Climbing out of poverty, Falling back in:

Low Incomes' Stability in Spain

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Abstract

The study of the probability of entering or escaping a low income spell is not sufficient in order to fully describe a household's experience in deprivation. If poverty spells are recurrent in time, the persistency of poverty for a given household is not completely described unless we consider the household's likelihood of a *fall back into* deprivation shortly after exit. We find that combining the re-entry equation results with those of the exit equation we are able to discuss, in a comprehensive way, which of the household characteristics promote welfare stability or instability and poverty persistence or transience. Results indicate that one third of households who manage to leave poverty in Spain return to it shortly after. This upward income mobility, if maintained for a year, appears to provide non-poverty for long. More educated households and households with a spouse are more stable in their income level. Also, the point reached in the income distribution after a jump out of poverty is more determinant than duration out of poverty for reducing the household's re-entry probability.

JEL Classification: D1, D31, I32

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Introduction

In a first approach to measuring the reasons for experiencing a short-term poverty spell instead of a long-term one we could look at the probability of either entering or escaping low income for individuals with various low income spell lengths.[1] Nevertheless, the study of the probability of entering or escaping a low income spell is not sufficient in order to fully describe a household's experience in deprivation. This is to say, the persistency of poverty is not completely described unless we consider the individual's likelihood of a *fall back into* deprivation shortly after exit – see Stevens (1999). Indeed, if those escaping poverty remain only for a very short period above the poverty line and then fall back in, one would prefer not to consider exits a sign of a clear improvement in their welfare. Instead, they should be viewed as *temporary increases* of the *persistently deficient* household's welfare situation. Consequently, not taking account of poverty recall produces under-estimations of permanent poverty. Moreover, Gardiner and Hills (1999) indicate that only a minority of the poor are continuously under the poverty line, this, however, does not stop most of them being *repeatedly* poor. These authors underline that in understanding why people follow different income trajectories it is important to find out who leave poverty *really* and who soon drop back again.

The interest of measuring the stability of poverty spells in Spain is twofold. First, the literature on poverty dynamics (Duncan *et al.*, 1993; Walker, 1994; Jarvis and Jenkins, 1996) has studied the determinants of transition rates but has often avoided considering which of the relevant demographic and socio-economic characteristics provide *good quality exits* from poverty and which characteristics only provide households with periods of *welfare instability*.[2] This is our aim. The use of the Spanish *Encuesta Continua de Presupuestos Familiares* (ECPF) survey which provides income and family composition information at short time intervals, is here to a great advantage in order to improve the expected correlation between demographic and socio-economic characteristics of household members and changes in household income. Second, results in Jarvis and Jenkins (1996) and Cantó (2000) for the U.K. and Spain show similar levels of income mobility in a period when income inequality in the two countries followed very different trends: increasing in the U.K. and decreasing in Spain. However, Spain shows a slightly higher

persistence in the lowest tail of the income distribution. It is of interest to search for the roots of this persistence which cohabits with a consistent decrease in income inequality.

A further contribution of our work is that of considering explicitly the effects of duration dependence on transition probabilities. It appears reasonable to think that there is something about the length 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 scapers 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 a certain 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. Also, 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. Note that, as Hill (1981) and Stevens (1995) point out, results on duration dependence could either reflect a strong causal link between poverty itself and subsequent poverty or just a persistent correlation between poverty and other unobserved household characteristics which are the real sources of poverty i.e. duration dependence or unobserved heterogeneity. Both effects are not separable. We propose the inclusion of poverty gap dummies in the model expecting that the unobserved heterogeneity component in our duration dummies' coefficients will be strongly reduced.

In a first approach to measuring persistence we estimate non-parametric hazard exit and re-entry rates, a method which does not make any assumptions about the functional form of the hazard. This estimate would measure persistence accurately if the sample was totally homogeneous. Household demographic and socioeconomic characteristics also affect the probability of exiting or re-entering poverty. Short stayers leave their spells soon after entrance, so at each further interval the amount of long stayers is relatively larger; this biases the hazard downwards. Thus in order to predict the different probabilities of leaving or entering poverty for different type of households, multivariate regressions of the probability of experiencing an event have to be run.[3] In fact, using a simple estimation model in which the probability of a transition depends on all the available information on each particular household - a *discrete duration model* proposed by Jenkins (1995) - we estimate a household's probability of escaping or re-entering poverty.

This type of model fits nicely into this setting because, even if first-order Markov chains (see Amemiya, 1985) have been very popular in the literature on discrete dynamics while studying the application of these chains to industrial mobility, Blumen *et al.* (1955) noted that there was a tendency for the main diagonal elements of the empirically observed transition matrix to be underpredicted by the main diagonal elements of a first-order Markov. This led McCall (1971) and Shorrocks (1976) to address the issue using two different approaches. McCall (1971) explained this phenomenon by population heterogeneity and presented a model already proposed by Blumen *et al*. (1955) and theoretically developed by Goodman (1961) and later (and most generally) by Frydman (1984) called the *mover-stayer* model.[4] Shorrocks (1976), instead, attributed the phenomenon detected by Blumen *et al*. (1955) to a violation of the first order assumption. Therefore, he adopted a second-order Markov model in the study of income mobility. Our duration model follows this line and extends the first-order Markov Chain to an n-order Markov Chain (being n the number of interviews available for each household) maximising the amount of information from the panel which is effectively utilised.

This paper is organised as follows. In the first section we describe the dataset and the samples of spells. Then, in section 2, we measure the importance of poverty recall among the total number of households who escape low income. We also estimate hazard rates for different household characteristics. In section 3 we describe the multivariate econometric model in which we consider the effect of the duration of non-poverty spells in *ensuring the stability* out of the group of the poor. In the interpretation of results, presented at the end of section 3, we find that combining the re-entry equation results with those of the exit equation we are able to discuss, in a comprehensive way, which of the household characteristics promote welfare stability or instability and poverty persistence or transience. Finally, section 4 concludes.

