The Dynamics of Poverty in Spain: The relevance of considering multiple-spells and their accumulation

José María Arranz[Ψ]
(Universidad de Alcalá)
Olga Cantó
(Universidade de Vigo)

VERY PRELIMINARY VERSION, PLEASE DO NOT CITE

Abstract

The analysis of poverty dynamics yields important insights about the nature of poverty and the expected effectiveness of alternative social policies in order to fight against it. The recent literature on poverty dynamics proposes various approaches to the measurement of the effects of poverty spell length and the experience of multiple-spells on poverty exit or re-entry rates. However, none of the proposals in the literature considers the expected effect on transition probabilities of the accumulation of poverty spells in an individual's poverty history. This paper proposes the estimation of the individual probability of leaving and entering poverty using of a multiple-spell methodology that is able to consider the length of the current poverty spell, the time between various poverty experiences and the accumulation of spells. Results indicate that poverty transitions still show some negative duration dependence even if we introduce controls for unobserved heterogeneity and lagged durations. The duration of previous poverty spells reduces the exit and increases the re-entry hazard. Finally, estimating separate hazards by spell order allows for some control for the relevant impact of left-truncation on results and shows the significant differences in the covariates that turn out to promote transitions for individuals that often fluctuate into and out of poverty (transitory poor) in comparison with those that suffer a rather more persistent poverty experience (chronic poor).

Keywords: poverty dynamics, discrete-time hazard models, multiple spells, Spain.

JEL Classification: D1, D31, I32.

Address for correspondence: Olga Cantó, Departamento de Economía Aplicada, Facultade de CC. Económicas e Empresariais, Universidade de Vigo, Campus de Lagoas Marcosende s/n, 36310 Vigo (Pontevedra), Spain, Tel: +34 986813530, Fax: +34 986812401, e-mail: ocanto@uvigo.es

Introduction

The literature centred on the analysis of the lowest part of the income distribution has produced a large amount of work on the dynamics of poverty in recent years. A first interesting result of this research is the proposal of a new dimension in the measurement of poverty which refers to the duration of the poverty spells experienced by the individual. This dimension is to be added to Sen's three classic dimensions of poverty, often referred to as the three I's of poverty: Incidence, Intensity and Inequality.

Certainly, it appears quite undebatable that it is of interest to be able to characterise the diverse low income patterns of individuals along time. In particular, the advantage of providing information on the demographic or socio-economic situation of individuals that suffer from *persistent* poverty in contrast with those that experience low income for a relatively short time, is that different policies may be designed in fighting against each of these phenomena. Surely, fighting against long-term or *persistent* poverty requires the general use of educational or labour market policies while fighting against *transitory* poverty may add to these long term policies the use of money transfers as income substitutes during short periods of time. These transfers would be focussed on the reduction of the chances of those transitory poor individuals to experience recurrent poverty spells that would push them into chronic low income as time evolves. In this context, we believe that it becomes particularly important to investigate the relevance of poverty spell recurrence and, most importantly, to what extent the probability of leaving a second or subsequent poverty spell depends on having had a previous experience in poverty and non-poverty with a varied length.

The literature on poverty dynamics has largely focussed on the analysis of spells and the estimation of entry and re-entry hazards after the seminal works of Allison (1982) and Bane and Ellwood (1986) which have recently been fostered by Stevens (1999), Devicienti (2001) or Biewen (2006). These papers study the extent and composition of chronic poverty in a variety of countries using a hazard rate approach that accounts for multiple spells of poverty and incorporates spell duration, individual and household characteristics and unobserved heterogeneity. However, we believe that there are still some interesting issues related to the estimation of transition probabilities and the analysis of the different patterns of poverty along time that need to be investigated. One of the main areas of research that need to be developed in this field is related to the extent that individual previous experiences in poverty (as long as panel data allows us to know) may have in determining future poverty risks. In particular, the previous hazard rate approaches assume that the consideration of individual unobserved

heterogeneity captures the correlation across individual spells and thus identifies four types of individuals in the sample through a joint distribution of individual specific effects with respect to spells of poverty and non-poverty. This assumption imposes the estimation of a single exit and re-entry hazard rate for each individual independent of the number of poverty spells previously experienced. Further, we believe that the individual poverty history may play a relevant role in itself in determining the likelihood of experiencing a new poverty or non-poverty spell. Therefore, predicted exit and re-entry hazards should incorporate the information on both the duration and the accumulation of spells. Note that if we model state dependence exclusively through unobserved heterogeneity then current poverty spells duration, conditional on observed and unobserved heterogeneity, would be independent of past poverty spells duration. In fact, we believe that it could be the case that the importance of static unobserved characteristics on poverty exit and re-entry hazard rates may, in part, hide a genuine spell accumulation effect that can be distinguished if we allow poverty exit and re-entry hazards to vary as spells accumulate.

This issue is virtually unexplored in the literature on the dynamics of poverty and social exclusion while, in contrast, in the literature on labour economics there is already an important number of papers devoted to the analysis of recurrent unemployment and its effects on the individual's probability of leaving unemployment in a forthcoming spell i.e. the relevance of unemployment history on a current unemployment spell. These models are popular in the labour economics literature because they can easily incorporate variables that change over time and censored spells while they also allow one to examine how the probability of leaving poverty changes with spell duration when spells accumulate.[1] Some of these papers state that the duration of previous spells can contain valuable information about individual types, with the result being that the durations of previous spells would significantly reduce the exit hazard. Following these we tackle the complete analysis of the influence of poverty history on exit and re-entry hazards by estimating hazard rates that consider all the information available on the individual poverty situation by including lagged duration and spell accumulation covariates while controlling for both time-constant and time-varying individual and household characteristics and unobserved heterogeneity. In particular, we separate the estimation of baseline hazards and the effect of observed heterogeneity on transitions by spell order thus

[1] These models were introduced by Lancaster (1990) and have been mostly used for the analysis of unemployment spells in Heckman and Borjas (1980), Trivedi and Alexander (1989), Bonnal et al. (1997), Omori (1997) or Arranz and Muro (2004, 2006). Omori (1997) uses a model that can test if the exit hazard decreases with the duration of past and current poverty spells other things equal using a lagged duration term as an explanatory variable.

allowing poverty exit and re-entry rates as well as the effects of characteristics on them to vary when spells accumulate.

Our dataset for analysis is the information on Spain in the European Community Household Panel (hereinafter, ECHP) for the period 1994-2000. We analyse dynamics using this dataset by estimating two hazard rates, one for leaving poverty and another one for re-entering poverty, by spell order. Since omitting the left-truncated cases would lead to serious selection bias (see Iceland 1997) our strategy is to include them in the analysis and discuss the substantive differences in results when analysing exit hazard rates for first-spells for individuals in poverty in 1994 (for whom the poverty spell is in progress) and new entrants to poverty within our largest possible window of analysis: individuals that enter poverty in 1995.

Thus, this paper contributes to the literature on poverty dynamics in several ways: First, we aim to contribute to the debate on the determinants of the probability of leaving poverty by trying to disaggregate the distinct effects of unobserved heterogeneity and duration dependence. Secondly, our approach allows for different poverty exit, entry and re-entry hazards when spells accumulate, challenging previous studies based on poverty persistence that estimate one exit and one re-entry hazard rate independent of the number and duration of individual poverty experiences. Thirdly, our methodology is able to incorporate all relevant available information from the dataset by using time-varying covariates within each spell in the estimation of the exit and re-entry hazards, this will allow us to consider demographic or labour market events as explanatory variables.

The paper is organized as follows. Section 1 presents the most important previous results in the literature on the analysis of poverty dynamics in general and poverty outflow in particular. In Section 2, we describe the ECHP data set, detailing the definition of the variables and undertaking a thorough descriptive analysis of the observed poverty and non-poverty spells in the dataset. Section 4 presents the econometric model while Section 5 discusses the main estimation results. Finally, Section 6 concludes by presenting our main findings.

1. Some previous approaches in the literature

The analysis of the dynamics of poverty was initiated in the United States during the eighties, mainly as a result of the availability of a mature and reliable longitudinal data survey: the Panel Survey of Income Dynamics (PSID), ongoing since 1968.[2] In the European context it is

[2] One of the most relevant papers in this literature published in that period are Allison (1982) and Bane and Ellwood (1986). Other interesting papers are Hill (1981), Plotnick (1983), Duncan (1984) or Sawhill (1988).

only in the beginning of the nineties that Duncan *et al.* (1993) try to compare, for the first time, the duration of poverty in a group of countries using a variety of data sources. [3] Fortunately for the development of this literature, in 1994 the European Statistical Office decided to obtain an accurate and comparable longitudinal data information for most countries in the European Union initiating the European Community Household Panel (ECHP) which, after some years, has become a basic tool for the analysis of social cohesion dynamics in the European Union. The exploitation of this dataset, together with the information some nationally based panels available for some particular countries such as the British Household Panel Survey (BHPS) for the U.K., the German Socioeconomic Panel (GSOEP) for Germany or the *Encuesta Continua de Presupuestos Familiares* (ECPF) for Spain, has allowed a large list of researchers to present plausible answers to important issues related to the duration and persistence of poverty and deprivation.[4]

The development of new statistical techniques in the estimation of transition probabilities that take state dependence into account, as Aassve *et al.* (2005) note in their literature revision, has produced an important number of ways to estimate transition risks. In the first place some papers have used *components of variance* models to capture the dynamics of income using a complex error structure.[5] These models are able to predict the fraction of the population likely to be in poverty for different lengths of time. This methodology has the advantage of including all individual income information in time and avoiding the ex-ante definition of poverty using a binary indicator. Its main disadvantage, however, is that it assumes that the dynamics of the income process is identical for all individuals in the sample, whatever their income level. Clearly, this does not seem to match reality and, in fact, Stevens (1999) and Devicienti (2001) conclude that, in comparison with duration models, components of variance models perform worse in fitting observed patterns of poverty in the US and the UK respectively.

Some other recent approximations to the estimation of outflow hazard rates propose the estimation of a *first order Markov* taking simultaneously into account that individuals are not randomly distributed either within the poor at first interview (initial conditions) or within the effectively observed at second interview (not suffering attrition) - see Cappellari and Jenkins (2002 and 2004). In some sense, this type of approach focuses on sample heterogeneity and

[3] This is first paper on poverty dynamics that we know of Duncan *et al.* (1993) compare the duration of poverty in Germany, Sweden, The Netherlands and Luxembourg and in the Lorena region (France).

[4] Examples of these are Jarvis and Jenkins (1996), Cantó (1998), Antolín et al. (1999), Jenkins and Rigg (2001), Devicienti (2001), Gradín *et al.* (2004), Aassve *et al.* (2005, Biewen (2006) or Cantó *et al.*, (2007).

[5] Examples of this approach are Lillard and Willis (1978), Stevens (1999) and Devicienti (2001).

avoids assigning relevance to spell duration or persistence in the determination of the outflow rate, which is in line with the arguments raised by Blumen *et al*. (1995) in order to explain why empirical transition matrices underestimate the main diagonal of the matrix thus biasing downwards any estimation of persistence.

A different view on the matter was offered by Shorrocks (1976) who attributed the phenomenon to a violation of the first-order Markov assumption which implies that the extension of the Markov process, in as much as the longitudinal information allows us to is the way to proceed in the accurate estimation of the outflow rate. In this second line of argument, a long-standing approach to model poverty transitions has been the use of *discrete duration models* in a hazard rate framework. Since the relevant contributions to this literature due to Kalbfleisch and Prentice (1980), Allison (1982), Duncan (1984) or Bane and Ellwood (1986), a large list of papers have developed single-spell duration models based on Markov chains that allow for the estimation of the transition probability taking into account all the relevant longitudinal information offered by panel datasets. A relevant contribution to the easy estimation of hazard rates as an n-Markov chain by using a simple logit or probit model was proposed by Jenkins (1995).[6]

However, a list of recent papers have highlighted the limitations of the use of single spells approaches in the fitting the observed pattern of poverty persistence and have proposed a new methodology that allows for the consideration of multiple poverty and non-poverty spells simultaneously. This methodology was first proposed by Stevens (1999) and then used by Devicienti (2001), Hansen and Wahlberg (2004) and Biewen (2006).[7] These papers do not

[6] Empirical applications of this methodology selecting a poverty inflow sample of spells for Spanish data referred to the 1985-1995 period appear in Cantó (2002, 2003). Finnie and Sweetman (2003) use this methodology on administrative data to estimate exit and re-entry transitions for Canadian individuals avoiding to include unobserved heterogeneity but stratifying the sample by family status (single, couple with/without children and lone parents) and including events as a relevant reason for transitions occurrence. Cantó *et al*. (2007) use a similar strategy to estimate exit transitions for Spanish households distinguishing between households with and without children and including a large list of events as explanatory variables of the transition equation. A single-spell approach is also used by Fouarge and Layte (2005) who estimate the exit probability using a single-spell approach but including unobserved heterogeneity an individual specific error term with Gaussian distribution and assume a Weibull hazard rate model for the exit probability. Much more simple is the methodology in Valletta (2006) who uses a pool of transitions to estimate the probability of leaving and entering poverty for a sample of individuals living in working-age households including labour market and demographic events as explanatory variables but without considering the effect of duration, unobserved heterogeneity or past poverty occurrences.

