

ESTUDIOS SOBRE LA ECONOMIA ESPAÑOLA

**Job loss and unemployment duration
for older workers in Spain**

**Almudena Blanco
Sara de la Rica**

EEE 56



Fundación de Estudios de Economía Aplicada

<http://www.fedea.es/hojas/publicado.html>

JOB LOSS AND UNEMPLOYMENT DURATION FOR OLDER WORKERS IN SPAIN

Almudena Blanco and Sara de la Rica^ª
Universidad del País Vasco

November 4, 1999

Abstract

^ªFor contact: Sara de la Rica - Universidad del País Vasco. Avenida Lehendakari Aguirre, 83 - 48015 Bilbao (Spain) - Tfno: 94-6013783 - e-mail: jeprigos@bs.ehu.es

Abstract

The aim of this study is to analyze how unemployment affects older workers, which is a demographic group of increasing importance in the Spanish population structure. The specific empirical issues we try to answer are (i) which are the main determinants of job loss for these workers, relatively to prime age workers, and (ii) which are the main determinants for these job losers to find a job again. We use a longitudinal sample of the Spanish Labour Force Survey (1992:I - 1997:2) and the findings suggest that whereas individual characteristics, such as qualification are important determinants for prime age workers in order not to suffer a job loss, the impact of these characteristics for older workers is very small, and dominated by other issues, such as firing costs or demand conditions. With respect to unemployment duration, we find that technical education helps prime age workers to find a job. However, for older workers education seems to have a negative impact in order to leave unemployment. (JEL J14, J64).

Keywords: elderly, job search, hazard.

1 Introduction

The phenomenon of population aging in most developed countries is not new. Since the early decades of this century, we are facing with an increasing percentage of older individuals (45 or more) relative to younger ones (14 years or less). Spain is not unaware of this phenomenon. Figure 1 shows this aging process very clearly. However, what it is new and in some sense alarming in the last two decades, not only for Spain but for most OECD countries, is the high pace that this process is taking. Figure 1 shows how the aging process is being accelerated since the early eighties. Furthermore, it is expected that whereas the ratio of the older population (65 and above) to that of working age in the OECD areas has already risen from 15 percent in 1960 to 21 percent in 1998, it will rise up to 35 percent by 2030 (OECD, 1998).

[Insert Figure 1]

This phenomenon implies a formidable change in the composition of the labour market, with fewer young people entering the labour market and an increasing proportion of older workers in pre and post- retiring ages. As the Secretary-General of the OECD, Donald Johnston, recently addressed,

“... meeting the challenge of ageing populations will require comprehensive reforms that address the fiscal, financial and labour market implications for pensions, social benefits, and systems of health and long-term care. The goal must be to harness the skills and experiences of older people and to ensure adequate living standards for them without placing an unfair burden on younger people”. (OECD, 1998, page. 3).

Policy action must combine financial, economic and social measures to cope with this phenomenon. Given that older workers will become a greater proportion of the

labour force in the following decades, one of the aspects that experts stress is the need for these workers to work for longer and hence reverse the recent early retirement patterns that many developed countries have experienced. The possibility for older workers to work for longer, however, requires a variety of reforms that ensure that more job opportunities are available for them and that they are equipped with the necessary skills to take them.

The employment problems that older workers face are, therefore, at the root of the whole analysis of the aging phenomenon and most European countries are developing active and passive measures to cope with them. In Spain, an example of active measures for workers older than 45 can be found in a new permanent contract for these workers, with tax reductions for employers (law 64/1997). Passive measures like assistance unemployment benefits for workers over 45 with family dependents also exist in our country. Someone might argue that the labour market situation of this group of workers is not that bad, given that the percentage of older workers that suffer unemployment is lower than for other groups of population. Taking Spain as an example, the male unemployment rate for workers over 45 is about one third of that for workers under 24. However, this fact should not understate another one, that is that older job losers often find more serious difficulties than younger workers to find another job. Figure 2 shows the duration of unemployment for different age groups and it can be seen that almost 40 percent of workers between 45-54 stay unemployed for more than two years, that this percentage rises to almost 50 percent when we look at workers over 54, whereas average unemployment duration diminishes greatly as we look at younger individuals.

[Insert figure 2]

The difficulty for older job losers to find another one is hence obvious, so policy action must therefore be directed towards those older workers that face the risk of

unemployment and to those that are already unemployed. In order to dictate policy measures directed to this group of individuals, it is first necessary to know who among older workers face the risk of unemployment and which are the determinants for them to lose their job. Second, for job losers, we must know which factors contribute for them to remain unemployed. This empirical analysis will give us the clue to design policy measures that help older workers who face employment problems. This is going to be the main aim of our paper.

The incidence and duration of unemployment has already been analyzed for the Spanish economy by some authors. In particular, Bover et al (1997) concentrate on the effects of unemployment benefit and business cycle on unemployment duration for males younger than 64 years old. García (1997) analyses also unemployment duration for workers younger than 55 and for the period 1978-1993. Another example is Alba (1998) who concentrates on unemployment duration of young workers. Our study, therefore, must be seen as a complement to these ones, given that it analyses employment difficulties of a specific group of population with an increasing importance in the demographic structure of our country.

The paper is organized as follows: Section 2 describes the data and presents a descriptive analysis of the sample we use for estimation. In section 3, we present the empirical analysis of which factors contribute that older workers lose their job. This analysis will be done not only for older workers, but also for a reference group of adult but younger workers (35-44 years) to capture which factors are specific determinants for older workers to be at risk of unemployment. Section 4 presents the analysis of unemployment duration for older workers. Finally, the last section is devoted to outline the most important conclusions derived from the empirical work, as well as possible indications for economic policy that in view of our results might help to shorten the duration of unemployment for older workers.

2 The Data

We use a longitudinal sample taken from the Longitudinal Spanish Current Population Survey (EPA enlazada). The National Bureau of Statistics interviews around 60.000 households quarterly and the process is repeated for the same individuals for six consecutive quarters. It is possible therefore to follow each individual for around one year and a half (six observations per individual). The period we analyze is 1992:1 - 1997:2. We get extensive information about each individual's labour market situation, as well some information about the rest of household members.

As we said in the introduction, we are interested in the analysis of employment problems that older workers face, and in particular, in the determinants for older workers to lose their job and for these job losers to remain unemployed or rather to find another job. Given the low participation rate of older females in our country (less than 40 percent in 1997), we are left with a very small sample of older females who lose their job and either remain unemployed or find another job. In addition to this, the Spanish family structure where the male is in most cases the head and main earner of the family, makes that the labour market situation of older females are very much dependent of their husbands', and therefore, the labour market problems of older females are probably more adequately analyzed in a family framework context, which is out of the scope of this paper. Therefore, we restrict our empirical analysis to males.

However, we must take into account that during the recent past, voluntary retirement has been a quite standard labour market measure for workers over 55 in our country (see figure 3). For workers that face the possibility of voluntary retirement, unemployment is in many cases a transitory agreement between employer and employee before voluntary retirement.

[Insert ...gure 3]

Our aim in this study is to analyze job loss and unemployment duration of older workers that do not face the possibility of voluntary retirement, given that it is for these workers that unemployment is really a distressful situation. In ...gure 4 it can be observed that it is not before 55 years old that Spanish workers start doing the transition unemployment - retirement. Besides this, the empirical analysis of the labour market problems of workers older than 55 is more complex, since as OECD (1998, page.. 331) notes, (i) it is not easy to distinguish between supply and demand factors, and (ii) measurement error problems are more likely to appear given that many of them classify themselves as unemployed whereas they are voluntary retirees, and viceverse. Finally, given that our methodology consists of comparing the labour market situation of older workers relative to that of adult younger workers, and that the latter do not face any retirement prospect, we have considered more appropriate to restrict our sample of older workers to those that are not affected by the possibility of voluntary retirement. We have therefore delimited the age for older workers to be less than 56. In doing so, we avoid unobserved heterogeneity derived from different future prospects that older workers may face.

