Household Income Mobility in the European Union and in Portugal: an Analysis of Labor Market and Demographic Events[1]

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ABSTRACT

This article aims to assess the impact on income mobility of transitions in the labor market and of changes in the composition of households in Portugal and in the European Union. The analysis combines two concepts of income mobility: the growth in household income and the changes in the relative position of each household in the income distribution. Based on longitudinal microdata for the period 2004-2008, the article highlights the role of social transfers and income generation at the household level in cushioning shocks on individuals. The events identified have a material impact on income mobility. For example, in the European Union, the point estimates suggest that in the case of households who experience an increase in the number of unemployed, the average fall in equivalized household income is about 19 percent. In the case in which individuals move from employment to retirement, the average fall in equivalized household income is about 6 percent. The corresponding estimates for Portugal are not statistically different from those obtained for the European Union. Additionally, the article reveals some heterogeneity in the impact of those shocks along the income distribution.

1. Introduction

Household income fluctuates significantly over time.[3] This observation is as valid when analyzing the percentage changes in household income, as well as when considering changes in the relative position of each household income *vis-à-vis* the remaining households. Based on each of these concepts, charts 1 and 2 illustrate the high income mobility across European Union countries (see Alves and Martins, 2012). Underlying this mobility is a set of events – of a more or less permanent nature and of a more or less expected nature - that determines individual and household income at each point in time and over the life cycle. In particular, the literature has highlighted the importance of labor market transitions and demographic changes in determining income mobility (see Jenkins, 2011). The analysis of the role of these events in determining household income mobility is the focus of this article.

This study is based on the microdata from the European Union – Survey of Income and Living Conditions (EU- SILC) for the period 2004-2009.[4] Given the characteristics of the database, the impact of events on income mobility will be assessed between consecutive years. The analysis focuses on Portugal and in the set of European Union countries. It should be noted that the empirical literature focusing on the events underlying income mobility in a cross-country perspective is not abundant (see Aristei and Perugini, 2012). The limitations of available databases, including the EU-SILC, definitely contribute to this outcome.

This article includes three contributions which should be emphasized. Firstly, the analysis explicitly combines two concepts of income mobility: the percentage changes in household income and the changes in the relative position of each household in the income distribution. The combination of these two dimensions is important because the profile of percentage changes in income

does not necessarily coincide with the profile of percentile changes in the income distribution. This finding may be particularly relevant in the tails of the income distribution. Secondly, the EU-SILC database allows disaggregating the several sources of income of individuals and of the household. Thus, it is possible to trace the role of the family and of social transfers (at the individual and household levels) in cushioning the impact of labor market and demographic events. Thirdly, the article includes an analysis of the heterogeneity of the impact of events by income decile. This contribution extends the analysis usually undertaken in the literature for individuals in the left tail of the income distribution, which focuses on events that determine entries and exits from poverty (see Bane and Ellwood, 1986).

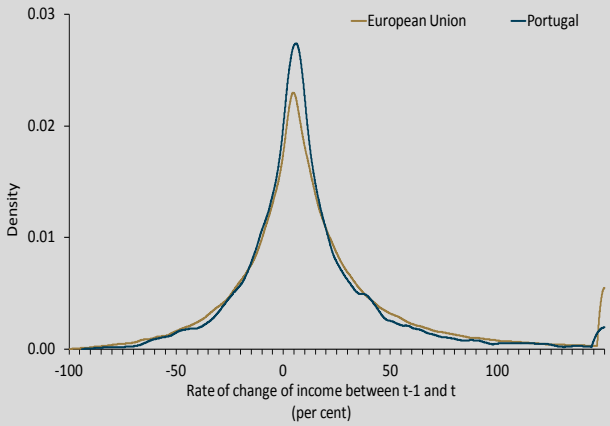
The remainder of the paper is organized as follows. Section 2 presents the database and characterizes the demographic and labor market events under analysis. Section 3 describes a decomposition of the evolution of household income after the events, starting from gross income at an individual level and adding the several income sources yielding household disposable income. Section 4 presents a multivariate analysis aimed at quantifying the impact of each event on household income in light of the two income mobility concepts described above. Section 5 concludes.