[7] Devicienti (2001) adds the consideration of the initial conditions problem by adjusting the contribution to the exit hazard rate of those individuals who are already below the poverty line at first household interview. In general, in most available datasets the lack of information on the previous household socio-economic situation implies that most papers must either avoid to use left-censored observations or avoid the inclusion of duration as a explanatory variable. However, Devicienti (2001) reports that fitting this type of model is computationally too demanding for a relatively short panel dataset of eight years. Hansen and Wahlberg (2004) use this same approach using data from Swedish administrative records which imply no attrition and a most accurate income measurement. Biewen (2006) shows how correct standard errors (not affected by the correlation between

only consider the estimation of the probability of leaving a poverty spell but are able to estimate the hazard rate for multiple spells while controlling for unobserved heterogeneity, an important source of bias for the estimated coefficients for duration.[8] However, these methodologies have important disadvantages, they only estimate a single exit and re-entry hazard rate independent of the number of individual poverty experiences that the individual may have accumulated in time. This means that, virtually, the recurrence of poverty spells is assumed not to affect the estimated probability of transition. Also, in practice, their estimation procedure does not allow for changes in individual characteristics during a poverty spell given that covariates are constant within a spell which does not allow for the inclusion of events as explanatory variables of the probability of transition. [9]

The analysis presented here borrows from a tested methodology in the labour economics literature on the analysis of unemployment spells that allows us, in a very simple way, to improve our knowledge on to what extent the accumulation of poverty spells and the individual poverty history (lagged poverty and non-poverty durations) has a relevant role in determining future poverty risks within a discrete duration model framework. Therefore, we aim to relax the assumption on the independence of the recurrent poverty experiences while controlling for unobserved heterogeneity and allowing for the inclusion of time-varying covariates.[10]

---

individuals from the same household) can be computed for the hazard rate model by taking into account clustering of observations at the household level. These standard errors are relevant in order to construct confidence intervals to compare the hazard rate with the components-of-variance approach. Other recent papers as Fertig and Tamm (2007) have followed a similar methodology to that of Devicienti (2001) including Biewen's correct standard errors. These authors analyse the duration of child poverty in Germany trying to contribute to the literature by reducing the effect of left-censored spells on results. In order to do so they select a sample of newly born children. However, the problem these authors face is that left-censoring in poverty is a household matter and not an individual specific problem so their strategy, in our point of view, is hardly able to improve our research knowledge of how results would change if we could use a proper non-left-censored spells sample.

[8] These approaches recognise explicitly the existence of two processes that can generate persistence: unobserved heterogeneity and true state dependence. In the first process, individuals could be heterogeneous with respect to characteristics that reduce their probability of leaving poverty (think for example that some persistent individual characteristic reduces the probability that the individual experiences a positive event between t-1 and t, i.e. finding a job, having a child, etc.). In the second process, experiencing poverty in a specific time period, in itself, increases the probability of undergoing poverty in subsequent periods.

[9] Note that in any empirical estimation of a duration model there is also an expected bias in the estimated effect of duration due, mainly, to the lack of complete information imposed by the high attrition rate registered in longitudinal data.

[10] An alternative methodology that tries to account for the way in which past poverty can have an effect on future poverty and thus aims to relax the assumption on the independence of the recurrent poverty experiences has been developed by Biewen (2004). This paper is related to the attempts to model poverty transitions in a more structural way initially proposed by Burgess and Propper (1998) and recently simplified by Aassve *et al.* (2005). These approaches propose a comprehensive model of poverty dynamics by modelling demographic and employment processes that underlie the poverty outcome. The main problem these models face is the need to simplify the large number of simultaneous risks for each household member given the limited number of equations and parameters we can identify. Further, a series of assumptions are to be made in terms of the fertility

We examine the persistence of poverty during a seven year period using data from the European Community Household Panel from 1994 to 2000 and estimate two hazard rates, one for leaving poverty and another one for entering or re-entering poverty by spell order and including regressors related to lagged spell durations and the accumulation of spells. We believe that our methodology is analogous to what is usually called a Discrete-Time Recurrent Hazard Analysis in the analysis of poverty dynamics. This implies that we are able to include events as explanatory variables for a transition into or out of poverty as in Callens *et al.* (2005) and to check the dependence of results when poverty experiences are recurrent. This strategy allows us to easily integrate some control for left-truncation. Since omitting the left-truncated cases would lead to serious selection bias (see Iceland 1997) our strategy is to include them in the analysis and discuss their substantive differences in the results using two methods. First, we will separate them from the rest of spells by labelling them as *first spells* in our life-table and hazard regressions analysis[11] and second, replicating all relevant calculations for a sample of *new-entrants* to poverty that restricts the analysis to individuals who are observed to become poor within the observation window, most precisely at their second interview in the panel in 1995.[12]

3. The ECHP data set.

3.1 A short description of the ECHP data set.

The dataset we use is constructed using the information for Spain from the European Community Household Panel (hereinafter, ECHP) for the period 1994-2000. The dataset used was designed by *Eurostat* in order to obtain country-comparable statistics on many demographic and socio-economic aspects of the European population related to labour market issues, income, living standards, education, employment and not employment-related satisfaction, health and migration, among others. The ECHP collects information about individual age, sex, education, income and labour market status together with an important amount of family composition variables.

---

and employment process and this becomes most difficult in socioeconomic contexts where these processes and their income effects are largely unexplored.

[11] Note that this implies a form of control for left-truncation.

[12] These two strategies are referred to as convenient in Iceland (1997). The author refers to the fact that, even if they do not solve the problem they shed light on the issues of interest. The second strategy was used by Moffitt and Rendall (1993) in their study on lifetime distribution of female headship in the U.S.

The ECHP is annually based and has a longitudinal structure that allows following individuals during eight years, unless they voluntarily leave the survey earlier.[13] Most of the variables included in the survey describe the individual's and household's situation at the moment of the interview (1994 along to 2001) or refer to information on the current month. However, the information on annual individual income from a variety of sources refers to that obtained by the individual during the year previous to the interview. Thus, in the construction of the relevant income variable to determine the individual situation of poverty in a given year we believe that it is important to make demographic and income information contemporaneous, especially if we wish to include time-varying covariates or events as explanatory variables of poverty flows. This means that we have to drop the information on incomes for 1993 (declared in 1994) and on characteristics for 2001 which implies that we finally use the information from seven complete waves instead of eight.[14] The advantage of this procedure is that the definition of poor is based on contemporaneous information on incomes and needs which becomes crucial when we aim to correctly measure the effect of demographic or socioeconomic events on the individual's probability of experiencing a transition.

3.2 Sample selection and descriptive analysis

The period of observation in our study is from 1994 to 2000 and our sample includes individuals with a complete interview in the survey[15] and whose household reports previous year income information.[16] As noted earlier, our sample reduces slightly, see Table A.2, when we match demographic and socioeconomic characteristics with yearly income so that we have contemporaneous information on both. Thus, our final sample in 1994 includes 19,044 individuals of which 15,042 (79 percent) are adults and 4,002 (21 percent) are children below 16 years of age.

For the purposes of our investigation, we use the standard definition of poverty, thus an individual is poor if total household income of the household he or she lives in is less than 60

[13] This would imply the existence of attrition which is taken into account in the survey by the use of longitudinal weights.

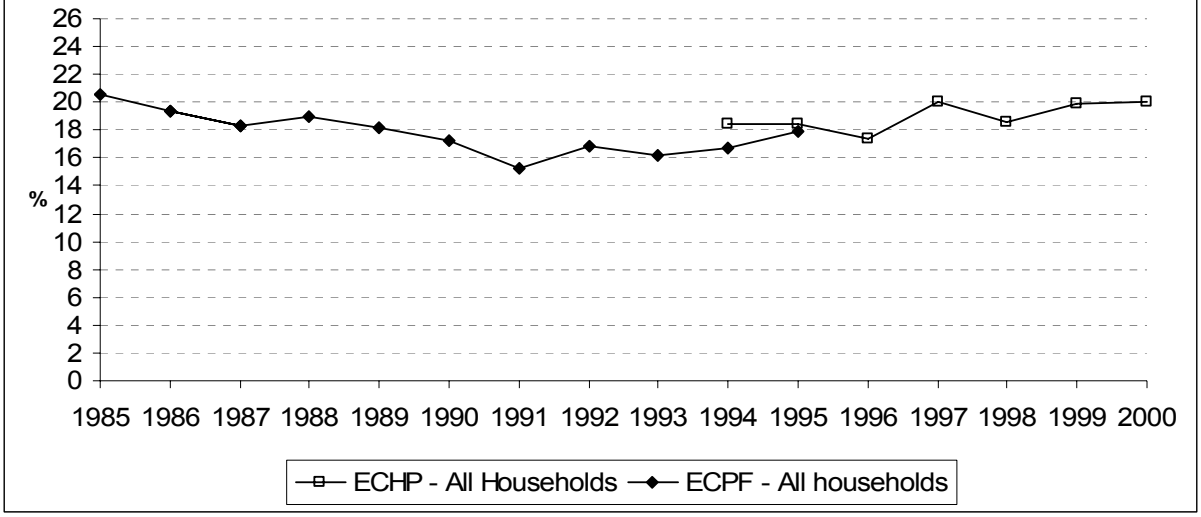
[14] It is important to note here that given that individuals change households by creating a new one between two consecutive interviews (emancipation, divorce or separation), we must make some adjustments to household income so that individuals that change household effectively contribute to the income of the household where they were when household characteristics were observed. Clearly, if attrition occurs this strategy implies that we lose information on some individuals and our sample reduces. In fact, our final sample reduces between a 9 to 14 percent with respect to a non-contemporaneous sample depending on the year considered – see Table A.2.

[15] We eliminate between a 1 and 2 percent of individuals due to the lack of complete interview – see Table A.1.

[16] We lose less than 1 percent of individuals most of the years due to the lack of information on previous year household income.

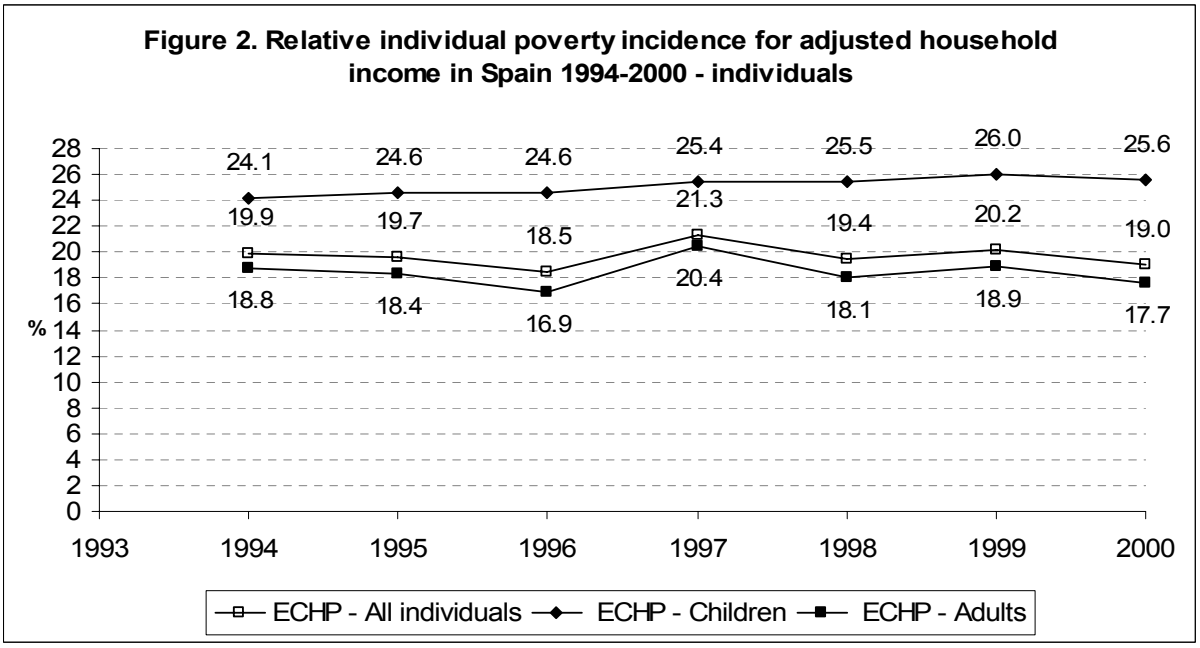
per cent of the contemporary household median income. The results on static poverty for this sample are reported in Figure 1 and 2 (households and individuals).

Figure 1. Relative poverty incidence for adjusted household income in Spain 1985-2000



Note: These results on poverty are obtained using income data from the ECPF for 1985 up to 1995 (eq. scale=(adults+0.7children)^0.75) while the period 1994-2000 are obtained using the ECHP (eq. scale= modified OECD scale). Both datasets use contemporary incomes and characteristics.

Figure 2. Relative individual poverty incidence for adjusted household income in Spain 1994-2000 - individuals



Note: These results are obtained using the ECHP using contemporary income and characteristics and a modified OECD scale. Calculations are made for individuals weighted by their population weight each particular year.

However, to be in our final sample for dynamics analysis, individuals must accomplish some further criteria. First, they should be present in 1994 and in consecutive interviews until either the survey ends or suffer attrition (they leave prior to the end of the survey).[17] Thus individuals joining the survey after 1994 are not included in our sample. After this selection

[17] Note that if the individual leaves prior to the end of the survey the ongoing spell will be treated as right-censored.

we have an unbalanced panel of individuals that we will use for a preliminary descriptive analysis of poverty incidence, poverty persistence and poverty transition rates using conditional probabilities calculations – see Table 1.[18] Results from Table 1 indicate that the pattern of static poverty in Spain in the period under study is quite flat: the incidence of poverty is pretty stable between 19-21 per cent of the households in the sample.

Some preliminary results on transitions are also reported in Table 1, these are obtained by calculating the conditional probability that the individual is in a certain situation at moment *t* given his/her situation in the previous year, *t-1*. The fourth row of these conditional probabilities indicates the individual probability of remaining in poverty in two consecutive interviews i.e. two-year poverty persistence. Some 52 per cent of individuals who were poor in 1994 continue to be in poverty in 1995. In subsequent waves, this conditional probability fluctuates only slightly from 51 per cent in 1996 to just over 55 per cent in 2000. Thus, for the entire period, these results show that there is a considerable persistence in poverty, a mean of almost 53 per cent of individuals who where poor at time *t-1* are also poor one year later. As expected, transition probabilities from poor to non-poor are higher than from non-poor to poor but entry and exit from poverty do not seem to have a clear pattern along the period.[19] Interestingly, the probability of attrition does not appear to be determined by the individual poverty situation. Indeed, even if in 1995 the probability of attrition was slightly higher for the group of the poor (13 to 11 per cent), this difference is not observable for any other moment.

