# STUDYING POVERTY OVER TIME:

# AN ANALYSIS BY GENDER AND AGE IN EUROPE

Annalisa Busetta, Daria Mendola

Department of Economics, Business and Finance
University of Palermo, Italy

annalisa.busetta@unipa.it  - daria.mendola@unipa.it

[version updated to 1st June 2012]


## 1. Measuring longitudinal poverty

Most of recent studies on poverty agree on the importance of studying poverty in longitudinal perspective to identify people in status of severe economic disadvantage. Several approaches can be found in the literature, but one of the most recent is based on the use of indices of chronic (or longitudinal) poverty summarizing the sequence of individual poverty spells across time-span.

In this paper we base our analyses upon the class of measures proposed by Mendola *et al.* (2011), which takes into account the way poverty and non-poverty spells follow one another along individuals' life courses. The rationale of the indices is briefly summarized in next section 2, whereas for further details we refer the readers to the original paper.

Our interest here is focused on the persistence of poverty, with a particular attention paid to gender and age differences. The role of these two variables is widely debated in the literature. The general belief that women are more at risk of experiencing poverty at every stage of the life course seems to be controverted in a longitudinal perspective. Most of the gender studies maintain that at every stage of the life course women are more at risk of experiencing poverty (European Commission, 2006). This fact is mostly imputed to inequalities and discrimination in education and labour market opportunities and to the impact on both of these of family care responsibilities. Moreover differences in gender and in educational level are often overlapped since, among older generations, women had fewer educational opportunities and lower qualification levels.

The way in which poverty acts in different stages of life course has ever concerned scholars and policy makers due to the differentiated and detrimental effect of being poor during the childhoold, the adulthood or the older age.

Our empirical analyses, made on a sample from the European Community Household Panel, intend to show how longitudinal poverty impacts different subpopulations, revealing interesting differences among European Countries, often attributable to the influence of welfare state models.


## 2. Measures and methods

As mentioned above, in order to measure the longitudinal poverty of individuals, we use one index in the class of Longitudinal Poverty Indices (*LPI*) proposed in Mendola *et al.* (2011). This set of indices is based upon the idea that the closer (and the deeper) two years spent in poverty are, the more they contribute to the overall longitudinal poverty measure. This is known as cumulative hardship hypothesis or closeness approach, and is adopted also in Bossert *et al.* (2011), and Hoy and Zheng (2011). It is worthwhile to highlight here that *LPI* indices map all the longitudinal information inside the sequence of poverty statuses in a single number accounting simultaneously for the duration and intensity of poverty persistence. The property of decomposability by subgroups of all the indices in the class offers an effective instrument to investigate longitudinal poverty in specific age-groups in the population and, if necessary, to address specific poverty reduction policies.

In Mendola *et al.* (2011), the cumulative hardship hypothesis is operazionalized working on all the pairwise distances between the waves that an individual spent in poverty, and on the sequencing of the poverty gaps in the poverty profile. Each index of the class of indices takes into account the sequences of poverty statuses (poor /not poor)[1], associated with each year (wave) observed, for each individual. The main characteristic of the class is that, playing with a set of parameters, one can give more or less importance to different aspects of the poverty experience, such as the intensity of the experiences of poverty and/or their sequencing, and/or their recentness, and/or the chances for an individual to escape poverty.[2] Here, we use the full version index, named in the original paper as *LPI_SE*, but ignoring the "emergence", or recentness, effect.

---

[1] The status of poverty/non poverty is assigned to all the individuals in a household who have net equivalised income less than the 60 per cent of the median net equivalised income (poverty line), for each country and each year using the OECD modified equivalence scale).

[2] Permanence probabilities are estimated for each pair of years spent in poverty in the individual poverty profile. There are evaluated at country-level, and act on the value of the *LPI* index in so that given a pair of waves the higher is the number of persons who were poor in the first wave and are not poor in the second wave considered, the worst is

The consequent class of Aggregate Longitudinal Poverty Indices (in the following, for the sake of shortness, named simply *ALPI* instead of *ALPI_SE*) is derived from a simple arithmetic mean of the individual longitudinal poverty indices *LPI_SE,* since longitudinal poverty of a population is viewed as a synthesis of longitudinal poverty of its members. In this way we assume that no compensation is allowed among individuals for the same year, whereas compensations among individual poverty profiles (sequences) are possible. So, at population level, the higher intensity of the longitudinal poverty of an individual can be compensated by the lower intensity of the longitudinal poverty of another individual. But the intensity of poverty, or even simply the status of poverty, of an individual in a single year (i.e. cross-sectional poverty) should not be compensated (at aggregate level) by the non poverty of another individual in the same year.