2. The database and the events

2.1. The data

The sample used in this article is based on the EU-SILC longitudinal data. This database resulted from the creation at the European level of a program on harmonized statistics on income and living conditions of households, taking place annually since 2004. Each year, the EU-SILC project involves the collection of information at the individual level and for the respective household, resulting in a cross section database, as well as a longitudinal database. The sample underlying each longitudinal database is based on four subgroups of equal size and each one representative of the total population. Each year, the subgroup that completes four years is dropped from the

Chart 1 · Distribution of the rate of change of income between t-1 e t



Sources: EU-SILC 2004-2009 and authors' calculations.

Chart 2 · Annual transitions between income distribution deciles (frequency): European Union

Decile in t-1 \ Decile in t	1	2	3	4	5	6	7	8	9	10
1	50.8	21.1	9.8	6.1	4.0	2.8	1.7	1.5	1.2	1.0
2	17.1	40.1	18.7	9.4	5.8	3.5	2.2	1.5	0.9	0.8
3	7.0	18.4	32.9	17.8	9.9	5.7	3.7	2.2	1.5	1.1
4	4.5	8.4	18.7	29.2	17.2	9.9	5.8	3.5	1.7	1.2
5	3.1	4.8	8.5	18.3	28.3	17.5	9.7	5.4	2.9	1.5
6	2.1	2.9	4.8	8.6	18.1	28.4	18.3	9.5	4.9	2.4
7	1.4	2.0	2.9	5.0	8.6	18.3	29.9	18.9	9.3	3.7
8	0.9	1.3	1.9	3.0	4.7	8.4	19.1	33.3	20.6	6.6
9	0.9	0.9	1.3	1.7	2.6	4.5	7.7	18.8	42.2	19.4
10	0.9	0.8	0.9	1.1	1.6	2.1	3.1	6.0	17.5	66.1

Sources: EU-SILC 2004-2009 and authors' calculations.
Note: Stronger colour intensity reflects an higher frequency.

sample and replaced by another equivalent, meaning that each individual or family can only be followed by a period of four years. The analysis considers a range of up to twenty nine European countries. In the following sections, the whole set of countries available in each sample is referred to as the European Union. It must be underlined that the country coverage in the available databases is not uniform. For example, the longitudinal database for Germany is only available in 2006 and the cross-section database for France is not available in 2008.

This study is based on longitudinal databases between 2005 and 2009. The unit of analysis consisted in pairs of incomes for a given household or individual in two consecutive years, to ensure the computation of annual changes in income (or changes in percentiles of the income distribution). To exclude extreme percentage changes, households with income smaller than the first percentile of the income distribution in the database (which corresponds to an annual income of 600 euros) were not included in the sample. The income percentiles and deciles for each country / year were computed with the cross-sectional database.

The household income in each year refers to the equivalent disposable income for a period of twelve months, at constant 2008 prices. Note that, in most countries, this period corresponds to the previous calendar year, which implies that information concerning income incorporated in our analysis ends in 2008. Household income is the sum of incomes earned by each individual in the household, including labor income, pensions or other social transfers, with other household income (including property income) and other transfers (in particular, from the government) received by the family as a whole, net of direct taxes. Once deflated, the household income, as well as the above mentioned components, are divided by the number of equivalent adults in each family (according to modified equivalence scale of the OECD, which takes into account the size and composition of the household) to calculate the equivalent income of each household member.[5] Thus, household income is assumed to be fully shared within the family.

All results presented in this study were calculated using the sample weights available in the longitudinal databases.[6] Given the characteristics of the sample, the two-year longitudinal weights from the database of the respective year were primarily used, and if these did not exist, the same weights of the database of the previous year. The records to which it was not possible to assign weights were excluded from the analysis.