[18] This first unbalanced sample includes 19,044 individuals (a total of 99,507 person-year observations) and, as it would be expected due to attrition, the sample size falls along the period. Table A.3 in the appendix contains a similar analysis for the total sample from the panel without any selection. As one can easily check it appears that results are remarkably similar.

[19] Our results in this table match those obtained for the period 1994-1996 by the OECD (2001) report where using an OECD equivalent scale and a 60% of the median income poverty line the headcount index is 19.2, the entry rate is 8.3 and the exit rate is 39.7.

Table 1. Poverty Incidence and Short-term Persistence.
ECHP 1994-2000.

	1994	1995	1996	1997	1998	1999	2000
Incidence							
Headcount index (% poor)	20.99	19.68	18.84	21.41	19.26	20.18	20.79
Conditional probabilities							
Poverty short-term persistence							
Prob (y_t=1/y_{t-1}=1)		**51.96**	**50.93**	**54.06**	**51.83**	**53.95**	**55.61**
Poverty entry occurs							
Prob (y_t=1/y_{t-1}=0)		**8.27**	**8.13**	**10.22**	**7.62**	**9.13**	**9.76**
Poverty exit occurs							
Prob (y_t=0/y_{t-1}=1)		**35**	**37.03**	**33.95**	**38.04**	**36.92**	**37.33**
Persistence out of poverty							
Prob (y_t=0/y_{t-1}=0)		80.82	79.7	78.42	82.48	80.1	81.98
Atrittion							
Prob (y_t=mis/y_{t-1}=0)		10.91	12.17	11.36	9.9	10.77	8.26
Prob (y_t=mis/y_{t-1}=1)		13.03	12.04	11.99	10.13	9.14	7.06

Note: These results are obtained using the ECHP contemporary income and characteristics information and using a modified OECD equivalence scale. Calculations of headcound index are made for individuals weighted by their population weight each particular year. The sample here is that of all individuals present in 1994 and in consecutive interviews in the ECHP panel until the survey ends or they suffer from attrition. Note that y_t=1 if the individual is poor in time t and 0 if the individual is non-poor, "*mis"*means that attrition occurred.

Our econometric estimations of transitions rates require individual consecutive observations (to allow for current and lagged poverty and re-entry spells) and a common date of entry to the panel to facilitate estimation of initial conditions, see Heckman (1981). Therefore, our sample of individuals for analysis is an unbalanced panel of 3,664 individuals who were poor in 1994 and have consecutive observations in the panel.[20] Given that the incidence, short-term persistence and recurrency remained quite constant across the period we believe that this sample selection is particularly adequate in this context. This choice allows us to use the longest observation window possible and provides us with a stock of 3,664 individuals in poverty whose first poverty spell is, by definition, in progress at the start of the sample period.[21] This sample's first spells are all left-censored poverty spells for which duration is unknown because the start date is missing. By definition, second, third or fourth spells are non-left-censored. However, some of the poverty and non-poverty spells will be right-censored because they will be still in progress at the end of the ECHP time window. For the latter we only know that the elapsed time of the spell was longer than the interval between

[20] This means that we require an individual not to have missing observations in between interviews to be included in this dataset. This sample amounts to a total of 19,219 person-year observations.

[21] Note here that we cannot distinguish if the spell began precisely in 1994 or was in progress before the start of the sampling period. This sample doest not include individuals who started the ECHP and may temporarily exit the ECHP presenting missing values across several years (because we do not know their status of poverty and non-poverty). They are 333 individuals of this type who experience 1,496 spells.

the spell start date and the end of the ECHP observation window (1994-2000): censored durations. Clearly, ending spell dates are only known for those spells that are observed to finish within the observation window.[22]

With the analysis of this sample we are ignoring the fact that we are not able to determine the real duration of left-censored spells.[23] Note, in any case, that erasing left-censored spells in progress at the start of the sample (even if considering unobserved heterogeneity) provokes a form of sample selection bias as Stevens (1997) and Iceland (1997) indicate.[24] Indeed if from this sample we select only those individuals who are observed to enter poverty in 1995 and follow their future movements into and out of poverty across the period 1994-2000 – see Table A.4. in the Appendix -, the conditional transitions from poor to non–poor obtained from this sample, are significantly higher than those reported for the complete sample in Table 1 or even the first sample in Table A.3 (they range from 14 percent to 26 percent while those for the first sample are almost always below a 10 percent).[25] However, we will return to this issue later in order to analyse, in detail, the consequences of keeping left-censored spells in the sample on our results.[26]

Results on poverty incidence and persistence using this sample are reported in Table 2. We observe that in comparison with our first sample, the individual's probability of stepping into of poverty is now significantly higher (more than a double risk of transition than our first sample in Table 1: 7.6 to 9.8 compared to 20.3 to 29.1).[27] In contrast, individuals in this second sample show a higher persistence in poverty (53 to 63 percent depending on the year compared to 50.9 to 55.6 percent) and thus also a lower probability leaving poverty at any two subsequent interviews. Also they show a lower persistence out of poverty which implies that

---

[22] Note here that the duration of the spells (of poverty or non-poverty) of those individuals who leave prior to the end of the survey (attrition) are also considered as right censored observations. It would be of interest to analyse the effect on duration of deleting right censored observations.

[23] Note that this is also the choice in Stevens (1999) or Jenkins and Rigg (2001) in their descriptive analysis.

[24] It is easy to see that if we were to eliminate them, and only consider individuals who begin a new spell after 1994, thus in 1995 for the first time, we would overstate transition probabilities given that the selected sample would have experienced at least one transition since 1994.

[25] However, note that the estimations of models ignoring unobserved heterogeneity or omitted variables which only include spells that begin after the start of the sample, give consistent estimates of poverty transition rates for the population, Heckman and Singer (1984).

[26] It is not possible for us to model the hazard rate of an individual's first entry into poverty or first exit from poverty (initial conditions) because we do not have information on the pre-1994 income histories of those who were poor (or not) before 1994. Our only control for left-censoring is to estimate a separate baseline hazard for left-truncated spells as Callens et al. (2005) suggest. An extension to our work could consider the suggestions of Arulampalam and Stevens (page 562) in order to tackle the influence of left-censoring on results.

[27] This appears a reasonable effect of selecting individuals already touched by poverty in 1994.

they are more likely to suffer poverty recall. In sum, this sample includes more chronic poor but also more short-term recurrently poor individuals than our first sample.

Table 2. Poverty Incidence and Short-term Persistence: Maximum observation window.

Sample restricted to individuals who are poor in 1994 and consecutive observation in panel. ECHP 1994-2000.

	1994	1995	1996	1997	1998	1999	2000
Incidence							
Headcount index (% poor)	100	59.47	53.75	54.11	50.25	46.95	43.91
Conditional probabilities							
Poverty short-term persistence							
Prob (y_t=1/y_{t-1}=1)		**53.11**	**63.77**	**65.92**	**64.99**	**61.29**	**63.51**
Poverty entry occurs							
Prob (y_t=1/y_{t-1}=0)			**24.81**	**29.09**	**24.28**	**24.63**	**20.29**
Poverty exit occurs							
Prob (y_t=0/y_{t-1}=1)		**36.19**	**26.67**	**23.82**	**27.94**	**30.03**	**30.28**
Persistence out of poverty							
Prob (y_t=0/y_{t-1}=0)			62.75	61.95	66.97	67.44	70.92
Atrittion							
Prob (y_t=mis/y_{t-1}=0)			12.44	8.96	8.75	7.93	8.79
Prob (y_t=mis/y_{t-1}=1)		10.7	9.56	10.25	7.07	8.67	6.21

Note: These results are obtained using the ECHP contemporary income and characteristics information and using a modified OECD equivalence scale. Calculations of the headcound index are made for individuals weighted by their population weight each particular year. The sample here is that of all individuals poor in 1994 and in consecutive observation in the ECHP panel until the survey ends or they suffer from attrition. Note that y_t=1 if the individual is poor in time t and 0 if the individual is non-poor, "*mis"*means attrition occurred between the two interviews

Table 3. Frequency distributions of elapsed durations, all spells.

Sample restricted to individuals who are poor in 1994 and consecutive observation in panel. ECHP 1994-2000.

Elapsed duration	all poverty spells		All non-poverty spells	
	Freq	%	Freq	%
1	1,395	38.1	865	35.5
2	796	21.7	549	22.5
3	514	14.0	361	14.8
4	277	7.6	232	9.5
5	214	5.8	145	5.9
6	123	3.4	288	11.8
7	345	9.4	-	-
Total individuals	3,664	100	2,440	100
Mean (Std. Dev.)	2.69 (1.94)		2.63 (1.70)	

Results on spell duration pooling the data for all the poverty and non-poverty periods without considering the order of each occurrence are reported in Table 3. The last row of this Table reflects the long-term persistence of poverty in Spain in the period under analysis: 9 per cent of individuals who are poor in 1994 continue to be below the poverty line seven years

later, this percentage rises to 12 per cent for those who are able to step out of poverty for a year but come back to it suffering a second poverty spell of, at least, 6 years of length.[28] We find that 38.1 per cent of all poverty exits last one year, 21.7 per cent two years and nearly 30 per cent of the individuals remain four years or more in poverty. On the contrary, 35.5 per cent of the individuals who enter to a non-poverty period remain one year in non-poverty, 22.5 per cent two years and 12 per cent at least six.

Table 4. Number of spells of poverty and non-poverty in total sample.
Sample restricted to individuals who are poor in 1994 and consecutive observation in panel.
ECHP 1994-2000

Number of occurrences	Poverty		Non-poverty	
	Freq.	%	Freq.	%
1	2,388	65.17	1,670	45.58
2	1,003	27.37	678	18.5
3	268	7.31	92	2.51
4	5	0.14		
Total individuals	3,664	100	2,440	66.59

Table 5. Frequency distributions of elapsed durations by order of occurrence.
Sample restricted to individuals who are poor in 1994 and consecutive observation in panel.
ECHP 1994-2000

Elapsed duration	First poverty spell		First non-poverty spell		Second poverty spell		Second non-poverty spell		Third poverty spell		Third non-poverty spell	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
1	1,718	46.89	1085	44.47	691	54.15	413	53.64	201	73.63	81	88.04
2	705	19.24	461	18.89	332	26.02	225	29.22	59	21.61	11	11.96
3	389	10.62	276	11.31	146	11.44	85	11.04	13	4.76	-	-
4	205	5.59	185	7.58	72	5.64	47	6.1	-	-	-	-
5	179	4.89	145	5.94	35	2.74	-	-	-	-	-	-
6	123	3.36	288	11.8	-	-	-	-	-	-	-	-
7	345	9.42	-	-	-	-	-	-	-	-	-	-
Total individuals	3,664	100	2440	100	1276	100	770	100	273	100	92	100
Mean (Std. Dev.)	2.50 (1.97)		2.47 (1.75)		1.77 (1.04)		1.70 (0.89)		1.31 (0.56)		1.12 (0.33)	

Tables 4 and 5 focus on the frequency distribution of elapsed poverty and non-poverty spells by the order of occurrence of the particular spell. Our findings in these tables highlight the importance of considering multiple spells in the analysis of poverty dynamics: out of the 3,664 individuals who are in poverty since 1994, 27 percent have two occurrences along the time of observation and nearly 7.5 per cent have three or more occurrences. This implies that a 66 percent of the individuals re-enter poverty during the seven year period and more than 20 percent re-enter twice or three times. Poverty and non-poverty first-spells have a mean

[28] In the OECD (2001) chapter on poverty dynamics the always poor in Spain were a 8.3 percent of the sample in the first three years of the ECHP, one of the highest percentages in the European Union context. Only Greece, Italy and Portugal register a larger percentage while Denmark registers the lowest percentage with a 2.6 percent.

duration of two and a half years. The duration of second and third poverty spells is slightly shorter (1.7 and 1.3 years respectively). This result is most probably affected by the seven interview structure of the dataset. The first row of this Table shows that 47 percent of first poverty spells have an elapsed duration of one year, this percentage increases up to 54 per cent if we are in a second occurrence and to 73 per cent in a third one. This means that if one has a second or third poverty spell, spells are likely to be particularly short, in fact they are most likely to be one year periods. A similar result is obtained for non-poverty spells. In sum, there seem to be certain groups of individuals that are particularly prone to exit and re-enter poverty experiencing a row of one-year spells.

4. The Econometric approach to measuring the exit and re-entry transition rates: a discrete time hazard model

The main aim of this paper is the estimation of the individual probability of leaving poverty taking account the effect across multiple spells of the current poverty spell, the time (of non-poverty) between various poverty experiences, the occurrence of multiple-spells, the lagged poverty duration and also individual and household characteristics. For that purpose, we chose to use analyse life-tables and to estimate a discrete time recurrent hazard model for the exit and re-entry hazards both for all poverty and non-poverty spells.

Our strategy consists in estimating two hazard rates: one for leaving poverty and another one for returning (or re-entering) poverty. We first choose to examine the persistence of poverty for individuals who are poor in 1994 and have consecutive interviews in the panel (second sample), rather than examining the incidence of poverty for the entire ECHP sample. Later, we will restrict our analysis to those individuals who become poor in 1995 (inflow sample or sample of new entrants) in order to understand the relevance of left-truncation on results.