1. The samples of spells and some crucial definitions

1.1 The Spanish *Encuesta Continua de Presupuestos Familiares*

The sample is obtained from the Spanish Household Expenditure Survey (Encuesta Continua de Presupuestos Familiares, ECPF). The ECPF is a rotating panel survey which interviews 3,200 households every quarter and substitutes 1/8 if its sample at each wave. Households are kept in the

panel for a maximum of two years. A pooled sample of our data consists of 20,985 households observed between one and eight times since the first quarter of 1985 and the last quarter of 1992, both inclusive[5]. The ECPF survey has the advantage of providing up to date income and family composition information at short time intervals. Thus, helping to identify, more precisely, the specific point in time at which income changes and demographic or socio-economic events take place. In this sense, it becomes particularly useful in the study of poverty dynamics because it improves the expected correlation between household characteristics and changes in household income. However, a clear drawback of a this sub-annual interview structure is that household fatigue imposes short household tracing periods. This results in a substantive attrition rate which, fortunately, has proved to be uncorrelated with the household income level. We should note, however, that in studying poverty dynamics in general, attrition implies loosing valuable information on long spells of poverty.

Due to the quarterly interview structure or the ECPF, the inclusion of seasonal dummies in all regressions will control for the effects of income fluctuations. Also, dummies for yearly time effects are included in order to control for the evolution of low income dynamics over time.

1.2 Some important definitions

The choice of the household as unit of study is based on the fact that individual's well being in Spain is believed to strongly depend on total household welfare (if income is equally distributed within the household). Also, the shortage of demographic and socio-economic information (apart from age and sex) of individuals other than the head of household and the spouse in the data makes this choice advantageous.

Following the terminology in Jenkins (1999), a clear way to write our economic measure of well-being is to use the household income-equivalent or *HIE*. HIE_q is the needs-adjusted household gross income at quarter q (we assume that incomes are pooled within the household). Thus:

$$HIE_q = \frac{\sum_{j=1}^{n}\sum_{k=1}^{K} x_{jkq}}{m(a,n)}$$

where j indicates the number of individuals in the household (j=1,2..., n) and k is each money income source.[6] The denominator is an equivalence scale factor depending on household size *n* and on a vector of household composition variables *a* (ages of individuals or role within the household). Our welfare measure *HIE* is therefore the sum of all household members monetary income before housing costs adjusted by household needs using an OECD equivalence scale.[7]

Clearly, in this setting, income measurement error plays a role in determining false transitions into and out of poverty. The expected performance of our sample compared to that from other surveys regarding this problem is rather positive. The ECPF survey measures income for all previous three months to household interview while other surveys measure monthly income and infer from that value all other incomes during the year. We expect, therefore, that the ECPF income surveying structure reduces the amount of incomes measured with error.

A household is counted as poor if its HIE_q is below 50 percent of the median equivalent household income at the corresponding quarter (a relative poverty line).

1.3 The characteristics of the spells

Under the previous definition of poverty, we find that 4.2 per cent of households are poor during their observation period. The sample of poverty spells includes 4,676 spells out of which 2,282 are left censored and 2,394 are observed to start within the household observation period (inflow to poverty sample). Out of the total of 21,532 non-poverty spells, 2,829 are non-left-censored[8] that is, they belong to households who were observed poor and who exited poverty some time during their observation period in the survey. By construction, all spells last for at least three months.

< Insert Table 1, 2, 3 around here >

In Tables 1, 2 and 3 we present the demographic and socio-economic characteristics of poverty and non poverty spells. We find that non-poverty spells tend to be of longer duration than poverty spells. Large similarities are found for households touched by poverty (first three columns of these tables). In terms of demographics, these households have a larger number of non-elderly

members in the household, their head is more often a low educated female and live in smaller townships than households who are never found poor. Both inflow samples of spells include an important number of households whose head is self-employed. As expected, a large percentage of households who have recently exited poverty or fallen in it have incomes very near the poverty line.

2. How much Poverty Recall is there?

What is the probability that a household who exits poverty in a given quarter returns to it in the next three months? in the next six months? in the next year? The qualitative importance of an exit is clearly determined by its capacity of *maintaining* the household persistently out of poverty after its occurrence. The *quality* of the registered poverty exits is what we try to evaluate in this section.

Using inflow to poverty sample of spells, we calculate that 22 per cent of them survive over 12 months and 13.4 per cent over a twenty-one month period. The shape of the non-parametric hazard implies a decreasing probability of exiting poverty as time in poverty lengthens -see Table 4 and Figure 1.[9] This probability steeply decreases when the household has remained between six and nine months in poverty. From nine months onwards, the escape rate continues to fall even if rather more slowly over time. However, if an exit does not take place before a year and a half after entry, the probability of it happening afterwards is particularly low.

Results indicate that a large percentage of households, around one quarter (28 percent) of those who register an exit from poverty, return to poverty between 3 and 6 months after exit. However, almost half of the households who exit poverty (48 percent) do not return to it in the subsequent 21 months. Thus, a large number of households that have experienced poverty and who register an exit during the survey period do not return to poverty for, at least, some time.[10] Depicting results for the hazard one observes that as the time out of poverty increases (or as the non-poverty spell lengthens) the re-entering hazard decreases rapidly. The longer the duration of the non-poverty spell, the less probable a return to poverty becomes. The largest reduction in the probability of falling back into poverty takes place during the first year after exit. From then onwards, i.e. passing the year hurdle, the probability of returning to poverty continues to decrease

but at a lower rate. These results confirm the importance of stepping out of poverty and remaining out of it for some time: households successful in leaving poverty for a year, in general, leave it for some time.

< Insert Table 4 around here >

The homogeneity of the hazard rate is rejected at a 99 percent confidence level[11] for different marital status, for different number of children[12], for different labour market status of the household head, for different size of township of residence and for different levels of the dependency ratio.[13] Surprisingly, the sex or age of the household head do not impose much of a different returning-to-poverty hazard.