All the indices of the class (both at individual and aggregate level) are normalized (i.e. span over [0,1]), where 0 implies minimum longitudinal poverty and 1 maximum longitudinal poverty.

An interesting feature, shared by all the indices in the class of *ALPI*, is the decomposability property, which puts in evidence how different groups contribute differently to the overall evaluation of the longitudinal poverty in a society. So, if we divide the entire population in *M* subgroups according to any characteristic of interest, and if, for each year, all the groups share the same poverty line and permanence probabilities are estimated at population level, the aggregate level index for the overall population can be re-written as:

$$ALPI = \sum_{m=1}^{M} ALPI_m N_m \bigg/ \sum_{m=1}^{M} N_m \qquad (1)$$

where $ALPI_m$ is the index for the subgroup *m*, and $N_m$ is the number of individuals in the *m-th* group.

As a consequence, the proportional Contribution to the Poverty Persistence of group *m* (here named $CPP_m$) can be decomposed by the following ratio:

$$CPP_m = \frac{C_m}{N_m/N} \quad \text{where} \quad C_m = \frac{N_m}{N}\frac{ALPI_m}{ALPI} \qquad (2)$$

---

evaluated the situation of an individual who, on the contrary, persists in poverty in both the waves considered. Note that this parameter is very useful for country comparisons, since it accounts indirectly for the different income mobility across countries. A deeper presentation of the class of indices and its properties is in Mendola *et al.* (2011).

Hence if the contribution to the aggregate level index of the sub-group $m$ ($C_m$) equals its contribution to the demographic size of the population ($N_m/N$), the ratio $CPP_m$ is equal to 1 (that is, the $m^{th}$ sub-group has an average contribution to the global poverty in the population). If $m^{th}$ group is more affected by longitudinal poverty than prescribed by its demographic size, the ratio will be greater than 1, whereas if the group has a lower longitudinal poverty level, $CPP_m$ will be lower than 1. So that for example if in a certain country women have higher level of longitudinal poverty, their *CPP* will be greater than 1, whereas if they have a lower level, the index will be lower than 1.


## 3. Data and results


The aggregate and individual longitudinal poverty indices proposed above are now used to analyze data on people from the European Community Household Panel survey (ECHP). The sample is a balanced panel of individuals living in 11 European Countries with complete information about household income along all the waves of the panel (from 1994 to 2001). The sample size is around 300 thousands individuals and, among those, only a small part (less than 15%) never experimented poverty.

Let us firt analyse the role of gender in the dynamics of poverty. Figure 1 shows some first analyses on the differential incidence of longitudinal poverty, as defined *via LPI_SE,* by gender and age classes in each country. This is made by using the information provided by $CPP_m$ ratios.

The curves for men and women intersect each other in all European countries highlighting no clear gendered patterns. Looking at the age profiles relevant differences in terms of the impact of chronic poverty emerge. Poverty experiences appear to accumulate at the extremes of the life course (childhood and older age) but with different patterns among countries. Indeed, some European countries (such as Denmark, France, Belgium, Greece, and Germany) are characterized by a high poverty persistence in older age, whereas others (such as Italy and Spain) are branded by high levels of longitudinal poverty for childhood and young people. The comparison among countries sheds light on the fact that not all the countries are equally able to take care of oldest old people. This is largely evident from the situation experienced by people over 75 in Denmark, Belgium, France, Greece and Germany, who contribute to the overall poverty persistence in their country around two times more than expected according to their demographic weight.