[Insert ...gure 4]

With respect to the reference group (henceforth prime age workers) we have used workers that are between 35 and 44 years to capture the labour market situation of workers that are not affected neither by problems derived from labour market entry, nor by older workers problems. As Toharia (1997, pp. 46) in his study of the Spanish labour market notes, "... the phase of integration into the labour market takes place until the age of 30-34. The central ages 35-44 represent both the ending

point of the integration phase and the starting point of the exit place, and can be taken as reference points for both of them”.

In order to see a first approximation of the labour market transitions that both older workers and prime age workers experience, we can look at table 1. It describes transitions between the different possible states in the labour market (employment, unemployment and out of the labour force) in the interval of one year. We want to highlight that (i) the probability of job loss is higher among the group of prime age workers (4.40 %) than among older workers (3.47 %), (ii) older unemployed workers face more difficulties to find another employment (25.8 % of them find employment in the interval of 1 year) than prime age workers (32.9 % of them find it in the same interval of time), and (iii) transitions to inactivity, both from employment and from unemployment, are more frequent for the group of older workers than for the reference group.

[Insert table 1]

Although our initial sample contains, as table 1 shows, 32785 individuals aged between 45-55 years and 34394 individuals in the reference group, in order to analyze job loss and unemployment duration we need to observe in the first place individuals that are employed in the first interview and either remain employed or lose their job. This restriction reduces our total sample in 12065 individuals. In the second place, for those who lose their job, we need to observe either complete or incomplete unemployment durations. After dropping those who experience directly the transition employment-inactivity (1373, which represents 2% of the sample), those individuals for whom we have missing observations before experiencing any transition and those who answer inconsistently to some of the questions, we are left out with our final sample, which accounts for 19421 older workers and 19877 prime age workers.

3 Empirical analysis of job loss

In this section we analyze which are the characteristics of older workers who lose their job relative to those of prime age workers, as well as the determinants for job loss.

In table 2 we present a preliminary description of the sample. As we are interested in looking at individuals affected by job loss, we distinguish between those individuals that do not lose their job (and remain in it) along the period we observe them from those that although being employed at the time of the ...rst interview, lose their job at some point while observed. From table 2 it can be inferred that for both age groups, workers who suffer job loss are individuals with low education, low qualified and unstable (temporal) jobs.

[Insert table 2]

However, there are some differences between job losers of both age groups that are noteworthy. In the ...rst place, the increasing educational level attained in Spain in the recent past can be reflected in the percentage of job losers with no studies. For the older group, 27.75 % of workers have no studies, compared to 12.95 % for the prime age group. In the second place, the percentage of head of household among older job losers (91.25 %) is much higher than the percentage of heads among prime age job losers (78.65 %). This is an important aspect from the social point of view because given the low participation rate of older females, it is reasonable to expect that older males were the only labour income earners in the family, and hence job loss is likely to represent a very important economic distress not only for them, but for the whole household.

In order to know the determinants to lose a job for the group of older workers relative to prime age workers, we have estimated a logit model where the dependent

variable takes the value of one if the worker loses his job at some point along the time they are observed and zero otherwise. Results are presented in table 3.

As independent variables we have included personal characteristics (age, education), family structure (marital status, head of household or not), measures of family income (approximated by the number of no economic dependents in the household), previous job characteristics (type of job (public/private/self-employed,...), type of contract (temporal/permanent), hours of work (full-time/part-time), tenure in the previous job, occupation) and some demand variables such as activity, male unemployment rate by province and the growth rate of the Gross Domestic Product¹.

[Insert table 3]

The first result that we would like to highlight is the different role that qualification, described in terms of occupation, plays in order to lose a job. For prime age workers, increases in qualification clearly decreases the probability of a job loss. This impact is however very small for the group of older workers. Only highly qualified white-collar workers (professionals) show a lower probability to lose the job with respect to non-qualified manual jobs. Among the rest of occupations, there seems to be no difference in the probability to lose the job. This indicates that personal characteristics play a smaller role for a job loss among the group of older males than for younger adults. In the same line we can interpret the result we found with respect to education. For the older group, only very educated (university) or very low educated (no studies) show differences in the probability to lose the job with respect to individuals with primary studies. For the prime age group, however, every increase in educational attainment diminishes the probability to lose the job. Again, personal characteristics seem to have a greater effect for the probability of a job loss for younger workers than for older workers.

Other results reflect that most individuals that suffer a job loss were working in a temporary basis, which seems very reasonable in our country given the high costs associated to laying off a permanent worker. Besides this, it is likely that temporary workers' jobs are more associated with discontinuous and/or seasonal activities. Among permanent workers, however, we can see the effect that tenure on the firm exerts for the probability of a job loss. Having a higher tenure seem to offer more protection to older workers with permanent contracts against job loss than to comparable prime age workers. In order to interpret this finding, we must associate tenure with firing costs, given that severance payments in Spain are proportional to the number of years that workers have been employed on the firm². This result is thus telling us that firing costs prevent against job loss especially to older workers. For prime age workers, the effect of firing costs for the probability of a job loss is smaller, perhaps because there are other personal characteristics, like qualification that also prevent against job loss.

Finally, demand conditions also affect the probability of a job loss. Favorable economic conditions, translated in higher GDP growth or a low male unemployment rate diminishes the probability of a job loss, for both older and prime age workers.

In summary, we might say that for older workers the probability of a job loss does not seem to be affected by personal characteristics, such as qualification but rather by other determinants, such as firing costs or demand conditions. This seems to be a particular result for this group of age, given that when considering the determinants of a job loss for prime age adults, personal characteristics such as qualification and education help workers to retain the job. This might reflect a different behavior of employers with respect to layoffs when treating with different age groups, in the sense that when deciding layoffs younger workers are evaluated in terms of their personal characteristics, whereas older workers' personal characteristics do not play

any important role for determining who loses and who retains the job.

4 Duration of unemployment

4.1 Theoretical framework - The search model

The standard framework to explain unemployment duration is the search model presented by Mortensen (1970). This model can be used to explain unemployment duration for those who end up in another job.

It is based on the optimal job search strategy for an unemployed worker. It is assumed that the worker is actively looking for a job, but faces imperfect information concerning location and wages of available jobs. Therefore, in each period t individuals incur in search costs. Once a job offer arrives, each individual must decide whether to accept the offer or not. Therefore, the probability for an unemployed worker of leaving unemployment depends on the probability of receiving an offer $\lambda(t)$ and the probability of accepting it, which depends on the reservation wage, w^r . Denoting by $\mu(t)$ the probability of leaving unemployment, we can define it as

$$\mu(t) = \lambda(t)[1 - F(w^r)]$$

This is the structural expression of the hazard rate for unemployed workers. However, we will estimate the reduced form, where we consider variables affecting both $\lambda(t)$ and w^r : We will not, therefore, be able to estimate separately neither which is the effect of the reservation wage nor the effect of $\lambda(t)$ on the hazard rate.

With respect to variables affecting $\lambda(t)$ we must include those variables reflecting personal characteristics that make them attractive to employers, such as education, experience, as well as variables reflecting the demand side. With respect to variables affecting w^r , we must include search costs and unemployment income.

4.2 Econometric model

Our sample of unemployed workers consists of workers that were employed in the first interview and lost their job at some point while observed. This means that these workers are entrants into unemployment from a job. This avoids potential stock sample bias³. We will use the so-called single-risk models, that allow to empirically analyze the duration of processes when only one type of risk is considered. We will consider the hazard to employment. Unemployment duration (T) will be defined in months, given that although the survey is conducted quarterly, it is possible to define it in months using other available information from the survey⁴.