Despite the large heterogeneity found for the re-entering hazard, separate regressions for different groups of households are not estimated due to the non-significance of Likelihood-ratio tests. This could be due to the small sample of households which result when separating the sample by any of the groups considered or to the fact that the different bivariate effects are not independent of each other. This will be revealed in a multivariate framework.

3. Low income stability or instability: Poverty persistence or transience

The interpretation of the results obtained in a re-entry equation can be done with two complementary but different objectives. The first one is a mere description of the household characteristics that, after a successful exit from poverty, are an obstacle or an advantage for the stability of the household's new situation. Here, the discussion centres on the size of the marginal effect of each characteristic on the probability of the household of falling back into poverty compared to that of others. Part of this aim has been already covered using a univariate estimation of survival functions for different values of household characteristics in the previous section. A multivariate approach completes the analysis. However, a more interesting and meaningful interpretation of the results obtained is that which combines them with those emerging from the exit equation. When the specification of the exit and re-entry probability equations is the same, the coefficient estimates are perfectly comparable. Interpreting together both estimated effects (here mostly in terms of sign and less of size), results in a complete description of the implications of

household characteristics on the household welfare stability, the quality of the recent exit and the nature of poverty: permanent (long-term poverty spells) or transitory (repeated short-term poverty spells). In order to interpret combined results, a summary of the implications of the signs of the variable coefficients in both equations on the household poverty experience is helpful- see Table 5.

< Insert Table 5 around here >

The most interesting results from the comparison of the exit and the re-entry equations are those obtained from the characteristics that are significant in both regressions. However, variables which are significant in one of them and non-significant in the other also give some hints on either the quality of the previous household exit or the expected length of poverty/non-poverty spells for the households in that group. Table 6 clarifies implications of all possible situations of this kind.

< Insert Table 6 around here >

3.1 The econometric approach to Discrete Duration Models

In the estimation of the exit probability we use a sample of 2,394 inflow to poverty spells. Similarly, in the estimation of the re-entry probability we use an inflow to non-poverty sample of 2,829 spells.

To construct the likelihood function to maximise for the n-order Markov model we build a discrete-time duration model for non-censored spells following Jenkins (1995). The probability of a non left-censored spell i finishing at moment t given that it survived until t-1 is

$$\Pr\left(T_i = t \middle| T_i > t-1\right) = P_{it} \prod_{k=h}^{t-1} \left(1 - P_{ik}\right) \qquad (1)$$

where k is the moment when the household is interviewed in the panel and h is the value of k at which the spell begins. Finally, the probability of a non left-censored spell i lasting longer than t is

$$\Pr\left(T_i > t \middle| T_i > t-1\right) = \prod_{k=h}^{t} \left(1 - P_{ik}\right) \qquad (2)$$

If y_{ik} is a dummy variable, equal to 1 if the household completes a spell at time k and equal to 0 if the household does not complete the spell at time k or the spell is censored at time k; then, the log likelihood function to be maximised is

$$\log L = \sum_{i=1}^{n} \sum_{k=1,h}^{t} \left[y_{ik} \left(\log P_{ik} \right) + \left(1 - y_{ik} \right) \log \left(1 - P_{ik} \right) \right] \qquad (3)$$

where n is the number of spells and t is the observed duration of spell i or the moment the event occurs. This likelihood in equation (3) is always conditional on the household transiting into (out of) poverty some time during observation. This transition is not modelled (even if the probability of leaving poverty is modelled within the escape probability framework). Only the realisation of this event is, ex-post, what is used as the *sample at risk* of leaving (falling back into) poverty. Thus, this model is equivalent to the discrete-state, discrete-time n-order Markov model where the only possible transitions are 1 to 0 or 1 to 1, indicating 1 the poverty (non-poverty) status of the household.

Subsequently, the probability of suffering an event can be modelled as independent of time

$$P_{ik} = \Pr\left(i \ \textit{not poor at } t \middle| \ i \ \textit{poor at } t-1; X_{it}, D_{it}, \underline{\beta} \right) = F\left(X_{it}, D_{it}, \underline{\beta} \right) \qquad (4)$$

$$P_{ik} = \Pr\left(i \ \textit{poor at } t \middle| \ i \ \textit{not poor at } t-1; X_{it}, D_{it}, \underline{\beta} \right) = F\left(X_{it}, D_{it}, \underline{\beta} \right) \qquad (4')$$

where X_{it} are time-varying household characteristics, D_{it} is the time-varying distance from the poverty line and $\underline{\beta}$ is a parameter vector. Thus the model becomes a n-order Markov model with heterogeneity. This is the estimation procedure for models 1 and 2.[14]

For a first assessment of the change in the probability of a household stepping out of a poverty as the spell evolves in time we specified P_{ik} in a way that it is possible to distinguish between the effect of the *duration of the spell* and the effects of *other covariates*. Thus, the probability of escaping poverty is now specified as

$$P_{ik} = \Pr\left(i\ not\ \ poor\ \ at\ \ t \middle| i\ \ poor\ \ at\ \ t-1; X_{it}, D_{it}, d_{it}, \underline{\phi}\right) = F\left(X_{it}, D_{it}, d_{it}, \underline{\phi}\right) \quad (5)$$

$$P_{ik} = \Pr\left(i\ \ poor\ \ at\ \ t \middle| i\ \ not\ \ poor\ \ at\ \ t-1; X_{it}, D_{it}, d_{it}, \underline{\phi}\right) = F\left(X_{it}, D_{it}, d_{it}, \underline{\phi}\right) \quad (5')$$

where d_{it} are time-varying dummies for spell duration.[15] Equation (5 or 5') is plugged into the previous log likelihood expression (equation 3) and assuming a logistic distribution of the error term the likelihood function is maximised respect to the unknown vector of parameters, $\underline{\phi}$. The model is now a duration dependent n-order Markov process with heterogeneity and is estimated for the sample of both non-poverty and poverty spells in models 3 and 4.