**Figure 1.** *Proportional contributions to longitudinal poverty in European countries (CPP$_m$) by age groups and gender*
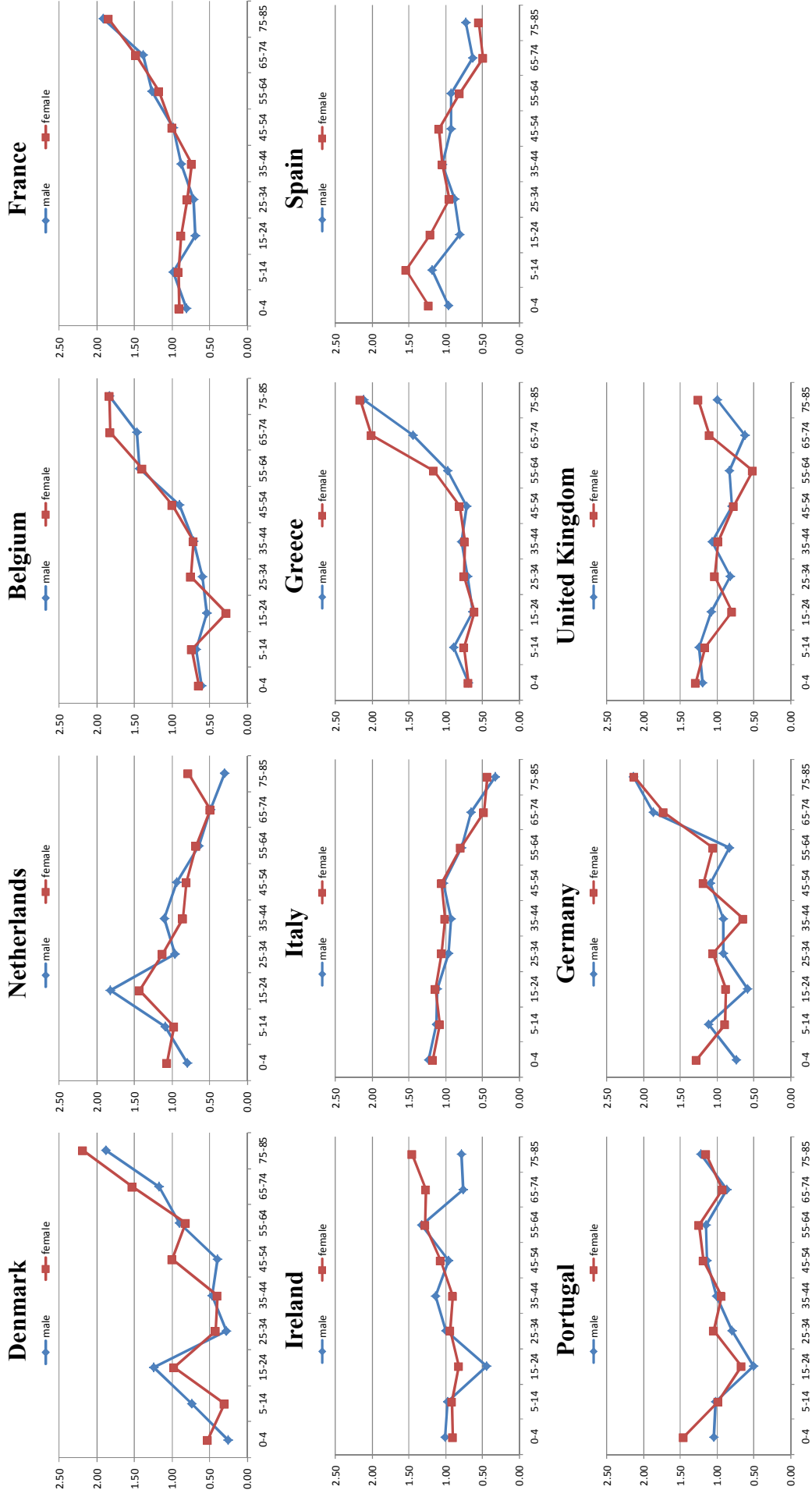
Indeed the overall picture of the persistence of poverty in a population is the resulting of three driving forces acting together: *diffusion* in the population (how many longitudinally poor people are there?), *duration* of the hardship (how long do they remain poor?), and *severity* of the experience (how poor they are?). The longitudinal version of the TIP curves -originally from Jenkins and Lambert (1997), and here renamed TIPP curves (where double P stands for PovertyPersistence) - provides a comprehensive view of the complexity of the phenomenon of longitudinal poverty.

In the following figure 2 there is a clear representation of the information that could be drawn from a TIP curve (for further explanations see Jenkins and Lambert, 1997) if computed resorting to a longitudinal poverty index.
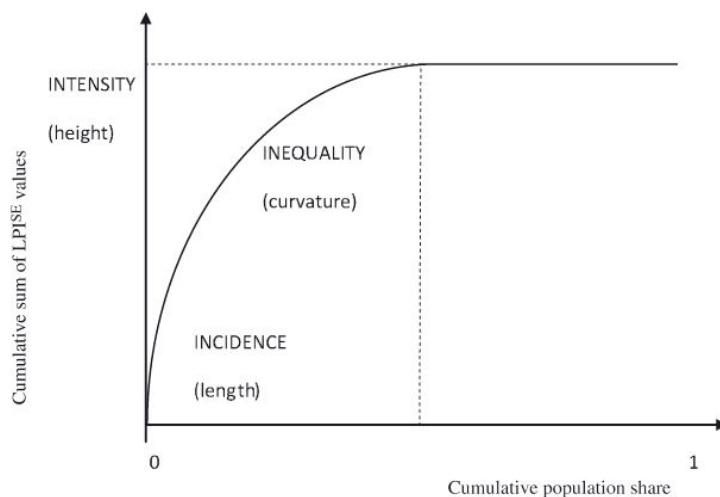
**Figure 2.** *TIPP curve*