In the hazard methodology, the probability of leaving poverty (or non-poverty) may be defined as the limit of the conditional probability of a transition taking place in a small interval *dt* after time t if no transition occurs until t, when that interval approaches to zero. The exit rate is modelled by means of a multiplicative separable function of three terms: the baseline exit, covariates and unobserved heterogeneity.

Formally:

$$h_i(T_{ij}, X_{ij}(t), \theta_i) = \lim_{dt \to 0} \frac{\Pr(t + dt > T_{ij} \geq t \mid T_{ij} \geq t)}{dt} = \lambda_0(T_{ij}) \exp\left\{X_{ij}(T_{ij})' \beta\right\} \theta_i \qquad (1)$$

In this equation, subscript i indicates the individual and j the period in poverty (i=1,2,…N; j=1,2,…,N_i). The subscript j numbers individual i's poverty spells from one to N_i, the maximum number of spells he/she experiences. The term T_{ij} is the latent current duration of individual i´s j'th poverty spell, $\lambda_0(t)$ is the interval-specific baseline hazard rate, which is unknown; X_{ij} is a vector of time-invariant and time-varying covariates for individual i, β is the vector of unknown parameters to be estimated, and finally θ_i captures unobserved individual characteristics that could affect the hazard but are unobservable in the data, such as social exclusion problems together with attitudes towards claiming benefits of finding a job, motivation, inherent ability, and so on.

Defining the probability of surviving through any interval *dt* after having survived the preceding j intervals as $(1-h_{ij})$, the probability of ending a spell of poverty in the j^{th} interval is given by the hazard function:[29]

$$h_{ij} = \Pr\left[T_{ij} = t\right] = h_i \prod_{j=1}^{Ni-1} (1 - h_j) \tag{2}$$

Given that there are some poverty (non-poverty) spells that continue to proceed at the end of the sample period these are incorporated as right censored spells and also contribute to the likelihood. Their contribution to the likelihood is:

$$\Pr\left[T_{ij} > t\right] = \prod_{j=1}^{Ni} (1 - h_j) \tag{3}$$

Thus, d_i=1 if individual i's spell ends in a transition to non-poverty and d_i=0 otherwise. Therefore, the contribution to the likelihood of an individual i can be written as:

$$L_i = \left[\left[\Pr(T_{ij} = t)\right]^{d_i} \left[\Pr(T_{ij} > t)\right]^{1-d_i}\right] = \left\{ h_i \prod_{j=1}^{N_i - 1} (1 - h_j) \right\}^{d_i} \left\{ \prod_{j=1}^{N_i} (1 - h_j) \right\}^{1-d_i} \tag{4}$$

where the discrete time hazard in the *jth* interval for each individual is:

$$h_j = 1 - \exp\left[-\exp(\beta X_i(T_{ij}) + \gamma_t(T_{ij}) + \theta_i)\right]. \tag{5}$$

This specification allows for a fully non-parametric baseline hazard with a parameter for each duration interval capturing duration dependence. We choose a semi-parametric approach (piecewise constant hazard) by specifying duration dummies *γ(t)* with coefficients for transitions from poverty to non poverty. This method is common in the literature given its flexibility (see Stevens, 1999; Devicenti, 2001; Alba-Ramirez *et al.*, 2007).

Note here that the use of specific year or duration dummies as explanatory variables stems from the idea that it appears reasonable to think that there is something about the length

[29] We omit t, X and θ to simplify notation.

of the period of time spent either in poverty or out of poverty that affects the probability of a household leaving or returning to this situation. This reasoning appears straightforward in clear-cut definitions of other possible individual states like unemployment, where the loss of human capital or the end of benefit reception while unemployed makes it reasonable to expect a different escape rate from unemployment as unemployment duration increases. Why would this be the case for the state of poverty?

In the case of poverty, the definition of *state of poverty* is not so clear-cut. The division between being poor or not is a thin line in the income distribution. Is it reasonable then to expect that the opportunities to move up in the income distribution for households in its lowest tail will be affected by the time they remain in low income? Theoretically, when a household enters poverty, household members would start to use up their savings in order to maintain their previous level of welfare. The longer the household is poor, the more likely the household's savings will have ended and the more likely the household is to suffer a welfare loss. This welfare loss may imply a loss of household members' opportunities (due to the costs of undertaking them) that may bring the household out of poverty. These opportunities include the members' search for a job if unemployed, the members' investment in education that will help them enter the labour market in an advantageous position or the departure of members from the household to create a new one. Other effects on the exit hazard rate could be imposed by the means-testing and receipt duration schemes of state benefits paid to the lowest tail of the income distribution. Hence, it would be reasonable to think that the probability that a household jumps out of the lowest tail of the income distribution could be affected by poverty duration.

A similar reasoning would apply to the probability of returning to poverty. As Gardiner and Hills (1999) point out, the income mobility process is not random and low-income escapers are more likely to drop back into the poorest than those who never suffered low-income. Clearly, duration out of poverty in this case is expected to play a similar role: the longer the time the individual is out of poverty, the lower the probability of returning to it.

The study of the relationship between the duration of a poverty spell and the escape and re-entry rate will test this correlation and find out if it is constant in time or it changes after some duration of a poverty or non poverty spell. Obviously, one should note that, in the case of poverty-non-poverty, the difficulties in detecting this correlation and disentangling it from unobserved heterogeneity may be larger than for other definitions of individual or household states. The reason is the larger amount of events that affect the value of the household income and the time span needed in order to detect this correlation due to both the time it takes a household to use up its savings and the long-term nature of the effects of a household's low

income period on most household members' labour market opportunities and correlated decisions.

Finally, and in order to take unobserved heterogeneity into account, a finite-mixture unobserved heterogeneity distribution with unknown support points is also considered, see expression (5).[30] Therefore, the likelihood function for individual *i* is obtained by integrating the following conditional likelihood distribution:

$$L_i(\beta,\gamma,\varepsilon,\pi) = \prod_{s=1}^{S} L(\beta,\gamma \mid \theta = s)\pi(s) \qquad (6)$$

where θ are the location points, π the probability associated to them, and *s* the number of support points.

The covariates included in our estimations will try to capture the differences in individual characteristics but also those related to the composition of the household they belong to (number of adults in the household, number of dependent children, children below 6 in the household, age of the household head, etc.) and household members labour market attachment (whether the household head or other adults are in paid work, etc.). The individual variables included are gender, age, marital status, educational level, activity, status if employed, main income source, unemployment spells, etc. To study differences in poverty exits, entries and re-entries with respect to the labour market conditions in which individuals live, we will, for now, only include yearly dummies. We hope that these dummies will serve as a control for the potential effect of the business cycle on poverty exit and re-entry.[31]

5. Results.

In a first approach to measuring the relevance of spell duration on the probability of leaving poverty we report life-table estimates of the probability of leaving and re-entering poverty. This approach assumes that the population is homogeneous in characteristics. We begin by analysing the whole sample of spells irrespective of their order and follow by distinguishing the order of each spell occurrence. In a second step we report results on estimations of transition rates using multivariate hazard regression models. This second approach to measuring transition risk provides a generalization of life tables estimations when

[30] Heckman and Singer (1984) demonstrate that standard parametric form assumptions for unobserved heterogeneity might be biased when the chosen distribution for the unobservable term is incorrect. For this reason, they solve this problem by assuming that unobserved heterogeneity is discretely distributed with unknown support points.

[31] These dummies will be usefully substituted by the Spanish regional unemployment rate each year and the yearly GDP rate of growth in future versions of our work.

transition rates are allowed to vary not only with the elapsed time at risk but also with observed and unobserved individual characteristics.

5.1 Life-table estimates of transition rates.

Tables 6 and 7 display the life-table estimates of hazard rates, survival probability and cumulative failure. Table 6 illustrates that both types of spells show a decline of the transition hazard as duration evolves, thus supporting the idea of *negative duration dependence* for both situations. However, some differences are readily observable between the exit and re-entry hazards. First, the probability of returning to poverty is significantly lower than the probability of exiting from poverty. Thus, non-poverty spells, in general are of a longer duration than poverty spells. Secondly, the re-entry hazard continues to decline after three years of spell evolution while the exit hazard rate experiences a rapid decline during the first three years but is fairly constant from then onwards.

Table 6. Life tables estimates of hazard rates, survival probability and cumulative failure for all poverty exits and re-entries.

Based on all poverty spells observed from ECHP waves 1994-2000 for individuals who are poor since 1994.

Interval (years)		Total number of individuals at risk Total (individuals)	Deaths	Lost	Survival(%)	Cum. Failure (%)	Std. Error	Hazard (%)	Std. Error
All exits									
1	2	5218	1900	715	60.91	39.09	0.7	48.59	1.08
2	3	2603	718	378	42.79	57.21	0.75	34.94	1.28
3	4	1507	323	225	32.88	67.12	0.75	26.2	1.45
4	5	959	163	114	26.94	73.06	0.75	19.87	1.55
5	6	682	111	103	22.2	77.8	0.74	19.3	1.82
6	7	468	87	36	17.91	82.09	0.73	21.4	2.28
7	8	345	0	345	17.91	82.09	0.73	0	-
All re-entries									
1	2	3302	947	632	68.29	31.71	0.85	37.69	1.2
2	3	1723	351	346	52.82	47.18	0.98	25.54	1.35
3	4	1026	155	206	43.95	56.05	1.04	18.33	1.47
4	5	665	63	169	39.18	60.82	1.09	11.48	1.44
5	6	433	38	107	35.26	64.74	1.15	10.54	1.71
6	7	288	0	288	35.26	64.74	1.15		

Distinguishing the order of spells and thus analysing the effects of spell accumulation is one our main objectives. Therefore, in Table 7 we include results on transition rates for each spell type by their order of occurrence. We can see that the results in Table 6 are similar to those obtained for the first spell of poverty or non-poverty in Table 7 but are clearly different from those obtained for the second poverty spell. This result underlines the importance of taking multiple spells into account and in considering the differential hazard rate implied by accumulation of multiple experiences in and out of poverty.

Regarding the results for the first poverty spell, we appreciate that hazard rates declined rapidly during the first two years of observed poverty spell duration, thus supporting the idea of *negative duration dependence*. However, the hazard stayed fairly constant from two years up to seven years durations. Indeed, some 47 per cent of individuals in their first poverty spell left after one year of observation in the panel (note here that the real spell could be much longer) while out of those that remain poor, just over a third 32 per cent left poverty in the following year. In contrast, from the third to the sixth year of observation, the exit hazard rate fell only by two percentage points, from 23.5 to 21.4. Combining this relative high hazard rates for the first poverty spell with the results on the first spell survival function suggests that the majority of individuals in our sample experience relatively short poverty spells while some minority (a fifth of the sample) experience relatively long spells: 62 per cent of individuals remain poor only during one year, 44 per cent two years, 35 per cent at least 3 years and just about 19 per cent seven or more years.

The interesting question we pose is: Do these conclusions differ for those individuals that experience a second occurrence in poverty (after having experienced a period of non-poverty)? We appreciate that the probability that an individual leaves poverty when experiencing a second occurrence is significantly higher than it was during his/her first poverty spell. Indeed, during the first year the hazard rate in the second poverty period is 5.5 percentage points higher than in the first one. Interestingly this difference increases up to a 14 and 19 per cent more during the second and third year. Therefore, we find evidence that individuals remain a relatively shorter time in poverty if they have managed to leave deprivation for some time most recently.

Turning to results on non-poverty spells, we observe that the shape of the first re-entry hazard is also consistent with a negative duration dependence up to the third year, remaining constant thereafter. Interestingly we find little differences in the annual hazard rates of returning to poverty depending on the order of the non-poverty spell. The largest difference is observable after durations of three years or more and, in contrast with the impact of spell order in poverty experiences, poverty hazard rates in the second non-poverty spell are lower than in the first one. This implies that once you have managed to step out of poverty once, the accumulation of non-poverty spells plays in your favour by reducing the probability of coming back to poverty.

Table 7. Life tables estimates of hazard rates, survival probability and cumulative failure by order of occurrence.

Based on all poverty spells observed from ECHP waves 1994-2000 for individuals who are poor since 1994.

