive hourly gross earnings, so that both full-time and part-time workers can be included and compared.

4. Descriptive analysis

Setting the low pay and high pay cut-offs as two-thirds and three-halves the median earnings, respectively, we can classify workers in low-, medium-, or high-paid jobs. Figure 1 shows the evolution of low-, medium-, and high-wage employment over the period 1995-2001. As it can be observed, low-paid jobs present the lowest participation over total employment during the whole period (around 20 per cent). In contrast, the highest percentage corresponds to people employed in medium-paid jobs. During the whole period more than 50 per cent of our sample of wage and salary workers fall in jobs where the earnings are equal or higher than two-thirds, but lower than three-halves the median earnings. Finally, high-paid jobs present an intermediate position. Between 30 and 40 per cent of the selected sample are located in jobs with wages above three-halves the median earnings.

Table 1 reports the proportions of people falling in these three types of jobs for the initial and final years of the period under analysis. 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,

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[3] 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.

occupation and industry. In Table 2 we present the results of estimating separate probit models for the likelihood of being in low-, medium-, or high-paid jobs in 1995, with the corresponding predicted probabilities. Several points are worthy of mentioning. First, remarkable gender differences become apparent. Males are clearly more likely than females to be in either medium-, and 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 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 sized private firms are the most likely to suffer from low-wage employment while the least likely to be high paid.

The individual unemployment history is another important factor that can influence the likelihood of being in either low-, medium-, or high jobs. The results reveal that having being unemployed, at least once, before current job increases the likelihood of being low-paid and decreases the likelihood of being high-paid.

Finally, the results show how the likelihood of being 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 is focused on people being in low-paid jobs. Figures 1–9 c) show the evolution of low-wage employment for the period 1995-2001 looking at different individual and job characteristics. Among individual characteristics I consider gender, age and educational differences regarding the incidence of low-pay. With respect to job characteristics, I include the type of firm, the type of contract, full-time vs part-time job, occupation and industry.

Figure 1 shows the evolution of low-wage employment by gender. In general, the proportion of people in low-wage employment has slightly decreased over the whole period,

for both males and females. However, as it can be observed, females are clearly more likely to suffer from a low-pay situation. In 1995, for instance, almost 30% of females were in a low-paid job, while the corresponding percentage for males was 15%. In Figure 2 I report the evolution of low-wage employment for different age groups. In particular, I consider three different age groups: people aged between 16-25 years old, those aged 25-50 years old, and those between 50-65 years old. Comparisons across the age cohorts show a remarkable higher incidence of low-wage employment amongst the younger cohorts. This is not surprising since the Spanish youth labour market is characterized by low wages relative to adults, as well high relative rates of unemployment. Furthermore, we observe that the differences between young and adult workers become smaller after 1998. This result can be linked to equalization of minimum wages imposed by the Spanish labour market reform. Under current law, all workers aged 16 and over are subject to the adult minimum wages. Prior to this reform, workers under the age of 18 could be paid less than the minimum wage[4].

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-wage employment. 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 3 shows the evolution of the percentage of people falling below two-thirds of the median hourly 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.

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, I distinguish between small sized firms (less than 50 employees), medium sized firms (50-500 employees) and big sized firms (more than 500 employees). As it can be observed in Figure 4, clear differences become apparent between the different types of firms. Small sized private firms are clearly the most likely to suffer from low-pay. In contrast, the lowest incidence of low-wage employment corresponds to both the public sector and big private firms. These differences remain quite significant over the whole period. However, it can be appreciated a decrease in the incidence of low-wage employment

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[4] Figure 10 in the Appendix show the evolution of both minimum wages (for the period 1995-2000) and two-thirds de median wage (for the period 1995-2001).

in small sized private firms (from 30% in 1995 to 25% in 2001) while for public and big sized private firms the percentages remain unchanged (around 5%).

In Figure 5 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.

Differences in the evolution of low-wage employment by the type of contract are shown in Figure 6. 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. Again, we can observe a small decrease in the percentage of people with a non-permanent contract being in a low-paid job after 1998, although the differences remain quite significant over the whole period.

Figures 7 a), b) and c) reveal that low-wage employment is concentrated among certain types of occupations. 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). The lowest percentages of people in low-wage employment corresponds to 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.

Figure 8 shows the evolution of low-wage employment by industry. While no significant differences are appreciated between industry and services, people employed in agriculture are clearly the most likely to be in low-paid job.

Finally we explore differences in the incidence of low-pay within the service sector. These differences are shown in Figures 9 a), b) and c). In Figure 9 a) services sectors with the highest incidence of low-wage employment are reported. This corresponds to: 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 the following service sectors: financial intermediation; public administration and defense, compulsory social security; and education.

5. The determinants of being in a low-paid job

Once I have analysed the evolution of low-wage employment for the period 1995-2001 by different personal and job characteristics, I proceed to study the determinants of being in a low-paid job. Under the assumption that the initial conditions are exogenous, the initial approach is to use a multinomial logistic regression to model the probability of an individual being in a low-paid job during either 1 year or 2 or more than 2 years. The multinomial logistic regression procedure is as follows: assume that the categories of individuals in the survey sample are j=0,1,2 recorded in L_i, and the independent variables are denoted by x. The j=0 state includes those individuals who have not been in low-wage employment in any of the interviews, while j=1 and j=2 include, respectively, people in low-wage employment during 1 year, and during 2 or more than 2 years. A set of coefficients β_0, β_1 and β_2 corresponding to each outcome category are then estimated as:

$$\Pr\left(L=0\middle|X\right)=\frac{e^{x\beta_0}}{e^{x\beta_0}+e^{x\beta_1}+e^{x\beta_2}} \tag{1}$$

$$\Pr\left(L=1\middle|X\right)=\frac{e^{x\beta_1}}{e^{x\beta_0}+e^{x\beta_1}+e^{x\beta_2}} \tag{2}$$

$$\Pr\left(L=2\middle|X\right)=\frac{e^{x\beta_2}}{e^{x\beta_0}+e^{x\beta_1}+e^{x\beta_2}} \tag{3}$$

If β_0 is set to zero then the coefficients β_1 and β_2 measure a relative change with respect to β_0, so that the above model becomes:

$$\Pr\left(L=0\middle|X\right)=\frac{1}{1+e^{x\beta_1}+e^{x\beta_2}} \tag{4}$$

$$\Pr\left(L=1\middle|X\right)=\frac{e^{x\beta_1}}{1+e^{x\beta_1}+e^{x\beta_2}} \tag{5}$$

$$\Pr\left(L=2\middle|X\right)=\frac{e^{x\beta_2}}{1+e^{x\beta_1}+e^{x\beta_2}} \tag{6}$$

and the relative probability of, for example, L=1 to the category L=0 is then

$$\frac{\Pr\left(L=1\right)}{\Pr\left(L=0\right)}=e^{x\beta_1} \tag{7}$$

which is the relative risk ratio[5].