Figure 3 shows the TIPP curves on the distribution of the values of the index *LPI_SE* for three subgroups of age in our sample: children (i.e. aged less than 16 years), middle age-group (from 16 to 59 years old), and the elderly (over 65 years old).

It is well known from the literature that the European countries differ greatly for diffusion, duration, and severity of poverty (Fouarge and Layte, 2005; Mendola *et al.,* 2009), and this information can be readily drawn by inspecting TIPP curves in figure 3. However here we put our attention on three interesting patterns of chronic poverty. A first pattern is that in some countries (the Netherlands, Spain, Italy, and the UK) the elderly are exposed to lower levels of poverty persistence, and this is likely due to a welfare system which protects the elderly better than it does with other groups. In particular in Italy and Spain there is some evidence of *reversed* progressivity (poverty persistence decreases moving toward higher age classes). On the contrary in Germany, Denmark, Belgium, France, and Greece it emerges a second pattern according to which elderly

**Figure 3.** *TIPP curves based on LPI_SE index in European countries by three age groups*
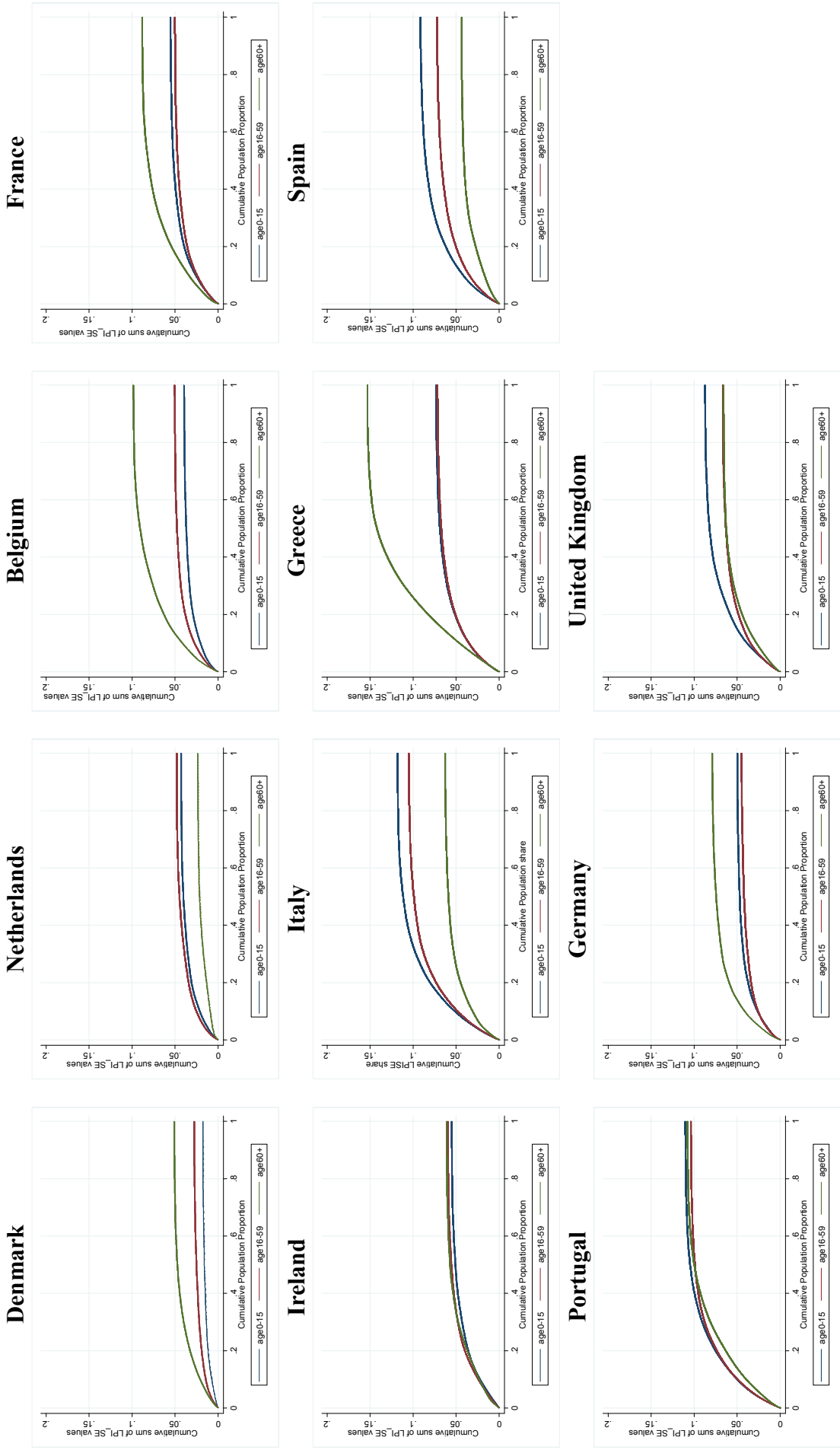
experience higher levels of poverty persistence, and in particular Belgium and Denmark show *direct* progressivity of poverty with age. Perhaps most striking is the third pattern represented by the case of Ireland and Portugal where there are no clear evidences of differences among age groups both in term of duration, severity and intensity of the poverty experiences.

