What Determines Income Mobility Differences Across the European Union?

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ISER Working Papers
Number 2002-27

Institute for Social and Economic Research

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The support of both the Economic and Social Research Council (ESRC) and the University of Essex is gratefully acknowledged. The work reported in this paper is part of the scientific programme of the Institute for Social and Economic Research.

Acknowledgement:
The authors would like to acknowledge financial support from the Inter-ministerial Commission on Science and Technology (SEC 2001-0746) and the Instituto de Estudios Fiscales. We would also like to acknowledge the help given by the European Centre for Analysis in Social Sciences of the University of Essex, and helpful comments made by Olga Cantó and Javier Ruiz-Castillo.

Readers wishing to cite this document are asked to use the following form of words:

> **Familyname, Firstname (November 2002) 'Title of Working Paper', *Working Papers of the Institute for Social and Economic Research*, paper 2002-27. Colchester: University of Essex.**

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ABSTRACT

In this paper we use the *European Community Household Panel* (ECHP) to assess differences in the structure of income mobility in a selected sample of European countries. The principal determinants of mobility are analysed by means of different decomposition exercises. We adopt recent theoretical proposals for the decomposition of axiomatic and welfare measurements of mobility in exchange, structural and growth components. Decomposition exercises which take into account some type of division of the population and income sources are also performed. Results show that in general income growth has a very limited effect upon aggregate mobility, being the most important determinant the rerankings of individuals, with a little weight for inequality changes. Decomposition exercises both by population groups and by of income sources allow us to relate differences in observed mobility levels to possible country-specific determining factors. Although some common results exist concerning the delimitation of groups experiencing the greatest income fluctuations, such as individuals belonging to single-parent households or young household heads, the intensity of these results varies greatly across countries.

1. Introduction

The comparative analysis of inequality has acquired increasing importance in recent years. The demand for new indicators to compare differences in the economic welfare of different countries, the renovation of analytical methods and, particularly, the increased availability of homogenous databases have given rise to an unprecedented increase in the number of studies dedicated to assessing the differences in the distributive processes of OECD countries. In the case of the European Union there has been a renewed interest on new indicators related to the social cohesion processes following monetary integration. Nevertheless, attention has been paid almost exclusively to static analyses of inequality. Few studies have paid attention to the dynamics of the income distribution, due to the lack of comparable longitudinal databases, together with important limitations upon the theoretical basis of the analysis of income mobility. Only recently comparative dynamic analysis have appeared [1]. As Fields and Ok (1999a) state, despite increasing advances in the definition of measurement procedures with a degree of axiomatic content and analytical properties equal to that existing in the case of inequality, the distances which continue to separate the characterisation of the two fields are all too apparent.

On the one hand, there exist various approximations for the study of income mobility: a focus on mobility throughout the whole distribution or low income dynamics, absolute or relative mobility and structural or exchange mobility. No consensus, however, has been reached as to the relative advantages of any of these approaches. On the other hand, the normative content itself of the concept of mobility permits very different value judgements to be made. These include both positive considerations regarding the fluctuation of income over time (levelling of results over time, the transient nature of poverty and equality of opportunities), as well as more negative considerations such as the relationship between fluctuations in individual income and income instability (Jarvis and Jenkins 1998) or the link between labour market segmentation processes and earnings mobility.

One of the less developed lines of research has been the analysis of the causes behind income mobility together with the study of the dissimilarities in the structure of income mobility across countries. There are different national characteristics which may condition the process of income mobility. One important element is, without a doubt, the institutional diversity of the labour markets. Although the labour environment in European Union countries is often thought

to be homogeneous, with regulatory mechanisms far more intense than those in the USA, there exists sufficient evidence to affirm that the differences between the member states themselves are greater than those between the two continents (Nickell, 1997). Various studies have shown the effects of these dissimilarities upon the different international results, in terms of earnings inequality or inequality of disposable household income[2]. When analyzing income mobility may be relevant to consider highly diverse mechanisms of entry to or exit from the labour market, which may have very different effects upon income fluctuations, or those factors which restrict possible decreases in earnings –minimum wages or salaries negotiated by trade unions- or, especially, those which favour transitions from unemployment to employment, such as the unequal development of active policies or the differences in the relative generosity of unemployment benefit systems.

The employment sphere is not, however, the only one which has the potential to produce long-term variations in household income. Various studies have shown notable differences in the degree of mobility among different demographic groups (Jarvis and Jenkins, 1998, Gardiner and Hills, 1999 or Zaidi *et al.*, 2001). International differences in the weight of those groups having greater potential mobility, such as the young, may explain part of the differences to be found in mobility indicators. There may exist, furthermore, interactions between demographic processes and the responses of public policy to the needs of each collective which, in turn, may also influence mobility. Such is the case of the incomes of older individuals, which *a priori* fluctuate less and are greatly affected by the specific effect in each country of old age protection systems.

Income mobility literature, borrowing from intergenerational mobility sociological literature, has also traditionally emphasised the difference existing between structural and exchange mobility. In terms of international comparisons may be relevant to identify the contribution of each component. Recent studies have incorporated a third dimension, that which results from the effect of the growth of income. The precise identification of these components will permit us to assess not only some of the general causes of mobility, but also the welfare implications of the longitudinal variation of income.

The aim of this paper is to assess differences in the structure of income mobility in a selected sample of European countries. The principal determinants of mobility are analysed by

[1] See Fritzell (1990), Aaberge et *al.* (1996), Burkhauser et *al.* (1998), Fabig (1998), Schluter (1998), Schluter and Trede (1999) McMurrer and Sawhill (1998) and Gottschalk and Smeeding (2000).
[2] A recent review can be found in Ayala, Martínez and Ruiz-Huerta (2002).

means of different decomposition exercises using the first five waves of the *European Community Household Panel* (ECHP). The paper has been structured in the following way. The data selected are presented in the second section, together with the principal methodological decisions we have taken. An analysis of the contributions of the components of exchange, structural and growth to income mobility in the countries under study is performed in the third section. A decomposition exercise which takes into account partitions of the population by demographic group is developed in the fourth section. An exercise to disaggregate mobility indicators by income sources is also performed in the next section. The paper ends with a brief list of our principal conclusions.