Table 3 reports the descriptive statistics (means) for the sample selected for this analysis, and the estimation results are shown in Table 4, where I take the initial status to be exogenous. The comparison group is those who have never been in low-wage employment. The vector of independent variables x_i contains individual characteristics: gender, age, education, on-the-job training, previous unemployment history, and experience with current employer; and job characteristics: type of firm, a dummy variable indicating part-time job, type of contract, occupation and industry. The associations between personal and job characteristics and the likelihood of being low-paid are presented in terms of "marginal effects". [6]

The estimation results of the multinomial logit model reveal that females have a probability of being in a low-paid job, either during one year or during a longer period of time, which is higher compared to the one of 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 16-25 years old emerged as having the highest probability of being low-pay. The fact that young workers account for a disproportionately large share of the people in low-paid job, 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-pay. As expected, higher educational levels are related with a lower probability of being 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 has a negative sign, which reveals that these two factors tend to decrease the likelihood of being in a low-paid job.

As concerned 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 big sized private sector compared to small sized private firms.

Previous unemployment history is another important factor in explaining the probability of being in a low-paid job. Those individuals who have never been in unemployment are clearly less likely of being low-pay than those who have ever suffered

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[5] Table 1 contains the summary statistics (mean and standard deviation) for the full sample and separately for those individuals who have never being in low-pay and for those who have suffered from low-wage employment either during one period or for a longer period of time.
[6] Relative risk ratios instead of estimated coefficients are reported.

from unemployment. This result is not surprising if we take into account that unemployment spells may be interpreted as a negative signal, or a signal of low-productivity by employers who will be less prone to offer these workers a high-paid job.

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-pay. This result suggests that low-wage employment is concentrated among certain types of occupations and sectors, as it could be observed in the Figures 7 a) – 9 c).

Previous estimation is conditional on being initially employed. However, conditional on being initially employed in modelling the probability of being in a low-paid job, will result in a selection bias in the estimates if being initially employed is not exogenous. I will investigate the extent of this bias in the estimates by assuming exogeneity. To account for this selection bias, I proceed to estimate a bivariate probit model with selectivity, of the type used by Van de Ven and Van Praag (1981). Thus, the conditional probability of being in a low-paid job in any period t given that the individual is employed in that period is given by:

$$\Pr\left[w_i < \delta \middle| y_i = 1 \right] = \frac{\Phi_2\left(x_i^{'}\beta, z_i^{'}\gamma; \rho \right)}{\Phi\left(z_i^{'}\gamma \right)} \tag{8}$$

where $y_i = 1$ 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 o low-employment, Φ is the univariate standard normal cumulative distribution function, and Φ_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 by a simple probit model. In contrast, if ρ is non-zero the more general bivariate probit with selectivity, given by equation (8), 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 view as instruments for the selection probability of being employed.

The estimation results of this bivariate probit model are reported in Table 5. The explanatory variables in the main equation include both individual 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 and industry variables. 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 variables indicating the financial situation of the household.

The likelihood ratio test reveals that the correlation coefficient ρ is significantly different from zero, which indicates the presence of a sample selection problem. 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.

6. Mobility

In this section I explore the effects of low and high pay on job mobility. I look at both, transitions job to job and transitions to non-employment. And I investigate whether being low or high-paid significantly influences the likelihood of an individual to change job or to move towards non-employment. For the purpose of this section, I first assume independence of failure times and I estimate a competing risks model following the Cox approach. Competing risks models occur when failure can arise from two or more sources. In my case an employment spell can end with either a new job or with a transition to non-employment. The Cox approach consists of constructing two separate hazard functions for the two risks of failure. Let *failure1* denote the risk of making a transition from employment to non-employment, and *failure2*, the risk of changing job. Then, I define the hazard function ϕ_1 for *failure1*, so that staying at the same job and changing job are considered as censored observations. And I define the hazard function ϕ_2 for *failure2*, so that staying in the same job and making a transition to non-employment are considered as censored observations. The final step of this Cox approach would be to estimate a multinomial logit model where the dependent variable takes value 1 if there is risk of *failure1*, value 2 if there is risk of *failure2*, and 0 for censored observations.

Apart from personal (gender, age, education, on-the-job training, unemployment history and experience with current employer) and job characteristics (part-time/full-time, type of firm, type of contract, occupation and industry), I include as an explanatory factor in

the multinomial logit model a dummy variable indicating high pay[7]. The estimation results are reported in Table 6. As it can be observed, the estimated coefficient on the dummy variable indicating high pay is negative and quite significant for the two risks of failure. Thus, individuals whose earnings are equal or higher than three-halves the median earnings are clearly less likely to either, change job or move to non-employment, than those whose earnings fall bellow three-halves the median earnings.

As mentioned before, the Cox approach is based on the independence of failure times, which is a very strong assumption. Another possibility would be to estimate the two hazard functions simultaneously. I will use a logistic distribution to modelize the hazard rates, following Bover et al. (2002) and García-Pérez (1997), so that the two conditional exit rates can be written as follows:

$$\phi_1(t) = F\left(\theta_0(t) + \theta_1(t)x\right) \tag{9}$$

$$\phi_2(t) = F\left(\gamma_0(t) + \gamma_1(t)x\right) \tag{10}$$

where x denotes the vector of explanatory variables. $\theta_0(t)$ and $\gamma_0(t)$ represent the additive terms of the duration dependence in the hazard rates that I will estimate in the most general way as possible. Finally, $\theta_1(t)$ and $\gamma_1(t)$ are the coefficients for the explanatory factors which in general depend on duration.