We define by T_i the length of unemployment period for each individual i . Given the discrete nature of our data, and that we assume a proportional hazard parameterization⁵, we define the hazard rate as

$$\begin{aligned} h_i(t) &= \Pr[T_i < t + 1 \mid T_i \geq t] = 1 - \exp \left(- \int_t^{t+1} \mu_i(s) ds \right) \\ &= 1 - \exp \left(- \int_t^{t+1} x_i(s) \exp \left(\int_t^s x_i(u) du \right) g du \right) \end{aligned} \quad (1)$$

We also assume $x_i(s)$ to be constant for $t \leq s < t + 1$. This allows the hazard to be written in the following terms:

$$h_i(t) = 1 - \exp \left[\exp \left(\int_t^{t+1} x_i(u) du \right) + \phi(t) g \right] \quad (2)$$

where $\phi(t) = \ln \left(\int_t^{t+1} x_i(u) du \right)$ captures duration dependence non-parametrically.

Given this hazard rate, the likelihood of individual i can be defined as

$$L_i = \prod_{t=1}^{d_i} h_i(t) \prod_{t=1}^{c_i} [1 - h_i(t)]^{1 - c_i} \quad (3)$$

where d_i is the observed duration for the individual (complete or censored) and c_i is an indicator variable which takes the value of one if the observation is complete and zero if it is censored.

However, there is an alternative way to define this likelihood that makes computations much easier. Following Jenkins (1995), we define a variable y_{it} which takes the value of 0 for all spell quarters except the exit month, in which case y_{it} takes the value of one. Note that for stayers, $y_{it} = 0$ for all spell months. Using this indicator variable, the likelihood function of each individual i can be written as

$$L_i = \prod_{t=1}^{d_i} \frac{h_i(t)^{y_{it}}}{1 + h_i(t)} \quad (4)$$

In addition to this, we estimate this model adding a term to correct for the presence of unobserved heterogeneity. Not introducing this term would imply not correcting for unobserved individual differences, which might lead to bias, not only on the baseline hazard but also on the parameters associated to the explanatory variables. We include this term, as it is standard, in a multiplicative way. Denoting by γ_i the heterogeneity term, the hazard rate for discrete data can be rewritten as

$$h_i(t) = \exp \{ \gamma_i \exp [x_i(t)\beta + \alpha(t) + \log(\gamma_i)] \} \quad (5)$$

The log-likelihood function for all individuals in the sample, introducing the heterogeneity term is written as

$$\log L = \sum_{i=1}^N \left[\sum_{t=1}^{d_i} \log \frac{h_i(t)^{y_{it}}}{1 + h_i(t)} \right] + \sum_{i=1}^N \log \frac{c_i}{1 + c_i} \quad (6)$$

We assume that τ_i follows a normalized gamma distribution⁶. Hence the log-likelihood can be defined by the expression

$$\log L = \sum_{i=1}^N \left[\log f_i + \frac{1}{\tau_i} \exp \left(-\frac{1}{\tau_i} \right) \right] \quad (7)$$

4.3 Empirical findings

As we said when we described the theoretical framework to be used in the empirical analysis of duration of unemployment that ends up in employment, we must take into account variables related with the probability of receiving a job offer and with individual's reservation wage. Among variables that affect the probability of receiving a job offer we include personal characteristics that reflect accumulated human capital, such as education, tenure in the last job as well as age (to proxy experience) as well as some characteristics related to the former job (type of contract, activity). Demand conditions also affect the probability of receiving a job offer, so we also include variables that reflect the business cycle. With respect to the reservation wage, we must include income variables. Given that we do not have direct measures of family income, we include approximations to this variable (number of household members that are not economically dependent). Approximations to individual income of unemployed workers are measured by an indicator that takes the value of one if individuals receive unemployment benefits⁷.

Figures 5 and 6 present the univariate Kaplan-Meier estimations of the hazard rate. It can be seen that instantaneous hazard rates are very low for the first unemployment periods, they increase up to the fifth month approximately, and from

then onwards, the hazard decreases continuously. This pattern is quite standard in many empirical studies of unemployment duration. The low hazard rate in the first months is usually associated with a low search intensity at the beginning of the unemployment period which is translated into a low job finding rate. The decreasing hazard from the fifth month onwards is normally associated to human capital losses associated to workers that remain unemployed. Nevertheless, note that the hazard rate is always higher for prime age workers than for older workers (see figure 7), which reflects that older workers have more difficulties to find a job after a job loss.

[Insert figures 5, 6 and 7]

Table 4a presents estimations of duration models for both groups of unemployed workers. We present the results from such estimations when unobserved heterogeneity is not taken into account (columns I and III) and when it is taken into consideration (columns II and IV). Our comments will refer to the latter case, given the significance of the term that controls for heterogeneity⁸. In any case, results of both estimations are very similar in terms of significance and sign of coefficients of the explanatory variables, except for the coefficients of the duration dependence⁹, whose values are presented in table 4b.

[Insert tables 4a and 4b]

Turning to table 4a, we can see that in the final estimation there are some interactions between age and other explanatory variables. We started introducing

interactions among all explanatory variables and age to see if the effects changed as age increased even inside of each group. The final estimation presents only those interactions that were significant (at 90 % of significance)¹⁰. With respect to the results, we want to highlight in the first place the findings that concern the effect of education on the probability of finding a job. We can see that for the group of older workers education affects very little the probability of finding a job, and for those educational levels where the effect is significantly different from zero (vocational II), the sign is negative. This result contrasts with the effect that education exerts on the probability of finding a job for prime age workers, where education (especially vocational education) has a strong positive impact on the probability of finding a job. The little impact of education for the group of older workers can in principle be understood since investment in human capital was done many years ago and it is reasonable to think that there may be other variables that affect more the probability of finding a job. However, the fact that for those educational groups for which education is significant (vocational II) the sign is negative whereas for prime age workers this particular educational level has a strong positive effect to leave unemployment suggests that for jobs where a certain level of technical qualification is needed, employers prefer to employ younger workers. This interpretation is reinforced if we look at the effect of this educational level (vocational II) when it is interacted with age for prime age workers. The older these workers are, the less positive the effect of this educational level is in order to find a job. We may think of various reasons why employers do not want to employ older workers for jobs that require certain level of technical qualification. It is possible that they consider that their human capital is obsolete or that given that they must give workers some training they prefer to invest in specific human capital in younger workers in order to receive higher future returns of such investment. Another surprising effect

concerning education, which is common for both age groups, is that upper secondary and university studies (the latter is not strictly significant) have a negative impact for the probability of finding a job. A first possible explanation for this result is that higher educated workers may have a higher reservation wage than other workers and hence their probability of rejecting job offers is higher than for the rest of workers. However, another possible explanation is that given the impressive increase in the educational level that Spain has gone through during the last decades, there is a shortage of demand for jobs that require upper secondary or university studies.

Other results we can observe from table 4a are the following: (i) Having worked as a self-employed affects the probability of finding a job negatively, both for older and for prime age workers. It is possible that self-employed workers have less information about labour market possibilities given that they have worked as independent workers. (ii) With respect to the effect of either personal labour income or family income of unemployed workers, we can see in the first place that receiving unemployment benefits affects negatively and very strongly the probability of finding a job. This is a very standard result in the empirical analysis of unemployment duration for many countries and for every age group. Personal income increases the reservation wage and so the probability of rejecting job offers increases. (iv) Finally, positive demand conditions, represented either by a high growth rate of GDP or a low unemployment rate increase the probability of unemployed workers of finding a job.

5 Conclusions

The aim of this study has been to analyze how unemployment affects the group of older workers in Spain. Older workers, although do not exhibit high unemployment rates, suffer higher proportions of long-term unemployed than other age groups. We

limit our analysis to workers under 56 (and over 44) because in Spain from 56 years onwards we start to observe transitions from unemployment to voluntary retirement. For these workers, unemployment represents a transitory stage from employment to retirement. Unemployment is a severe and distressful problem particularly for those that can not consider the option of voluntary retirement and thus we concentrate in such group of older workers. The study has been done using a comparative group of prime age workers (between 35 and 44). This allows us to better characterize the labour market problems that older workers face compared to younger workers. The data used is a longitudinal sample of the Spanish Labour Force Survey and the period covered is 1992:I - 1997:II. The two specific issues we have empirically analyzed are (i) which are the main determinants for older workers to suffer a job loss compared to prime age workers, and (ii) the determinants for these job losers to find a job.