2. Data and methodological decisions

The database use for the analysis of income mobility in some countries of the European Union are the first five waves of the *European Community Household Panel* (ECHP). This statistical source has been developed by EUROSTAT since 1994 and contains longitudinal information regarding monetary income and a set of socioeconomic and demographic characteristics of households and individuals, making it an obligatory reference point for the study of questions related to the cross-country comparison of income distribution and income mobility[3]. Of the set of countries which form part of the ECHP we shall concentrate on five: the United Kingdom, Germany, France, Italy and Spain, for which there exist sufficient elements for comparison, supplied by national studies, and which constitute different models both with regard to levels of inequality and mobility, and also to the different institutional characteristics of the labour markets or the unequal scope and design of redistributive policies.

The *concept of income* we shall use is that of disposable household income, which includes income after transfers and the deduction of income tax and social security contributions. With the important exception of France, the majority of income sources are received net of taxes and deductions, while income from capital may be stated as net or gross quantities, depending on the interviewee. The fact of not being able to compare mobility with gross and net data and, more concretely, to work with data which have already been corrected by public sector intervention, may mean the introduction of a certain bias in the evaluations which are made regarding mobility. A high level of instability in gross earnings may be compensated by income tax and social security contributions.

The reference period for income is the year prior to the interview. The interviews corresponding to the first five waves of the ECHP were performed in the years 1994, 1995, 1996, 1997 and 1998, meaning that the corresponding incomes refer to, respectively, the years 1993, 1994, 1995, 1996 y 1997[4]. The utilization of annual rather than monthly or quarterly data may affect the possible results[5]. Although the majority of studies use annual income distribution, owing basically to the method of collecting information and the availability of data, there exist significant fluctuations in the income perceived throughout the year. Nevertheless, it is generally recognized that households or individuals may compensate transitory losses of income by the consumption of savings or recourse to borrowing, making it advisable to utilize periods longer than monthly[6].

Although the time period employed –five years– makes it more appropriate to talk of medium-term rather than long-term mobility, an interesting question is the presence, even in a relatively brief period, of important changes in the rates of economic growth which, without a doubt, favour the possibility of observing different patterns of mobility in each of the countries studied. This may explain, as shall be seen, the existence of certain notable wave-on-wave changes in the mobility indicators estimated. In order to avoid possible biases in our conclusions regarding short-term mobility, the results which refer to the inter-annual movements of income are presented as the average of the results corresponding to the four transitions between waves.

Income is expressed in 1996 prices by the use of the harmonized consumer price indices published by EUROSTAT. The indicators refer, therefore, to the *real mobility* of incomes, without the different inflationary context of each country conditioning the results obtained. Since the standard of living of households depends on both its income and its size and composition, we shall take these factors into account by adjusting income using *equivalence scales*. The scale employed is that known as the "modified OECD scale", which assigns the value of 1 to the first adult in the household, 0.5 to other adults and 0.3 to each child under 16. The equivalent income

[3] There are previous studies analyzing different questions related to income dynamics with the ECHP. See Maître and Nolan (1999) and Whelan *et al.* (2000).

[4] Starting from the fourth wave, the original interview of the ECHP ceased to be performed in Germany and the United Kingdom. In these countries there exist high-quality national panels which have been used to supply data comparable with those of the ECHP for all the waves. As a result, for the years 1994, 1995 and 1996 there are two databases available for both countries. In our analysis we follow the recommendation of EUROSTAT and use, for longitudinal analyses, standardized files from national sources.

[5] Cantó, Del Río and Gradín (2002) found, using the Continuous Family Budget Survey, that income mobility in Spain is appreciably higher when quarters instead of years are taken.

of each household is assigned to each member, employing the implicit hypothesis that all individuals belonging to the same household enjoy the same level of welfare.

Following the usual practice in longitudinal studies, the unit of analysis is the individual, given the natural restrictions on studying units which may change over time. Choosing the household as the unit of analysis would require the definition of what a longitudinal household really is, a concept which gives rise to numerous problems. Thus, changes in the income assigned to an individual may be due to variations in the income of the household to which he or she belongs or to changes in its composition. In order to construct a balanced panel, a prerequisite for the elaboration of the indices proposed, we shall work with the subsample of individuals (adults and children) present in each of the five waves of the ECHP. With the aim of taking into account the effect of attrition or gradual fall in the sample of observations present in the initial year, estimations have been weighted using the ECHP longitudinal individual weights as recommended by EUROSTAT.

One final methodological consideration is that of the need to perform some type of *trimming* of the distributions tails, in order to increase the coherence of the comparison in different countries. The treatment of outliers is even more relevant than in the comparative analysis of inequality, in which it has become a standard element. Cowell and Schluter (1998) demonstrate that the majority of mobility indicators are very sensitive to the presence of data contamination. In order to minimise this problem, we have truncated the samples symmetrically, through the elimination for each wave of those households whose equivalent income (using the modified OECD scale) was situated below the first percentile or above percentile 99[7]. The number of observations eliminated is relatively low, meaning that the gains in robustness justify the loss of information.

[6] As Gottschalk and Danziger (1997) argue, the length of the accounting period chosen for incomes may change according to the sociodemographic group under analysis.
[7] A similar procedure is that employed by Schluter and Trede (1999). Schluter (1998) establishes *left-censoring sampling* procedures, to eliminate the most obvious cases of underestimation of declared income.