Table 1 shows some summary statistics on the incidence of poverty persistence in the 11 countries of Europe. First line shows the percentage of incidence of longitudinal poverty (i.e. considering people with at least one wave spent in poverty between 1994 and 2001). Below the first line we take into consideration some factors/situation that could represent relevant "family disadvantages". In particular we focus on having the head of the household with a low level of education, or unemployed, or split from the partner, or reporting a low level of health, or living in a large family with more than two children (with less than 17 years old). For all these situations we give in table 1 the incidence of longitudinal poverty (i.e. percentage number of people with *LPI_SE* >0) and the odds ratio as measures of increased exposure.

All the family disadvantages considered are statistically significant risk factors for the experience of chronic poverty in almost all the European countries. They increase the probability to experience one or more spells of poverty. Most striking effects are due to being low educated in Greece and Portugal; or being unemployed at the beginning of the panel in Ireland, Spain and, above all, in Italy.

**Table 1.** *Incidence of longitudinal poverty by key aspects of family disadvantages*

| | NH | BE | FR | IE | IT | EL | ES | PT | DE | UK |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Incidence (%)** | 19.81 | 32.01 | 29.24 | 46.98 | 38.35 | 48.01 | 41.21 | 44.77 | 23.71 | 34.27 |
| **Percentage of longitudinal poor in each category** | | | | | | | | | | |
| Low education* ( < 2nd stage - isced 0-2) | 28.77 | 50.00 | 43.32 | 62.45 | 46.45 | 62.97 | 49.97 | 48.77 | 37.52 | 46.31 |
| Unemployed* | 40.95 | 72.13 | 66.06 | 85.07 | 87.74 | 69.12 | 81.08 | 48.48 | 55.98 | 69.66 |
| More than 2 children** in the household | 28.21 | 26.83 | 39.44 | 47.17 | 61.67 | 57.84 | 60.19 | 64.84 | 40.94 | 51.67 |
| Separated, divorced or widowed* | 24.59 | 42.94 | 40.91 | 74.05 | 41.89 | 56.21 | 42.14 | 56.4 | 36.16 | 54.75 |
| Bad or very bad self-assessed health* | 22.97 | 59.38 | 49.17 | 69.44 | 50.24 | 64.08 | 53.87 | 62.15 | 32.51 | 46.41 |
| **Odds ratio** | | | | | | | | | | |
| Low education ( < 2nd stage - isced 0-2)* | 1.88 | 3.34 | 3.48 | 5.05 | 3.56 | 6.99 | 4.69 | 9.17 | 2.35 | 3.80 |
| Unemployed * | 3.05 | 6.00 | 5.04 | 7.39 | 12.34 | 2.49 | 6.80 | - | 4.72 | 4.70 |
| More than 2 children** in the household | 1.65 | - | 1.63 | - | 2.69 | 1.51 | 2.23 | 2.38 | 2.32 | 2.14 |
| Separated, divorced or widowed* | 1.42 | 1.89 | 1.93 | 3.97 | - | 1.48 | - | 1.77 | 2.18 | 3.29 |
| Bad or very bad self-assessed health* | - | 3.31 | 2.49 | 2.67 | 1.75 | 2.09 | 1.81 | 2.45 | 1.71 | 1.74 |

\* Characteristic of the head of the household at the first wave of interview
\*\* Children: people 0-16 years old at the first wave of interview

Figure 4 summarizes our poverty analyses using the *CPP* ratios presented in section 2. As explained a *CPP* above 1 gives evidence to an over exposition of a group to the chronic poverty experience. The group are obtained combining gender and four age classes (0-14, 15-39, 40-64, and 65 and over).