Thus, all models are estimated as n-order Markov Chains. Models 2, 3 and 4 include dummies for the distance between household equivalent income and the poverty line. Their results are conditional on the household's position with respect to the poverty line just before or after exit: given the point in the income distribution where the household is before leaving poverty or has jumped to when exiting poverty, what are the household characteristics that determine an exit or a re-entry into poverty? Models 3 and 4 include dummies for the time the household spends in or out of poverty just before or after an exit as explanatory variables for the exit and re-entry hazard and drop some insignificant regressors. The included duration dummies attempt to measure the degree of duration dependence of the probability of leaving or returning to poverty given that, according to the non-parametric hazard rates in Table 4, the longer a household remains either in or out of poverty the less likely it will be either to leave it or to return to it, respectively.

3.2 The results

The coefficients estimated conditional on the distance of household income to the poverty line differ only slightly from those which are not conditional on this distance. It is only the *dependency index* and the *retirement status of the household head* that register a higher absolute value when not conditioning on household's income distance to the poverty line. These two variables are highly correlated (especially the dependency index) to the point in the income distribution where the household is placed after an exit from poverty. Conditioning on the distance

from the poverty line does not change the estimations obtained in model 1 for the rest of the regression coefficients.

There is no differentiated net effect of the sex of the head of household on the re-entering probability found for the sample of households registering an exit from poverty - see Table 7. The sex variable is only significant if mixed with civil status and age. The older female heads are, the higher their probability of re-entering poverty soon after exit. The marginal effect of age is larger (even if with a much lower initial probability of returning to poverty) if these females have a spouse present in the household than if they do not have one. The inequality in the probability of re-entering poverty within the group of female heads with spouse is higher than within the group of female heads without a spouse. The latter have a higher risk of falling back into poverty while being more homogeneous with respect to age. The presence of a spouse in the household, whatever her/his labour market status, is an advantage when maximising the length of the non-poverty spell if the household manages to exit poverty sometime – see Table 8.

Results on the coefficient of the sex variable in the exit and re-entry equations indicate that male-headed households should expect shorter poverty spells than female-headed households. Little can be said, however, on the implications of an exit from poverty for each of these groups. Nonetheless, model (2) of the re-entry equation gives some evidence on the likelihood of a 'good quality' exit from poverty for female headed households with a spouse. Despite the fact that its effect decreases as the age of the head increases.

< Insert Table 7 around here >

As one would expect, studies on the correlation of the number of income earners in the household and the risk of poverty (see for example, Foerster (1994) or Cantó (1998) for comparative results on Spain) come to the general conclusion that households without income earners (head aged <60) have a higher risk of poverty than households with one or more income earners. However, some country specific differences exist. European countries, in general, register lower poverty rates for no-earner household than countries like the US or Australia. Within Europe, Spain is placed in the group of countries in which the lack of earners in the household is less correlated with poverty. Even in the Spanish case, we find that a large number of dependants

in the household (over 75 percent of household members) promotes long-term poverty spells with short periods of non-poverty. Moreover, dependants of a short age (especially between 3 and 6 years of age) increase even more the expected poverty spell length.

The distribution of permanent and transitory poverty between rural and urban parts of the country is particularly interesting in terms of policy. Intuition would lead one to consider the higher number of short-term labour market opportunities in cities to predict a higher importance of transitory poverty there. Little differences, however, were found between townships in household poverty exit hazard rates (length of the poverty spell). Regarding the re-entry, instead, some results arise. An income improvement, if it ever takes place, is of a 'better quality' in townships with more than 100,000 inhabitants than in smaller ones (especially if with more than 500,000 inhabitants). The expected time out of poverty after an exit in urban parts of the country is larger than in rural areas. Thus, it is the re-inflow (and not the outflow) into poverty that is lower in urban than in rural areas.

Households with an unemployed head are expected to have long-term poverty spells mixed with some short spells of non-poverty – see Table 8. Out of this group, those without Unemployment Insurance (UI) or Income Support (IS) (either because they are not elegible for it or because it has already ended[16]) had a higher probability of leaving poverty compared to those who are receiving these benefits. In the re-entry equation, however, their probability of returning to poverty shortly after escaping it is largely higher than that of the unemployed with benefit. Thus, a higher welfare instability is expected from households whose head is unemployed but is not receiving a benefit than otherwise. For those receiving UI or IS, some welfare instability is also expected but spells of poverty or non-poverty will be longer.

< Insert Table 8 around here >

This result on welfare instability is similar for households whose head is self-employed. Some under-reporting of income for the self-employed is expected while the highest instability may come from the inclusion in this group of self-employed farmers without dependent workers.

In attempting to approximate both the income jump associated with the household's exit from poverty and the stability of the jump in itself, we have also included, in models 2 and 3, dummies for the distance from the household's equivalent income to the poverty line. All dummies are strongly significant and show higher coefficients as the distance increases. Thus, the further up in the income distribution the household ends at after an exit, the less probable it is to fall back into poverty shortly after.

The inclusion of duration dummies in the re-entry equation (compare models 2 and 3 in Table 6) reduces the significance of the dummies which describe the household's distance to the poverty line after an exit. These dummies, however, continue to be significant with slightly lower coefficient estimates. The size of the jump in equivalent income terms emerges as a clear determinant of welfare stability whereas the original household income level with respect to the poverty line (poverty gap) before moving out of poverty was of less importance in determining the household's exit probability- see model 4.

< Insert Table 9 around here >

All duration dummies in both the exit and the re-entry equations show strong negative coefficient signs, duration in a state (in or out of poverty) promotes stability in that state. However, an exit from poverty does not assure a long non-poverty spell given that the *duration out of poverty* is not a characteristic which is inherent to the household but a quality which is acquired as the spell evolves. After a year and a half out of poverty, the probability of a move from above to below the poverty line becomes extremely low (as already shown by the non-parametric hazard rate). However, this strong correlation may be seriously biased by unobserved heterogeneity. Even if this was the case, it is important to include unobserved heterogeneity in the regression in order to obtain unbiased estimates of other independent variable coefficients. In terms of the marginal effect of duration on the re-entry hazard rate, one finds that it is somewhat weaker than that found for duration on the exit hazard.