Furthermore, in order to avoid that the presence of unobserved factors may generate spurious duration dependence in the hazard rate, I control for unobserved heterogeneity, so that we have the following expressions for the hazard rates:

$$\phi_1(t,\eta) = F\left(\theta_0(t) + \theta_1(t)x + \eta\right) \tag{11}$$

$$\phi_2(t,\eta) = F\left(\gamma_0(t) + \gamma_1(t)x + \eta\right) \tag{12}$$

I estimate the two hazard rates, given by (11) and (12), simultaneously and I follow a semi-parametric approach based on Heckman and Singer (1984) assuming that unobserved heterogeneity follows a discrete distribution function with different mass points[8]. In particular, I consider the case of two-mass-point distribution, and I estimate the model by maximum likelihood.

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[7] The same estimation is repeated including a dummy variable that indicates low pay, but the estimated coefficient does not appear to be significant. So I report just the estimation results when including a dummy for high pay.

[8] Following Han and Hausman (1988), the presence of two continuous variables among the covariates is a sufficient condition under which the competing risks model is identified even if the covariates for the two risks are identical.

The individual likelihood function with unobserved heterogeneity can easily be constructed, following García-Pérez and Muñoz Bullón (2001), as follows:

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

$$\left[\prod_{s=1}^{t_2}\left(1-\phi_{2i}(s)\right)\right]^{d_{2i}}\left[\phi_{2i}(t_2)\prod_{s=1}^{t_2-1}\left(1-\phi_{2i}(s)\right)\right]^{1-d_{2i}} \tag{13}$$

where t_1 and t_2 represent durations, and d_{1i} and d_{2i} are the two indicators that allow to distinguish between censored and uncensored observations for the two risks of failure respectively. The log-likelihood function of the simultaneous equation system, with unobserved heterogeneity then takes de form:

$$\ln L = \sum_{i=1}^{N}\ln\int L_i(\eta)dF(\eta) \tag{14}$$

Table 7 reports the hazard rates resulting from a simultaneous estimation of equations (11) and (12). The delta method has been used to calculate the real value of the unobserved heterogeneity coefficient, η, which results to be quite significant.

The main concern is on the estimated coefficient on the explanatory variable indicating high pay. As in the Cox model, this coefficient is found to be negative and quite significant for the two risks of failure. Nonetheless, the simultaneous estimation procedure lead to higher values (in absolute terms) of these estimated coefficients than those obtained with the Cox approach.

Some other points are also worthy of mentioning. Regarding the effects of personal characteristics the results reveal, in one hand, that transitions from job to job are found to be more likely among young workers, workers with higher attained levels of education, and those who have experienced unemployment at least once before current job. On the other hand, transitions to non-employment seem to be more likely among males, young workers, workers with higher levels of education, and those who have experienced unemployment at least once before current job.

As regards job characteristics, I find, that working part-time, being employed in small sized private firms and holding a non-permanent contract increase the likelihood of both changing job and moving towards non-employment.

APPENDIX

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

Figure 2: Evolution of low-wage employment by gender
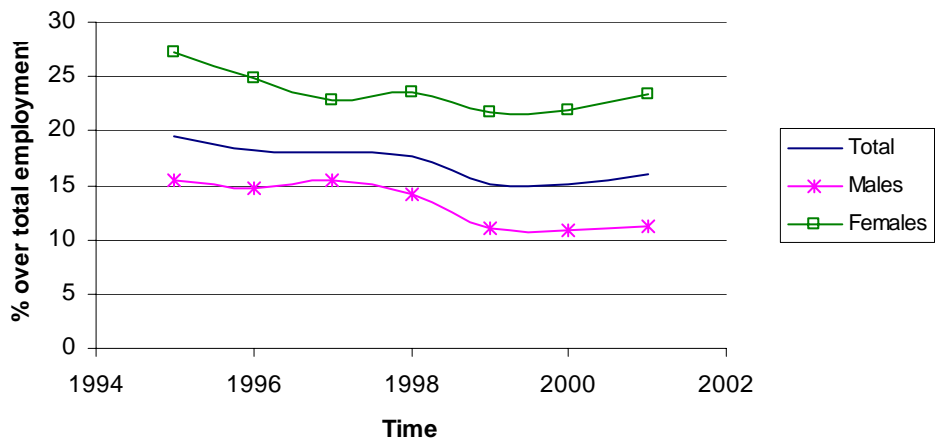
Figure 3: Evolution of low-wage employment by age groups