Considering all these criteria, the final sample corresponds to about 530 000 pairs of income for households in the European Union and about 9500 pairs of income for households in Portugal.

Finally, it should be noted that all the computations for the European Union are based on data for each country individually considered. Accordingly, all references to income distribution in the European Union should be understood as an aggregation of income distributions of each individual country. For example, when reporting results on changes in percentiles of income in the European Union, these results are based on the aggregation of those changes calculated for each individual country.

2.2. The characterization of events

This study aims to analyze household income mobility associated with events in the labor market and with demographic events. The events must concur with the reference period of household income. As mentioned previously, this period, in most countries, covers the calendar year immediately preceding the date of survey. Regarding the events in the labor market, the database includes information on the economic situation of each individual in each month of the income reference period, namely if the individual is employed (in full or part time), unemployed, retired,

or in other types of inactivity. Thus, an individual is considered to be working (in full or part-time) if she works more than six months during the income reference period. A similar procedure was adopted for the other possible situations, that is, an individual is unemployed, retired or other inactive, if she is in that specific situation for more than six months during the income reference period.

Based on this hypothesis, it was possible to define transitions in the labor market for each individual in two consecutive years (for example, an individual moving from a situation of working, *i.e.* being more than six months working, to a situation of unemployment, that is, being more than six months unemployed). These individual events were then redefined at the household level in the five events considered in the analysis: (i) increase in the number of working individuals in the household, (ii) increase in the number of unemployed individuals in the household who were working in the previous year, (iii) increase in the number of unemployed individuals in the household who were in another situation of inactivity in the previous year, (iv) increase in the number of retired individuals in the household who were working in the previous year and, finally, (v) increase in the number of retired individuals in the household who were not working in the previous year. With regard to demographic events, three events were considered (i) increase in the number of individuals in the household (excluding increases due to births), (ii) decrease in the number of individuals in the household and (iii) households in which one or more births were registered in the income reference period.

The sample frequency of events in the European Union and Portugal is presented in table 1. The table shows that the most frequent events are those that are associated with an increase in the number of working individuals in the household (with around 8 and 9 percent of occurrences in the sample). The second most frequent events are changes in the household size (not resulting from births). It is also possible to observe that the frequency of households where more than one event occurred simultaneously is relatively small, both in the European Union and in Portugal, although not negligible in terms of magnitude.

Table 1 • Frequency of events | Values in percentage of total sample

	European Union			Portugal		
	Event	Intersection with other labor market events	Intersection with other demographic events	Event	Intersection with other labor market events	Intersection with other demographic events
Labor market events						
Increase in the number of individuals in the household:						
working	8.3	0.5	1.4	9.1	0.8	1.1
unemployed (working in t-1)	1.7	0.2	0.3	3.2	0.3	0.5
unemployed (inactive in t-1)	1.4	0.2	0.2	1.7	0.2	0.3
retired (working in t-1)	1.9	0.2	0.2	3.3	0.3	0.3
retired (not working in t-1)	2.0	0.2	0.2	2.6	0.3	0.3
Demographic events						
Increase in the number of individuals in the household:	4.9	0.9	0.2	3.4	0.7	0.1
Decrease in the number of individuals in the household:	5.2	1.1	0.1	5.4	1.4	0.0
At least 1 birth in the household	2.3	0.3	0.2	1.5	0.4	0.1
Total number of observations in the sample		526065			9539	

Sources: EU-SILC 2004-2009 and authors' calculations.