With respect to the determinants of job loss we have found that in general terms individuals with low education, employed in relatively unstable (temporal) jobs are those who are more at risk to suffer a job loss. However, a noteworthy finding of our analysis is that when comparing the determinants of job loss for older workers with those of prime age workers, we find that for the latter personal characteristics such as qualification, measured in terms of education and type of occupation help individuals not to suffer a job loss. However, for older workers, the impact of qualification on job loss is very small. For these, the main determinants to prevent a job loss are issues such as high hiring costs and favorable demand conditions. A possible interpretation of this finding is that human capital of older workers is rather obsolete given that it was acquired long time ago, even for those that are relatively more educated and whose jobs are qualified. If that is the case, personal differences in qualification do not make real differences in productivity, and hence the probability of a job loss does

not depend on them. However, this interpretation implies that older workers have not received enough on-the-job training, which is likely to be the main determinant for human capital not to be obsolete. It is possible that we are in the face of a market failure case, given that employers have no incentives to invest in specific human capital for older workers because of their relatively short future working years. In this sense, we consider that it is necessary to design policy measures that encourage employers to invest in on-the-job training for the group of older workers in order to avoid that their human capital depreciates.

Relatively to unemployment duration, an important finding is that technical education (vocational I and vocational II) have a very strong effect to help prime age workers to find a job, but a negative effect for older workers. This suggests that employers are reluctant to employ older workers for jobs that require certain level of technical qualification. A possible explanation of this is, in line of what has been said above, that human capital of older workers is rather obsolete, especially when it is referred to technical human capital. Fiscal incentives to employers when contracting older unemployed workers might serve to partially solve this problem.

Another interesting result that we have found is that for both age groups upper secondary education has a negative effect to leave unemployment. Given the impressive increase in educational attainment that Spain has been going through in the last decade we think that this negative effect may be due to an excess of supply or equivalently a shortage of demand of jobs that require such level of education.

Finally, the last result that we want to mention is that for both age groups workers that lose a self-employed job experience a greater difficulty to find another job. This may be the result of their lower information about labour market possibilities given the type of job they used to have. Some policy measure might be taken in order to help these workers to leave unemployment, given that in many

cases self-employed jobs are family business, and a job loss may entail the loss of job for many members of the household.

Data appendix

Definition of variables used in the empirical analysis:

- Duration of unemployment: In order to create the dependent variable, duration of unemployment, we have considered the answer to the question "When did you start looking for a job?" at the moment we see they lose their job and enter unemployment. From such answer we can infer duration of unemployment (in months) for entrants. Then we add three months for each interview that individuals report to continue unemployed. If they do not leave unemployment, they will be considered censored at the time we stop observing them. Complete durations for individuals whose unemployment period end up in employment are constructed by looking at the answer to the question "When did you start working in your current job?" at the time we observe they start working.

- Education: Primary education corresponds to 5 years of education, lower secondary to 8 years, upper secondary to 11 or 12 years, vocational I refers to two years of vocational studies after primary education, vocational II refers to four or five years of vocational studies after primary education. Finally, university studies can entail 3 or more years of university studies.

- Number of no dependents: It is calculated as the difference, relatively to household size, between the total number of household member and the number of economic dependent members (members of less than 16 years old or older members that are either out of the labour force or unemployed without receiving benefits).

- Unemployment rate: Male unemployment rate by province. The source is the Spanish Statistics Bureau (INE). For the analysis of job loss, we have used the unemployment rate of the moment of job loss. For the analysis of unemployment duration, this variable changes with time, but given that the information reported is quarterly, we have imputed the information given in the nearest publication to

that particular month.

- GDP rate of growth: We have used the annual rate of growth of GDP at constant prices that National Accounts publish quarterly. For the analysis of job loss, we have used the GDP rate of growth of the moment of job loss. For the analysis of unemployment duration, this variable changes with time, but given that the information reported is quarterly, we have imputed the information given in the nearest publication to that particular month.

- Unemployment benefits: It is a dummy variable that takes the value of 1 if the individual receives UB and zero otherwise. It changes with time. The information that we have about UB is quarterly, so in order to convert it to monthly data we have imputed the information given in the nearest interview to that particular month.

Notes

¹See the data appendix for a full description of all variables.

²The exact number of pay days depends on the type of dismissal (collective or individual and fair or unfair). For more details, see Bentolila and Dolado (1994).

³The maximum unemployment period that any individual can be observed is 16 months. This prevents somehow the analysis of long-term unemployment for this age group. However, the objective of this paper is not to deep into the determinants of long-term unemployment for older workers, but to study which are the specific characteristics that help and prevent unemployed older workers to have a quick exit rate to employment relatively to adult but younger workers.

⁴See the data appendix for a detailed description of the construction of the variable duration of unemployment.

⁵The proportional hazard is a very common parameterization due to its advantages. On the one hand, it does not impose any restriction on γ whereas it guarantees the non-negativity of the hazard rate. On the other hand, the estimation and inference of these models is rather direct (see Kiefer (1988)).

⁶Ridder and Verbakel (1983) show that this specification is less restrictive the more flexible the duration dependence is. They also show that the other standard definition of unobserved heterogeneity (discrete non parametric estimation), although in terms of goodness of fit it gives better results, its effect over final results is very small. Given the computation complexity of such assumption, we have assumed the gamma-distribution.

⁷The variable unemployment benefits (UB) is a variable that changes with time. This allows us to capture the effect of exhausting UB for the hazard. To see precisely how we have constructed it, see the data appendix.

⁸At the end of table 4a we have included the significance of the heterogeneity

variance for those models where heterogeneity is controlled for, as well as the statistic which corresponds to the test of the likelihood ratio of both models (including the term of heterogeneity against not including it). This value must be compared to a $\hat{A}_{(1)}^2$ (3.84 at 5%). This test is often used in this context (see Lancaster (1990)), although the second model is not, strictly speaking, nested in the first one.

⁹Not correcting for unobserved heterogeneity induces to underestimate the duration dependence and diminishes the effect of explanatory variables on the hazard rate (see Lancaster (1990)).

¹⁰Similarly, we introduced interactions between the log of duration and some explanatory variables but they were not significant, so we decided not to include them in the final estimation.

REFERENCES

- Alba, A. (1998): "Re-Employment Probabilities of Young Workers in Spain", *Investigaciones Económicas*, 22(2), pp.201-224.
- Bentolila, S. and Dolado, J.J. (1994): "Labour Flexibility and Wages: Lessons from Spain", *Economic Policy: A European Forum*; 9(18), April 1994, pp.53-99.
- Bover, O., Arellano, M. and Bentolila, S. (1996): "Unemployment Duration, Benefit Duration and the Business Cycle", *Estudios Económicos del Banco de España*, Departamento de Investigación, nº 57.
- García, J.I. (1997): "Las Tasas de Salida del Empleo y el Desempleo en España (1978-1993)", *Investigaciones Económicas*, 21(1), pp.29-53.
- Jenkins, S. (1995): "Easy Estimation Methods for Discrete Time Duration Models", *Oxford Bulletin of Economics and Statistics*, 57.1, pp.120-138.
- Kiefer, N.M. (1988): "Economic Duration Data and Hazard Functions", *Journal of Economic Literature*, Vol.XXVI, pp.646-679.
- Lancaster, T. (1990): "The Econometric Analysis of Transition Data", Cambridge University Press, Cambridge.
- Mortensen, D.T. (1970): "A theory of wage and employment dynamics", in E.S. Phelps et al., eds, *Microeconomic foundations of employment and inflation theory*. New York: W.W. Norton.
- OECD (1998), Perspectivas del empleo, 1998, OCDE, Ministerio de Trabajo y Asuntos Sociales. Subdirección General de Publicaciones.
- Ridder, G. and Verbakel, W. (1983): "On the Estimation of the Proportional Hazard Model in the Presence of Heterogeneity", A&E Report 22/83, Faculty of Actuarial Science and Econometrics, University of Amsterdam.