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
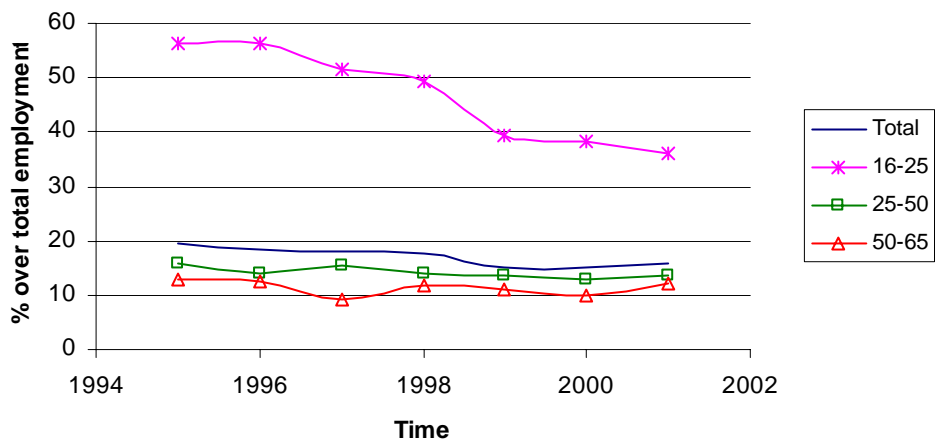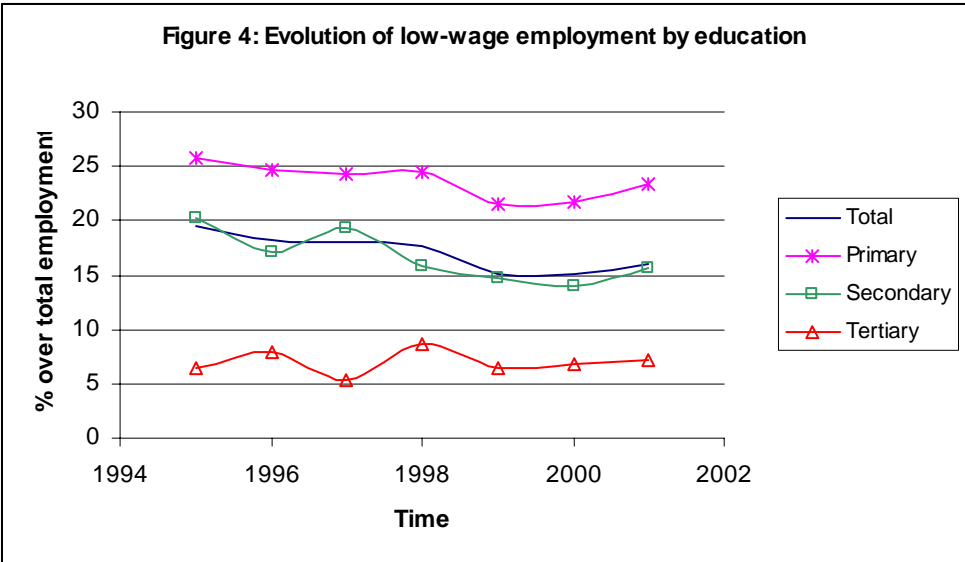
Figure 7: Evolution of low-wage employment by type of contract
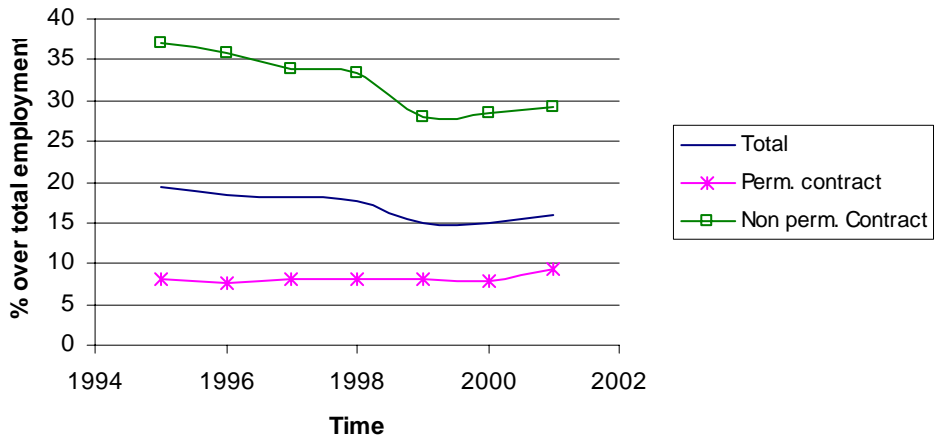
Figure 8 a): Evolution of low-wage employment by occupation
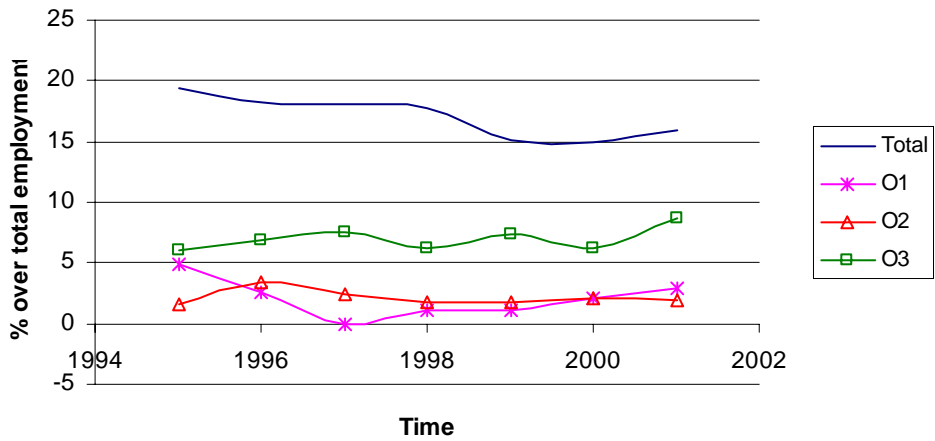
Figure 8 b): Evolution of low-wage employment by occupation