3. A decomposition of the impact of the events: from individual income to household income

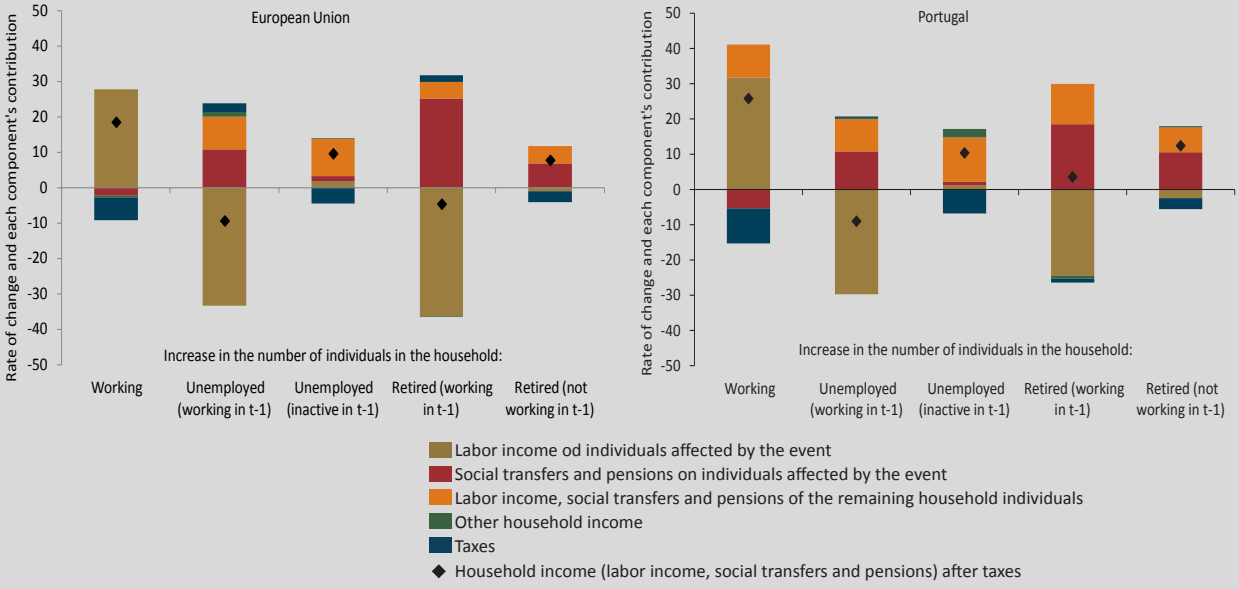
The transmission of an idiosyncratic event in the labor market to household income occurs through several mechanisms. In particular, there are mechanisms that smooth the impact of those events, particularly through the increase in the labor supply of other household members, transfers between households and net transfers from the government (see Blundell *et al.*, 2014). This section aims to explore the richness of the EU-SILC data to illustrate some of these mechanisms.

In this context, chart 3 shows, for the households involved in each of the five events identified in the labor market, a decomposition of the average rate of change of household income into the following contributions: (i) labor income of individuals affected by the event; (ii) social transfers and pensions of individuals affected by the event; (iii) labor income, social transfers and pensions of other household members; (iv) other household income; (v) taxes paid. Note that the underlying sample in chart 3 excludes all the cases in which events in the labor market occur simultaneously with demographic events, in order to focus on the impact of the former.

The chart clearly illustrates the important role of the household and the government in cushioning the impact on family income of individual transitions in the labor market.

In the case of an increase in the number of working individuals in the household, in the European Union, household income increases 18.5 percent on average. The positive contribution of labor income earned by individuals who become workers (27.8 percentage points) is moderated both by a reduction in the respective social benefits (contribution of -2.2 percentage points) and by an increase in taxes paid by the household (contribution of -6.5 percentage points). Similarly, in the case of an increase in the number of unemployed individuals who were workers in the previous year, the direct negative contribution in labor income (-33.3 percentage points) is mitigated by an

Chart 3 • Decomposition of the impact of labor market events | Contribution of each component to the rate of change of equivalized household income



Sources: EU-SILC 2004-2009 and authors' calculations.

increase in unemployment and other social benefits (contribution of 10.9 percentage points), by the reduction of taxes paid (contributing 2.5 percentage points), as well as by a positive contribution from income earned by other household individuals who did not suffer the shock (contribution of 9.3 percentage points). Notice that the positive contribution of income earned by other household members is common to both events in which there is an increase in the number of unemployed in the household. This suggests that, in a situation of unemployment, the remaining household members tend to intensify their participation in the labor market (see Bredtmann *et al*., 2014). This conclusion is similar both in the European Union and in Portugal.