- Toharia, L. (1997), "Labour Market Studies: Spain", Official publication of the European Community, serie nº 1.

Table 1. Simple transitions in the interval of one year.				
45 to 55 years	Situation at 4 th interview			
1 st interview	Employed.	Unemployed.	Inactive	Total (32785)
Employed	94.76%	3.47%	1.77%	23505
Unemployed	25.88%	66.87%	7.25%	2828
Inactive	5.58%	6.08%	88.34%	2994
35 to 44 years	Situation at 4 th interview			
1 st interview	Employed	Unemployed	Inactivity	Total (34394)
Employed	94.79%	4.30%	0.91%	25241
Unemployed	32.89%	63.45%	3.66%	3141
Inactive	12.54%	11.53%	75.93%	1483

Table 2. Individual characteristics of job losers and non job losers.				
	45 to 55 years		35 to 44 years	
	No job loss	Job loss	No job loss	Job loss
Variables				
No. Observations	18232 (93.88%)	1189 (6.12%)	18315 (92.15%)	1560 (7.85%)
Mean age	49.5645 (3.0878)	49.3179 (3.0086)	39.5240 (2.8876)	39.1038 (2.9048)
Education				
No estudios	10.85	27.75	4.35	12.95
Primary	55.59	57.78	41.81	56.99
Lower Secondary	12.04	7.65	20.09	17.82
Upper Secondary	4.91	1.77	10.85	4.23
Vocational I	1.95	0.93	3.63	2.24
Vocational II	3.75	1.93	5.77	3.33
University	10.89	2.19	13.50	2.44
Marital Status				
Married	92.83	90.50	88.54	82.24
Single	5.86	6.73	10.11	15.96
Widow	0.64	1.09	0.25	0.32
Others	0.67	1.68	1.10	1.47
Family Situation				
Head	92.46	91.25	85.56	78.65
No. of non dependents	0.4969 (0.2354)	0.5157 (0.2302)	0.4616 (0.2392)	0.4757 (0.2607)
Job Situation				
Public employee	17.97	7.15	19.39	7.05
Private employee	47.78	83.85	51.26	84.04
Self-employment	32.14	8.16	27.19	8.33
Other	2.11	0.84	2.16	0.58
Type of Contract				
Permanent	90.09	33.30	86.06	29.91
Temporal	9.91	66.70	13.94	70.09
Hours				
Full-time	98.98	98.57	99.06	98.78
Part-time	1.02	1.43	0.94	1.22

(Continuation table 2)				
	45 to 55 years		35 to 44 years	
	No job loss	Job loss	No job loss	Job loss
Tenure				
Less than 3 months	3.05	38.16	4.48	36.96
4 to 6 months	1.79	11.66	2.74	12.66
7 to 11 months	1.46	6.60	2.55	8.08
1 to 3 years	6.22	12.84	10.91	16.50
4 to 10 years	16.41	10.04	27.17	12.32
11 to 30 years	61.46	18.44	52.04	13.48
More than 30 years	9.61	2.26	0.12	0.00
Company size				
0 to 10 employees	43.73	40.82	42.51	42.02
11 to 49 employees	23.85	42.78	26.58	43.58
more than 50 employees	32.42	16.40	30.91	14.40
Occupation				
Professional	12.88	2.52	13.62	3.85
Clerical	10.94	4.21	12.77	4.17
Trade	8.26	3.78	9.12	3.33
Personal Services	7.24	6.31	8.67	8.08
Agricultures	11.56	10.68	7.63	8.14
Skilled manual	5.47	4.46	4.71	4.17
Non skilled manual	43.64	68.04	43.48	68.27
Activity				
Agriculture	12.33	14.13	8.39	11.79
Manufacturing	37.13	50.04	35.84	47.63
Construction	4.89	12.78	6.04	12.31
Trade	21.39	14.13	21.39	16.60
Other services	24.27	8.92	28.34	11.67

Table 3. Logit estimation for the transition Employment-Unemployment ¹ Dependent variable: Job loss=1; No job loss=0		
	45 to 55 years	35 to 44 years
Variables		
Age	-0.004 (0.36)	-0.02 (2.23)
Education (Ref. Primary):		
No studies	0.23 (2.67)	0.12 (1.21)
Lower secondary	-0.16 (1.28)	-0.23 (2.88)
Upper secondary	-0.38 (1.56)	-0.43 (2.96)
Vocational I	-0.45 (1.36)	-0.40 (2.09)
Vocational II	-0.11 (0.48)	-0.20 (1.22)
University	-0.55 (2.35)	-1.20 (6.03)
Marital Status (Ref. Married)		
Single	0.22 (1.25)	0.40 (3.23)
Widow	0.55 (1.58)	0.75 (1.39)
Others	1.01 (3.21)	0.52 (1.96)
Family Situation (Ref. Head)		
No Head	-0.06 (0.45)	0.005 (0.04)
No. of non dependents	0.001 (0.01)	0.06 (0.43)
Job Situation (Ref. Private employee):		
Public employee	-0.24 (1.72)	-0.32 (2.54)
Self-employed	-3.37 (28.11)	-2.89 (27.81)
Other	-3.05 (9.37)	-3.26 (9.57)
Hours (Ref. Full-time):		
Part-time	0.11 (0.40)	0.25 (0.90)
Type of contract (Ref. Temporal):		
Permanent	-0.10 (0.38)	-0.42 (1.73)
Tenure (Ref. Less than 3 years*Permanent):		
4 to 6 months*Permanent	-0.20 (0.49)	-0.45 (1.18)
7 to 11 months*Permanent	-0.71 (1.73)	-0.25 (0.76)
1 to 3 years*Permanent	-1.25 (4.37)	-0.95 (3.66)
4 to 10 years*Permanent	-1.97 (7.15)	-1.65 (6.63)
11 to 30 years*Permanent	-2.61 (9.90)	-2.18 (8.85)
More than 30 years ² *Permanent	-2.65 (7.74)	-

¹ Absolute t-value in brackets.

² Dummy variable for this tenure has not been included in the prime age group estimation because there is nobody younger than 45 with a tenure upper than 30 years.

(Continuation table 3)		
	45 to 55 years	35 to 44 years
Company size (Ref. Less than 10*Permanent)		
11 to 49 employees*Permanent	-0.03 (0.28)	0.03 (0.32)
More than 50 employees*Permanent	-0.72 (4.71)	-0.55 (3.91)
Occupation (Ref. Non skilled manual):		
Professional	-0.56 (2.57)	-0.16 (0.99)
Clerical	-0.13 (0.74)	-0.35 (2.31)
Trade	-0.17 (0.96)	-0.60 (3.65)
Personal services	0.02 (0.14)	0.06 (0.51)
Agriculture	-0.24 (1.23)	-0.33 (1.79)
Skilled manual	-0.23 (1.37)	-0.35 (2.31)
Activity (Ref. Manufacturing):		
Agriculture	-0.10 (0.56)	0.23 (1.38)
Construction	0.30 (2.62)	0.28 (2.79)
Trade	-0.28 (2.44)	-0.09 (0.93)
Other services	-0.74 (5.32)	-0.45 (4.04)
Male unemp. rate by province	0.03 (6.94)	0.04 (9.41)
GDP growth rate	-0.09 (4.73)	-0.05 (2.82)
Constant ³	-0.70 (1.24)	-0.22 (0.51)
No. of observations	19421 (100%)	19875 (100%)
No. of individuals who retain the job	18232 (93.88%)	18315 (92.15%)
No. of individuals who lose the job	1189 (6.12%)	1560 (7.85%)

³ The constant term represents the reference individual, it is, a male with primary studies, married, whose last

job was in the private sector with temporal contract, in a non skilled manual occupation and in a manufacturing activity.