Main evidences from figure 4 highlight that children are particularly exposed to chronic and severe poverty in the United Kingdom (*CPP*=1.5 for male and 1.4 for female) and Spain (*CPP*= 1.7 for female). Among teenagers and young adults (aged 15-39) the exposure to chronic poverty is generally fair or lower than expected, with no clear differences between boys and girls. There is a contribution to chronic poverty at average expected levels for adults (aged 40-64) with some over-exposition of men in Ireland and women in Belgium.

The elderly of both sexes are again the more disadvantaged people, with contribution to chronic poverty up to twice (among men in Belgium or women in France) or even three times (for women in Belgium and Greece) than expected under a hypothesis of equal distribution. Spain, Italy and the Netherlands are the only countries which largely protect their over-65 citizens.

Figure 5 presents the mean values of poverty persistence (i.e. *ALPI* index) among poor people by five-years age classes (for the age range 0-85) in each of the eleven European countries. As it is clear from these graphs the UK, Italy, Spain and Ireland have some of the highest child poverty persistence values in Europe, whereas Denmark, Belgium, France, Ireland, Portugal and, particularly, Greece show an increase of poverty persistence among older people. [3]

Looking at poverty persistence age-profiles by welfare system it is possible to spot distinct patterns. The Social Democratic group of countries (i.e. Denmark and the Netherlands) has the lowest aggregate poverty persistence indices in Europe and poverty persistence values very low for children. However in this context of low overall poverty rates, it is particularly striking the peak of aggregate poverty persistence values in the early twenties. The most likely explanation for these levels of youth poverty persistence may be driven by the fact that young people in Social Democratic countries leave home at "an extremely early age, and are therefore unlikely to have high enough earnings at the time of home-leaving to protect them against poverty" (Aassve *et al.,* 2006). The Conservative countries (i.e. Belgium, France and Germany) exhibit much flatter age profiles of poverty persistence at least up to the retirement age.

The Southern European countries show generally high poverty persistence values that reaches particularly high values for children in Portugal and Italy, and for older people in Portugal and

---

[3] A possible explanation for the falls of *ALPI* values in figure 5 in correspondence of age class 15-19 can be attributed to the effect of the equivalence scale coefficients (OECD modified scale) which set a cut points between adults and children at 16 years (for this problem see also Aassve *et al.,* 2006).

Greece. It is noticeable that in all the Southern European countries, there is no peak in poverty persistence either in the early twenties, or at any age which might be associated with leaving home.