Finally, in a situation of transition to retirement, the significant reduction of labor income is largely offset by an increase of social transfers and pensions. Again, the income of other household members increases, both in the European Union and (sizeably) in Portugal. The transition from inactivity to retirement increases the income of these individuals, reflecting an increase in pensions. There is also an increase in the income of other household members, as well as a reduction of taxes paid by these families. These effects are similar in the European Union and in Portugal.

An additional event that deserves attention is the birth of a child. This event is associated with a decrease in equivalent household income (about 4 per cent in the European Union and around 1.5 percent in Portugal). This result is largely determined by the increase in the size of the household reflected in the equivalence factor. In fact, expunging this scale effect, the total income of these households increases by about 10 percent, both in the European Union and in Portugal. This rise is primarily supported, as would be expected, by the increase in social transfers.

4. The impact of events on household income mobility

4.1. The empirical model

In this section, the impact of events on household income mobility is assessed based on multivariate regressions that control for several demographic and socioeconomic characteristics of families. Two econometric models were estimated. In the first model, we assess the impact of events on the annual rate of change of household income. In the second model, the dependent variable is the change in the households' position in the percentiles of the income distribution, calculated for each year and country.

The panel built with the EU-SILC is inevitably limited in the time series dimension. The final sample used to estimate the models has an average time-series length of only 1.7 years. Thus we chose to present the results obtained by estimating a pooled OLS model, with binary variables to capture information concerning each period and every country. It should be noted that the estimation of models with random effects or fixed effects pointed to similar results *vis-à-vis* the pooled OLS.

To control for the effects of demographic and socioeconomic characteristics, the models include a set of variables observed at the household level in the year prior to the event. In particular, these variable are related to the share of individuals in the household in different age groups (between 16 and 34 years, 35 and 49 years, 50 and 64 years and over 64 years) and to the share of individuals with different levels of education (primary, secondary and tertiary education). Additionally, to take into account the degree of participation of the household in the labor market the models include the share of months in which the individuals in the family were working, unemployed, retired or in other forms of inactivity. Finally, variables related to the size of the household and to the number of children were also considered.

4.2. The results

Table 2 presents the main results of the model. Columns (1) and (2) present the estimates of the impact of each event on the percentage change in household income, respectively for the European Union and for Portugal. In turn, columns (3) and (4) report the estimates of the impact on percentile changes in the income distribution. The results point to conclusions which are globally consistent with the descriptive analysis presented in Section 3 .

Firstly, as expected, the participation in the labor market has a significant impact on household income mobility. In the case of the European Union, an increase in the number of individuals working in the household is associated with an increase of about 22 percent in household income, which represents an increase of 7.3 percentiles in the income distribution. The corresponding figures for Portugal are 31 percent and 9.4 percentiles, respectively.

Secondly, the impact on income mobility due to transitions to unemployment or to retirement depends crucially on the prior status of the individual in the labor market (as already observed in Section 3). In the European Union, in the case in which individuals move from employment to unemployment, the average fall in household income is about 19 percent (a fall of about 10 percentiles in the income distribution). In the case in which individuals move from employment to retirement, the average drop in family income is around 6 percent (around 5 percentiles in the income distribution). In the case of individuals not previously working, the transition to unemployment or retirement has a small or non-significant impact on household income mobility.