In all regressions, the inclusion of seasonal dummies controls for the effects of quarterly income fluctuations. Dummies for yearly time effects are also included. These control for the evolution of low income dynamics over time. The combined interpretation of exit and re-entry

equation coefficients for these variables is interesting. Between 1988 and 1990, a decrease in the re-entry probability of households who had managed to exit poverty is observed. This effect is most strong for 1989. Towards 1991, things changed and an exit from poverty became less likely (negative coefficient in the exit equation) while those experiencing an exit were likely to return to poverty shortly after.

4. Conclusions

In this paper we have offered an innovative reasoning about the way in which demographic and socio-economic characteristics affect low income household's welfare stability by considering both poverty escape rates and poverty recall.

In a first inspection of the data we estimate non-parametric hazard rates in order to measure the importance of poverty recall. Results indicate that a large percentage of households (around a quarter of those households who manage to exit from poverty) return to poverty between 3 and 6 months after exit. Low income instability is therefore quite high. Thus the study of persistence of incomes in the lowest tail of the income distribution in Spain should take into account poverty recall. However, almost half of the households who exit poverty (48 percent) do not return to it in the subsequent 21 months. The largest decrease in the re-entering hazard takes place in the first year after exit and decreases only slightly from then onwards. Thus, households who have experienced poverty and who register some upward income mobility crossing the poverty line maintaining their income level for a year are most likely to remain longer out of poverty for long.

By comparing the effect of household characteristics on the poverty escape rate and on the probability of re-entering poverty after suffering a poverty spell we are able to detect which characteristics promote poverty persistence or transience. The model used to estimate probabilities was recently proposed in the literature and approaches the empirical transition probabilities observed directly in the data better than a first order Markov. Also, it has the advantage of maximising the amount of information from the panel which is effectively utilised.

Results show that demographic characteristics increasing the households' re-entry hazard shortly after entry are: the lack of a spouse, a large number of dependants (mainly if these are three

or more children under 14) or being located in small townships. Labour market characteristics increasing the probability of a household's re-entry are: having a head who is unemployed, is a blue-collar worker in agriculture or is self-employed.

Households with a spouse are more stable in their income level, both above and below the poverty line. However, if the household head is male households should expect shorter poverty spells. An improvement in household income, if ever taking place, is of a 'better quality' in large townships than in smaller ones, it is the re-inflow (and not the outflow) into poverty that is lower in urban than in rural areas. Finally, households whose head is unemployed are expected to have long-term poverty spells mixed with some short spells of non-poverty. A higher welfare instability is expected from those whose head is unemployed but is not receiving a benefit while those whose head is unemployed but is receiving UI or IS will expect a higher stability in their income, whatever its level.

Following previous research on poverty dynamics we introduce the concept of persistence of poverty in the estimation of hazard rates by including duration dummies in the regressions. We add poverty gap dummies in the model in order to minimize the bias in the estimated coefficients when a combination of nonparametric unobserved heterogeneity and duration dependence components are included in the model. We obtain that the length of time below the poverty line influences the households' upward income mobility more than the distance between household income and the poverty line does. After an income jump takes place, even if duration out of poverty is important, the income level achieved is a more important determinant of the household’s re-entry probability.

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Table 1. Characteristics of the samples of spells: Means.

	POVERTY SPELLS		NON-POVERTY SPELLS	
Characteristics	Inflow sample of spells (2,394 spells)	All spells (4,676 spells)	Inflow sample of spells (2,829 spells)	All spells (21,532 spells)
Age of household head	53.5	52.7	53.5	52.2
Number of household members	3.75	3.92	3.77	3.47
Number of members over 65	0.37	0.34	0.37	0.44
Number of children (<18)	1.25	1.40	1.24	0.99
Number of children (<14)	0.88	0.99	0.86	0.73
Number of children (<6)	0.33	0.36	0.30	0.28
Number of children (<3)	0.18	0.19	0.15	0.15
Dependency Index	0.60	0.62	0.49	0.44
Duration of Spell	1.55	1.93	2.32	4.07

Source: Own construction using the ECPF.

Table 2. Characteristics of the samples of spells: Percentages.

	POVERTY SPELLS		NON-POVERTY SPELLS	
Characteristics	Inflow sample of spells (2,394 spells)	All spells (4,676 spells)	Inflow sample of spells (2,829 spells)	All spells (21,532 spells)
Type of income source (% total)				
Employment income	31.4	29.7	35.2	49.2
Self-employment income	15.7	16.8	21.2	14.2
Capital income	0.8	0.8	1.6	1.2
Pensions income	39.9	37.7	32.1	30.1
Unemployment income	9.2	11.0	6.4	3.3
Transfers income	2.3	2.8	2.2	1.2
Other income	0.4	0.8	1.1	0.5
Poverty Gap (as % of poverty line)				
0-10%	41.0	0.6	24.0	6.3
10-25%	27.2	1.8	23.0	8.4
25-40%	11.2	4.4	14.6	7.8
40-50%	4.6	4.8	6.5	5.1
50-60%	3.3	6.5	4.0	4.8
60-75%	3.0	15.3	6.0	6.9
75-90%	1.2	26.5	4.2	6.6
90-99%	0.4	31.9	2.1	3.8
Zero income	7.7	8.0	--	--
>100% over line	--	--	15.2	49.9

Source: Own construction using the ECPF.

Table 3. Characteristics of the samples of spells: Percentages.