**Figure 4.** *Proportional contributions to longitudinal poverty in European countries (CPPm) by age groups and gender*
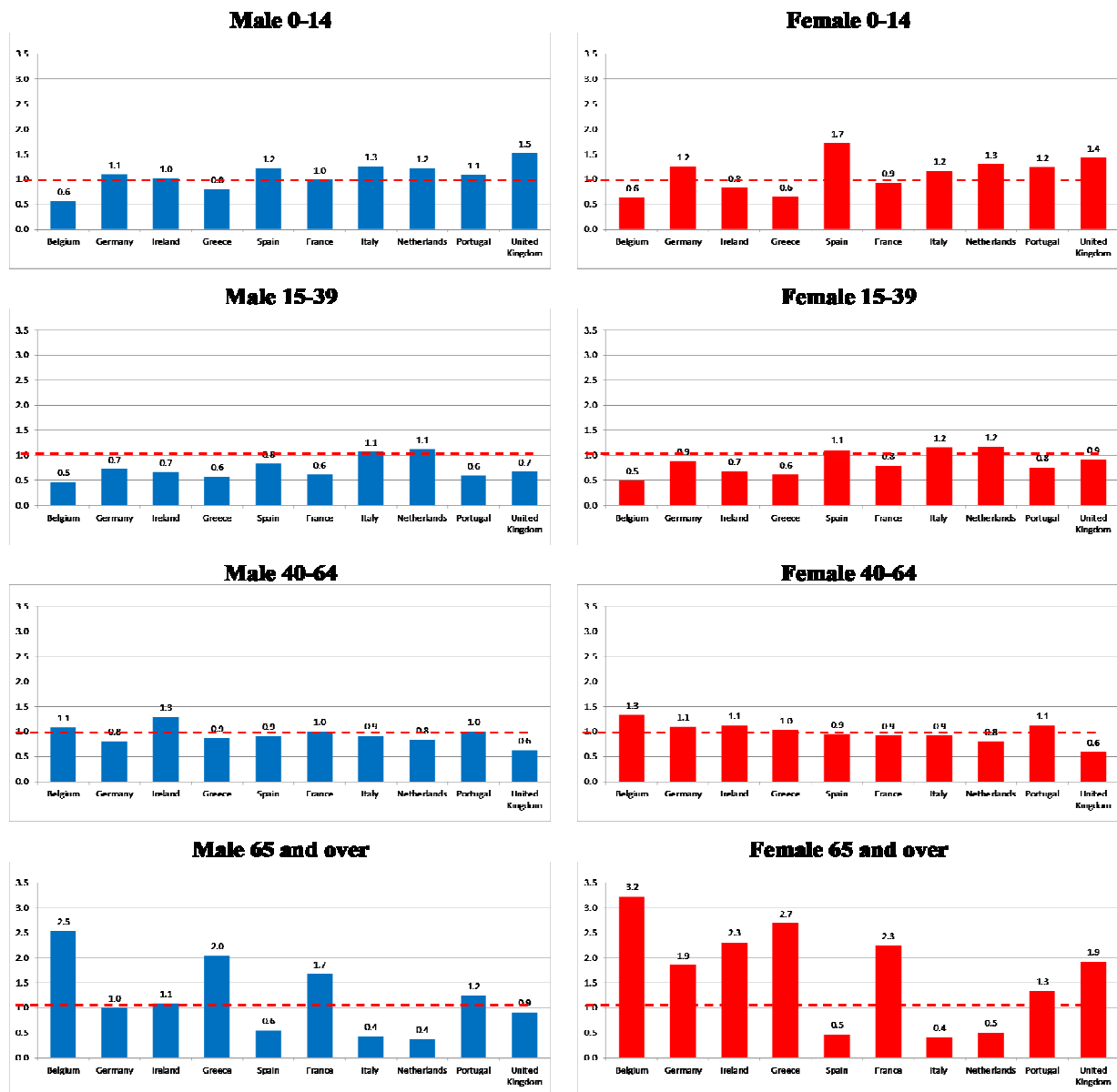


Note: CPPs are the ratio between the contribute of a sub-population (for example male children in Belgium) to the overall longitudinal poverty in the whole country and their demographic weight. So if CPP is lower than 1 it means that the mix between incidence and intensity of the longitudinal poverty (*ALPIm*) is lower than expected if the hardship were equally distributed in all the ages and for both sexes in the society.