Thirdly, the estimates obtained for Portugal do not differ qualitatively from those obtained for the European Union. In quantitative terms, the point estimates suggest that the impact on household income from an increase in the number of workers is stronger in Portugal and that the negative impact on income from transitions to unemployment or to retirement is relatively smaller in Portugal. However, in these latter cases, the differences are not statistically significant.

Finally, demographic changes also have a significant impact on household income mobility. In case of changes in household composition and size (excluding births), the evidence for the

Table 2 · The impact of transitions in the labor market and of demographic changes on household income mobility

Dependent variable	Income change (per cent)		Number of percentiles	
	European Union	Portugal	European Union	Portugal
	(1)	(2)	(3)	(4)
Labor market events (between t-1 and t)				
Increase in the number of individuals in the household:				
working	22,1 ***	31,0 ***	7,3 ***	9,4 ***
unemployed (working in t-1)	-18,8 ***	-14,3 ***	-10,1 ***	-9,1 ***
unemployed (inactive in t-1)	0,7	1,7	-0,4	0,6
retired (working in t-1)	-6,0 ***	-3,8	-4,7 ***	-1,8 *
retired (other inactive or unemployed in t-1)	1,3	9,4 **	1,5 ***	2,9 **
Demographic events (between t-1 and t)				
Increase in the number of individuals in the household[(a)]	3,6 ***	3,3	0,3	1,0
Decrease in the number of individuals in the household	-3,8 ***	-4,2 *	-3,9 ***	-4,8 ***
At least 1 birth in the household	-12,1 ***	-6,6	-6,6 ***	-4,7 ***
Number of observations	526065	9539	526065	9539

Sources: EU-SILC 2004-2009 and authors' calculations.
Notes: 1) Model: Pooled OLS. 2) All regressions include country and year fixed effects. In addition, the share of household individuals in different age groups, the share of individuals with different levels of education, the share of months that household individuals were working, unemployed, retired or in other forms of inactivity as well as variables related to the size of the household and to the number of children are included as explanatory variables. 3) All models were weighted with sample weights. 4) *** 1% significance; ** 5% significance; * 10% significance (based on robust t-ratios). 5) EU-SILC 2005-2009 longitudinal data. (a) except births.

European Union is close to the one estimated for Portugal, although the significance of the coefficients is clearly stronger in the former. These events cover a wide variety of situations, with very heterogeneous implications on income mobility. Thus, on average, the estimated impact is likely to be associated with the increasing or declining economies of scale (depending on the event), as captured in the OECD equivalence scale.[7] This contributes to explain the estimated decline in (equivalent) income and in the percentiles of the income distribution stemming from a reduction in the number of individuals in the household. Conversely, the birth of a child is associated with a decline in household equivalent income, mechanically contributing to a downward mobility of family income. In this case, the estimated impact for the European Union is higher than the one estimated for Portugal (this result is partly associated with the fact that the average size of households with births is relatively higher in Portugal).

The estimates presented in table 2 reflect the average household mobility after the identified events. An interesting question that can arise in this context is whether this mobility varies along the income distribution. Chart 4 contributes to answer this question in the case of three labor market events: (i) an increase in the number of individuals working; (ii) an increase in the number of unemployed individuals (after working); (iii) an increase in the number of retired individuals (after working). The three panels on the left show the percentage change in income in each of the events, for each decile of the income distribution. The three panels on the right show the estimates for the change in percentiles. The analysis focuses on the European Union, given that the sample for the case of Portugal becomes rather small (however, the chart shows the point estimates for Portugal whenever statistically significant).

In the case of an increase in the number of individuals working (first row in chart 4), the evidence suggests that the impact on income mobility is decreasing along the income distribution. In fact, in the lowest deciles of the income distribution, an increase in the number of workers implies a very substantial increase in household income (in the case of the first decile of the distribution, the percentage change in income amounts to over 50 percent, which corresponds to an increase of more than 10 percentiles in the income distribution). These values converge to zero in the highest decile of the income distribution. The figure referring to the percentage change in income also shows the sensitivity in the case of low incomes (even after excluding from the sample the households in the lowest income percentile, as mentioned in Section 2). This issue does not affect the analysis of changes in income percentiles.