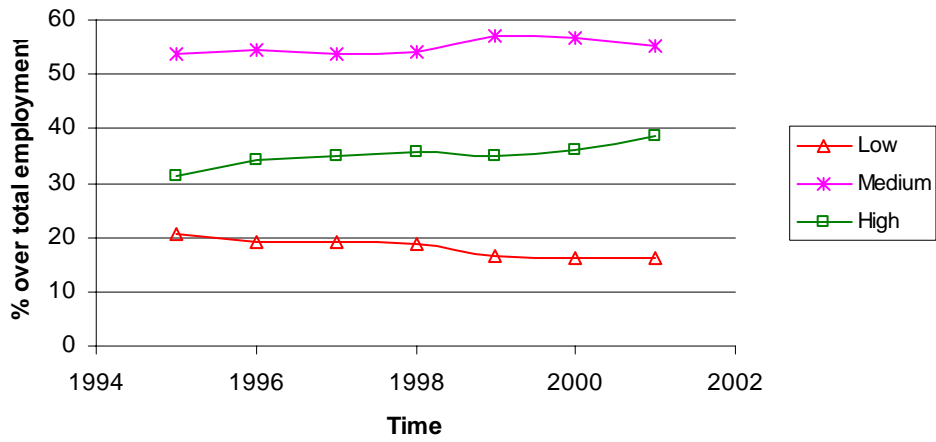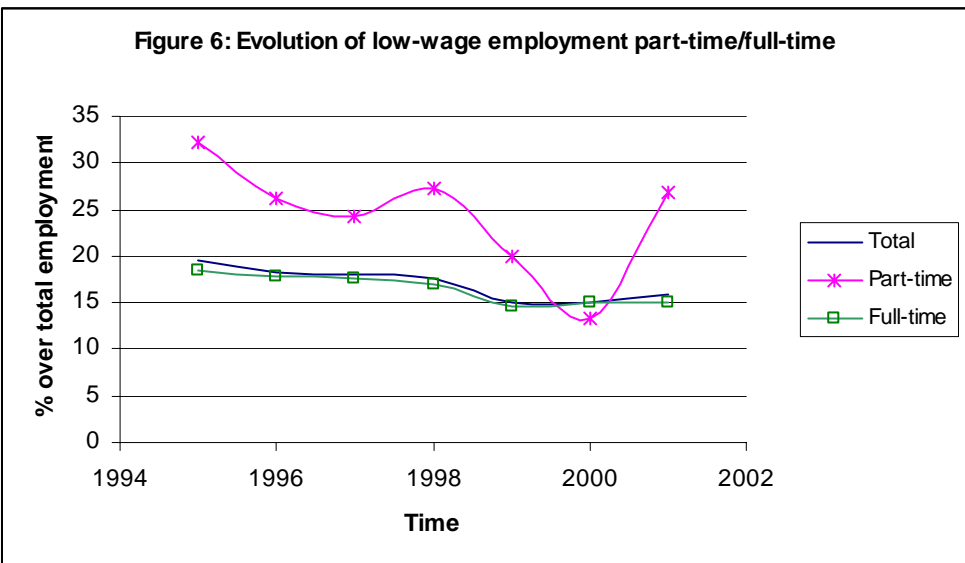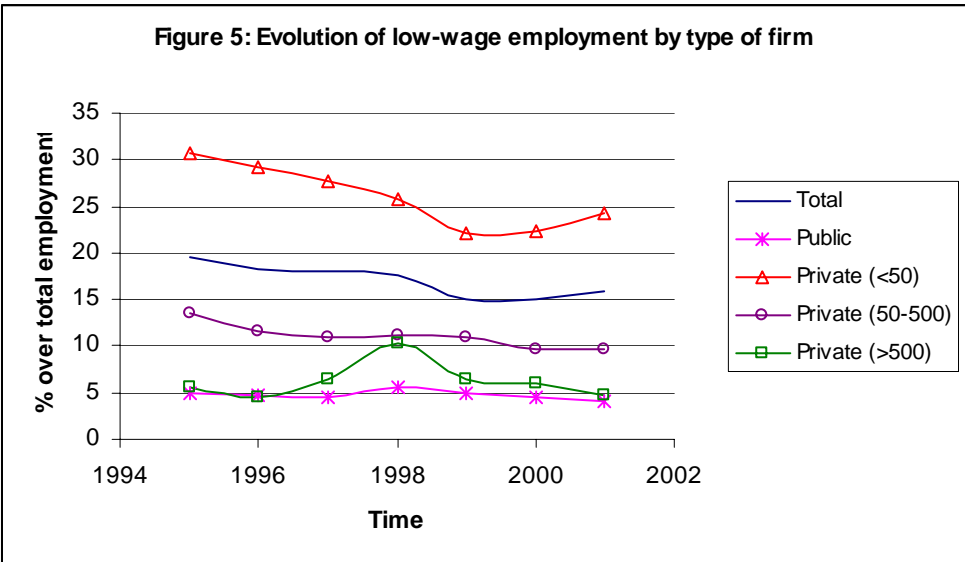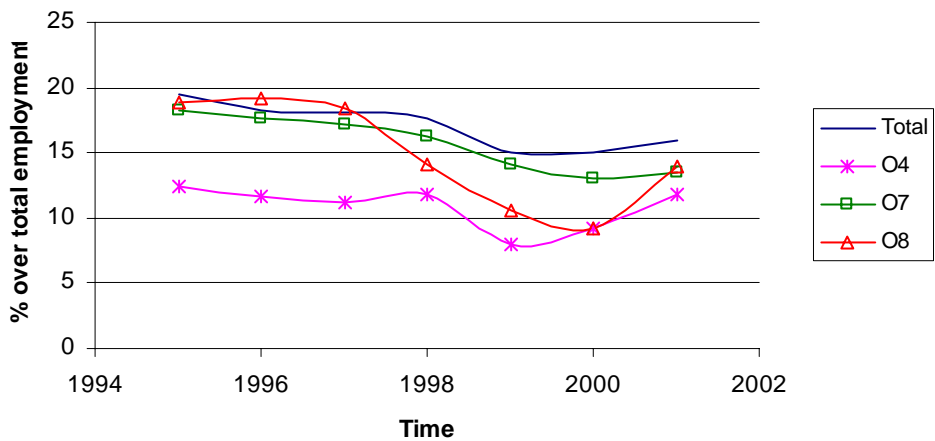Figure 8 c): Evolution of low-wage employment by occupation
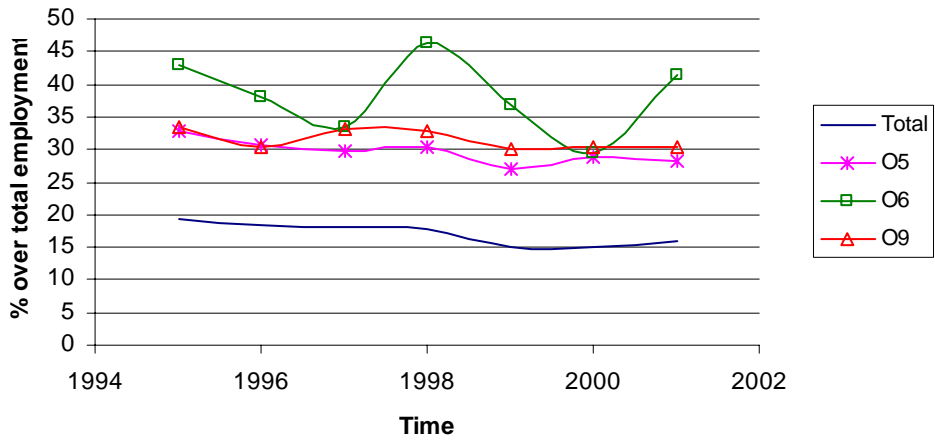
Figure 9 a): Evolution of low-wage employment by industry
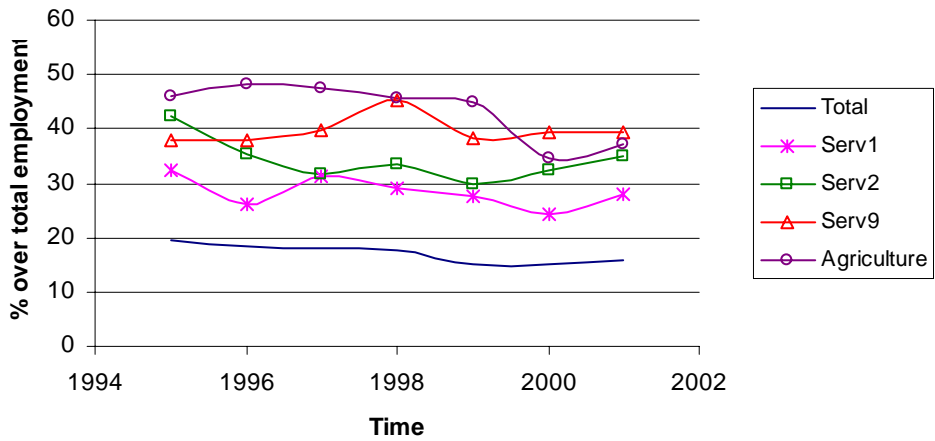
Figure 9 b): Evolution of low-wage employment by industry