**Figure 5.** *Mean values of poverty persistence among poor people by age classes in European countries*
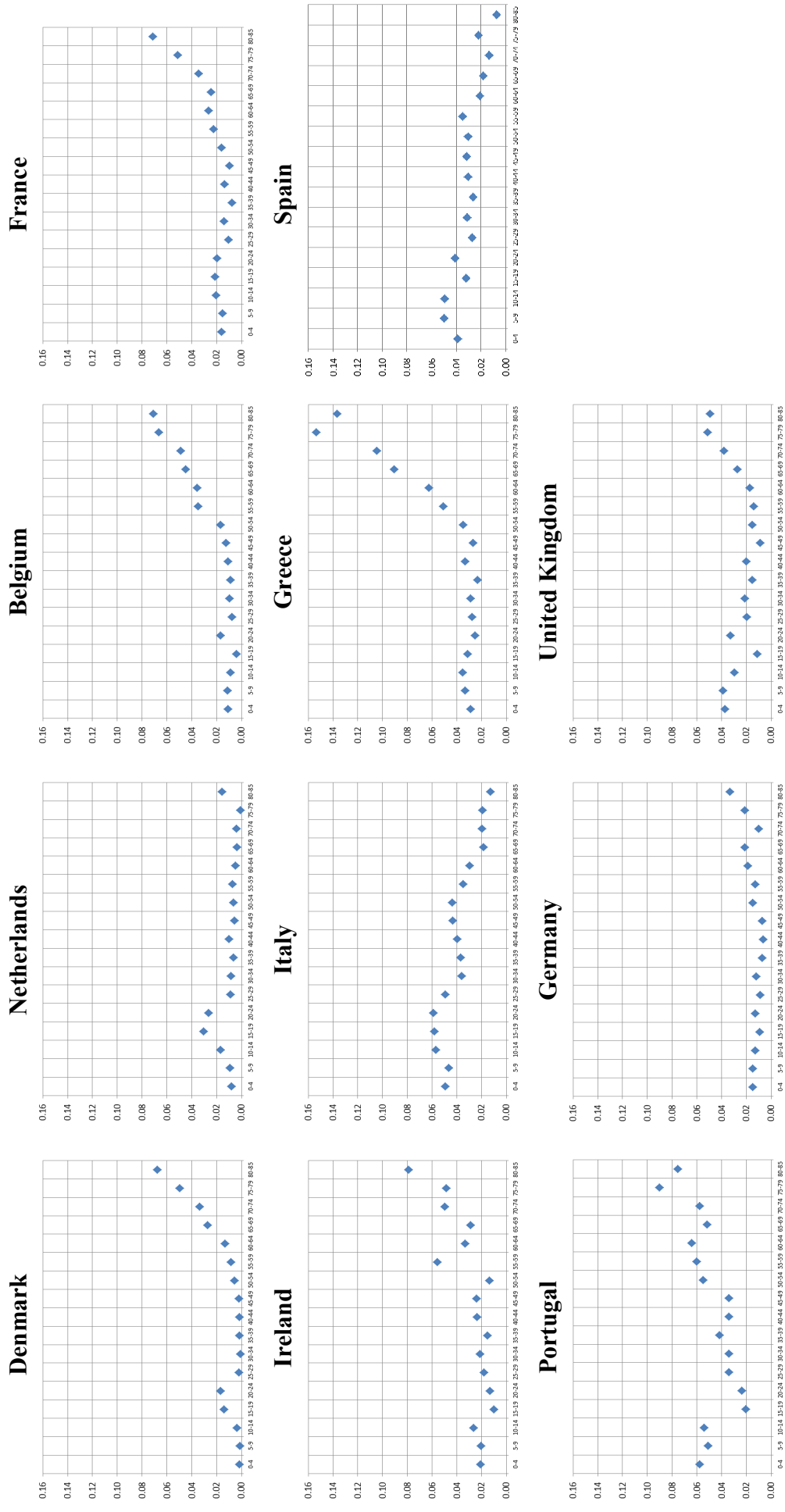
## 4. Conclusion

There has been an on-going debate regarding the extent to which information on longitudinal poverty can be summarized and usefully used to address better social policies. Clearly, we do not claim that the preliminary analyses in this paper are enough to explain the complex phenomenon of longitudinal poverty. However, we view our approach as an attractive option which could give a substantial help in interpreting chronic poverty. Moreover the decomposability property of the *LPI* allowed to identify the groups who contributed more to the overall longitudinal poverty in European countries, and in particular to put in evidence the difficult situation of people over 75 years old in many European countries. These results could be a useful starting point for deeper analyses.

## References

Aassve, A., Iacovou, M., Mencarini, L. (2006), Youth poverty and transition to adulthood in Europe,. *Demographic Research*, 15 (2), 21–50.

Bossert, W., Chakravarty, S.R., and D'Ambrosio C. (2011), Poverty and Time, *Journal of Economic Inequality*, DOI: 10.1007/s10888-011-9175-2.

European Commission (2006), Gender inequalities in the risks of poverty and social exclusion for disadvantaged groups in thirty European countries, Directorate-General for Employment, Social Affairs and Equal Opportunities, Commission of the European Communities, Brussels.

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), 407–426.

Hoy, M., and Zheng, B. (2011), Measuring Lifetime Poverty, *Journal of Economic Theory*, 146(6), 2544–2562.

Jenkins, S.P., and Lambert, P.J. (1997), Three I's of poverty curves, with an analysis of UK poverty trends, *Oxford economic papers*, 49(3), 317-327.

Mendola, D., Busetta, A., and Aassve, A. (2009), What keeps young adults in permanent poverty? A comparative analysis using ECHP, *Social Science Research*, 38, 840–857.

Mendola, D., Busetta, A., and Milito, A.M. (2011), Combining the intensity and sequencing of the poverty experience: a class of longitudinal poverty indices, *Journal of the Royal Statistical Society - Series A*, 174(4), 953–973.