Interval (years)		Total number of individuals at risk	Deaths	Lost	Survival (%)	Cum. Failure (%)	Std. Error	Hazard (%)	Std. Error
First poverty spell (1)									
1	2	3664	1326	392	61.76	38.24	0.83	47.27	1.26
2	3	1946	519	186	44.47	55.53	0.88	32.57	1.41
3	4	1241	246	143	35.11	64.89	0.87	23.51	1.49
4	5	852	151	54	28.69	71.31	0.85	20.15	1.63
5	6	647	111	68	23.49	76.51	0.83	19.91	1.88
6	7	468	87	36	18.95	81.05	0.8	21.4	2.28
7	8	345	0	345	18.95	81.05	0.8	0	-
First non-poverty spell (2)									
1	2	2440	736	349	67.51	32.49	0.98	38.79	1.4
2	3	1355	295	166	51.86	48.14	1.1	26.23	1.51
3	4	894	144	132	42.84	57.16	1.14	19.05	1.58
4	5	618	63	122	37.99	62.01	1.16	11.99	1.51
5	6	433	38	107	34.19	65.81	1.2	10.54	1.71
6	7	288	0	288	34.19	65.81	1.2		
Second poverty spell (3)									
1	2	1276	491	200	58.25	41.75	1.44	52.77	2.3
2	3	585	190	142	36.72	63.28	1.54	45.35	3.2
3	4	253	77	69	23.78	76.22	1.55	42.78	4.76
4	5	107	12	60	20.07	79.93	1.64	16.9	4.86
5	6	35	0	35	20.07	79.93	1.64		
Second non-poverty spell (4)									
1	2	770	206	207	69.09	30.91	1.79	36.56	2.5
2	3	357	56	169	54.89	45.11	2.21	22.9	3.04
3	4	132	11	74	48.54	51.46	2.66	12.29	3.7
4	5	47	0	47	48.54	51.46	2.66		
Third poverty spell (5)									
1	2	273	83	118	61.21	38.79	3.33	48.12	5.13
2	3	72	9	50	49.49	50.51	4.43	21.18	7.02
3	4	13	0	13	49.49	50.51	4.43		
Third non-poverty spell (6)									
1	2	92	5	76	90.74	9.26	3.94	9.71	4.34
2	3	11	0	11	90.74	9.26	3.94		
Fourth poverty spell (7)									
1	2	5	0	5	100	0	0		

5.2 The main characteristics of individuals under analysis.

In any case, before going into a more detailed multivariate analysis of spells we must focus our discussion on the comparative characteristics of the samples of spells to be used in regressions. In order to do this we have constructed Table 8[32] where one can compare the characteristics of the pooled sample of individuals who experience some poverty spell (*all*

[32] See also Table A.5. in the Appendix.

spells sample, first column) with the sample of left-censored spells (*first spells*, second column) and with the sample of individuals whose transition into poverty is observed (*inflow sample of spells*, fourth column).[33]

Results show that the characteristics of the pooled sample of individuals touched by poverty is very similar the sample of left-censored poverty spells.[34] As it could be expected, the largest differences in characteristics appear between individuals who suffer some left-censored poverty spell and those who are observed to enter poverty within the observation window. In particular, these differences are related to the household and household's head socioeconomic and demographic characteristics more than to individual characteristics, even if the individual's age and labour status is different too. In fact, if we were to use a sample of new entrants to poverty, thus omitting left-censored spells, our sample would contain significantly younger individuals, more often active, living in households whose head is relatively younger (often below 49 years of age), more educated, more often employed full time or unemployed but rarely retired, with more adults in the household (more often active in the labour market) and fewer children, whose main income source is often wages and whose total household income is somewhat nearer to the poverty line and, in some cases, it is declared to be temporarily zero. As it could be expected, the characteristics of the sample of new entrants are most similar to those of individuals who experience a second poverty spell within the observation window.[35]

Focusing on poverty spell duration, we can see that the elapsed duration of poverty spells for left-censored spells is significantly longer: 2.4 years compared to 1.7 years (more than eight months longer). This result clearly reflects the duration bias of choosing to discard left-censored spells completely when analysing poverty dynamics. Including the first and second spell in the analysis reduces duration to 2.2 years and includes non-poverty spells of a mean duration of 1.7 years in between poverty spells.

[33] Note that right censoring may imply also that the complete duration is not observed. We here refer to the observation of the complete spell since it begun until it finishes or suffers from attrition.

[34] Clearly this is due to the fact that most individuals suffering a poverty spell suffer just one left-censored spell.

[35] Our results here suggest that, similarly to what was obtained by the OECD (2001), transitory poverty in Spain is largely made up of the working-age population. Note that Spain registers one of the largest percentages of individuals poor at least once in the ECHP period together with Greece, Italy and Portugal. However, Spain registers the largest percentage of poor at least once if we restrict the analysis to the working-age population.

Table 8. Characteristics of spells samples, individuals: Means.

Characteristics	POVERTY SPELLS							
	All spells		**First spell**		**Second spell**		**Inflow sample of spells – new entrants**	
	(5,218 indiv.) (5,113 weight)		**(3,664 indiv.)** (3,387weight)		**(1,276 indiv.)** (1,416 weight)		**(1,593 indiv.)** (1,632 weight)	
Individual Characteristics	*Means*	*S.E.*	*Means*	*S.E.*	*Means*	*S.E.*	*Means*	*S.E.*
Age	36.2	22.2	36.6	22.8	35.4	21.2	35.2	21.2
Aged 16-29	**0.23**	0.42	**0.22**	0.42	0.24	0.43	**0.25**	0.43
Aged 60+	**0.18**	0.39	**0.20**	0.40	0.16	0.37	**0.16**	0.37
Child, below 16 years old	0.23	0.42	0.24	0.43	0.22	0.42	0.22	0.42
Labour status								
Working (+15 hours/week)	**0.22**	0.41	**0.20**	0.40	0.24	0.43	**0.26**	0.44
Working (less 15 hours/week)	0.02	0.15	0.03	0.16	0.02	0.13	0.01	0.10
Unemployed	0.14	0.35	0.15	0.35	0.13	0.34	0.14	0.34
Discouraged worker	0.00	0.06	0.00	0.05	0.01	0.09	0.02	0.13
Economically inactive	**0.38**	0.49	**0.39**	0.49	0.38	0.49	**0.36**	0.48
Unemployment experience								
Had unemp. spell last 5 years	0.29	0.45	**0.29**	0.45	0.30	0.46	**0.31**	0.46
Main income source								
No income from any source	0.28	0.45	0.28	0.45	0.29	0.46	0.27	0.44
Wages and salaries	**0.13**	0.34	**0.12**	0.33	0.14	0.35	**0.19**	0.39
Self-employment or farming	0.06	0.24	0.05	0.23	0.06	0.24	0.06	0.23
Pensions	**0.11**	0.31	**0.11**	0.32	0.09	0.28	**0.09**	0.29
Unemployment benefits	0.06	0.23	0.06	0.24	0.05	0.22	0.06	0.25
Any other social benefits	0.08	0.27	0.08	0.27	0.08	0.27	0.06	0.24
Private income	0.05	0.22	0.04	0.20	0.06	0.24	0.04	0.21
Household Characteristics								
Household structure								
Total household members	4.16	1.68	**4.09**	1.69	4.27	1.63	**4.17**	1.59
Number of adults in household	3.06	1.35	**2.99**	1.32	3.15	1.43	**3.10**	1.40
Number of 0-5 children	0.23	0.42	**0.24**	0.43	0.21	0.41	**0.21**	0.41
Main income source								
Wages and salaries	0.34	0.47	**0.32**	0.47	0.38	0.49	**0.42**	0.49
Self-employment income	0.15	0.36	0.13	0.33	0.18	0.38	0.14	0.34
Pensions income	0.23	0.42	**0.25**	0.43	0.20	0.40	**0.21**	0.41
Unemployment income	0.12	0.33	0.14	0.35	0.10	0.30	0.13	0.34
Transfers income	0.10	0.30	**0.11**	0.31	0.10	0.30	**0.08**	0.27
Private income	0.05	0.21	0.05	0.22	0.04	0.19	0.03	0.16
Poverty Gap (as % of poverty line)								
0-10%	0.23	0.42	**0.22**	0.42	0.23	0.42	**0.28**	0.45
Zero income	0.02	0.14	**0.00**	0.00	0.06	0.25	**0.07**	0.25
Household head characteristics								
Household head aged 30-39	0.20	0.40	**0.20**	0.40	0.23	0.42	**0.27**	0.44
Household head aged 40-49	0.26	0.44	**0.24**	0.43	0.29	0.45	**0.28**	0.45
Household head aged 50-59	0.23	0.42	0.23	0.42	0.23	0.42	0.19	0.39
Household head aged 60+	0.24	0.43	**0.29**	0.45	0.16	0.36	**0.12**	0.33
Female household head	0.14	0.35	**0.12**	0.33	0.18	0.38	**0.15**	0.35
Separated, Divorced or Widowed	0.10	0.30	**0.12**	0.32	0.06	0.23	**0.07**	0.25
Head is in paid work, more than 15 hours	0.53	0.50	**0.48**	0.50	0.60	0.49	**0.64**	0.48
Head is working part-time	0.07	0.25	0.07	0.25	0.08	0.27	0.05	0.21
Head retired	0.15	0.36	**0.19**	0.39	0.09	0.28	**0.06**	0.24
Head unemployed	0.17	0.38	**0.15**	0.35	0.23	0.42	**0.23**	0.42
Number of earners in household (active)	1.61	1.14	**1.58**	1.13	1.63	1.15	**1.61**	1.12
Head university education	0.04	0.20	**0.03**	0.16	0.07	0.25	**0.06**	0.24
Head secondary education	0.07	0.25	**0.06**	0.24	0.08	0.28	**0.13**	0.34
Characteristics of Spells								
Non-censored observations	0.63	0.48	0.68	0.47	0.59	0.49	0.68	0.47
Elapsed duration (years)	2.17	1.68	**2.40**	1.90	1.82	1.06	**1.67**	1.19
Lagged poverty duration (years)			-	-	1.78	1.02		
Lagged accum. pov. duration (years)			-	-	3.60	1.39		
Lagged non-poverty duration (years)			-	-	1.73	1.02		
Lagged accum. non pov. duration (years)			-	-	1.73	1.02		

Note: These results omit the percentage of missings in variables for which children have no information available.

In general, after these descriptive analyses of our samples, we can assert that the inclusion of left-censored spells in the regressions will influence multivariate results on first-spell hazard rates for the case of Spain by including individuals who have experienced poverty more persistently, are older and often detached from the labour market. These effects will not appear in the analysis of their second spells where we will be including individuals who are more likely to fluctuate between poverty and non-poverty (the transitorily poor) and whose results will most likely match those from a sample of new-entrants to a poverty situation.

5.2 Multivariate models of poverty exit and re-entry.

In this sub-section, we estimate several discrete hazard models taking into account the individual's complete poverty history in order to analyse the determinants of leaving or entering poverty in Spain. We are interested in obtaining the evolution of the hazard rates as poverty and non-poverty spells evolve after controlling by personal, socio-economic and household characteristics as well as lagged durations. Table 9 and 10 present the estimated hazard regressions for all exits, entries and re-entries by spell order. The models considered include covariates such as sex, age, education, number of adults in the household, number of occurrences in poverty and non-poverty, the length of the current poverty spell (duration terms) and the duration between poverty and non-poverty spells.[36]

The results show that individual and household characteristics significantly affect the probabilities of leaving poverty and entering or returning to poverty. First, in Table 9 we can see that variables that are associated with higher exit rates from poverty are: a large number of adults in the household, high educational attainment, more than one occurrence in poverty and a short length of the current poverty spell in progress (negative duration dependence). However, some differences are found when comparing the characteristics that affect a first poverty exit and a second one. In some of the cases, differences are just a matter of coefficient's magnitude but in others, covariates have the opposite effect. In fact, Table 9 shows that there are variables such as number of adults in the household, level of education of the head, current poverty duration and the number of occurrences in poverty that present similar effects on the probability of leaving from poverty analysing multiple spells jointly or separating spells by their order of occurrence.

[36] We fitted a variety of alternative specifications.

However, there are other variables that present interesting differences in their effects depending on the sample. In particular, being a male increases the individual's probability of leaving poverty only for those experiencing their first spell (all left-censored) in a 10.5 percent while, in contrast, for individuals who are observed to fluctuate into and out of poverty at least twice during the observation window, gender does not affect their chances to leave poverty.

Interestingly age variables turn out to have a significantly different effect on poverty exits by spell order. If we estimate multiple spells jointly in a pool of poverty periods, thus we do not distinguish the order of the spell, young children and adults, especially those over 26 and below 35 show a significantly higher probability of leaving poverty than the rest. However, the distinction of first and second poverty spells shows that this advantageous situation of the middle-aged is only relevant when individuals are fluctuating often between poverty and non-poverty. Indeed, only in second poverty spells individuals between 18 and 65 years of age show a particularly high probability of leaving poverty in comparison with those over 65. In contrast, for those that suffer a first poverty spell, only teenagers appear to show particular difficulties in managing to step out of poverty with respect to the rest.

The estimated effects for the number of occurrences in poverty is clearly very relevant for both first and second poverty spells, always increasing the probability of experiencing an exit. Also, as expected, the longer the previous poverty duration the less likely that individuals will leave a second poverty spell, the contrary the longer the previous non-poverty duration.

Table 9. Discrete hazard models for all poverty exits, by spell order.
Second sample. ECHP 1994-2000.

	all poverty periods			first poverty spell			second poverty spell		
Variables	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Duration terms									
Spell year 1	-2.064	0.085	***	-1.937	0.097	***	-1.341	0.266	***
Spell year 2	-2.388	0.093	***	-2.338	0.106	***	-1.421	0.260	***
Spell year 3	-2.519	0.095	***	-2.523	0.112	***	-1.433	0.253	***
Spell year 4	-2.697	0.115	***	-2.563	0.126	***	-2.940	0.373	***
Spell year 5	-2.585	0.128	***	-2.431	0.135	***			
Spell year 6+	-2.924	0.139	***	-2.852	0.147	***			
Gender									
Male	0.100	0.042	***	**0.124**	0.050	***	-0.008	0.097	
Age group variables									
Aged 0-5	**0.217**	0.112	**	-0.135	0.132		-0.147	0.323	
Aged 6-12	-0.027	0.089		-0.191	0.105	*	0.339	0.219	
Aged 13-17	-0.099	0.091		**-0.376**	0.111	***	0.311	0.219	
Aged 18-25	0.158	0.086	*	-0.033	0.103		**0.676**	0.193	***
Aged 26-35	**0.309**	0.088	***	0.126	0.107		**0.709**	0.203	***
Aged 36-45	0.168	0.085	**	-0.052	0.101		**0.643**	0.199	***
Aged 46-55	0.170	0.092	*	0.024	0.111		0.447	0.206	**
Aged 56-65	0.231	0.087	***	0.135	0.106		0.502	0.196	***
Aged +65									
Number of adults in household	0.192	0.016	***	**0.208**	0.020	***	**0.143**	0.036	***
higher education (university)	0.328	0.118	***	**0.518**	0.145	***	**0.582**	0.222	***
Occurrences in poverty									
One occurrence in poverty	-	-	-	-	-	-	-	-	-
Two occurrences in poverty	1.032	0.047	***	1.587	0.050	***			
Three or more than three occurrences in poverty	1.692	0.058	***	2.590	0.102	***	1.777	0.118	***
lagged poverty duration (years)	-	-	-	-	-	-	-0.399	0.056	***
lagged non-poverty duration (years)	-	-	-	-	-	-	0.115	0.058	**

Note: *** Indicates significance at 1 per cent; ** indicates significance at 5 per cent.