	POVERTY SPELLS		NON-POVERTY SPELLS	
Characteristics	Inflow sample of spells (2,394 spells)	All spells (4,676 spells)	Inflow sample of spells (2,829 spells)	All spells (21,532 spells)
Female household head	19.9	19.4	19.2	16.8
Head without spouse	23.7	22.5	23.1	21.2
Level of education household head				
Illiterate	7.6	8.2	7.0	4.3
No studies	37.7	37.7	37.7	23.8
Primary school	45.7	44.8	46.5	44.6
Secondary school (1st cycle)	5.3	5.4	5.1	10.1
Secondary school (2nd cycle)	2.1	2.5	2.3	8.9
University (3 years)	1.0	0.9	0.9	4.3
University (5 years)	0.4	0.4	0.4	3.8
Head labour market status				
Employed – ft – qualified	4.6	4.8	13.0	33.6
Employed – ft – non qual	8.7	8.2	10.9	9.0
Employed – ft – non qual. agric	10.3	19.1	5.1	2.1
Employed – self-employment	19.9	9.0	22.2	14.2
Employed – less than 13 hrs.	2.8	3.2	0.9	1.3
Unemployed – no UI or IS	6.5	8.0	2.4	1.3
Unemployed – some UI or IS	7.0	8.9	5.8	2.8
Retired – no pension benefit.	1.9	1.8	0.8	0.6
Retired – some pension benefit	34.2	32.6	36.2	33.3
Working at home	2.0	2.1	1.3	0.9
Other status	1.7	1.9	1.0	0.7
Size of municipality of residence				
<5,000 inh	29.1	27.6	29.3	18.0
5,000-10,000 inh.	12.4	12.7	12.7	9.1
10,000-20,000 inh.	13.2	12.6	12.9	10.4
20,000-50,000 inh.	13.3	12.3	12.3	10.7
50,000-100,000 inh.	8.8	9.4	8.2	11.8
100,000-500,000 inh.	15.5	16.9	16.5	23.8
>500.000 inh.	7,6	8.3	8.0	16.1
Type of housing				
Owned	77.4	75.3	77.0	76.0
Rent-free	1.1	1.3	1.2	1.6
Subsidised	6.8	7.3	6.8	5.9
Rented	14.6	16.0	14.9	16.4

Source: Own construction using the ECPF.

Table 4. Survival and hazard rates for escaping and re-entering poverty. All inflow spells.

	ESCAPING POVERTY (2,394 spells at start)				RE-ENTERING POVERTY (2,829 spells at start)			
Interval of time in status	Survival	*std. error*	Hazard	*std. error*	Survival rate	*std. error*	Hazard	*std. error*
0-3 months	1	--	--	--	1	--	--	--
3-6 months	0.48	*.010*	0.69	*.019*	0.72	*.008*	0.31	*.011*
6-9 months	0.31	*.011*	0.42	*.027*	0.62	*.010*	0.15	*.010*
9-12 months	0.22	*.011*	0.37	*.038*	0.56	*.011*	0.10	*.011*
12-15 months	0.17	*.012*	0.25	*.048*	0.52	*.012*	0.07	*.012*
15-18 months	0.15	*.013*	0.13	*.052*	0.50	*.013*	0.04	*.012*
18-21 months	0.13	*.015*	0.10	*.072*	0.48	*.015*	0.05	*.019*
21-24 months	0.13	*.015*	0	--	0.48	*.015*	0	--

Source: Own construction using the ECPF.

Table 5. Combined interpretation of covariates effects on Welfare Stability and Quality of Poverty Exits. Signs of coefficient estimates in Poverty Exit and Re-entry equations.

EXIT HAZARD	RE-ENTRY HAZARD	IMPLICATIONS		
		Main effect	Quality of Exit	Spell length
negative	negative	welfare stability	assures non-poverty for long	long-term poverty and non-poverty spells
positive	positive	welfare instability	not assure poverty for long	repeated poverty and non-poverty spells
negative	positive	some positive welfare instability	not assure non-poverty for long	long-term poverty and short-term non-poverty spells
positive	negative	some negative welfare instability	assures non poverty for long	long-term non-poverty and occasional short-term poverty spells

Notes: the term "positive" indicates that the instability brings the household out of poverty, The term "negative" indicates that the instability brings the household into poverty.

Table 6. Combined interpretation of covariates effects on Welfare Stability and Quality of Poverty Exits. Signs of coefficient estimates in Poverty Exit and Re-entry equations.

EXIT HAZARD	RE-ENTRY HAZARD	IMPLICATIONS	
		Quality of Exit	Spell length
non-significant	negative	good quality exit	
negative	non-significant		expected long-term poverty spells
positive	non-significant		expected short-term poverty spells
non-significant	positive	bad quality exit	

Table 7. Logit regressions for the Poverty Exit and Re-entry Probabilities. N-order Markov.