Table 4.a. Hazard rate estimations from Unemployment to Employment				
	45 to 55 years		35 to 44 years	
Variables	No H.I.	With H.I.	No H.I.	With H.I.
Age	-0.05 (2.98)	-0.06 (2.60)	-0.03 (2.10)	-0.03 (1.69)
Education (Ref. Primary)				
No studies	0.05 (0.43)	0.01 (0.11)	-0.09 (0.76)	-0.12 (0.77)
Low secondary	-6.25 (1.80)	-7.48 (1.63)	-0.15 (1.39)	-0.19 (1.33)
Low sec*Age	0.12 (1.71)	0.14 (1.48)	-	-
Up secondary	-0.96 (1.37)	-1.23 (1.55)	-0.71 (2.91)	-0.81 (2.58)
Vocational I	0.35 (0.61)	0.06 (0.08)	8.20 (1.82)	10.88 (1.75)
Vocational I*Age	-	-	-0.20 (1.75)	-0.27 (1.65)
Vocational II	-1.04 (2.40)	-1.49 (2.38)	29.93 (3.86)	34.32 (3.41)
Vocational II*Age	-	-	-0.81 (3.79)	-0.93 (3.39)
University	-0.26 (0.63)	-0.27 (0.51)	-0.22 (0.83)	-0.39 (1.07)
Activity (Ref. Manufacturing)				
Agriculture	0.04 (0.31)	-0.03 (0.17)	0.27 (2.41)	0.33 (2.05)
Trade	-0.46 (2.74)	-0.60 (2.62)	-0.24 (2.01)	-0.37 (2.29)
Construction	0.08 (0.50)	0.11 (0.47)	-0.05 (0.39)	-0.07 (0.35)
Other services	-0.35 (1.73)	-0.55 (1.87)	-0.23 (1.64)	-0.21 (1.09)
Job Situation (Ref. Private employee)				
Public employee	0.11 (0.61)	0.25 (0.88)	-3.39 (1.80)	-3.90 (1.52)
Public*Age	-	-	0.08 (1.83)	0.10 (1.55)
Self-employed	-0.43 (2.28)	-0.56 (2.06)	-0.37 (2.45)	-0.48 (2.42)
Other	-1.55 (1.55)	-2.18 (1.93)	-0.009 (0.01)	0.27 (0.40)
Non dependents	-0.41 (1.98)	-0.47 (1.61)	-0.60 (3.98)	-0.65 (3.20)
Unem. benefit (Ref. Do not receive)				
Receive	-2.17 (16.93)	-2.65 (16.42)	-1.97 (19.92)	-2.37 (19.20)
Economic situation				
GDP growth rate	0.11 (3.39)	0.13 (3.03)	0.03 (1.22)	0.04 (1.18)
Unemp. rate	-0.006 (0.93)	-0.01 (1.37)	-0.02 (4.04)	-0.03 (4.43)
Heterog. variance	-	1.01 (4.63)	-	0.79 (5.04)
L-ratio estatist.	-	35.1318	-	42.9433
No. of observations	7440		9338	

Table 4b. Estimated duration dependence.				
	45 to 55 years		35 to 44 years	
Duration	Without UH	With UH	Without UH	With UH
d1	-2.17 (2.22)	-1.32 (1.02)	-3.01 (4.26)	-2.61 (2.92)
d2	-0.91 (1.00)	-0.004 (0.004)	-1.37 (2.18)	-0.91 (1.10)
d3	0.65 (0.74)	1.63 (1.33)	-0.27 (0.45)	0.25 (0.31)
d4	1.36 (1.55)	2.47 (2.00)	0.78 (1.30)	1.43 (1.74)
d5	1.50 (1.71)	2.80 (2.25)	0.81 (1.34)	1.62 (1.96)
d6	1.42 (1.61)	2.86 (2.28)	0.96 (1.58)	1.88 (2.26)
d7	1.41 (1.59)	2.98 (2.37)	0.77 (1.25)	1.80 (2.14)
d8	1.32 (1.48)	2.95 (2.33)	0.59 (0.95)	1.71 (2.01)
d9	1.23 (1.38)	2.99 (2.34)	0.70 (1.12)	1.90 (2.23)
d10	1.16 (1.30)	2.98 (2.32)	0.66 (1.05)	1.87 (2.17)
d11	1.16 (1.27)	3.06 (2.35)	0.44 (0.68)	1.72 (1.97)
d12	1.26 (1.37)	3.22 (2.46)	-0.24 (0.34)	1.06 (1.16)
d13	0.46 (0.45)	2.46 (1.78)	0.44 (0.66)	1.85 (2.07)
d14	0.64 (0.64)	2.60 (1.88)	-0.10 (0.14)	1.47 (1.50)
d15	1.47 (1.45)	3.44 (2.47)	0.14 (0.17)	1.80 (1.70)
d16	1.43 (1.09)	3.56 (2.14)	0.65 (0.56)	2.30 (1.68)

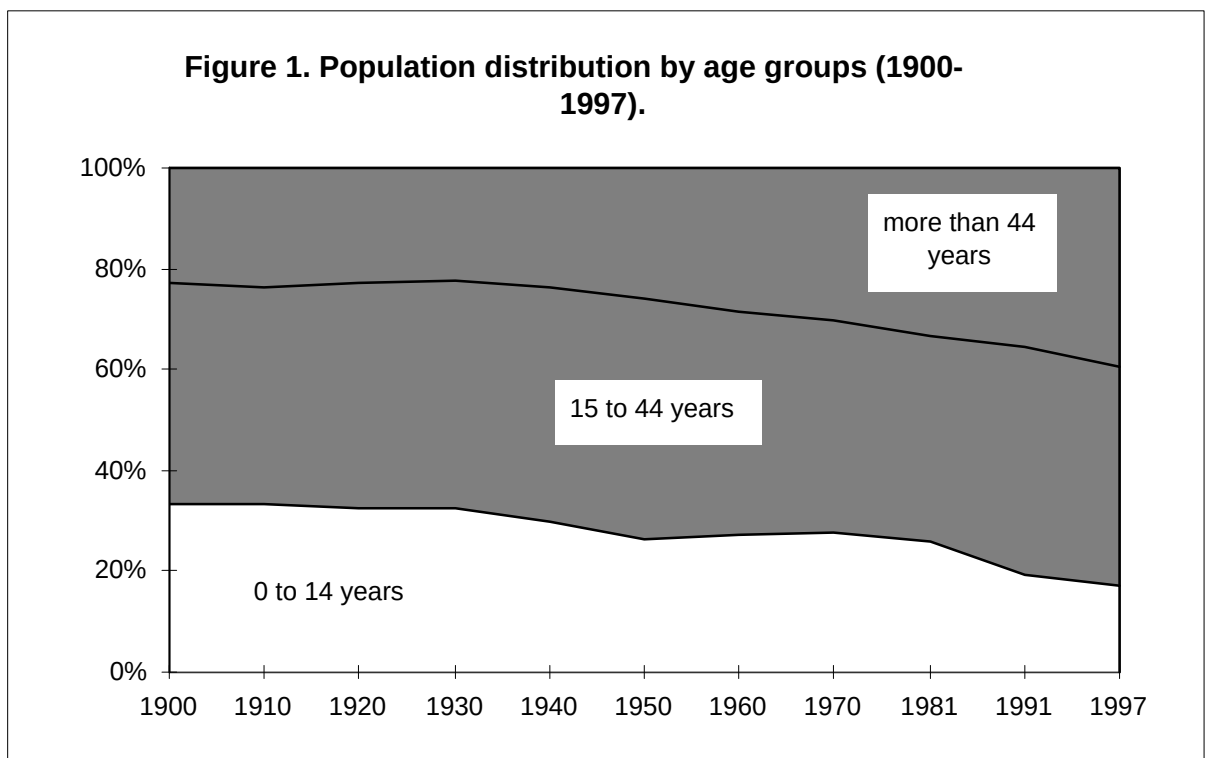


Figure 1: Source: Anuario Estadístico de España (1900-1991) and Encuesta de Población Activa (EPA) (1997). Age groups for 1997 are: 0-15 years, 16-44 years and more than 45 years.