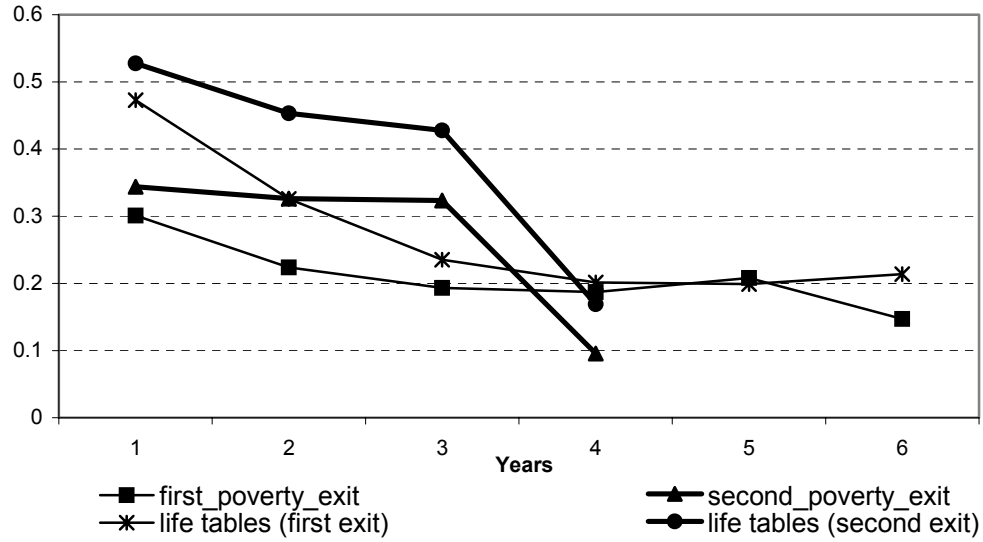
Figures 3 and 4 present the comparison of hazard rates using a life-table homogeneous methodology and that estimated in a heterogeneous discrete-time recurrent hazard analysis.[37] Comparing both types of analysis, we clearly appreciate that controlling for observed heterogeneity shifts down the common estimated hazard function proportionately for all poverty exits. Furthermore, if this information is not included, the poverty hazard function would decline a little faster as the spell lengthens, this is specially observable in poverty exits and in the first poverty exit. In particular for the first spell, the heterogeneous model significantly reduces the hazard during the first two or three years while this is not the case if

[37] This figure and the next plots the estimated or predicted poverty hazard rates for all poverty exit spells and by the order of each poverty exit spell according to the estimations in Table 9. This figure shows the estimated hazard rate (after controlling for observed heterogeneity) at the mean values of covariates for all individuals. We also present Life-Table estimations of the poverty hazard rates, which may be interpreted as a type of sample-average hazard function without controlling for individual characteristics.

durations reach 4 or 5 years. However, note also that controlling for unobserved heterogeneity reduces the exit hazard of those that are both left and right-censored poverty spells, thus long-term or *chronic* poor. We observe that there is a common pattern in all the estimated hazard functions and life tables, however, thanks to the separate estimations by spell order, we observe that: (1) first poverty exits and all exits present a similar pattern and (2) the size of the second poverty exit rate is higher than the first poverty exit.

Figure 3. Regression estimated Hazard rates compared to Life-Table Hazard rates as duration evolves.
ECHP 1994-2000.

Figure 4. Regression estimated Hazard rates compared to Life-Table Hazard rates as duration evolves, by spell order.
ECHP 1994-2000.



In Table 10 we can see that variables that are associated with higher re-entry rates from poverty are similar to those that promoted poverty exits: a small number of adults in the household, educational attainment below university degree, more than one occurrence in

poverty and a short length of the current non-poverty spell in progress (negative duration dependence). However, we also appreciate here some relevant differences when we consider spells jointly to when we separate them by spell order. These differences are particularly observable in the age variable. Children and teen-agers show a particularly high probability of re-entering poverty once during the observation window while if we consider an increase in the accumulation of poverty spells age does not appear to be relevant at all.

Table 10. Discrete hazard models for all poverty re-entries, by spell order.
Second sample. ECHP 1994-2001.

	all non-poverty periods			First non-poverty spell			Second non-poverty spell		
Variables	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**	**Coef.**	**Std. Err.**	**P>z**
Duration terms									
Spell year 1	-1.566	0.120	***	-2.257	0.156	***	0.017	0.437	
Spell year 2	-1.879	0.123	***	-2.348	0.156	***	-0.246	0.444	
Spell year 3	-1.981	0.139	***	-2.344	0.161	***	-1.290	0.492	***
Spell year 4	-2.259	0.165	***	-2.503	0.173	***			
Spell year 5	-2.597	0.197	***	-2.835	0.208	***			
Gender									
Male	-0.039	0.055		-0.023	0.072		-0.183	0.164	
Age group variables									
Aged 0-5	**0.475**	0.174	***	0.116	0.245		0.888	0.570	
Aged 6-12	**0.499**	0.128	***	**0.458**	0.162	***	0.345	0.378	
Aged 13-17	**0.490**	0.132	***	**0.379**	0.168	**	0.035	0.389	
Aged 18-25	0.257	0.111	**	0.159	0.140		0.224	0.336	
Aged 26-35	0.185	0.114	*	0.181	0.147		-0.149	0.353	
Aged 36-45	0.267	0.116	**	0.097	0.147		0.314	0.340	
Aged 46-55	0.247	0.121	**	0.258	0.146	*	0.029	0.355	
Aged 56-65	0.096	0.118		0.273	0.143	*	-0.415	0.349	
Aged +65	-	-	-	-	-	-	-	-	-
Number of adults in household	-0.125	0.022	***	**-0.162**	0.028	***	**-0.202**	0.069	***
higher education (university)	-0.730	0.133	***	**-0.549**	0.157	***	**-0.787**	0.351	**
Occurrences in poverty									
One occurrence in poverty	-	-	-	-	-	-	-	-	-
Two occurrences in poverty	1.509	0.060	***	2.656	0.076	***			
Three or more than three occurrences in poverty				4.954	0.399	***	3.865	0.377	***
lagged poverty duration (years)	-	-	-	0.317	0.031	**	-0.048	0.107	
lagged non-poverty duration (years)	-	-	-	-	-	-	**-0.496**	0.106	***

Note: *** Indicates significance at 1 per cent; ** indicates significance at 5 per cent.

Figures A.1. and A.2. repeat the graphical analysis in Figures 3 and 4 (life-tables and estimated hazard function) but for all entries and re-entries (non-poverty spells). The estimated hazard rates are calculated with the estimations of Table 10 at the mean of covariates for all individuals. The estimated re-entry hazard function shifts down proportionately when observed heterogeneity is included in the analysis and the re-entry

hazard rates of the life-tables analysis decline a little faster as the non-poverty spell lengths , which can be particularly noticed in the first re-entry hazard rate and in all re-entries. The shape of these estimated re-entry hazard rates presents a similar pattern while the size of the second re-entry into poverty hazard rate is slightly higher than the first one.

Conclusions.

This paper analyse the persistence of poverty over individual's periods taking account multiple poverty and re-entry spells, incorporating individual and household characteristics and also unobserved heterogeneity. In particular, we investigate the possibility that poverty exits vary not only with personal and household characteristics, but also with the length of the current and past poverty spells, the time between poverty and re-entry poverty spells, the occurrences of multiple poverty spells and the accumulation of poverty duration spells. The dataset used for the questions addressed is with the European Community Household Panel for the period 1994-2001. For that purpose we use a sample of Spanish individuals who are poor in 1994 and follow their future movements into and out of poverty across the period 1994-2001. Here, we summarize the main results and offer poverty policy conclusions.

First of all, we see that the estimated hazard coefficients for all exits jointly from poverty and separating by the order of each poverty spell present differences in magnitude and significance in individual, household and poverty (current and lagged) duration variables. This effect is also appreciated for all re-entries jointly estimations and separated estimations by the order of re-entry poverty spells.

Secondly, the highest poverty exit rates are associated with having more adults in the household, having higher educational qualification (university), having more occurrences in poverty, being male and aged less than 65 years old and also having the shorter of the length of the current poverty spell had been in progress . On the contrary, the lowest re-entry poverty hazard rates are associated with having more adults in the household, having higher education and the shorter the current non-poverty duration in progress. This pattern of re-entry transitions is detected for all re-entry periods and separating by their order though with differences in magnitude.

Finally, the order of the poverty spell estimations let appreciate that the longer the length of time of the previous poverty spell experienced by the individuals the lower their future poverty exit hazard rates and the higher the probability of returning to poverty. The longer the

time spent in non poverty spells (intermediate period between two poverty spells) the higher their future poverty exit rates and the lower the probability of returning to poverty.

References

Aassve, A., S. Burgess, C. Propper, and M. Dickson (2005), Modelling Poverty by Not Modelling Poverty: A Simultaneous Hazard Approach to the UK, ISER Working paper 2005 – 26.

Allison, P.D. (1982), Discrete-time Methods for the Analysis of Event Histories, Chapter 2 in *Sociological Methodology 1982*, S.Leinhardt (editor), pp.61-97, Jossey-Bass Publishers, San Francisco.

Arranz, J.M. and Muro, J., (2004), Recurrent unemployment, welfare benefits and heterogeneity, *International Review of Applied Economics*, Vol. 18, No 4, pp. 423-441.

Arranz, J.M. and Muro, J., (2006), Duration data models, unemployment benefit and bias, *Applied Economics Letters*, *forthcoming*.

Alba-Ramírez, A., Muñoz, and Arranz, J.M. (2007) Exits from unemployment: recall or new job, Labour Economics, *forthcoming*.

Ayala, L., Sastre, M. y Navarro, C. (2006), La *attrition* en el Panel de Hogares de la Unión Europea: ¿Cómo influye en la movilidad?, trabajo presentado en el XIII Encuentro de Economía Pública, Almería.

Bane, M.J. and D.T. Ellwood (1986), Slipping into and out of poverty: the dynamics of spells, *Journal of Human Resources*, 21(1),1-23.

Bonnal, L. Fougere, D. and Serandon, A. (1997) Evaluating the impact of French Employment policies on individual labour market histories, *Review of Economic Studies*, 64, 683-713.

Bárcena E. y F. A. Cowell, (2006), Static and Dynamic Poverty in Spain, 1993-2000, STICERD - Distributional Analysis Research Programme Papers 77, Suntory and Toyota International Centres for Economics and Related Disciplines, LSE.

Biewen, M. (2004) Measuring State Dependence in Individual Poverty Status: Are there Feedback Effects to Employment Decisions and Household Composition?, Discussion Papers of DIW Berlin 429, DIW Berlin, German Institute for Economic Research.

Biewen, M. (2006), Who are the chronic poor? An econometric analysis of chronic poverty in Germany, *Research on Economic Inequality*, Vol. 13, pp. 31-62

Blumen, I., Kogan, M. and McCarthy, P.J. (1955), The industrial mobility of labour as a probability process, Ithaca, N.Y.: Cornell University Press.

Burgess, S. y Propper, C. (1998), An Economic Model of Household Income Dynamics, with an Application to Poverty Dynamics among American Women, Casepaper 9, July, STICERD, London School of Economics and Political Science.

Callens, Croux and Avramov (2005), Poverty dynamics in Europe: A Multilevel discrete-time Recurrent Hazard Analysis, mimeo.

Cantó, O. (2002), Climbing out of poverty, Falling back in: Low incomes' stability in Spain, *Applied Economics*, 34: 1903-1916.

Cantó, O. (2003), Finding out the routes to escape poverty: the relevance of demographic vs. labor market events in Spain, *Review of Income and Wealth*, series 49, number 4, pp: 569-589.

Cantó, O., Gradín, C. y Del Río, C. (2003), La evolución de la pobreza estática y dinámica en el periodo 1985-1995, *Hacienda Pública Española / Revista de Economía Pública,* Volumen 167-(4/2003): 87-119.

Cantó, O, Del Río, C. and Gradín, C. (2007), What helps households with children in leaving poverty?: Evidence from Spain, Research on Economic Inequality, Vol. 14, pp. 1-29.

Cappellari, L. and Jenkins, S.P. (2002), Modelling Low Income Transitions, IZA Discussion Papers 504, Institute for the Study of Labor (IZA).

Cappellari, L. and Jenkins, S.P. (2004), Modelling low income transitions, *Journal of Applied Econometrics*, 19: 593-610.

Devicienti, F. (2001), Poverty persistence in Britain: a multivariate analysis using the BHPS, 1991–1997, *Journal of Economics*, Supplement 9: 1-34.

Duncan, G.J., Gustafsson, B., Hauser, R., Schmauss, G., Messinger, H., Muffels, R. Nolan, B. and Ray, J.C. (1993), Poverty dynamics in eight countries, *Journal of Population Economics*, 6, 215-234.

Fertig, M. and Tamm, M. (2007), Always poor or never poor and nothing in between? Duration of child poverty in Germany, ECINEQ WP, number 59-2007.

Finnie, R. and Sweetman, A. (2003), Poverty dynamics: empirical evidence for Canada, Canadian Journal of Economics, Volume 36 Issue 2 Page 291.

Fouarge, D. and Layte, R. (2005), Welfare regimes and poverty dynamics: the duration and recurrence of poverty spells in Europe, *Journal of Social Policy*, 34, 3, pp. 407-426.

Gardiner, K. and Hills, J. (1999), "Policy implications of new data on income mobility", *The Economic Journal*, 109: F91-F111.