Table 1

ECHP Number of Unweighted Observations[1]

	Number of unweighted observations (individuals)											
						Balanced Panel[2]						
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Waves 1-2	Waves 1-2-3	Waves 1-2-3-4	Waves 1-5	Attrition[3] (%)	Trimming[4]	%Dropped observations[5]
Germany	16,151	16,542	16,148	15,715	15,024	15,072	14,178	13,312	12,374	23.4	11.906	3.8
France	18,190	17,311	16,861	15,662	14,801	16,196	15,036	13,421	12,232	32.8	11.286	7.7
UK	12,623	12,333	12,454	12,324	12,284	11,465	10,893	10,440	9,978	21.0	9,281	6.6
Italy	21,421	21,426	21,227	19,834	19,077	19,978	18,826	16,954	15,419	28.0	14,331	7.1
Spain	22,834	20,390	19,218	17,865	16,549	19,598	17,448	15,391	13,660	40.2	12,759	6.6

[1] Households with positive income, at least one adult and positive survey weights.
[2] Individuals present in each of the waves considered.
[3] %Attrition with respect to the first wave.
[4] Trimming, for each wave, lower and upper 1% using the "modified OCDE" equivalence scale.
[5] With respect to individuals present in each of the five waves.

The characteristics of the data are summarised in Table 1. There are some important differences in the sample size and in the attrition incidence in each country. With regard to the first of these issues, the relatively large sample in Spain is immediately apparent, given its lower level of population. It is also the country suffering the greatest attrition, losing 40% of the sample between the first and the last wave. The opposite experience is that of Germany and the United Kingdom, with losses limited to a fifth of the initial sample.

3. The structure of mobility

The starting point for the analysis of mobility is the existence of information regarding the distribution of income for the same individuals in two different periods[8]. Let R_+^n be the set of possible distributions for a population composed of N individuals, with $N \equiv \{1,2,...,n\}$, $\mathbf{x}=(x_1,x_2,...,x_n) \in R_+^n$ the initial distribution of income in ascending order and $\mathbf{y}=(y_1,y_2,...,y_n) \in R_+^n$ that corresponding to a second period. Given that the transformation $\mathbf{x} \rightarrow \mathbf{y}$ produces an intertemporal variation in individual incomes, it is possible to assign to any individual $i \in N$ a vector of incomes (x_i,y_i) for the whole period.

Sociological literature, when referring to intergenerational mobility, has traditionally emphasised the difference existing between the processes of mobility caused by an increase in the positions in the upper part of the social scale and those which have their origin in the exchange of positions within that scale. Extrapolating this distinction to the case of income mobility, it would seem necessary to differentiate between the effect of the rerankings of individuals on the income scale and the changes which may be attributed to modifications in the income structure, accompanied by improvement –without a worsening of the relative situation of the rest– for some individuals. Research into mobility has traditionally characterised these two processes as *exchange* mobility and *structural* mobility, respectively. Recent studies have incorporated a third dimension, that which results from the effect of the growth of income.

The precise identification of both components will permit the evaluation not only of some of the general causes of mobility but also the implications for welfare which the longitudinal variation of income has. For this task we shall adopt the proposals for the decomposition of axiomatic measurements made by Fields and Ok (1996) and that of Ruiz-Castillo (2000), using the indicator devised by Chakravarty, Dutta and Weymark (1985).

3.1. *Mobility due to transfer of income and economic growth*

Mobility levels can be measured employing different criteria, which may give rise to different orderings. Fields and Ok (1996) systematize the axioms which should form part of a consistent indicator of mobility. Such properties are linear homogeneity, translation invariance, normalization, strong decomposability, weak decomposability, population consistency, growth sensitivity and individualistic contribution. The only indicator which satisfies such requirements is that of aggregate income movement:

$$d_n = \sum_{i=1}^{n} \left| \log x_i - \log y_i \right| \qquad (1)$$

In order to correctly establish comparisons over time or in space, these movements may be normalized, taking as reference the size of the distribution:

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[8] This formulation restricts the analysis to two periods, following the norms established by the majority of previous studies. See Markandya (1982 and 1984), King (1983), Cowell (1985) and Fields and Ok (1996 and 1999a,b).

$$m_n(x,y) = \frac{\sum_{i=1}^{n} |\log x_i - \log y_i|}{n} \qquad (2)$$

In terms of the differentiation of the various components of mobility, the most important feature of this indicator is that it is additively decomposable into two sources: mobility resulting from the transfer of income among individuals with total income held constant, assimilated to exchange mobility, and mobility arising from a change in the total amount of income, similar to the concept of structural mobility. Consideration of the dual component permits the Fields and Ok index to be broken down as:

$$m_n(x,y) = K(x,y) + T(x,y) = \frac{1}{n}\sum_{i=1}(\log y_i - \log x_i) + \frac{2}{n}\sum_{i\in L}(\log x_i - \log y_i) \qquad (3)$$

If it is assumed that total income does not change and that there exist L individuals whose income decreased during the study period ($L \equiv \{i: x_i > y_i\}$), then the social utility lost by this group and transferred to the rest ($\Sigma_{i\in L}(\log x_i - \log y_i)$) means that the total movement of income attributable to the transfers from those who gain to those who lose may be defined as $T(x,y)$[9]. Economic growth produces changes in incomes ($\Sigma y_i \geq \Sigma x_i$) which are summarised by the term $K(x,y)$.

Using the data from the ECHP, it is possible to estimate both the Fields and Ok index and the dual component of income transfer and economic growth (Table 2). The estimated Fields and Ok index, while confirming the extreme position of France as the country with the lowest mobility, situates Spain and Italy as the countries with the greatest longitudinal variation in income.

[9] It is multiplied by two because any loss of income by one individual is, conversely, a gain for another.

Table 2

Fields and Ok Mobility Index[1]

	Short Term			Medium Term (1993/1997)		
	Mobility	K (%)	T (%)	Mobility	K (%)	T (%)
UK	0.250	10.2	89.8	0.373	27.4	72.6
Germany	0.192	7.7	92.3	0.309	19.1	80.9
France	0.166	12.6	87.4	0.250	33.5	66.5
Italy	0.278	1.5	98.5	0.360	4.6	95.4
Spain	0.295	0.5	99.5	0.390	1.4	98.6

[1] ECHP five waves balanced panel. Trimming, for each wave, lower and upper 1% using the "modified OCDE" equivalence scale.

The explanation for these differences may be found in the different role played in each case by income growth and the effect, also differential, of income transfers between individuals. In every country aggregate income growth is less important, although in some cases this component is crucial for the determination of mobility levels. Such is the case of France, where growth accounts for more than one third of total income fluctuation throughout the study period as a whole. The opposite occurs in Spain and Italy where transfer mobility accounts for more than 95% of the total[10].

3.2. *Mobility and welfare*

A second proposal for the decomposition of total mobility emphasises the possibility of establishing normative valuations for the changes in social welfare caused by mobility. According to Chakravarty, Dutta and Weymark (CDW) (1985), mobility can be defined as the result of comparing the welfare derived from an observed income structure with another structure, hypothetically immobile, in which the positions occupied by individuals in the initial distribution are held constant. If information is available for two distributions of income for the same units at different points in time, then comparison is a question of relating the welfare associated to the distribution resulting from the aggregation of the incomes for the two periods to that which would exist if there had been no mobility.

[10] For the period considered in this work, the rate of growth of "ajusted equivalente income" for the balanced panel sample varies greatly among countries. The growth was especially high in the United Kingdom and France (11.1% and 8.3% respectively).

To explore further the notion of two distributions, **x** and **y**, initial and final respectively, it is possible to define three additional distributions: a distribution of aggregate income for the whole population $\mathbf{z}=\{(x_1+y_1),\ldots (x_n+y_n)\}$, a hypothetical distribution $\mathbf{y_b}$, which would result if the final income distribution (**y**) took such a form that each household were to receive the same proportion of income as in the initial distribution (**x**), and a hypothetical aggregate distribution $\mathbf{z_b}=\mathbf{x}+\mathbf{y_b}$[11]. In other words, that aggregate distribution which would have resulted in the absence of mobility with respect to the initial distribution **x**. CDW (1985) suggest mobility indices which incorporate social welfare functions (SWF) of the following type:

$$M_{CDW}(x,y)=\left\{\frac{\omega(z)-\omega(z_b)}{\omega(z_b)}\right\}*100 \tag{4}$$

where $\omega(\cdot)$ is the welfare associated to each income structure. An appropriate SWF for empirical analysis, is that which permits the aggregate welfare of a distribution to be expressed as a function of the mean, $\mu(\mathbf{x})$, and a continuous, S-convex and scale invariant relative inequality index, $I(\mathbf{x})$:

$$\omega(x)=\mu(x)[1-I(x)] \tag{5}$$

As, by definition, the mean of the aggregate distribution is equal to that of the hypothetical aggregate distribution ($\mu(\mathbf{z})=\mu(\mathbf{z}_b)$), and the inequality of such a distribution is equal to that of the initial distribution $I(\mathbf{x})=I(\mathbf{z}_b)$, the mobility indicator may be expressed as:

$$M_{CDW}(x,y)=\left\{\frac{I(x)-I(z)}{1-I(x)}\right\}*100 \tag{6}$$

Taking as a basis the CDW indices, Ruiz-Castillo (2000) formulates a decomposition of mobility which permits it to be broken down into three components: structural, exchange and growth mobility. In a first decomposition, $M_{CDW}(\mathbf{x},\mathbf{y})$ may be the sum of the two above-mentioned terms of structural mobility (SM) and exchange mobility (EM):

[11] With $y_b=x\frac{\mu(y)}{\mu(x)}$.

$$M_{CDW}(x,y) = SM(x,y) + EM(x,y) \tag{7}$$

Structural mobility would capture the impact upon welfare of the differences between the inequality of the initial income distribution and the inequality of the final distribution, once all the reorderings between such distributions have been eliminated. Exchange mobility, by contrast, would reflect the effect of the rerankings which are produced in the transition between the initial and final situation. Let us think, considering this latter case, of a hypothetical distribution $\mathbf{y}^*$, which would result from the case in which $\mathbf{y}$ was ordered as the initial distribution ($\mathbf{x}$). Let $\mathbf{z}_c$ be the aggregate distribution of income for the two periods ($z_c = \{(x_1 + y^*_1),...,(x_1 + y^*_n)\}$). Structural mobility would then be defined in this case as:

$$SM(x,y) = \left\{\frac{W(z_c) - W(z_b)}{W(z_b)}\right\} * 100 = \left\{\frac{I(x) - I(z_c)}{1 - I(x)}\right\} * 100 \tag{8}$$

while exchange mobility would reflect the differences in welfare between that associated to the aggregate income distribution $\mathbf{z}$ and that resulting from $\mathbf{z}_c$:

$$EM(x,y) = \left\{\frac{W(z) - W(z_c)}{W(z_b)}\right\} * 100 = \left\{\frac{I(z_c) - I(z)}{1 - I(x)}\right\} * 100 \tag{9}$$

Using this initial distinction, and following Ruiz-Castillo (2000), it is possible to conceive a second decomposition of M_{CDW} which permits the effect of growth to be identified. For any transformation $\mathbf{x} \rightarrow \mathbf{y}$, with $\mu(\mathbf{x}) \neq \mu(\mathbf{y})$, we can associate another transformation $\mathbf{x} \rightarrow \mathbf{u}$, in which $\mathbf{u} = \frac{\mu(x)}{\mu(y)}\mathbf{y}$, so that the mean of the distribution $\mathbf{u}$ is the same as that of the initial distribution ($\mu(\mathbf{x}) = \mu(\mathbf{u})$) and its inequality is similar to that of the final distribution $I(\mathbf{u}) = I(\mathbf{y})$). We shall use $\mathbf{v}_a$ to denominate the aggregate income distribution associated with the transformation $\mathbf{x} \rightarrow \mathbf{u}$, so that $\mathbf{v}_a = \mathbf{x} + \mathbf{u}$. Let $\mathbf{v}_b = 2\mathbf{x}$, so that $\mu(\mathbf{v}_b) = \mu(\mathbf{v}_a) = 2\mu(\mathbf{x})$ and $I(\mathbf{v}_b) = I(\mathbf{x})$. The mobility associated with the transformation $\mathbf{x} \rightarrow \mathbf{u}$ is defined by the following equation:

$$M(x,u) = \left\{\frac{W(v_a) - W(v_b)}{W(v_b)}\right\} * 100 = \left\{\frac{I(x) - I(v_a)}{1 - I(x)}\right\} * 100 \tag{10}$$

and shows the mobility due to the transformation **x**→**y** with total income held constant i.e. if mean income were maintained at the initial level. This mobility can be broken down into the two well-known terms of structural mobility and exchange mobility. Let us suppose that rerankings occur between the distributions **x** and **u**. We shall use the term **u*** to denominate the income distribution **u** ordered as the initial distribution (**x**) and define, as in the first decomposition, a new distribution $\mathbf{v}_c$, which results from the aggregation of the incomes of the initial distribution and of this hypothetical distribution ($\mathbf{v}_c=\mathbf{x}+\mathbf{u}^*$)[12].

The mobility resulting from the process **x**→**u,** which can be interpreted as the sum of the two components mentioned, differs from the mobility associated with the transformation **x**→**y**. The origin of these differences is to be found in the variation of the incomes, since the means of the initial ($\mu(\mathbf{x})=\mu(\mathbf{u})$) and final distribution ($\mu(\mathbf{y})$) are not equal. It is possible, therefore, to define a third component, which reflects the effect of income growth upon mobility:

$$GRM(\mathbf{x},\mathbf{y},\mathbf{u})=M(\mathbf{x},\mathbf{y}) - M(\mathbf{x},\mathbf{u}) \tag{11}$$

Thus, the mobility associated with the transformation **x**→**y** can be broken down into three distinct terms:

$$M_{CDW}(x,y) = SM(x,u) + EM(x,u) + GRM(x,y,u) \tag{12}$$

The term SM(**x**,**u**) captures the structural mobility caused by the differences in the inequality of the initial and final distribution, once the rerankings between those distributions have been eliminated, and maintaining mean income constant at the initial level $\mu(\mathbf{x})$. The expression EM(**x**,**u**) reflects the exchange mobility arising from the rerankings produced between the distributions **x** y **u**, on the assumption that the transformation **x**→**y** does not originate variations in mean income. Finally, the term GRM(**x**,**y**,**u**) represents the mobility due to income growth.

The performance of this decomposition exercise with data from the ECHP and the PSID is conditioned by the possibility of using various aggregation criteria. We have chosen, as a

[12] In this scenario, $SM(x,u)=\left\{\frac{I(x)-I(v_c)}{1-I(x)}\right\}*100$ and $EM(x,u)=\left\{\frac{I(v_c)-I(v_a)}{1-I(x)}\right\}*100$.

general option, to compare the aggregate incomes of the first two waves with the sum of the third and fourth waves[13]. The results add certain nuances to the previous result (Table 3). The introduction of normative elements and, more specifically, the effect upon mobility of changes in inequality, while confirming Italy as the country with the highest mobility, produce some reorderings in the lower extreme of the ranking. The descent in the positions of Spain is clear, since the use of certain inequality indicators situates it as the country with the lowest CDW.

[13] The results do not change substantially when other criteria are applied, such as the comparison of the aggregation of the first two wave**s** with the sum of the three following ones or the consideration of the aggregated incomes of the first three waves and the sum of the last two.

Table 3
Decomposition of Chakravarty-Dutta-Weymark Mobility Index[1]
(Wave 1+2- Wave 3+4)

	Mobility M(x,y)	Structural Mob. SM(x,u) (%)	Exchange Mob. EM(x,u) (%)	Growth Mob. GRM (%)
GE(0)				
UK	1.307	-13.4	113.8	-0.4
Germany	1.581	31.8	67.9	0.4
France	0.881	7.4	92.4	0.2
Italy	1.898	26.1	74.3	-0.4
Spain	1.364	-6.2	106.2	0.4
GE(1)				
UK	1.029	-14.5	115.0	-0.5
Germany	1.220	27.0	72.8	0.3
France	0.790	5.4	94.3	0.1
Italy	1.604	28.8	71.7	-0.5
Spain	0.766	-4.0	104.0	0.8
GE(2)				
UK	1.044	-15.0	115.5	-0.5
Germany	1.208	24.1	75.6	0.2
France	0.879	6.0	93.9	0.1
Italy	1.785	32.6	68.0	-0.6
Spain	0.557	-3.2	103.4	1.8
GINI				
UK	1.423	-13.8	114.2	-0.4
Germany	1.878	25.3	74.4	0.3
France	1.125	2.0	97.8	0.2
Italy	2.193	25.9	74.5	-0.5
Spain	0.969	-1.5	101.5	0.6
ATK (1)				
UK	1.154	-13.3	113.8	-0.4
Germany	1.445	31.6	68.0	0.4
France	0.795	7.4	92.3	0.3
Italy	1.678	25.9	74.5	-0.4
Spain	1.163	-6.1	106.1	0.3

[1] ECHP five waves balanced panel. Trimming, for each wave, lower and upper 1% using the "modified OCDE" equivalence scale.

The results of the decomposition illustrate once more the differences in the determinants of the structure of mobility in each country. As occurred in the breakdown of the Fields and Ok index, income growth has a very limited effect upon aggregate mobility in the various countries considered. In almost all cases the most important determinant is that of the rerankings of

individuals in the respective distributions, as opposed to the lesser influence of changes in inequality. However, differences exist in the weight of each component, which allows us to talk of three types of experiences. The United Kingdom presents a negative contribution of the structural component, due to the increase in inequality, while the weight of the reorderings is considerable. In Italy and Germany, the contribution of structural mobility accounts for approximately 25% of the total, while in France and Spain virtually all the change can be attributed to the rerankings.

4. The decomposition of mobility by population sub-groups

The lack of an analytical tradition as deep-seated as that of inequality means that proposals for the decomposition of mobility indicators do not yet enjoy a similar level of axiomatic content and operational capacity. To date, very few studies have made the quantum leap from the estimation of basic indicators to explanations of the differences in mobility observed in the various population groups[14]. One of the greatest difficulties has been the lack of consensus regarding the properties which should be possessed by the possible indices and the difficulties involved in making such properties adaptable to the diverse aspects of mobility analysis.

Fields and Ok (1999b) propose a decomposition technique which overcomes many of the stated shortcomings. Using the concept of mobility as a process of income movements which may be evaluated by the previous indicator of aggregate variation in individual incomes, it is possible to conceive of this total sum of income fluctuations as a weighted average of the specific movements of different social groups. A necessary condition is the existence of a mobility indicator which combines four basic properties: scale invariance, symmetry, multiplicative path separability and subgroup decomposability.

The most important property with regard to the objective of disaggregation of overall mobility by population groups is that of subgroup decomposability. If the population is divided into $J \in \{1,...,n\}$ subgroups, $\forall j=1,...,J$ y $\boldsymbol{x}^j, \boldsymbol{y}^j$:

[14] A notable exception is the work of Ramos (1999), in which is proposed for the first time the decomposition of the Shorrocks rigidity index into additively within and between-groups components in order to analyse earnings mobility in the UK. His results appear to assign a greater explanatory capacity to intergroup mobility than to the differences among the various population divisions.

$$m_n\left[(x^1,...,x^j),(y^1,....,y^j)\right]=\sum_{j=1}^{J}\left(\frac{n_j}{n}\right)m_{nj}(x^j,y^j) \tag{13}$$

Any mobility indicator which combines the above properties should be able to be disaggregated, therefore, as a weighted average of the mobility of the various population groups, the weightings being the relative demographic importance of each group. The only indicator which combines all the required properties is that of aggregate income movement per capita, as described in the previous section. The decomposition could be derived as:

$$m_n(x,y)=\sum_{j=1}^{J}\left(\frac{n_j}{n}\right)\left[\frac{1}{n^j}\sum_{i=1}^{n}\left|\log y_i^j-\log x_i^j\right|\right] \tag{14}$$

The variables we have chosen to define the different groups are household type, household size and the age of individuals. However, the age of individuals, as well as other relevant variables defined at individual level, such as educational level, present problems for the performance of the decomposition exercise. While individuals are assigned the adjusted income of the household to which they belong, the groups are defined, nevertheless, according to the individual level variables.

The data regarding the contribution of each household type to mobility show the existence of some national divergences, although within a more or less similar pattern (Table 4). The basic features of this pattern are the greater mobility, in general, of single parent households, the greater stability over time of the income of older persons[15] and the average or low levels which correspond to couples with children, who constitute the most important demographic group. Some countries diverge moderately from this pattern, as a result of the specificity of some of their results. In Germany, in contrast to the rest of the countries, it is older people who live alone who show greater income mobility. The same does not occur, however, with older people who live in households with another adult. In France it is people who live alone who experience greater variation in income over time, although it would not be correct to talk of a behaviour different to that of single parent households. The Latin model –Italy and Spain– is interesting in that mobility is much more visible for couples with children.

[15] This result does not coincide, for the case of the United Kingdom, with that obtained by Zaidi *et al.* (2001), who conclude, in opposition to generalized intuition, that the oldest age group in this country displays a notable mobility.

Table 4

Decomposition of Fields and Ok Mobility Index, 1993/97[1]

	UK				Germany				France			
	Pi[1]	Mi	Ci	Ci/Pi	Pi[1]	Mi	Ci	Ci/Pi	Pi[1]	Mi	Ci	Ci/Pi
Household Type at Wave 1												
1 person aged 65	5.85	0.32	5.08	0.87	5.03	0.46	7.47	1.48	4.01	0.32	5.08	0.87
1 person <65	5.11	0.42	5.82	1.14	8.48	0.34	9.27	1.09	5.51	0.42	5.82	1.14
Single Parent	9.13	0.39	9.60	1.05	3.99	0.47	6.00	1.51	4.75	0.39	9.60	1.05
Couple, no kids, at least 1 aged 65+	8.56	0.31	7.07	0.83	7.66	0.24	5.97	0.78	7.22	0.31	7.07	0.83
Couple, no kids, both <65	14.85	0.35	14.11	0.95	16.73	0.33	17.57	1.05	13.55	0.35	14.11	0.95
Couple, 1 kid < 16 years	7.32	0.34	6.68	0.91	9.43	0.29	8.94	0.95	9.47	0.34	6.68	0.91
Couple, 2+ kids < 16 years	22.15	0.37	21.98	0.99	13.02	0.27	11.49	0.88	19.24	0.37	21.98	0.99
Couple with 1+ kids aged 16+	20.42	0.39	21.46	1.05	24.87	0.32	25.34	1.02	32.54	0.39	21.46	1.05
Other households	6.62	0.46	8.20	1.24	10.78	0.23	7.94	0.74	3.71	0.46	8.20	1.24
Household Size at Wave 1												
1	10.96	0.37	10.89	0.99	13.51	0.38	16.74	1.24	9.52	0.37	10.89	0.99
2	28.52	0.35	26.85	0.94	27.45	0.32	28.17	1.03	23.62	0.35	26.85	0.94
3	19.81	0.38	20.32	1.03	21.42	0.32	22.20	1.04	18.71	0.38	20.32	1.03
4	24.65	0.36	24.00	0.97	23.63	0.30	23.05	0.98	23.92	0.36	24.00	0.97
5	11.78	0.42	13.17	1.12	5.21	0.25	4.12	0.79	8.31	0.42	13.17	1.12
6	2.95	0.39	3.11	1.06	1.98	0.21	1.35	0.68	5.33	0.39	3.11	1.06
7 or more	1.34	0.46	1.65	1.23	6.80	0.20	4.36	0.64	10.59	0.46	1.65	1.23
Age group at Wave 1												
<25 years	32.88	0.41	35.97	1.09	28.39	0.30	27.51	0.97	35.05	0.41	35.97	1.09
26 to 45 years	29.38	0.35	27.66	0.94	31.16	0.28	28.19	0.90	32.49	0.35	27.66	0.94
46 to 59 years	17.65	0.38	18.08	1.02	21.41	0.32	22.21	1.04	15.32	0.38	18.08	1.02
60 to 64 years	5.13	0.41	5.64	1.10	5.76	0.43	8.02	1.39	4.99	0.41	5.64	1.10
Aged 64+ years	14.95	0.32	12.65	0.85	13.28	0.33	14.06	1.06	12.15	0.32	12.65	0.85

[1] ECHP and PSID five waves balanced panel. Trimming, for each wave, lower and upper 1% using the "modified OCDE" equivalence scale.

[2] Classification according to situation in wave 1. P_j= % of sample in group j, M_j=group j mobility, C_j= group j relative contribution to mobility.

Table 4 (cont.)

	Italy				Spain			
	Pi[1]	Mi	Ci	Ci/Pi	Pi[1]	Mi	Ci	Ci/Pi
Household Type at Wave 1								
1 person aged 65+	3.25	0.28	2.54	0.78	1.94	0.19	0.93	0.48
1 person <65	2.57	0.42	2.97	1.16	1.04	0.31	0.84	0.81
Single Parent	6.23	0.38	6.64	1.06	5.83	0.46	6.82	1.17
Couple, no kids, at least 1 aged 65+	6.88	0.33	6.21	0.90	5.68	0.21	3.08	0.54
Couple, no kids, both <65	8.34	0.34	7.80	0.94	5.08	0.40	5.26	1.03
Couple, 1 kid < 16 years	9.29	0.35	8.91	0.96	9.26	0.34	8.10	0.88
Couple, 2+ kids < 16 years	15.08	0.34	14.42	0.96	15.64	0.34	13.82	0.88
Couple with 1+ kids aged 16+	35.34	0.38	37.63	1.06	34.05	0.41	35.89	1.05
Other households	13.02	0.36	12.88	0.99	21.47	0.46	25.25	1.18
Household Size at Wave 1								
1	5.82	0.34	5.51	0.95	2.98	0.23	1.77	0.59
2	18.36	0.34	17.48	0.95	13.65	0.31	10.86	0.80
3	22.81	0.36	22.84	1.00	20.08	0.35	18.18	0.91
4	30.47	0.37	31.04	1.02	28.86	0.36	26.36	0.91
5	8.34	0.39	9.05	1.09	10.10	0.40	10.32	1.02
6	5.70	0.37	5.82	1.02	6.75	0.49	8.45	1.25
7 or more	8.50	0.35	8.25	0.97	17.57	0.53	24.06	1.37
Age group at Wave 1								
>25 years	32.66	0.36	32.85	1.01	36.76	0.43	40.80	1.11
26 to 45 years	29.26	0.37	29.81	1.02	29.21	0.38	28.43	0.97
46 to 59 years	18.10	0.37	18.74	1.04	15.30	0.41	16.26	1.06
60 to 64 years	6.77	0.35	6.60	0.97	5.93	0.39	5.85	0.99
Age 64+ years	13.21	0.33	12.01	0.91	12.79	0.26	8.66	0.68

[1]ECHP five waves balanced panel. Trimming, for each wave, lower and upper 1% using the "modified OCDE" equivalence scale.

[2] Classification according to situation in wave 1. P_j= % of sample in group j, M_j=group j mobility, C_j= group j relative contribution to mobility.

When we observe the results according to household size, the differences between categories are not so marked. There is however a difference in the profile of the relationship between the size of the household to which individuals belong and the degree of income fluctuation, with different typologies: a negative relationship in Germany (a larger household means lower mobility), a positive one in Spain, the United Kingdom and France –more irregular in the latter two cases– and an inverse-U form in Italy.

The joint observation of household type and individuals age let us to appreciate that the relationship between life cycle and mobility is not uniform. Young people are, in general, those who present the greatest variation in income over time, while the opposite occurs with older people[16]. Both results are compatible with the basic premises of economic theory. A large part of the income of collectives aged over 65 comes from public social transfers which, as they are updated for inflation, experience almost no variations in real terms. The instability of income from employment for young people and the large number of employment transitions of various types during the early stages of participation in the labour market mean that this is one of the most volatile groups. In countries with more flexible labour markets, such as Britain, young people experience greater instability in remuneration. However, as in previous cases, exceptions exist. In Italy there are scarcely any differences between age strata. There and in Spain, additionally, although the relatively greater mobility of young people who live alone is also apparent, the contribution to total mobility is extremely limited, due to the scanty demographic weight of this collective[17]. The opposite situation occurs in Germany, where there is a positive relationship between life cycle and income variation.

5. The decomposition of mobility by income sources

As occurs in the analysis of inequality, the decomposition of mobility by income source is faced with by theoretical and empirical restrictions greater than those for decomposition exercises using population segments. To date, there exist no methodological approaches comparable to those developed for the analysis of inequality. The sole exception is the proposal by Jenkins (1999) to measure the contribution of each income source to the variability of the total income of the reference unit. This is an adaptation to mobility analysis of the indicators proposed by Shorrocks (1982) in the field of inequality by income sources and of the derivation which Jenkins (1995) himself makes of that proposal.

According to Jenkins (1999), in order to explain the contribution of each source to the variability over time of individual incomes, the analysis of mobility can adapt the rule of decomposition of the family of generalized entropy indices, which is in turn an extension of the decomposition of variance developed by Shorrocks. Income mobility may be interpreted,

[16] These results are corroborated by Trede (1998), who, using a conditional kernel density estimation, finds that young people form the most mobile group. However, the estimations show that mobility does not decrease throughout the life cycle, but rather falls until the age of 35, when it becomes stable from then onwards.

[17] In those countries, the proportion of multigenerational homes is greater than in the rest of the experiences considered, while the proportion of young people who live alone is very small (Roussel, 1992).

according to this rule, as a combination of the contribution of each source to individual income, of the variability over time of each income component and of the correlation with other income sources. Specifically, for each individual the contribution of source f (β^f_i) would be:

$$\beta_i^f = \rho_i^f \frac{\sigma_i(x_i^f)}{\sigma_i(x_i)} \tag{15}$$

where $\Sigma_f \beta^f = 1$, ρ^f_i is the correlation between each income source and the total income of each individual during the reference period, $\sigma_i(x^f_i)$ is the standard deviation of each income source for the whole period and $\sigma_i(x_i)$ is the longitudinal standard deviation of the total income of the individual in the period considered. As in the decomposition of inequality, the contribution of each source to the longitudinal variation of individual incomes may be obtained as:

$$\beta_i^f = \rho_i^f \frac{\mu(x_i^f)}{\mu(x_i)} \sqrt{(I_2(x_i^f)/I_2(x_i)} \tag{16}$$

where $\mu(x^f_i)$ and $\mu(x_i)$ are the individual means of each source and of the total income for the whole period, respectively, and $I_2(x^f_i)$ e $I_2(x_i)$ are the generalized entropy indices (c=2) for that same source and for total income, respectively. In order to obtain the contribution of each source to the income mobility of the population, we compute the average of the results obtained for the individuals of the balanced panel.

The application of this decomposition technique to the ECHP data permits the discovery of important divergences in the determinants of income mobility in the countries selected (Table 5). Despite earnings being the income source which in each country makes the largest contribution to total mobility, their effect is not completely uniform[18]. Divergences may arise for two reasons: on the one hand, the contribution of earnings to total income may differ and, on the other, there may be differences in earnings mobility among the countries considered.

[18] Some of these differences had already been presented in other studies. See OECD (1996).

Table 5

Income Sources Contributions to Longitudinal Income Variability[1]

		Wages	Self-employement	Property Income[2]	Social Transfers[3]	TOTAL
UK	%Contribution	53.1	10.8	9.6	26.5	100.0
	Income Share	46.3	9.6	6.1	38.0	100.0
	Ratio[4]	1.1	1.1	1.6	0.7	1.0
Germany	%Contribution	64.9	7.3	8.3	19.5	100.0
	Income Share	55.3	6.0	5.6	33.1	100.0
	Ratio[4]	1.2	1.2	1.5	0.6	1.0
France	%Contribution	57.6	7.8	9.0	25.6	100.0
	Income Share	48.3	6.5	4.6	40.6	100.0
	Ratio[4]	1.2	1.2	2.0	0.6	1.0
Italy	%Contribution	56.1	15.9	6.6	21.4	100.0
	Income Share	46.2	15.2	3.9	34.7	100.0
	Ratio[4]	1.2	1.0	1.7	0.6	1.0
Spain	%Contribution	63.6	14.2	7.1	15.1	100.0
	Income Share	43.6	13.3	4.8	38.2	100.0
	Ratio[4]	1.5	1.1	1.5	0.4	1.0

[1] ECHP five waves balanced panel. Trimming, for each wave, lower and upper 1% using the "modified OCDE" equivalence scale.
[2] Property Income includes capital income, property rental income and private transfers received.
[3] Social Transfers includes unemployment related benefits, old-age/survivors benefits, family related allowances, sickness/invalidity benefits, educated related allowances, social assistance, housing allowance and any other personal benefits.
[4] Ratio: %Contribution/Income Share.

With regard to the first of these aspects, the greater weight of earnings in Germany is evident, being almost ten points greater than in the rest of the countries. This does not mean, however, that the contribution to mobility of this source is lesser in the latter. In fact, the Spanish experience stands out from those countries considered as that with the greatest earnings mobility. Proof of this is a contribution to total mobility by earnings which is twenty points greater than its weight in total income. Income from self-employment is not exceptional in any country with regard to its specific effects upon mobility. The opposite occurs with property income[19], which in all countries, and especially in France, is the least stable source of income. Its notable sensitivity to the economic cycle introduces, without a doubt, a more volatile component in its evolution.

[19] Property Income includes capital income, property rental income and private transfers received.

One final important factor is the compensatory effect on income instability of social transfers[20]. In all the countries studied the development of such benefits has a stabilizing function in income distribution. The systematic nature of cash benefits provided by the public sector and the absence of drastic changes in the determination of benefits –commonly updated in line with changes in consumer prices– limit the possibilities for drastic changes in the incomes of households which depend upon this source of income. There exist, however, some differences among the five countries considered, the United Kingdom being the country where this compensatory effect is smallest, while Spain is the country in which social transfers have the greatest difference between the contribution to mobility and the weight in total income[21].

6. Conclusions

The objective of this paper has been to examine what lies behind income mobility and to assess the differences in the determinants of income mobility in a selected sample of European Union member states. The use of the European Community Household Panel and of some of the most recent techniques to decompose income mobility has allowed us to reach various conclusions regarding these differences.

The results of the CDW decomposition and the breakdown of the Fields and Ok index show that income growth has a very limited effect upon aggregate mobility in the various countries considered. The most important determinant of income mobility is the reranking of individuals on the income scale. A smaller weight may be attributed to changes in the income structure. However, there are some differences across countries, with the United Kingdom presenting a negative contribution of the structural component and a remarkable contribution of the rerankings, while the contribution of structural mobility is lower in Italy and Germany. In France and Spain virtually all the change can be attributed to the reranking of individuals on the income scale.

[20] Social Transfers includes unemployment related benefits, old-age/survivors benefits, family related allowances, sickness/invalidity benefits, educated related allowances, social assistance, housing allowance and any other personal benefits.

[21] A related study is the comparison established by Fabig (1998), between mobility with gross and net income in Germany and the United Kingdom, with results highly sensitive to the type of income considered. Gross income is less mobile in the UK than in West Germany, while the opposite occurs with net income. Such a difference may be attributed to the importance softening role of income instability which is played by the tax and social benefits system in Germany.

The performance of various decomposition exercises both by population groups and by sources of income, has allowed us to relate differences in observed mobility levels to possible determining factors which are specific for each country. Although some common results exist concerning the delimitation of groups experiencing the greatest income fluctuations, such as individuals belonging to single-parent households or young household heads, the intensity of these results varies greatly from one country to another. Something similar occurs in the case of different sources of income. An important determinant of mobility appears to be changes in earnings in all the countries under study, although some differences exist. The singularity of the Spanish labour market leads to greater volatility in the earnings structure, while in other countries the greatest variations in longitudinal income are mainly due to cash property income.

The use of homogenous databases in the comparative analysis of income mobility is therefore very promising. However, further work addressing the different effects of public policy on income dynamics or more accurate techniques to develop decomposition exercises are necessary in order to shed light on income mobility differences across European countries. At the same time, further advances in the understanding of the phenomena described here can be expected as longer longitudinal databases become available.

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