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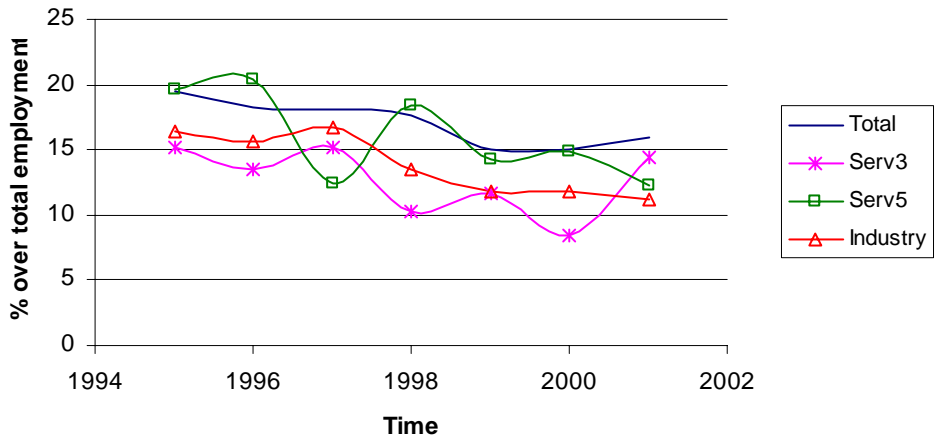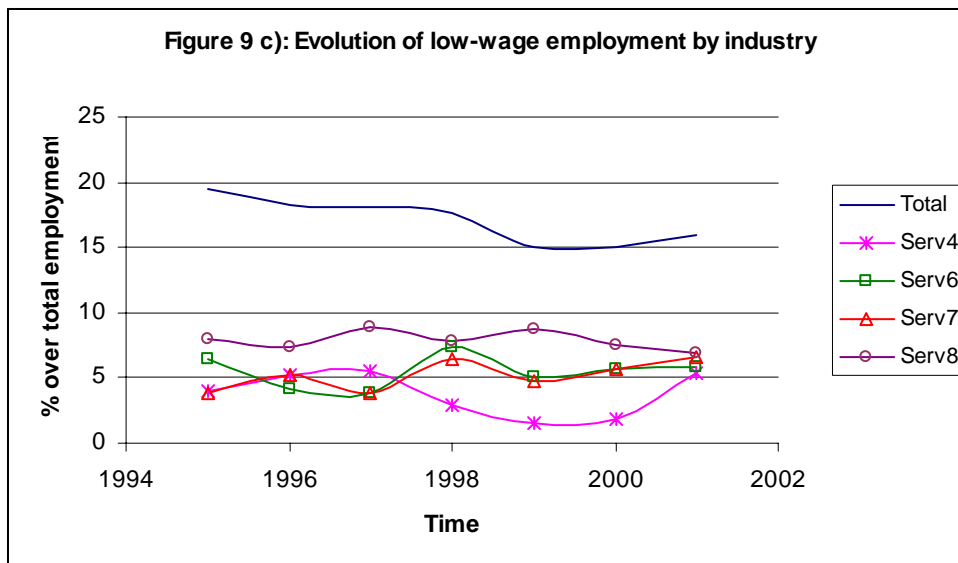
Occupations:

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.

Services:

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.