Hansen, J. and Wahlberg, R. (2004), Poverty Persistence in Sweden, IZA Discussion Paper, No. 1209.

Heckman, J. and Borjas, G.I. (1980) Does unemployment cause future unemployment? Definitions, questions and answers for a Continuous Time model of Heterogeneity and State Dependence, *Economica*, 47, 247-283.

Heckman, J. and Singer, B. (1984), Econometric Duration Analysis, Journal of Econometrics, 24, pp.63-132.

Hill (1981) Some Dynamic Aspects of Poverty, in *Five Thousand American Families: Patterns of Economic Progress. Analyses of the first twelve years of the Panel Study of Income Dynamics*, Vol IX.

Iceland, J. (1997), The dynamics of poverty spells and issues of left-censoring, PSC Report Series, University of Michigan, number 97-378.

Jarvis S. and Jenkins, S.P. (1996) , Changing places: Income mobility and Poverty Dynamics in Britain, Working paper 96-19, ESRC Research Centre on Micro-Social Change.

Jenkins, S. P. (1995), Easy estimation methods for discrete-time duration models, *Oxford Bulletin of Economics and Statistics*, **57**, 129-37.

Jenkins, S.P. and Rigg, J. (2001), *The Dynamics of Poverty in Britain*, Department for Work and Pensions, Research Report No 157.

Kalbfleisch, J.D. and Prentice, R.L. (1980), The Statistical Analysis of Failure Time Data, New York: John Wiley.

Lancaster, T. (1990), *The Econometric Analysis of Transition Data*, Econometric Society Monographs, Cambridge University Press.

Lillard, L.A. y Willis, R.J. (1978), Dynamic aspects of Earnings Mobility, *Econometrica*, 46: 985-1012.

Moffitt and Rendall (1995) Cohort Trends in the Lifetime Distribution of Female Headship in the U.S., 1968-1985, Demography, Vol. 32, No. 3, August, pp 407-424.

OECD (2001) *Employment Outlook*, June, Chapter 2: When money is tight: poverty dynamics in OECD countries.

Omori, Y. (1997) Stigma effects of Non-employment, Economic Inquiry, Vol. XXXV, April, 394-416.

Shorrocks, A. (1976) Income mobility and the Markov assumption, *The Economic Journal*, 86, 566-578.

Stevens, A.H. (1994), The Dynamics of Poverty Spells: Updating Bane and Ellwood, *American Economic Review Papers and Proceedings*, May.

Stevens, A.H. (1999), Climbing out of poverty, Falling back in. (Measuring the Persistence of Poverty over multiple Spells), *Journal of Human Resources*, 34, 557-588.

Trivedi, P.K. and Alexander, J.N. (1989) Reemployment probability and multiple unemployment spells: A partial likelihood approach, Journal of Business and Economic Statistics, July, 395-401.

Valletta , R.G. (2006) The ins and outs of poverty in advance economies: Government policy and poverty dynamics in Canada, Germany, Great Britain and the United States.

APPENDIX

Table A1. Final Panel Sample for Spain, ECHP (1994-2001), using contemporaneous current household income data

	1994	1995	1996	1997	1998	1999	2000	2001
Number of Households								
Households, initial sample	7,206	6,522	6,267	5,794	5,485	5,418	5,132	4,966
Households, all members complete interview	7,206	6,518	6,224	5,771	5,473	5,347	5,132	4,966
Households, all members complete interview and previous annual income information	7,142	6,448	6,125	5,709	5,430	5,289	5,040	4,941
Percentage of households eliminated	0.89	1.13	2.27	1.47	1.00	2.38	1.79	0.50
Number of Individuals								
All individuals, initial sample	23,025	20,708	19,712	18,167	16,728	16,222	15,048	14,320
Adults, initial sample	18,428	16,727	16,110	15,149	14,044	13,654	12,731	12,169
Children, initial sample	4,597	3,981	3,602	3,018	2,684	2,568	2,317	2,151
New born children in panel	--	142	142	151	133	153	156	127
Number of Individuals, complete								
All individuals, with complete interview	22,486	20,243	19,230	17,846	16,479	15,643	14,613	14,296
Adults, with complete interview	17,893	16,263	15,640	14,819	13,779	13,104	12,317	11,964
Children, in hh. all individuals complete interview (newborns included)	4,593	3,980	3,590	3,027	2,700	2,539	2,296	2,332
Percentage of individuals eliminated	2.34	2.25	2.45	1.77	1.49	3.57	2.89	0.17
FINAL SAMPLE								
Number of Individuals, complete + current hh. income (with complete interview + current hh. income information)								
All individuals	22,305	20,092	19,025	17,679	16,391	15,601	14,588	14,109
Adults	17,756	16,154	15,500	14,702	13,722	13,078	12,302	11,949
Children	4,549	3,937	3,525	2,977	2,669	2,523	2,286	2,160
Percentage of individuals eliminated	0.80	0.75	1.07	0.94	0.53	0.27	0.17	1.31
Percentage of adults eliminated	0.77	0.67	0.90	0.79	0.41	0.20	0.12	0.13
Percentage of children eliminated	0.96	1.08	1.81	1.65	1.15	0.63	0.44	7.38

Source: Own construction using ECHP (1994-2001).

Table A2. Final Panel Sample for Spain, ECHP (1994-2000), using contemporaneous information for household income and household characteristics

	Different year of observation of household income & household characteristics							
	1993/1994	**1994/1995**	**1995/1996**	**1996/1997**	**1997/1998**	**1998/1999**	**1999/2000**	**2000/2001**
Number of Individuals, complete + hh. income (with complete interview + hh. income information)								
All individuals	22,305	20,092	19,025	17,679	16,391	15,601	14,588	14,109
Adults	17,756	16,154	15,500	14,702	13,722	13,078	12,302	11,949
Children	4,549	3,937	3,525	2,977	2,669	2,523	2,286	2,160
	Contemporary year of observation of household income & household characteristics							
	1994	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	
FINAL SAMPLE (using contemporaneous income)								
Number of Individuals, complete + annual hh. income (with complete interview + annual hh. income information)								
All individuals	19,044	17,754	16,496	15,402	14,519	13,740	13,251	
Adults	15,042	14,216	13,374	12,800	12,088	11,489	11,147	
Children	4,002	3,538	3,122	2,602	2,431	2,251	2,104	
Percentage of individuals eliminated	14.62	11.64	13.29	12.88	11.42	11.93	9.17	
Percentage of adults eliminated	15.28	12.00	13.72	12.94	11.91	12.15	9.39	
Percentage of children eliminated	12.02	10.13	11.43	12.60	8.92	10.78	7.96	

Source: Own construction using ECHP (1994-2001).

Table A3. Incidence of Poverty, Poverty Persistence and Transitions. Total Sample (with and without selection).
ECHP 1994-2000.

	1994	1995	1996	1997	1998	1999	2000
Incidence							
Headcount index (% poor) (over sample size)	17.73	16.27	14.58	15.25	13.12	12.89	12.48
Headcount index (% poor) (over sample size without missing values)	20.99	20.66	19.92	22.32	20.36	21.15	21.23
Conditional probabilities							
Poverty persistence							
Prob (y_t=1/y_{t-1}=1)		**51.96**	**48.61**	**51.46**	**49.65**	**51.52**	**52.24**
Poverty entry occurs							
Prob (y_t=1/y_{t-1}=0)		**8.27**	**8.18**	**10.13**	**7.67**	**8.99**	**9.43**
Poverty exit occurs							
Prob (y_t=0/y_{t-1}=1)		**35**	**38.82**	**35.61**	**39.09**	**38.16**	**39.3**
Persistence out of poverty							
Prob (y_t=0/y_{t-1}=0)		80.82	79.32	78.02	81.59	79.55	81.93
Atrittion occurs							
Prob (y_t=mis/y_{t-1}=0)		10.91	12.5	11.85	10.73	11.46	8.64
Prob (y_t=mis/y_{t-1}=1)		13.03	12.57	12.93	11.26	10.32	8.47
Individuals join panel							
Prob (y_t=1/y_{t-1}=*mis*)		9.9	7.34	6.77	4.64	4.28	3.1
Prob (y_t=0/y_{t-1}=*mis*)		15.05	12.81	8.06	6.4	6.33	4.77
Prob (y_t=*mis*/y_{t-1}=*mis*)		75.05	79.85	85.17	88.96	89.39	92.12
Sample size	22,539	22,539	22,539	22,539	22,539	22,539	22,539
Sample size, no missing values(4)	19,044	17,754	16,496	15,402	14,519	13,740	13,251

Notes: y_t=1 if the individual is in poverty at time t and y_t=0 if the individual is out of poverty at time t, y_t=*mis* if individual information is missing (attrition occurred or individual not present in the ECHP panel that year).

Table A4. Incidence of Poverty, Poverty Persistence and Transitions. Inflow to poverty sample (with and without selection).
ECHP 1994-2000.

	1994	1995	1996	1997	1998	1999	2000	Total
Incidence								
Headcount index (% poor) (over sample size)		100	30.92	30.52	24.90	24.26	22.01	
Headcount index (% poor) (over sample size without missing values)		100	35.78	40.38	35.31	35.74	35.22	
Conditional probabilities								
Poverty persistence								
Prob (y_t=1/y_{t-1}=1)			**30.92**	**51.43**	**51.58**	**53.55**	**62.25**	
Poverty entry occurs								
Prob (y_t=1/y_{t-1}=0)				**26.34**	**17.29**	**19.72**	**14.18**	
Poverty exit occurs								
Prob (y_t=0/y_{t-1}=1)			**55.5**	**35.58**	**37.11**	**37.42**	**29.14**	
Persistence out of poverty								
Prob (y_t=0/y_{t-1}=0)				61.36	72.01	70.77	74.4	
Atrittion occurs								
Prob (y_t=mis/y_{t-1}=0)				12.3	10.7	9.51	11.42	
Prob (y_t=mis/y_{t-1}=1)			13.57	12.99	11.32	9.03	8.61	
Sample size		1,245	1,245	1,245	1,245	1,245	1,245	
Sample size, no missing values(4)		1,245	1,076	941	878	845	778	

Notes: y_t=1 if the individual is in poverty at time t and y_t=0 if the individual is out of poverty at time t, y_t=*mis* if individual information is missing (attrition occurred or individual not present in the ECHP panel that year).

Table A5. Characteristics of the samples of poverty spells, individuals: Means and standard errors.

Characteristics	POVERTY SPELLS							
	All spells		**First spell**		**Second spell**		**Inflow sample of spells – new entrants**	
	(5,218 indiv.) (5,113 weight)		**(3,664 indiv.)** (3,387weight)		**(1,276 indiv.)** (1,416 weight)		**(1,593 indiv.)** (1,632 weight)	
Individual Characteristics	*Means*	*S.E.*	*Means*	*S.E.*	*Means*	*S.E.*	*Means*	*S.E.*
Age	36.2	22.2	36.6	22.8	35.4	21.2	35.2	21.2
Aged 0-5	0.06	0.23	0.07	0.26	0.03	0.18	0.05	0.21
Aged 6-12	0.10	0.30	0.09	0.28	0.13	0.34	0.10	0.30
Aged 13-15	0.06	0.23	0.06	0.24	0.05	0.21	0.06	0.23
Aged 16-29	**0.23**	0.42	**0.22**	0.42	0.24	0.43	**0.25**	0.43
Aged 30-39	0.13	0.34	0.13	0.34	0.14	0.35	0.15	0.35
Aged 40-49	0.11	0.31	0.10	0.31	0.11	0.31	0.12	0.33
Aged 49-59	0.13	0.34	0.13	0.34	0.14	0.34	0.11	0.31
Aged 60+	**0.18**	0.39	**0.20**	0.40	0.16	0.37	**0.16**	0.37
Child, below 16 years old	0.23	0.42	0.24	0.43	0.22	0.42	0.22	0.42
Gender								
Male	0.48	0.50	0.48	0.50	0.49	0.50	0.50	0.50
Level of Education								
University	0.04	0.21	0.04	0.20	0.05	0.22	0.05	0.22
Secondary	0.10	0.30	0.10	0.29	0.11	0.31	0.11	0.31
Primary	0.63	0.48	0.63	0.48	0.62	0.49	0.61	0.49
Marital status								
Married	0.48	0.50	0.48	0.50	0.48	0.50	0.50	0.50
Separated	0.01	0.12	0.01	0.12	0.01	0.12	0.01	0.10
Divorced	0.01	0.07	0.01	0.08	0.00	0.04	0.00	0.07
Widowed	0.04	0.20	0.05	0.21	0.04	0.19	0.05	0.21
Never married	0.23	0.42	0.21	0.41	0.24	0.43	0.21	0.41
Labour status								
Working (+15 hours/week)	**0.22**	0.41	**0.20**	0.40	0.24	0.43	**0.26**	0.44
Working (less 15 hours/week)	0.02	0.15	0.03	0.16	0.02	0.13	0.01	0.10
Unemployed	0.14	0.35	0.15	0.35	0.13	0.34	0.14	0.34
Discouraged worker	0.00	0.06	0.00	0.05	0.01	0.09	0.02	0.13
Economically inactive	**0.38**	0.49	**0.39**	0.49	0.38	0.49	**0.36**	0.48
Unemployment experience								
Had unemp. spell last 5 years	0.29	0.45	**0.29**	0.45	0.30	0.46	**0.31**	0.46
Main income source								
No income from any source	0.28	0.45	0.28	0.45	0.29	0.46	0.27	0.44
Wages and salaries	**0.13**	0.34	**0.12**	0.33	0.14	0.35	**0.19**	0.39
Self-employment or farming	0.06	0.24	0.05	0.23	0.06	0.24	0.06	0.23
Pensions	**0.11**	0.31	**0.11**	0.32	0.09	0.28	**0.09**	0.29
Unemployment benefits	0.06	0.23	0.06	0.24	0.05	0.22	0.06	0.25
Any other social benefits	0.08	0.27	0.08	0.27	0.08	0.27	0.06	0.24
Private income	0.05	0.22	0.04	0.20	0.06	0.24	0.04	0.21
Household Characteristics								
Household structure								
Total household members	4.16	1.68	**4.09**	1.69	4.27	1.63	**4.17**	1.59
Number of adults in household	3.06	1.35	**2.99**	1.32	3.15	1.43	**3.10**	1.40
Number of 0-5 children	0.23	0.42	**0.24**	0.43	0.21	0.41	**0.21**	0.41
Main income source								
Wages and salaries	0.34	0.47	**0.32**	0.47	0.38	0.49	**0.42**	0.49
Self-employment income	0.15	0.36	0.13	0.33	0.18	0.38	0.14	0.34
Pensions income	0.23	0.42	**0.25**	0.43	0.20	0.40	**0.21**	0.41
Unemployment income	0.12	0.33	0.14	0.35	0.10	0.30	0.13	0.34
Transfers income	0.10	0.30	**0.11**	0.31	0.10	0.30	**0.08**	0.27
Private income	0.05	0.21	0.05	0.22	0.04	0.19	0.03	0.16
Housing								
Owned	0.77	0.42	0.76	0.43	0.78	0.41	0.77	0.42
Rented	0.13	0.33	0.14	0.35	0.11	0.31	0.13	0.33
Rent-free	0.10	0.30	0.10	0.30	0.11	0.32	0.10	0.30
Poverty Gap (as % of poverty line)								
0-10%	0.23	0.42	**0.22**	0.42	0.23	0.42	**0.28**	0.45
10-25%	0.28	0.45	0.30	0.46	0.24	0.43	0.31	0.46
25-40%	0.17	0.37	0.17	0.38	0.17	0.37	0.14	0.35
40-50%	0.09	0.29	0.08	0.27	0.12	0.32	0.08	0.27
50-60%	0.07	0.26	0.06	0.23	0.09	0.29	0.05	0.21