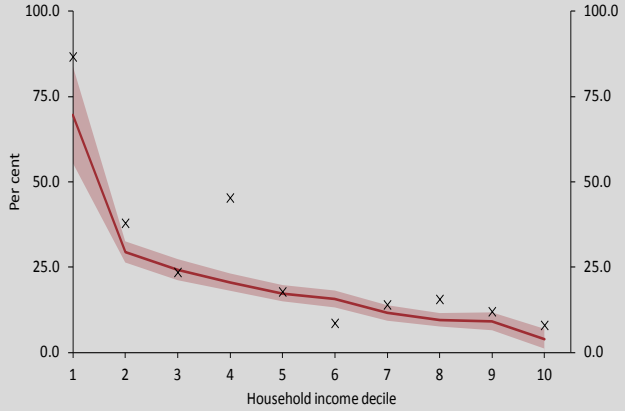
The case of an increase in the number of unemployed individuals (second row of the panel) shows the importance of combining the analysis of percentage changes in household income with the changes in the relative position of each household in the income distribution. In fact, focusing on the change of household income, the conclusion is of a relatively stable impact over the income distribution (excluding the first decile). However, the analysis of percentile transitions reveals a different conclusion, with the negative impact of an increase in the number of unemployed increasing over the income distribution, from about -7 percentiles in the first decile to around -16 percentiles in the tenth decile.

In the case of an increase in the number of retirees, the analysis by income deciles reveals that the statistical significance of the estimated fall in household income, as well as in the percentiles of the income distribution, is associated with upper median of the income distribution. Again, this finding illustrates the importance of taking into account the heterogeneity across the income distribution when analyzing the mobility of household income.

Chart 4 • Impact on household income mobility, by decile of the household income distribution