	RE-ENTRY PROBABILITY						EXIT PROBABILITY	
Dependent Variable: see note.	Duration dependence not included				Duration dependence included			
	Not- conditional Poverty Gap (1)		Conditional Poverty Gap (2)		Conditional Poverty Gap (3)		(4)	
	Coef	t-ratio	Coef	t-ratio	Coef	t-ratio	Coef	t-ratio
age of hh head/10	-0.03	*-0.8*	-0.06	*-1.3*			-0.28	*-1.3*
age of hh head^2/100							0.02	*1.1*
Sex head and Partner situation								
male head							0.35	*1.9*
male, no spouse	-0.06	*-0.1*	-0.24	*-0.3*				
female, with spouse	-2.90	*-2.5*	-2.38	*-2.0*				
female, no spouse	-0.49	*-1.2*	-0.64	*-1.5*				
male, no spouse x age head/10	0.12	*1.2*	0.13	*1.3*				
female, with spouse x age head/10	0.56	*2.9*	0.45	*2.2*				
female, no spouse x age head/10	0.20	*2.9*	0.19	*3.0*				
Education hh head								
no studies	-0.16	*-1.1*	-0.13	*-0.8*	-0.15	*-0.9*	0.15	*0.9*
primary school	-0.38	*-2.6*	-0.32	*-2.1*	-0.27	*-1.6*	0.13	*0.7*
secondary (1st cycle)	-0.79	*-3.2*	-0.78	*-3.0*	-0.90	*-3.3*	-0.17	*-0.6*
secondary (2nd cycle)	-0.35	*-1.1*	-0.07	*-0.2*	-0.18	*-0.5*	-0.39	*-1.1*
university (3 years)	-0.53	*-1.2*	-0.36	*-0.8*	-0.34	*-0.7*	0.31	*0.6*
university (5 years)	-0.72	*-1.1*	-0.28	*-0.4*	-0.97	*-1.5*	-0.01	*-0.02*
Household dependants, number and age								
dependency index	1.67	*9.0*	0.86	*4.4*	0.74	*3.4*	-0.49	*-2.0*
Size of municipality of residence								
5,000-10,000 inh.	-0.08	*-0.7*	-0.08	*-0.6*	-0.14	*-1.0*	-0.15	*-1.0*
10,000-20,000 inh.	-0.02	*-0.2*	-0.05	*-0.4*	-0.08	*-0.6*	-0.06	*-0.4*
20,000-50,000 inh.	-0.09	*-0.8*	-0.01	*-0.1*	-0.15	*-1.1*	-0.26	*-1.8*
50,000-100,000 inh.	-0.17	*-1.1*	-0.17	*-1.1*	-0.17	*-1.0*	-0.24	*-1.4*
100,000-500,000 inh.	-0.49	*-4.1*	-0.44	*-3.6*	-0.46	*-3.4*	-0.08	*-0.6*
>500,000 inh.	-0.53	*-3.4*	-0.41	*-2.5*	-0.55	*-3.1*	-0.25	*-1.4*
Type of housing								
subsidised	0.29	*0.8*	0.22	*0.6*	0.45	*1.1*		
rented	0.03	*0.3*	-0.02	*-0.1*	0.11	*0.9*		
rent-free	0.28	*2.0*	0.25	*1.7*	0.23	*1.4*		
constant	-1.95	*-5.6*	-0.51	*-1.4*	0.96	*3.2*	2.36	*3.9*
number of obs.	6,574		6,574		6,574		3,647	
Pseudo R^2	0.052		0.110		0.278		0.257	
Log Likelihood	-2677.4		-2513.6		-2037.6		-1816.3	
mean predicted prob.	0.15		0.15		0.15		0.39	
standard dev. prob.	0.07		0.11		0.18		0.27	
well-classified clases (cut-off P>=0.5)	84.6		84.5		86.9		77.1	

Notes:

(a) The dependent variables for the re-entry regression is: household transits into poverty conditional on having survived out of poverty until that moment.The dependent variables for the exit regression is: household transits out of poverty conditional on having survived in poverty until that moment.

(b) Models include all variables included in other tables under the same model number.

(c) The reference household in model 1 is a male-headed household with a spouse, where the head is illiterate, owns housing, is employed full-time non-qualified, observed in 1st quarter 1985.

Table 8. Logit regressions for the Exit and Re-entry Probabilities. N-order Markov.

	RE-ENTRY PROBABILITY						EXIT PROBABILITY	
	Duration dependence not included				Duration dependence included			
	Not- conditional Poverty Gap (1)		Conditional Poverty Gap (2)		Conditional Poverty Gap (3)		(4)	
	Coef	t-ratio	Coef	t-ratio	Coef	t-ratio	Coef	t-ratio
Head labour market status								
employed - less than 13hrs	0.68	*1.8*	0.56	*1.4*	0.37	*0.8*	-0.24	*-0.8*
employed - ft, qualified	-0.12	*-0.7*	-0.07	*-0.4*	-0.08	*-0.4*	0.13	*0.7*
employed - ft, non qual, agric	0.43	*2.3*	0.37	*1.9*	0.35	*1.6*	-0.53	*-2.2*
employed - self employment	0.40	*2.9*	0.51	*3.5*	0.60	*3.9*	-0.39	*-2.2*
unemployed - no UI or IS	1.01	*4.5*	1.00	*4.4*	0.83	*3.3*	-0.50	*-2.2*
unemployed - some UI or IS	0.40	*2.1*	0.38	*2.0*	0.38	*1.8*	-0.70	*-3.3*
retired -no pension benefit	0.76	*1.9*	0.50	*1.2*	0.46	*1.0*	0.43	*1.2*
retired - some pension ben.	0.28	*1.8*	0.13	*0.8*	0.05	*0.3*	-0.28	*-1.5*
working at home	-0.20	*0.5*	-0.10	*-0.2*	-0.46	*-1.0*	0.19	*0.5*
other status	0.34	*0.8*	0.33	*0.8*	-0.05	*-0.1*	-0.94	*-2.6*
Spouse labour market status								
employed					-0.32	*-2.1*	-0.08	*-0.4*
unemployed					-0.75	*-2.0*	0.28	*0.8*
out of the labour force					-0.40	*-3.3*	-0.08	*-0.5*
number of obs.	6,574		6,574		6,574		3,647	
Pseudo R^2	0.052		0.110		0.278		0.257	
Log Likelihood	-2677.4		-2513.6		-2037.6		-1816.3	
mean predicted prob.	0.15		0.15		0.15		0.39	
standard dev. prob.	0.07		0.11		0.18		0.27	
well-classified clases (cut-off P>=0.5)	84.6		84.5		86.9		77.1	

Notes:

(d) The dependent variables for the re-entry regression is: household transits into poverty conditional on having survived out of poverty until that moment.The dependent variables for the exit regression is: household transits out of poverty conditional on having survived in poverty until that moment.

(e) Models include all variables included in other tables under the same model number.

(f) The reference household in model 1 is a male-headed household with a spouse, where the head is illiterate, owns housing, is employed full-time non-qualified, observed in 1st quarter 1985.

Table 9. Logit regressions for the Exit and Re-entry Probabilities. N-order Markovs.