60-75%	0.07	0.26	0.09	0.28	0.04	0.20	0.03	0.17
75-90%	0.03	0.17	0.04	0.19	0.01	0.10	0.02	0.13
90-99%	0.04	0.20	0.05	0.21	0.04	0.19	0.03	0.18
Zero income	0.02	0.14	**0.00**	0.00	0.06	0.25	**0.07**	0.25
Household head characteristics								
Household head aged 30-39	0.20	0.40	0.20	0.40	0.23	0.42	0.27	0.44
Household head aged 40-49	0.26	0.44	0.24	0.43	0.29	0.45	0.28	0.45
Household head aged 50-59	0.23	0.42	0.23	0.42	0.23	0.42	0.19	0.39
Household head aged 60+	0.24	0.43	**0.29**	0.45	0.16	0.36	**0.12**	0.33
Female household head	0.14	0.35	0.12	0.33	0.18	0.38	0.15	0.35
Separated, Divorced or Widowed household head	0.10	0.30	**0.12**	0.32	0.06	0.23	**0.07**	0.25
Head is in paid work, more than 15 hours	0.53	0.50	**0.48**	0.50	0.60	0.49	**0.64**	0.48
Head is working part-time	0.07	0.25	0.07	0.25	0.08	0.27	0.05	0.21
Head retired	0.15	0.36	**0.19**	0.39	0.09	0.28	**0.06**	0.24
Head unemployed	0.17	0.38	**0.15**	0.35	0.23	0.42	**0.23**	0.42
Number of earners in the household (active)	1.61	1.14	**1.58**	1.13	1.63	1.15	**1.61**	1.12
Head university education	0.04	0.20	**0.03**	0.16	0.07	0.25	**0.06**	0.24
Head secondary education	0.07	0.25	**0.06**	0.24	0.08	0.28	**0.13**	0.34
Characteristics of Spells								
Non-censored observations	0.63	0.48	0.68	0.47	0.59	0.49	0.68	0.47
Elapsed duration (years)	2.17	1.68	**2.40**	1.90	1.82	1.06	**1.67**	1.19
Lagged poverty duration (years)			-	-	1.78	1.02		
Lagged accumulated poverty duration (years)			-	-	3.60	1.39		
Lagged non-poverty duration (years)			-	-	1.73	1.02		
Lagged accumulated non poverty duration (years)			-	-	1.73	1.02		

Note: These results omit the percentage of missings in variables for which children have no information available.
Source: Own construction using the ECHP 1994-2000.

Table A.6. Characteristics of the samples of non-poverty spells, individuals: Means and standard errors.

Characteristics	NON POVERTY SPELLS							
	All spells		**First spell**		**Second spell**		**Inflow sample of spells – new entrants**	
	(3,302 indiv.) (3,588 weight)		**(2,440 indiv.)** (2,612 weight)		**(770 indiv.)** (875 weight)		**(1,113 indiv)** (1,149 weight)	
Individual Characteristics	*Means*	*S.E.*	*Means*	*S.E.*	*Means*	*S.E.*	*Means*	*S.E.*
Age	36.05	20.81	36.30	21.36	35.15	19.35	35.92	20.62
Aged 0-5	0.04	0.19	0.04	0.20	0.02	0.14	0.04	0.19
Aged 6-12	0.09	0.29	0.09	0.29	0.11	0.32	0.10	0.29
Aged 13-15	0.04	0.20	0.05	0.21	0.04	0.20	0.04	0.19
Aged 16-29	0.28	0.45	0.27	0.45	0.29	0.45	0.27	0.44
Aged 30-39	0.13	0.33	**0.12**	0.32	0.15	0.36	**0.16**	0.36
Aged 40-49	0.11	0.32	0.11	0.32	0.12	0.32	0.13	0.33
Aged 49-59	0.14	0.34	**0.14**	0.34	0.14	0.35	**0.11**	0.31
Aged 60+	0.17	0.37	**0.18**	0.38	0.13	0.34	**0.17**	0.37
Child, below 16 years old	0.19	0.39	0.19	0.40	0.17	0.38	0.18	0.39
Gender								
Male	0.49	0.50	0.50	0.50	0.48	0.50	0.50	0.50
Level of Education								
University	0.06	0.23	0.05	0.21	0.08	0.28	0.07	0.26
Secondary	0.13	0.33	0.13	0.33	0.13	0.33	0.12	0.33
Primary	0.63	0.48	0.63	0.48	0.62	0.49	0.62	0.48
Marital status								
Married	0.47	0.50	0.47	0.50	0.48	0.50	0.50	0.50
Separated	0.01	0.12	0.01	0.11	0.02	0.13	0.01	0.09
Divorced	0.00	0.07	0.00	0.07	0.00	0.05	0.00	0.06
Widowed	0.04	0.19	0.04	0.20	0.02	0.15	0.05	0.22
Never married	0.29	0.45	0.27	0.45	0.30	0.46	0.25	0.44
Labour status								
Working (+15 hours/week)	0.30	0.46	**0.27**	0.44	0.34	0.47	**0.30**	0.46
Working (less 15 hours/week)	0.02	0.15	0.02	0.15	0.02	0.15	0.01	0.12
Unemployed	0.11	0.32	0.12	0.32	0.10	0.30	0.12	0.33
Discouraged worker	0.01	0.11	0.01	0.12	0.01	0.09	0.01	0.07
Economically inactive	0.37	0.48	0.38	0.49	0.36	0.48	0.37	0.48
Unemployment experience								
Had unemp. spell last 5 years	0.30	0.46	0.30	0.46	0.30	0.46	0.32	0.47
Main income source								
No income from any source	0.21	0.41	0.22	0.42	0.18	0.39	0.23	0.42
Wages and salaries	0.23	0.42	0.22	0.41	0.26	0.44	0.25	0.43
Self-employment or farming	0.09	0.29	0.08	0.28	0.10	0.30	0.08	0.28
Pensions	0.10	0.30	0.11	0.31	0.07	0.26	0.12	0.33
Unemployment benefits	0.03	0.18	0.04	0.19	0.02	0.14	0.04	0.20
Any other social benefits	0.09	0.28	0.09	0.28	0.09	0.28	0.06	0.24
Private income	0.06	0.24	0.05	0.21	0.10	0.30	0.04	0.19
Household Characteristics								
Household structure								
Total household members	4.58	2.08	**4.61**	2.23	4.45	1.62	**4.21**	1.66
Number of adults in household	3.62	1.70	**3.62**	1.77	3.55	1.50	**3.32**	1.50
Number of dependent children <12	1.59	0.49	1.59	0.49	1.58	0.49	1.60	0.49
Number of 0-5 children	0.19	0.39	0.20	0.40	0.17	0.38	0.17	0.38
Main income source								
Wages and salaries	0.49	0.50	**0.49**	0.50	0.48	0.50	**0.55**	0.50
Self-employment income	0.28	0.45	0.26	0.44	0.33	0.47	0.22	0.41
Pensions income	0.14	0.35	0.16	0.36	0.11	0.31	0.15	0.36
Unemployment income	0.02	0.13	0.02	0.15	0.00	0.05	0.04	0.19
Transfers income	0.05	0.22	0.05	0.22	0.04	0.21	0.04	0.20
Private income	0.02	0.14	0.02	0.13	0.03	0.17	0.01	0.11
Housing								
Owned	0.83	0.37	0.82	0.38	0.86	0.35	0.76	0.43
Rented	0.11	0.31	0.12	0.33	0.06	0.24	0.13	0.34
Rent-free	0.06	0.24	0.05	0.23	0.08	0.26	0.11	0.31
Household head characteristics								
Household head aged 30-39	0.20	0.40	**0.21**	0.41	0.19	0.39	**0.28**	0.45
Household head aged 40-49	0.27	0.45	**0.27**	0.44	0.28	0.45	**0.32**	0.47
Household head aged 50-59	0.25	0.43	0.24	0.42	0.31	0.46	0.18	0.39

Household head aged 60+	0.16	0.36	**0.16**	0.37	0.13	0.34	**0.12**	0.33
Female household head	0.17	0.38	0.16	0.37	0.18	0.39	0.19	0.39
Separated, Divorced or Widowed	0.06	0.24	0.07	0.25	0.05	0.21	0.07	0.25
Head is in paid work, more than 15 hours	0.71	0.45	0.69	0.46	0.77	0.42	0.70	0.46
Head is working part-time	0.07	0.25	0.06	0.24	0.07	0.26	0.08	0.28
Head retired	0.06	0.25	0.07	0.26	0.04	0.20	0.07	0.26
Head unemployed	0.16	0.37	0.17	0.38	0.14	0.34	0.16	0.37
Number of earners in household (active)	2.00	1.32	**1.95**	1.35	2.03	1.18	**1.81**	1.24
Head university education	0.06	0.23	0.05	0.22	0.08	0.27	0.09	0.28
Head secondary education	0.09	0.29	0.10	0.30	0.08	0.26	0.11	0.32
Characteristics of Spells								
Non-censored observations	0.48	0.50	0.54	0.50	0.36	0.48	0.45	0.50
Elapsed duration (years)	2.19	1.56	2.40	1.70	1.67	0.88	2.34	1.47
Lagged poverty duration (years)			2.02	1.41	1.54	0.72		
Lagged accumulated poverty duration (years)			2.02	1.41	3.06	1.03		
Lagged non-poverty duration (years)			-	-	1.57	0.84		
Lagged accumulated non poverty duration (years)			-	-	3.24	1.17		

Note: These results omit the percentage of missings in variables for which children have no information available.
Source: Own construction using the ECHP 1994-2000.

Figure A.1 Regression estimated Hazard rates compared to Life-Table Hazard rates as non-poverty duration evolves.
ECHP 1994-2000.

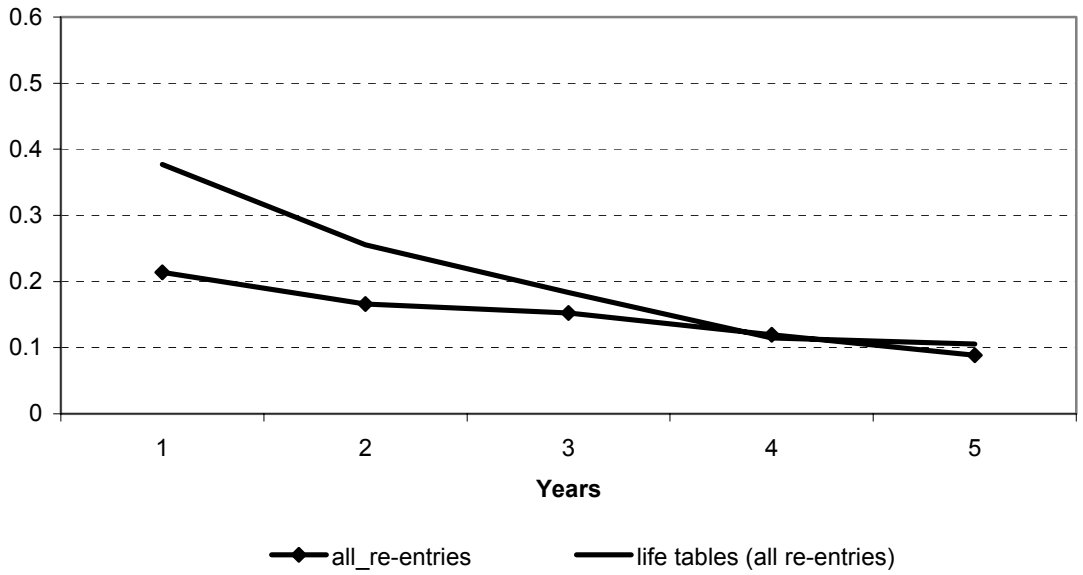


Figure A.2. Regression estimated Hazard rates compared to Life-Table Hazard rates as non-poverty duration evolves.

ECHP 1994-2000.