Figure 10: Minimum wages vs (2/3) Median wages (Euros)
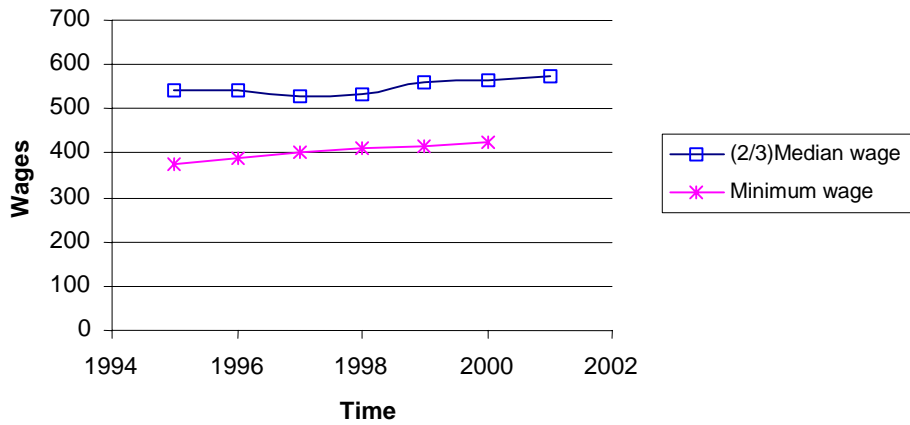
	LOW		MEDIUM		HIGH	
Table 1: Descriptive Statistics: Distribution of people in low-, medium-, and high-paid jobs						
	1995	**2001**	**1995**	**2001**	**1995**	**2001**
	(18.76%)	(14.75%)	(51.12%)	(50.06%)	(30.12%)	(35.19%)
	Mean	Mean	Mean	Mean	Mean	Mean
Male	0.539	0.426	0.692	0.634	0.687	0.669
Age						
16-25	0.363	0.282	0.098	0.129	0.007	0.005
25-50	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
Education						
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
Type of firm						
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
Job duration						
<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
Occupation						
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
Type of industry						
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)						
	LOW		*MEDIUM*		*HIGH*	
	Coeff.	t	Coeff.	t	Coeff.	t
Male	-0.526	-8.80	0.099	2.15	0.438	6.57
Age						
16-25	-	-	-	-	-	-
25-50	-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
Education						
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
Type of firm						
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
Job duration						
<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
Occupation						
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
Type of industry						
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	

	Total (100%)	Z=0 (67.79%)	Z=1 (28.89%)	Z=2 (3.32%)
	Mean	Mean	Mean	Mean
Male	0.617	0.667	0.505	0.518
Age				
16-25	0.171	0.089	0.341	0.357
25-50	0.685	0.746	0.557	0.544
50-65	0.143	0.164	0.098	0.098
Education				
Primary Ed.	0.523	0.451	0.680	0.609
Second. Ed	0.205	0.205	0.197	0.270
Tertiary Ed.	0.272	0.343	0.121	0.120
Part-time job	0.073	0.059	0.105	0.094
On-the-job training	0.260	0.339	0.093	0.112
Type of firm				
Public	0.212	0.280	0.067	0.087
Private (<50)	0.552	0.455	0.757	0.737
Private (50-500)	0.147	0.166	0.107	0.100
Private (>500)	0.059	0.076	0.025	0.018
Permanent Contract	0.560	0.686	0.296	0.264
Prev. unemployed	0.432	0.380	0.542	0.532
Job duration				
<2 years	0.397	0.294	0.614	0.600
2 – 5 years	0.147	0.144	0.154	0.148
> 5 years	0.456	0.561	0.232	0.252
Occupation				
Legislators, senior officials and managers	0.019	0.026	0.002	0.006
Professionals	0.110	0.154	0.016	0.014
Technicians and associate professionals	0.096	0.121	0.044	0.035
Clerks	0.102	0.118	0.069	0.069
Service workers and shop and market sales workers	0.171	0.131	0.255	0.248
Skilled agricultural and fishery workers	0.020	0.011	0.038	0.037
Craft and related trade workers	0.184	0.191	0.167	0.173
Plant and machine operators and assemblers	0.092	0.098	0.081	0.079
Elementary occupations	0.188	0.133	0.305	0.296
Type of industry				
Agriculture	0.051	0.026	0.105	0.094
Industry	0.314	0.337	0.264	0.282
Services	0.625	0.631	0.617	0.586

Table 3: Descriptive Statistics (Low-wage employment)

	$\ln\left[\dfrac{\Pr(z=1)}{\Pr(z=0)}\right]$		$\ln\left[\dfrac{\Pr(z=2)}{\Pr(z=0)}\right]$	
	RRR	t	RRR	t
Male	0.379	-19.01	0.398	-8.48
Age				
16-25	-	-	-	-
25-50	0.315	-20.47	0.305	-10.70
50-65	0.276	-15.09	0.292	-6.68
Education				
Primary Ed.	1.887	8.80	1.626	2.94
Second. Ed	1.357	3.96	1.867	3.68
Tertiary Ed.	-	-	-	-
Part-time job	0.627	-5.88	0.554	-3.47
On-the-job training	0.529	-9.28	0.620	-3.06
Type of firm				
Public	0.289	-15.91	0.370	-5.67
Private (<50)	-	-	-	-
Private (50-500)	0.447	-12.12	0.412	-5.63
Private (>500)	0.444	-6.76	0.295	-3.51
Permanent Contract	0.436	-15.54	0.319	-9.20
Prev. unemployed	1.177	3.49	1.175	1.59
Job duration				
<2 years	-	-	-	-
2 – 5 years	0.876	-2.04	0.970	-0.21
> 5 years	0.619	-7.66	0.823	-1.39
Occupation				
Legislators, senior officials and managers	0.308	-3.31	0.781	-0.41
Professionals	0.393	-6.13	0.282	-2.97
Technicians and associate professionals	-	-	-	-
Clerks	0.853	-1.51	0.770	-1.07
Service workers and shop and market sales workers	1.859	6.85	1.754	2.81
Skilled agricultural and fishery workers	2.917	6.08	2.922	3.05
Craft and related trade workers	1.694	5.16	1.590	2.00
Plant and machine operators and assemblers	1.735	5.08	1.600	1.87
Elementary occupations	2.203	8.44	2.139	3.69
Type of industry				
Agriculture	1.874	5.72	1.818	2.79
Industry	0.487	-11.36	0.560	-4.10
Services	-	-	-	-
N		15,255		
Log likelihood		-8,422		

Table 4: Multinomial Logit Model for the probability of being in a low-paid job

Table 5: Probit Model (with sample selection) for the probability of being low-paid