	RE-ENTRY PROBABILITY						EXIT PROBABILITY	
	Duration dependence not included				Duration dependence included			
	Not- conditional Poverty Gap (1)		Conditional Poverty Gap (2)		Conditional Poverty Gap (3)		(4)	
	Coef	t-ratio	Coef	t-ratio	Coef	t-ratio	Coef	t-ratio
Poverty gap as % pov. line (over or under the line)								
10-25%			-0.53	*-5.5*	-0.38	*-3.5*	-0.08	*-0.8*
25-40%			-1.30	*-10.4*	-1.05	*-7.7*	-0.25	*-1.7*
40-50%			-1.39	*-8.2*	-1.13	*-6.1*	-0.31	*-1.5*
50-60%			-1.76	*-8.1*	-1.46	*-6.2*	0.23	*1.0*
60-75%			-1.61	*-8.9*	-1.43	*-7.3*	-0.24	*-0.9*
75-90%			-1.98	*-8.5*	-1.67	*-6.7*	-0.48	*-1.2*
90-99%			-1.80	*-6.0*	-1.45	*-4.6*	--	
zero income							-0.09	*-0.4*
>200% over line			-1.51	*-12.2*	-1.38	*-10.1*		
Seasonal effects								
2nd quarter/10			-0.10	*-0.9*	-0.23	*-1.9*	0.18	*1.6*
3rd quarter/10			-0.11	*-1.0*	-0.15	*-1.3*	0.8	*0.8*
4th quarter/10			-0.08	*-0.7*	-0.22	*-1.9*	-0.37	*-3.1*
Yearly effects								
1986	-0.91	*-5.7*	-0.85	*-5.1*	-1.09	*-6.0*	-0.87	*-4.8*
1987	0.003	*0.02*	0.03	*0.2*	-0.05	*-0.3*	-0.27	*-1.6*
1988	-0.25	*-1.8*	-0.21	*-1.5*	-0.36	*-2.3*	-0.03	*-0.2*
1989	-0.38	*-2.7*	-0.37	*-2.5*	-0.62	*-3.9*	-0.11	*-0.6*
1990	-0.17	*-1.3*	-0.17	*-1.2*	-0.39	*-2.4*	0.09	*0.5*
1991	-0.10	*-0.7*	-0.11	*-1.1*	-0.19	*-1.2*	-0.33	*-1.9*
1992	-0.74	*-4.8*	-0.76	*-4.8*	-1.04	*-6.0*	-0.67	*-3.9*
Duration poverty spell								
spell between 6 - 9 months					-1.09	*-10.7*	-1.68	*-17.1*
spell between 9 - 12 months					-2.05	*-15.6*	-2.41	*-18.0*
spell between 12 - 15 months					-2.78	*-14.8*	-3.13	*-14.5*
spell between 15 - 18 months					-3.72	*-11.9*	-3.89	*-9.1*
spell between 18 - 21 months					-3.97	*-10.2*	-4.94	*-6.8*
number of obs.	6,574		6,574		6,574		3,647	
Pseudo R^2	0.052		0.110		0.278		0.257	
Log Likelihood	-2677.4		-2513.6		-2037.6		-1816.3	
mean predicted prob.	0.15		0.15		0.15		0.39	
standard dev. prob.	0.07		0.11		0.18		0.27	
well-classified clases (cut-off P>=0.5)	84.6		84.5		86.9		77.1	

Notes:

(g) The dependent variables for the re-entry regression is: household transits into poverty conditional on having survived out of poverty until that moment.The dependent variables for the exit regression is: household transits out of poverty conditional on having survived in poverty until that moment.

(h) Models include all variables included in other tables under the same model number.

(i) The reference household in model 1 is a male-headed household with a spouse, where the head is illiterate, owns housing, is employed full-time non-qualified, observed in 1st quarter 1985.

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[1] See Bane and Ellwood (1986) or Ruggles and Williams (1989).

[2] An exception to this is Stevens (1999) work on poverty recall.

[3] If the sample size for each heterogeneous hazard group is large enough, separate regressions should be run for those groups for which homogeneity of the hazard is rejected at a 1% confidence level.

[4] This model distinguishes two populations within the sample: *s* individuals whose probability of moving from state j to state k is 0 (stayers) and *(1-s)* individuals whose transition probabilities follow a first order Markov. In this way, the estimated values for transition probabilities approached much better the empirical transition probabilities observed directly in the data.

[5] See Cantó (1998) for a thorough description of the ECPF and discussion of its advantages and drawbacks in the study of poverty dynamics.

[6] Monetary individual disposable income includes employment and self-employment income, income from regular transfers (including pensions and unemployment benefits), investment income and income from other sources. It excludes social insurance contributions and it is net of pay-as-you-earn taxes.

[7] The OECD scale weights by 1 the first adult in the household, by 0.7 the second and subsequent adults and by 0.5 all children in the household (children are all individuals below 14 years of age). See Duclos y Mercader-Prats (1999) for the effects of the choice of equivalence scale on poverty measurement in Spain.

[8] These are experienced by 2,323 households (11.06% of the total sample).

[9] I use a non-parametric method to estimate this hazard. I have seven time intervals $I_i = [T_{i-1}, T_i)$ where *i=1,...,7*. Using a life-table estimate (equivalent to the Kaplan-Meier estimator) as proposed by Kalbfleisch and Prentice (1980) the survival function S can be expressed as

$$\hat{S}(I_j) = 1 - \hat{G}(I_j) = \prod_{i=1}^{j} \frac{n_i - d_i}{n_i}.$$

Where $G(I_j)$ is the probability of having a spell shorter than the relevant interval I_j, $n_i = R_i - \frac{C_i}{2}$ (C_i is the number of censored observations and R_i is the number of households at risk of exiting poverty) and d_i is the number of households finishing a spell at interval I_i.

[10] One should note, however, the existence of a large heterogeneity of the re-entry probability during the first year after exit.

[11] I run a Log-rank test for homogeneity of the hazard rate for all known characteristics of the household.

[12] A child is defined as an individual below 14 years of age.

[13] The dependency ratio is the ratio between the number of household members who do not receive any kind of income and total household members.

[14] Note, however, that in model 1 poverty gap dummies are not included as regressors.

[15] We have inserted duration dummies in the logit regression. Dummy variables take the value 1 if the spell has exactly a given length (3, 6, 9, 12, 15, 18, 21 or 24 months) and the value 0 otherwise (e.g. if the dummy variable "spell length 3 months" is equal to 1 in spell i then spell i is three months long and if it is equal to 0 then spell i is of any other length.).

[16] Some heads may be in the process of obtaining the benefit at interview moment.