Figure 2: Source: Encuesta de Población Activa (EPA enlazada), 1992:I-1997:II.

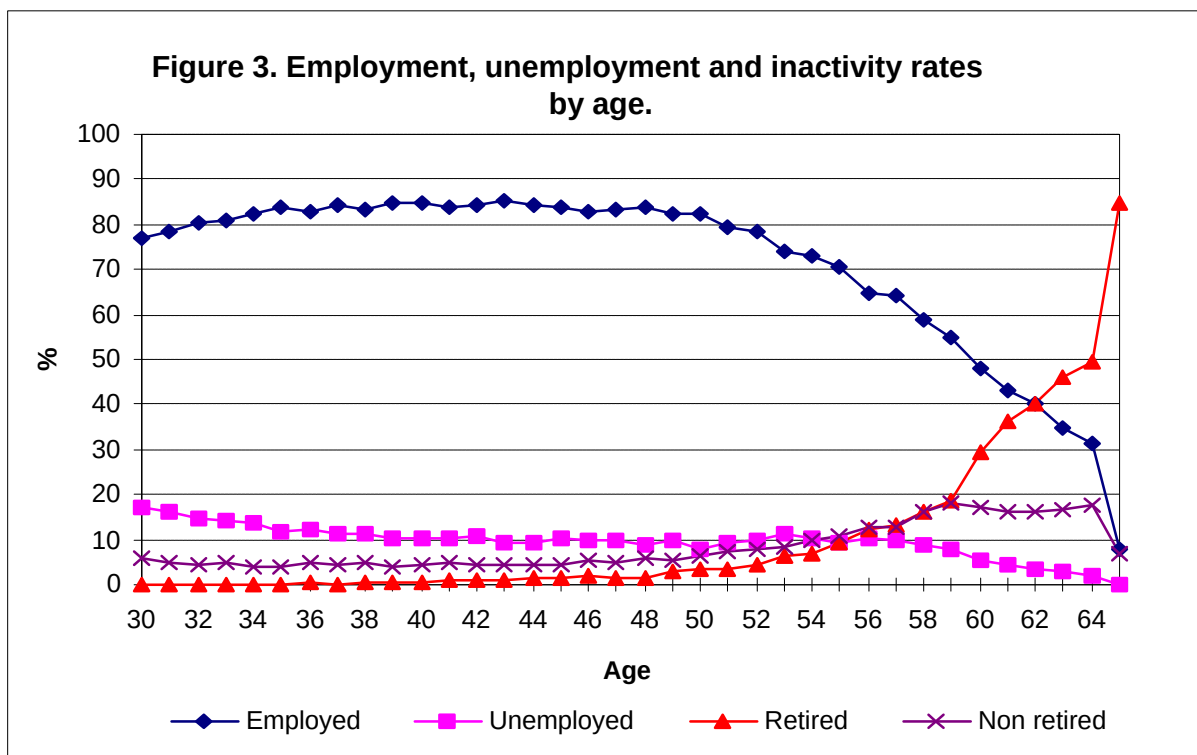


Figure 3: Source: Encuesta de Población Activa (EPA enlazada), 1992:I-1997:II.

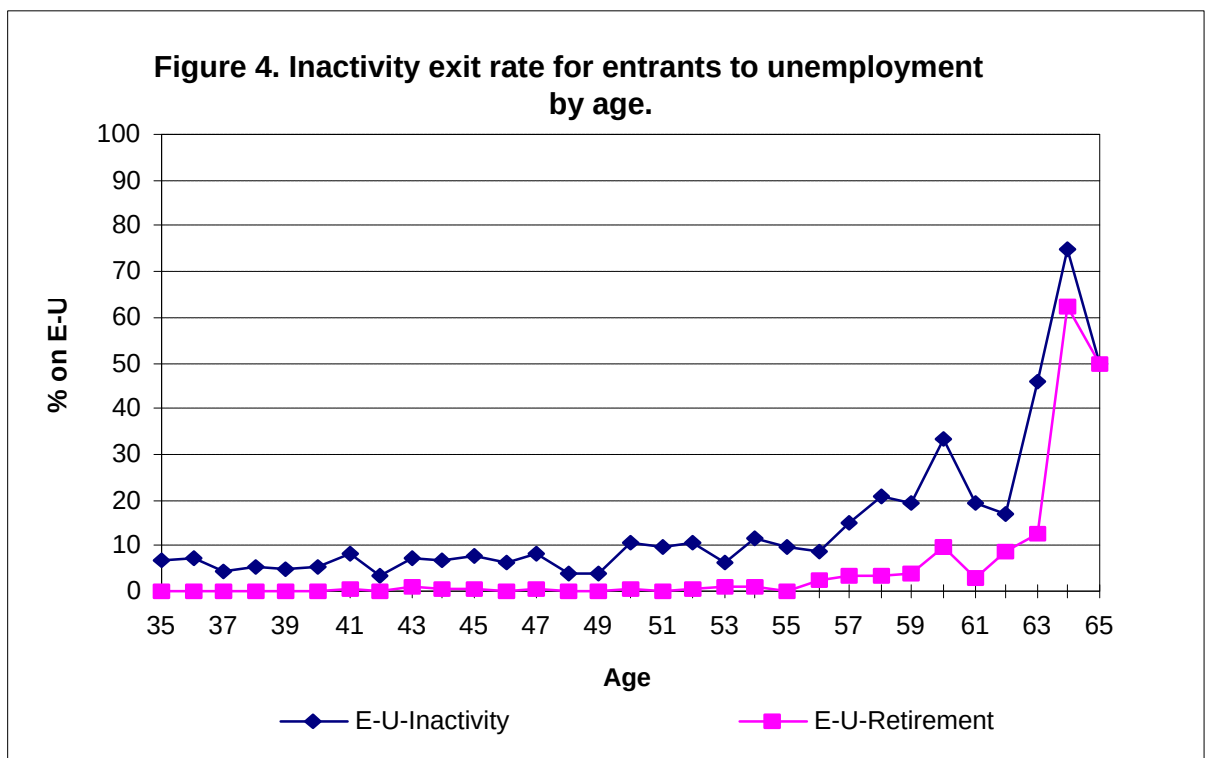


Figure 4: Source: Encuesta de Población Activa (EPA enlazada), 1992:I-1997:II.