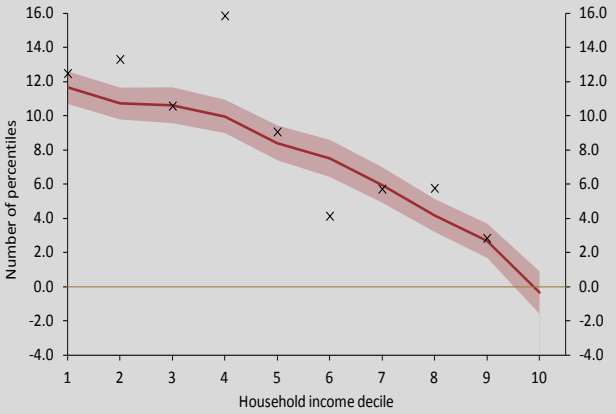
Rate of change in income

Increase in the number of working individuals

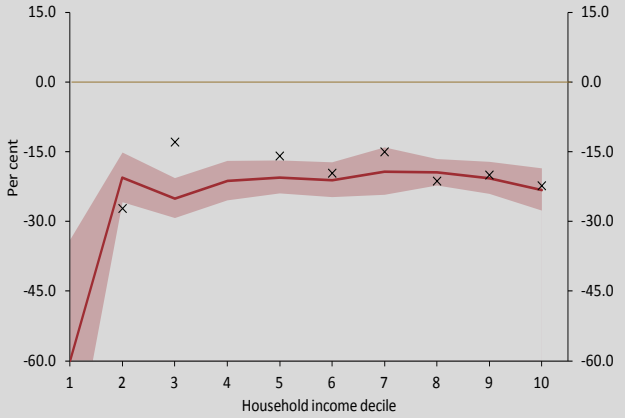


Percentile change in income distribution

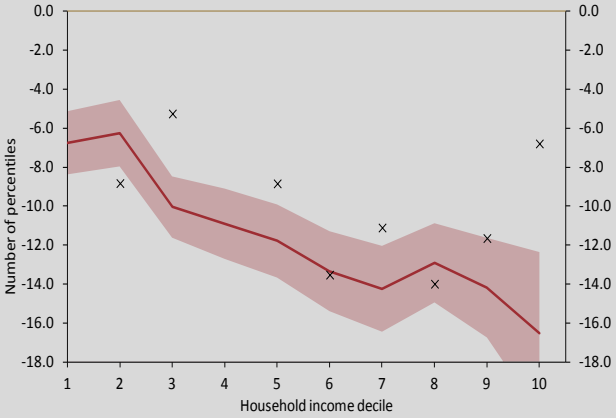
Increase in the number of working individuals



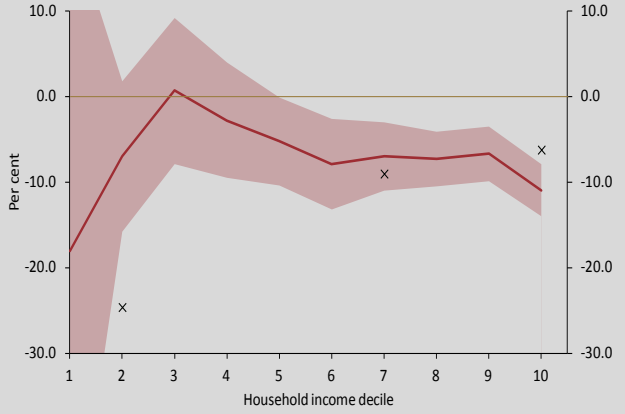
Increase in the number of unemployed individuals who were working in the previous year



Increase in the number of unemployed individuals who were working in the previous year



Increase in the number of retired individuals who were working in the previous year



Increase in the number of retired individuals who were working in the previous year

EU – 95% confidence interval
Portugal
European Union

Sources: EU-SILC 2004-2009 and authors' calculations.

5. Conclusions

This article assesses the impact of labor market transitions and of changes in the composition of households on income mobility in Portugal and in the European Union. Given the limitations of the database, the analysis aimed at documenting the impact of these events on household equivalent income, rather than finding the corresponding fundamental explanations. Additionally, it should be noted that the available information does not allow identifying the full set of events that contribute to the mobility of household income.

The evidence supports the idea that household income mobility depends significantly on idiosyncratic events in the labor market, on the family context (and changes in this context), as well as on the set of State transfers. For example, in the European Union, the point estimates suggest that in the case of households where the number of unemployed increases the average fall in family income is about 19 per cent. In the case in which individuals move from employment to retirement, the average fall in household income is about 6 percent. The corresponding estimates for Portugal are not statistically different from those obtained for the European Union. Additionally, there is significant heterogeneity in the impact of events along the income distribution. The average impact on household income is thus an insufficient statistic for a full analysis of these events. The study also confirmed the importance of complementing the analysis of changes in income with changes in the relative position of households in the income distribution. The combination of these two perspectives is especially relevant when analyzing the tails of the distribution.

Extending the sample period with new waves of the EU-SILC should strengthen the results, as well as allow extending the work in new directions. In particular, it should be interesting to undertake the analysis for the different countries of the European Union, as well as evaluating the impact of the European recession that began in 2009, particularly taking into account the heterogeneity along the income distribution.

Notes:

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2. Banco de Portugal, Economics and Reseach Department.

3. In this article, the terms family and household will be used interchangeably.

4. For more details, see http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/eu_silc.

5. According to this equivalence scale, the first adult in the family has a weight of 1, the remaining adults have a weight of 0.5 and children (under 14 years) have a weight of 0.3.

6. These weights are constructed to allow an extrapolation from the sample to the entire population.

7. For example, in the case of a household with two adults which earn, on average, 7500 euros each, the equivalent income of each household member is 10000 euros ((7500+7500)/1.5). In case the household breaks up, each individual would be attributed an equivalent income of 7500 euros.

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