	Coef.	t
Male	-0.740	-31.36
Age		
16-25	-	-
25-50	-0.991	-36.24
50-65	-0.711	-17.67
Education		
Primary Ed.	0.593	17.10
Second. Ed	0.306	8.31
Tertiary Ed.	-	-
Part-time job	-0.197	-5.59
On-the-job training	-0.262	-9.26
Type of firm		
Public	-0.525	-15.35
Private (<50)	-	-
Private (50-500)	-0.350	-11.78
Private (>500)	-0.347	-7.25
Permanent Contract	-0.385	-15.05
Prev. unemployed	0.060	2.88
Job duration		
<2 years	-	-
2 – 5 years	-0.049	-1.68
> 5 years	-0.210	-7.61
Occupation		
Legislators, senior officials and managers	-0.324	-3.04
Professionals	-0.331	-5.64
Technicians and associate professionals	-	-
Clerks	-0.075	-1.75
Service workers and shop and market sales workers	0.271	6.94
Skilled agricultural and fishery workers	0.487	5.68
Craft and related trade workers	0.231	5.39
Plant and machine operators and assemblers	0.256	5.56
Elementary occupations	0.356	8.82
Type of industry		
Agriculture	0.336	6.38
Industry	-0.293	-9.92
Services	-	-
Constant	1.060	22.33
ρ	-0.908	-10.02
N	20,810	
Log likelihood	-16,242	
LR test (ρ=0) : $\chi^2(1)$=53.92 , Prob > $\chi^2(1) = 0.000$		

	Failure 1: Change job		Failure 2: Transitions to non-employment	
	Coeff	t	Coeff	t
ln(duration)	-1.831	-15.19	-2.471	-16.77
ln(duration)^2	0.476	4.98	0.943	7.93
ln(duration)^3	0.080	4.01	-0.017	-0.67
Male	0.016	0.46	0.100	2.40
Age				
16-25	-	-	-	-
25-50	-0.344	-6.16	-0.556	-9.24
50-65	-0.781	-11.61	-0.856	-11.57
Education				
Primary Ed.	-	-	-	-
Second. Ed	0.016	0.38	0.000	0.01
Tertiary Ed.	0.243	5.23	0.153	2.77
Part-time job	0.059	0.85	0.116	1.46
On-the-job training	-0.043	-1.19	0.026	0.61
Type of firm				
Public	-0.177	-4.19	-0.277	-5.47
Private (<50)	-	-	-	-
Private (50-500)	-0.123	-2.76	-0.127	-2.44
Private (>500)	-0.235	-3.79	-0.118	-1.69
Permanent Contract	-0.724	-18.00	-0.833	-17.70
Prev. unemployed	0.667	19.78	0.539	13.44
High pay	-0.342	-7.87	-0.276	-5.35
No satisfaction with job security	0.007	0.11	0.149	2.08
Occupation				
Legislators, senior officials and managers	-0.027	-0.27	-0.077	-0.61
Professionals	-0.037	-0.60	0.025	0.33
Technicians and associate professionals	-0.152	-2.42	0.099	1.35
Clerks	-	-	-	-
Service workers and shop and market sales workers	0.006	0.11	0.102	1.39
Skilled agricultural and fishery workers	-0.196	-1.27	-0.253	-1.30
Craft and related trade workers	-0.081	-1.27	-0.043	-0.56
Plant and machine operators and assemblers	-0.079	-1.12	0.013	0.16
Elementary occupations	0.100	1.52	0.165	2.09
Type of industry				
Agriculture	-0.005	-0.05	-0.200	-1.63
Industry	0.010	0.24	-0.055	-1.10
Services	-	-	-	-
Constant	-1.954	-23.28	-1.951	-20.42
N spells	155,056			
Log likelihood	-34,449			

Table 6: Job Mobility (Cox model with competing risks)

	Failure 1: Change job		Failure 2: Transitions to non-employment	
Table 7: Job Mobility (Simultaneous estimation for the two hazard rates)				
	Coeff.	t	Coeff.	t
ln(duration)	0.012	0.08	-1.164	-7.22
ln(duration)^2	-1.201	-10.06	-0.284	-2.08
ln(duration)^3	0.513	19.30	0.304	10.05
Male	0.052	1.12	0.156	2.98
Age				
16-25				
25-50	-0.975	-10.27	-0.992	-11.10
50-65	-1.623	-15.12	-1.433	-13.85
Education				
Primary Ed.				
Second. Ed	0.083	1.44	0.061	0.97
Tertiary Ed.	0.457	7.16	0.232	3.24
Part-time job	0.217	2.16	0.173	1.70
On-the-job training	-0.061	-1.30	-0.004	-0.08
Type of firm				
Public	-0.401	-7.20	-0.352	-5.66
Private (<50)				
Private (50-500)	-0.208	-3.39	-0.113	-1.70
Private (>500)	-0.373	-4.82	-0.123	-1.41
Permanent Contract	-1.609	-21.77	-1.286	-18.88
Prev. unemployed	0.977	21.01	0.758	14.27
High pay	-0.527	-9.32	-0.407	-6.53
No satisfaction with job security	0.122	1.24	0.276	2.73
Occupation				
Legislators, senior officials and managers	0.001	0.01	-0.002	-0.01
Professionals	-0.004	-0.06	0.029	0.31
Technicians and associate professionals				
Clerks	-0.103	-1.29	0.128	1.44
Service workers and shop and market sales workers	0.080	1.00	0.109	1.20
Skilled agricultural and fishery workers	-0.201	-0.94	-0.443	-1.70
Craft and related trade workers	-0.061	-0.74	-0.031	-0.32
Plant and machine operators and assemblers	0.046	0.50	0.037	0.36
Elementary occupations	0.094	1.07	0.195	1.96
Type of industry				
Agriculture	-0.162	-1.11	-0.175	-1.07
Industry	-0.013	-0.22	-0.076	-1.19
Services				
Constant	-1.120	-9.48	-1.497	-11.67
η	0.914	21.26	0.914	21.26
pr	0.776	89.98	0.776	89.98
N Spells	155,056			
Log likelihood	-27,975			