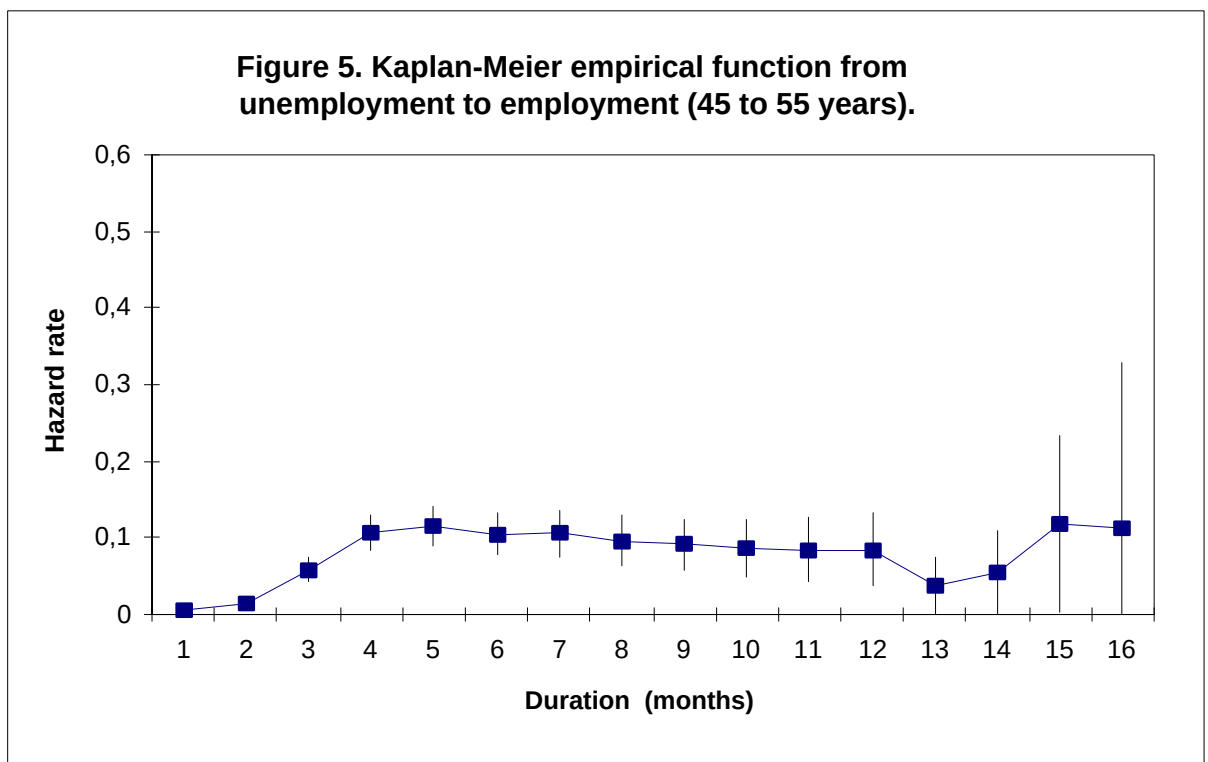


Figure 5:

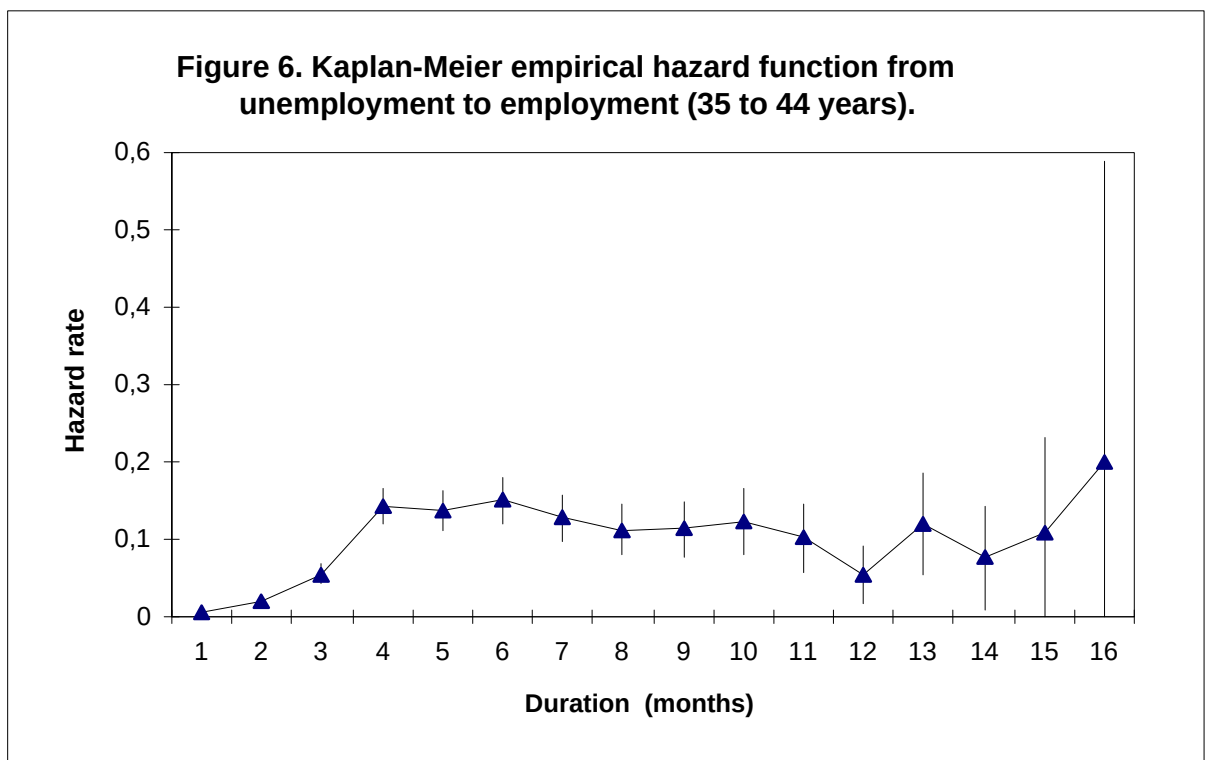


Figure 6:

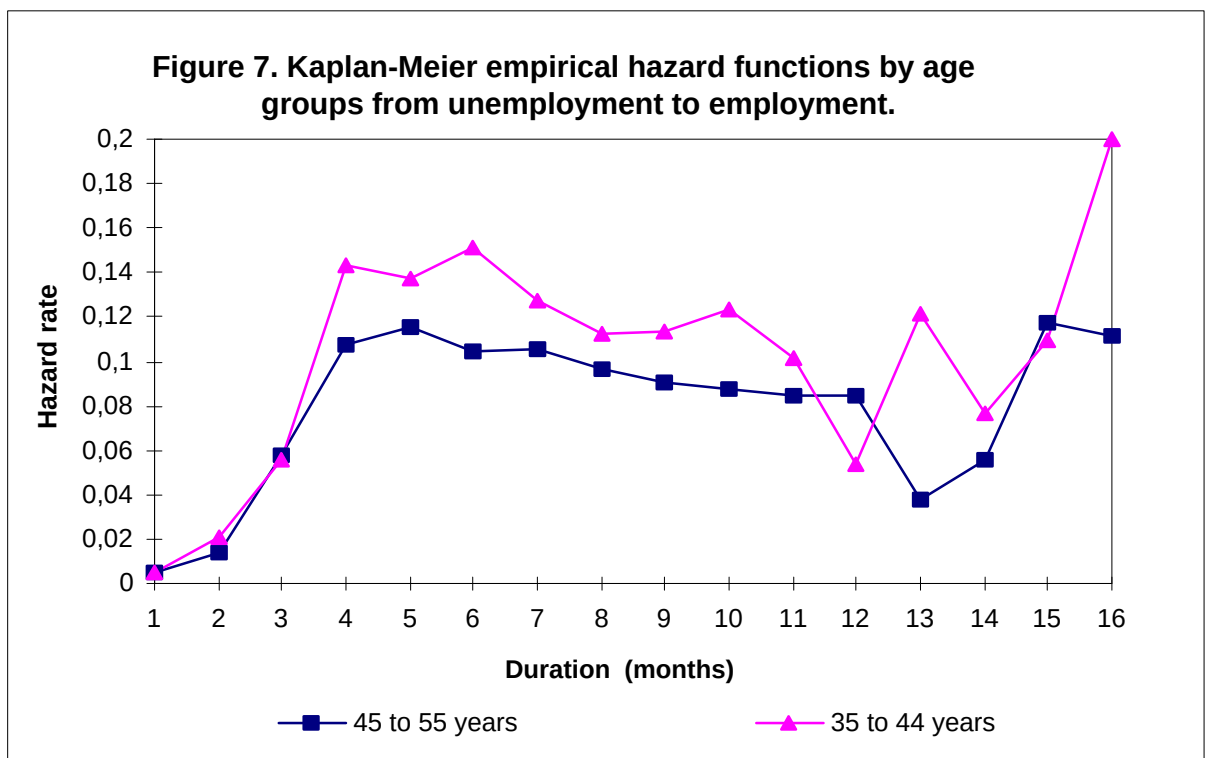


Figure 7: