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**Working Paper**

## Inequality and mobility of household incomes in Europe: Evidence from the ECHP

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Reihe Ökonomie  
Economics Series

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Household Incomes in  
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September 2006

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Founded in 1963 by two prominent Austrians living in exile – the sociologist Paul F. Lazarsfeld and the economist Oskar Morgenstern – with the financial support from the Ford Foundation, the Austrian Federal Ministry of Education and the City of Vienna, the Institute for Advanced Studies (IHS) is the first institution for postgraduate education and research in economics and the social sciences in Austria. The **Economics Series** presents research done at the Department of Economics and Finance and aims to share “work in progress” in a timely way before formal publication. As usual, authors bear full responsibility for the content of their contributions.

Das Institut für Höhere Studien (IHS) wurde im Jahr 1963 von zwei prominenten Exilösterreichern – dem Soziologen Paul F. Lazarsfeld und dem Ökonomen Oskar Morgenstern – mit Hilfe der Ford-Stiftung, des Österreichischen Bundesministeriums für Unterricht und der Stadt Wien gegründet und ist somit die erste nachuniversitäre Lehr- und Forschungsstätte für die Sozial- und Wirtschaftswissenschaften in Österreich. Die **Reihe Ökonomie** bietet Einblick in die Forschungsarbeit der Abteilung für Ökonomie und Finanzwirtschaft und verfolgt das Ziel, abteilungsinterne Diskussionsbeiträge einer breiteren fachinternen Öffentlichkeit zugänglich zu machen. Die inhaltliche Verantwortung für die veröffentlichten Beiträge liegt bei den Autoren und Autorinnen.

## **Abstract**

In this paper I want to shed light on two aspects of income mobility: relative total income mobility using the estimator by Fields and Ok [1999] and equalization of long-run incomes measured by the index of Fields [2004]. The cross country comparison shows a negative relationship between total relative mobility and long-run income equalization, this results is contrary to the intuition given by Shorrocks [1978a] who stated, that higher relative mobility will cause higher equalization of incomes when the accounting period is extended.

## **Keywords**

Income distribution, economic mobility, inequality

## **JEL Classification**

J30, D63

**Comments**

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# 1 Introduction

There are reasonable grounds, [...] for supposing that the existence of mobility causes inequality to decline as the accounting interval grows. Furthermore the intuition suggests that the extent to which inequality declines will be directly related to the frequency and magnitude of relative income variations.[Shorrocks, 1978*a*]

In this paper the second part of this statement will be challenged using cross country data from the European Community Household Panel. We will calculate the mobility measures axiomatized by Fields and Ok [1999] to get the magnitude of the relative income variation and the index by Fields [2004] to measure the ability to equalize incomes over time.

Closely related to this article is the study by Ayala and Sastre [2002] who considered a broad range of different mobility measures and compare several European countries and the United States. They used data from the ECHP from the years 1994 to 1998. Their aim is to connect the different notions of mobility to inequality, however, what has been left out was the essential index by Fields [2004] that gives a direct connection of inequality and mobility.

## 2 Data Description

The European Community Household Panel (ECHP) provides us with household income data from different sources. The source of income that underlies our analysis is total net household income (ECHP code HI100) post-tax and post-transfers. So this income can be interpreted as the disposable income for the household. Furthermore all households that had zero income in any of the waves under investigation have been removed. Some further trimming was recommended, because, as Cowell and Schluter [1998] point out, mobility measures are very sensitive to data contamination, that has happened in several aspects (like the adjustment from gross and net wages by statistical authorities, either gross or net reportings of capital income depending on the interviewee as pointed out by Ayala and Sastre [2002, p. 5]). In this case I trimmed the data as described in Ayala and Sastre [2002]<sup>2</sup> and didn't find different rankings of the countries, so I kept using the untrimmed data in order to get as many observations as possible.

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<sup>2</sup>I dropped the 1% centile and the 99% centile of each country

To adjust for demographic events like birth of a child or death of a household member and different household sizes I am using the OECD scale for equalizing size(HD004), with which I divided HH income  $(1 + 0.7(\text{adults} - 1) + 0.5(\text{HH size} - \text{adults}))$ .

To make incomes comparable we used PPP rates provided in the ECHP (*PPP<sub>yy</sub>*). Incomes are expressed in 1995 prices using the consumer price indices for each country provided by the World Bank. What is considered is therefore the *real mobility*, so we are interested in what a household actually can afford.

The observation points are from 1995, 1998 and 2001 and includes all EU-15 countries except of Finland and Sweden. I used aggregate household data because 98% of all households reported positive income. However in more than a third of all entries from wave one to wave three at least some imputation has been made [see Peracchi, 2002]. Controlling for imputation, i.e. using only data that has not been imputed, gives slight changes in the values of the indices, but hardly changes the ranking of the countries. A disadvantage of household data is that one is unable to assess income distribution over its members. For completeness, it is worth noting, that a balanced panel has been used according to be able to construct the mobility measures.

Choosing the household as the unit of analysis would give rise to numerous problems as Ayala and Sastre [2002] point out. One of it is that 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. Furthermore, if mobility measures that have welfare interpretations are used, all individuals in the household are attributed the same level of welfare. To resolve the first issue, the OECD equivalence scale helps to keep track of the changing composition of the household, the second problem can not be resolved easily, because it would require consumption data of each individual member of the family.

### 3 Methodology

In the following the concepts used in the empirical part are introduced and discussed. I will begin with the inequality measures and continue with the mobility indices.

#### 3.1 Inequality Measures

**Theil's measure** comes from entropy theory in information economics [Theil, 1967, see] that evaluates the informational value of a situation. It can be reinterpreted im-

mediately into a measure of inequality by viewing the probability of an event as the individual's proportion of total income. Let  $y_i$  be the share of total income the  $i$ th person obtains. Let  $h(y)$  be a decreasing function of  $y$  ( $h(y) = \log \frac{1}{y}$  is commonly used). Let  $H(y) = \sum_{i=1}^n y_i h(y_i) = \sum_{i=1}^n y_i \log \frac{1}{y_i}$  be the measure of entropy or the information content. It reaches its maximum when  $y_i = 1/n$  for all  $i$ . This leads us to following measure of inequality:

$$T = \log n - H(y) = \sum_{i=1}^n y_i \log n y_i$$

With the interpretation that the higher  $T$  the more unequal the income distribution.

**Gini Coefficient** The Gini coefficient can be defined as the ratio of the area between the Lorenz curve and the line of absolute equality and the area underneath the diagonal. It is defined as:

$$G = [1/(2n^2\bar{y})] \sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|$$

The Gini coefficient is bounded between 0 and 1. Highest inequality is denoted by 1 (in Lorenz interpretation 1 household possess 100% of economies income the rest nothing) lowest inequality is 0 (Lorenz curve equals line of absolute equality)

**Mean Log Deviation** takes more care at income transfers at the lower end, because it staggers the income distribution. Furthermore taking the differences of logs eliminates the dependence on the scale because what goes in multiplicative at units falls out when taking logs and subtracting it from the mean. Let  $y_i$  now be the income of household  $i$  in levels and  $n$  the number of households in the economy. The measure is then defined as:

$$(1) \quad H = \left[ \sum_{i=1}^n (\log \bar{y} - \log y_i)^2 / n \right]^{1/2}$$

One problem is, that this measure is not independent of the mean of the population's income.

## 3.2 Mobility Measures

Income mobility is a concept that has to be analyzed across various dimensions, because it is so multi-faceted and the literature does not give a unique of what mobility is. In his seminal paper on income mobility, Shorrocks [1978*b*] stated a few desiderata for mobility measures and showed that no index exists that can satisfy all of them. However, some of this desiderata apply specifically to inter-generational mobility where time-independence plays a significant role to evaluate the mobility process (see the discussion in Fields and Ok [1996]). A possible solution to this problem of multi-dimensionality of mobility is, to use several different measures, that are - in the best case - orthogonal to each other and therefore to get a more complete picture of income movements over time.

To classify mobility measures two branches can be thought as meaningful. (1) purely statistical measures that obey well defined axioms and (2) welfareist measures that try to evaluate mobility according to their effects on social welfare (interesting contributions to this topic have been made - among others - by Dardanoni [1993] and Gottschalk and Spolaore [2002]). Furthermore there are statistical measures that can be filled with social utility interpretation [see Fields and Ok, 1999, for a detailed discussion]. It seems to be quite common to assign welfare properties to measures of mobility, where underlying social welfare functions are assumed that use personal or household income as a source of individual utility.

I am not convinced, that the data with which I am applying these measures on allow any statements about welfare, because I do not take into account the conditions a household is living and whether the a change in household's income was due to transfers received because of serious diseases. Furthermore the distribution of income within the household is completely neglected, and for welfare is a purely individualistic concept, an evaluation on the household level does not seem appropriate.

So I will focus mainly on following two measures: (1) the total per household log-income movement in an economy, that can be disentangled in a transfer and a growth component and (2) measure to evaluate a countries ability to equalize lifetime income. These measures convey the information needed to challenge the statement by Shorrocks [1978*a*].

The basic framework we are in is described by a population of households  $N = 1, \dots, n$ . The income of household  $i$  at time  $t \in 0, 1$  is denoted as  $y_i^t$ . The income distribution at time  $t$  is written as  $y^t = y_1^t, \dots, y_n^t$ . An income distribution is defined by

a cdf  $F : R_+ \rightarrow [0, 1]$  with finite mean  $\mu_F$ . Take  $X \subset R_+$  as the set of feasible incomes. Let  $\mathcal{F}(X)$  the class of all income distributions whose support is contained in a given subset  $X \subseteq R_+$ .

A mobility process is defined as a function  $M : R_+ \times X \rightarrow [0, 1]$  such that  $M(\cdot|y) \in \mathcal{F}(X)$  for all  $y \in X$ . The basic question is how to evaluate the transition from  $y^0$  to  $y^1$ .

**Fields and Ok [1999]** The mobility index axiomatized by Fields and Ok [1999] is a measure of the total absolute log-income movement in a society. It is given by:

$$(2) \quad m_n^{FO99} = c \left( \frac{1}{n} \sum_{i=1}^n |\log y_{1i} - \log y_{0i}| \right) \text{ for all } x, y \in R_{++}^n$$

Following properties fully characterize this measure:

- Scale Invariance: for all  $x, y \in R_{++}^n$  and  $\lambda > 0$ ,  $m_n(\lambda x, \lambda y) = m_n(x, y)$
- Symmetry: For all  $x, y \in R_{++}^n$ ,  $m_n(x, y) = m_n(y, x)$
- Subgroup Decomposability  $m_n((x^1, \dots, x^J), (y^1, \dots, y^J)) = \sum_{j=1}^J \left(\frac{n_j}{n}\right) m_{n_j}(x^j, y^j)$
- Multiplicative Path Separability For any  $x \in R_{++}^n$ ,  $\alpha \geq 1$  and  $\beta \in [1, \alpha]$ ,  $m_n(x, \alpha x) = m_n(x, \beta x) + m_n(\beta x, \alpha x)$

This is the *absolute* mobility index that does not take into account the direction of the mobility, because of the symmetry axiom. The *directional* measure – as suggested by its name – takes into account the direction of mobility where higher income growth leads to higher mobility. In this case symmetry has to be give up and is replaced by following two properties:

$$m_n^{FO99dir}(x, y) = -m_n^{FO99dir}(y, x) \text{ and } m_n^{FO99dir}(x, \alpha x) = m_n^{FO99dir}(x, x)$$

For  $\alpha > 1$  and  $x, y \in R_{++}^n$ . The first property means that if  $x \rightarrow y$  is a "good" movement  $y \rightarrow x$  has to be a "bad" movement in the sense of more or less mobile. The second property just states that a proportional increase for all incomes has to be a good movement. The directional measure fits in a utilitarian framework. Take the unit elasticity utility function as a function of real income  $U(a) = \log a$ .  $m_n^{FO99}$  has the interpretation of the aggregate change in social welfare.

The measure for relative income movements decomposability into two components (1) total social utility growth and (2) total social utility transfer. It can be written as follows:

$$(3) \quad \underbrace{m_n^{FO99}(y_0, y_1)}_{\text{per capita income movement}} = \underbrace{\frac{1}{n} \sum_{i=1}^n (\log y_{1i} - \log y_{0i})}_{\text{per capita social mobility growth}} + \underbrace{\frac{2}{n} \sum_{i \in L} (\log y_{0i} - \log y_{1i})}_{\text{per capita social mobility transfer}}$$

Where  $L \equiv \{i : y_{0i} > y_{1i}\}$  is the set of individuals whose income has decreased over time. The first component measures the total income growth of these two components the second part adds the components that has been lost by the losers (due of the assumption of positive growth, one has to add twice the amount lost by the losers, because everything lost by the losers has been gained by some winners). It is worth noting, that the growth component is exactly the directional measure defined in (3.2).

However, as all measures of mobility, it cannot describe all aspects of mobility. It fulfills the some basic axioms that have been given as desiderata for mobility measures in the literature: (1) monotonicity (2) axiom of diagonalizing switches (3) monotonicity in distance. The relation of these axioms with the proposed measure are discussed in Fields and Ok [1996]. It is complementary to the traditional quintile transition matrix measures, because it is "insensitive to rerankings beyond what would be implied by the income changes themselves." [Fields and Ok, 1996].

**Mobility as long term equalizing phenomenon Fields [2004]** To measure an income mobility process several measures or ranking devices have been considered in the recent literature . For example Benabou and Ok [2001] consider a technique taken from the taxation literature to rank countries according to their ability to equalize opportunities, i.e. to make future incomes origin independent. Fields [2004] criticizes the approach taken from the taxation literature and illustrates it with the following example. Take two income transitions  $I : (1, 3) \rightarrow (1, 5)$  and  $II : (1, 3) \rightarrow (5, 1)$ . In both cases income inequality is more unequal in the second period compared to the first period.

Fields [2004] argues that the question to answer is wether a mobility process is lifetime income equalizing. To measure wether a it can achieve this goal, approaches taken from the tax literature are not valid. This is because the feature of the taxation approach looks at the change from an already realized disposable income distribution at

time 0 to a realized income distribution at time 1. The difference is striking, because in the tax literature one compares a realized but not paid out distribution with the distribution of disposable incomes. Therefore the interpretation of opportunity equalization is doubtful.

To resolve this problems he suggests following index:

$$(4) \quad m_{F04} = 1 - \frac{I(\bar{y})}{I(y_0)}$$

Where  $I(\cdot)$  is a static inequality measure (in this application the Gini coefficient will be used, although Theil's measure or mean log deviation could also be used) and  $\bar{y}$  is the vector of average income over the two periods<sup>3</sup>. The axioms underlying  $m_{F04}$  are:

Let  $I(\cdot)$  be an inequality measure and  $y_l = (\bar{y}_1, \dots, \bar{y}_n), y_s = (y_{0,1}, \dots, y_{0,n})$  be vectors of long-term and short-term incomes, respectively. Then  $m_{F04}$  has following properties: *Normalization*  $I(l) = I(s) \Rightarrow E(\cdot) = 0$ , so if the inequality is the same for long-term and short-term income then no mobility takes place. *Equalization*  $I(l) < I(s) \Rightarrow E(\cdot) > 0$ , when inequality is reduced over longer horizon then the index gets positive. On the contrary if inequality is larger in the long run, then the index gets negative, so *disequalization* means  $I(l) > I(s) \Rightarrow E(\cdot) < 0$ .

To compare two different income regimes one speaks about *Greater Equalization* if

1. For two alternative  $l$  vectors  $l_1, l_2 \in L$  and given a vector  $s \in S$ ,  $I(l_1) < I(l_2) < I(s) \Rightarrow E_{s,l_1} > E_{s,l_2}$
2. For two alternative  $s$  vectors  $s_1, s_2 \in S$  and given a vector  $l \in L$ ,  $I(s_1) > I(s_2) > I(l) \Rightarrow E_{s_1,l} > E_{s_2,l}$

and of *Greater Disequalization* if

1. For two alternative  $l$  vectors  $l_1, l_2 \in L$  and given a vector  $s \in S$ ,  $I(l_1) > I(l_2) > I(s) \Rightarrow E_{s,l_1} < E_{s,l_2}$
2. For two alternative  $s$  vectors  $s_1, s_2 \in S$  and given a vector  $l \in L$ ,  $I(l) > I(s_1) > I(s_2) \Rightarrow E_{s_2,l} > E_{s_1,l}$

From these axioms it follows for  $E(I(l), I(s))$  that it is decreasing in  $I(l)$ , increasing in  $I(s)$  and equal zero when  $I(l) = I(s)$ .

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<sup>3</sup>With panel data, long-term income is better observable by taking the average of all years from 1996–2001.



Fields states that this proposed measure is closely related to the measure by Chakravarty, Dutta and Weymark [1985]. Although the latter index was not constructed to test equalization of life time incomes but give ethical advice, whether mobility has to be regarded as positive. Fields states that its design fits better to the question he poses than to the one it has been used for, because – from an ethical perspective – it gives too much weight to the equalizing part of mobility (which is on the other hand good for the assessment whether the mobility process is income equalizing).

### 3.3 Some illustrative examples

Table 3.3 provides you with the numerical values of the mobility indices, described in the following.

**Bill Gates gets richer vs Bill Gates gets poorer** Consider following changes of an income distribution at period 0  $(\underbrace{10, \dots, 10}_{49 \text{ times}}, 1000) \rightarrow (\underbrace{10, \dots, 10}_{49 \text{ times}}, 10000)$  versus  $(\underbrace{10, \dots, 10}_{49 \text{ times}}, 1000) \rightarrow (\underbrace{10, \dots, 10}_{49 \text{ times}}, 500)$ . In the first case the Fields measure gets negative, because the process leaves long term incomes more unequal than period 0 incomes. In the second case we have more equality of incomes in the second period and therefore the long term inequality drops, which leads to the indication of more mobility than in the first period. The Fields and Ok measure gives us opposite results when comparing these two processes. Because the rise of Bill Gates' income in the first case is much higher than the drop he experiences in the second case the Fields and Ok measure attributes more mobility to the first case than to the second.

**Doubling of Income** Take the situation from the previous example and let the period 0 income double from period 0 to period 1. According to the Fields 2004 measure there is no mobility, because the distribution of incomes over individuals has not changed. However, there is a substantial part of mobility in the Fields and Ok measure of which 100 percent can be attributed to growth.

**Complete vs incomplete income reversal** Take again a population of 50 people and let the change of the income distribution be as follows:  $(1, 2, \dots, 49, 50) \rightarrow ((50, 49, \dots, 2, 1))$ . This is the case of complete income reversal. The Fields measure attributes full mobility to this process, because it completely equalizes long run in-

|                            | Fields and Ok [1999] |        |          | Fields [2004] |
|----------------------------|----------------------|--------|----------|---------------|
|                            | total                | growth | transfer |               |
| Gates gets richer          | 0.046                | 0.046  | 0.000    | -0.379        |
| Gates gets poorer          | 0.014                | 0.014  | 0.000    | 0.102         |
| Complete Income reversal   | 1.299                | 0.000  | 1.299    | 0.509         |
| Incomplete Income reversal | 1.267                | 0.124  | 1.142    | 1.000         |
| doubling of income         | 0.693                | 0.693  | 0.000    | 0.000         |

come. For the other measure we get also some mobility of which all can be attributed to the transfer component, because overall income stays the same. Now take a similar process except of the fact that the richest person gets even richer (the change has to be larger than 49). Fields measure would attribute to this process lower mobility than to the complete income reversal, because long-run incomes are not perfectly equalized. However, the Fields and Ok measure attributes more mobility to the incomplete income reversal, because additionally to the income reversal, there is overall income growth in the economy.

**Symmetry of  $m_n^{FO}$**  Due to the symmetry axiom of the Fields and Ok [1999] the measure of income movement takes Paretian welfare evaluations out of mobility measurement. E.g. take the two processes  $(1, 2) \rightarrow (2, 3)$  and  $(2, 3) \rightarrow (1, 2)$  the former process is certainly more desirable than the second but in the sense of the measure they are equally mobile, because each household experienced the same monetary income change. To get back a little bit of welfare interpretation to this approach, one can use the directional measure that reduces the amount of mobility when incomes fall from one period to the next. According to this measure the latter process is more mobile than the former.

**Rerankings** Consider now following income distributions [e.g. Fields and Ok, 1996]:  $x = (1, 2, 5)$ ,  $y = (1, 4, 5)$  and  $z = (3, 2, 5)$ . While the transition from  $x \rightarrow y$  and  $y \rightarrow z$  are considered equally mobile by the Fields and Ok index, the Fields index appoints higher mobility to the second process, because incomes are distributed more equally in the long run due to the reranking of individual 1 and 2.

## 4 Results

In this study I take a cross-country perspective, although an additional longitudinal aspect comes into play by separating the observation period 1995 to 2001 into two shorter periods: 1995 to 1998 and 1998 to 2001. In the following two sections the inequalities of European countries are compared and the two mobility measures introduced in the previous section are calculated.

### 4.1 Comparison of inequality

In table 4.1 you can see different inequality measures for the 13 countries over three years: 1995, 1998 and 2001. The long term inequality measures of 4.1 have been calculated using the average of the three years income for every household. The Gini coefficient ranges from 0.23746 in Portugal to 0.38389 in Portugal in 1995. The spread over Europe became slightly smaller in 2001, going from .23934 to 0.37221. The ranking of the countries at the top and the bottom remained the same, while there were some minor changes of place in the middle. The inequality indices are in line with Ayala and Sastre [2002] and others who used the same data set.

Table 1: Comparison of Inequality Measures between 1996 and 2001

| Country            | 1995    |         |         | 1998    |         |         | 2001    |         |         |
|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                    | Gini95  | Theil95 | MLD95   | Gini98  | Theil98 | MLD98   | Gini01  | Theil01 | MLD01   |
| Germany (SOEP)     | 0.27736 | 0.13812 | 0.15171 | 0.25376 | 0.11309 | 0.11276 | 0.25330 | 0.11481 | 0.11019 |
| Denmark            | 0.23746 | 0.11182 | 0.09910 | 0.23331 | 0.10385 | 0.09729 | 0.23934 | 0.10632 | 0.10399 |
| Netherlands        | 0.28152 | 0.14717 | 0.15340 | 0.26451 | 0.13307 | 0.12636 | 0.25268 | 0.11488 | 0.11398 |
| Belgium            | 0.28776 | 0.16306 | 0.16756 | 0.28188 | 0.15895 | 0.14570 | 0.30280 | 0.22958 | 0.16808 |
| Luxembourg (PSELL) | 0.26185 | 0.12085 | 0.11434 | 0.26332 | 0.12599 | 0.11612 | 0.26105 | 0.12100 | 0.11318 |
| France             | 0.30229 | 0.16574 | 0.17324 | 0.28539 | 0.14336 | 0.14272 | 0.28198 | 0.13629 | 0.14353 |
| UK (BHPS)          | 0.33075 | 0.20367 | 0.19959 | 0.32076 | 0.18308 | 0.17989 | 0.31798 | 0.19916 | 0.17990 |
| Ireland            | 0.32799 | 0.19498 | 0.18139 | 0.32084 | 0.18561 | 0.16911 | 0.32250 | 0.19116 | 0.18036 |
| Italy              | 0.33546 | 0.20349 | 0.23097 | 0.31419 | 0.17983 | 0.18839 | 0.30450 | 0.16875 | 0.17222 |
| Greece             | 0.36689 | 0.23991 | 0.24066 | 0.36552 | 0.23617 | 0.23857 | 0.33946 | 0.19763 | 0.19829 |
| Spain              | 0.33246 | 0.19008 | 0.20714 | 0.33817 | 0.20098 | 0.21548 | 0.32290 | 0.19283 | 0.20028 |
| Portugal           | 0.38389 | 0.25798 | 0.27038 | 0.38086 | 0.25677 | 0.26216 | 0.37221 | 0.25025 | 0.24212 |
| Austria            | 0.29074 | 0.14622 | 0.15592 | 0.27142 | 0.12800 | 0.13024 | 0.26763 | 0.12211 | 0.12839 |

Comparing the long term inequality measure in table 4.1 with the measures of any single year, one can see that long term income inequality is smaller than any observation for a single year, the question now is to which extent this has happened. An answer to this question will be given by the mobility index of Fields [2004] in the next section. The most equal countries in the long run are: The Netherlands, Denmark and Germany, where on the other side of the scale Spain, Portugal, Ireland and Greece can be found.

Table 2: Long Term Income Inequality: 95, 98 and 01

| Country            | long term (95,98,01) |         |         |
|--------------------|----------------------|---------|---------|
|                    | Gini                 | Theil   | MLD     |
| Germany (SOEP)     | 0.23617              | 0.09782 | 0.09234 |
| Denmark            | 0.20462              | 0.07710 | 0.06990 |
| Netherlands        | 0.23716              | 0.09767 | 0.09111 |
| Belgium            | 0.25969              | 0.14264 | 0.11815 |
| Luxembourg (PSELL) | 0.24540              | 0.10538 | 0.09847 |
| France             | 0.26512              | 0.11911 | 0.11491 |
| UK (BHPS)          | 0.28794              | 0.15049 | 0.13736 |
| Ireland            | 0.29567              | 0.15558 | 0.14064 |
| Italy              | 0.28373              | 0.14403 | 0.13814 |
| Greece             | 0.31968              | 0.17184 | 0.17037 |
| Spain              | 0.29932              | 0.15810 | 0.14705 |
| Portugal           | 0.35260              | 0.21872 | 0.20599 |
| Austria            | 0.24586              | 0.10045 | 0.09949 |

## 4.2 Comparison of mobility

**Fields and Ok [1999]** Table 4.2 gives detailed results of the Fields and Ok [1999] mobility measure. The figures reported here are  $m_{FO99}/\sum_{i=1}^N y_{0i}$ . The countries under consideration are very heterogeneous according not only to the magnitude of relative income mobility experienced but also by the composition of growth and transfer.

Portugal exhibited the largest relative mobility over the entire period of which almost 80% can be attributed to the growth component. This is not surprising because of Portugal's rapid growth in the 1990s. Quite different is the situation in Austria, while overall relative mobility puts it in the middle of the ranking, the transfer component contributes over 43% of total mobility and therefore is both absolutely and relative to total mobility among the highest in Europe whereas the growth component is among the lowest. Countries that also show considerable contribution of growth to mobility are the UK, Portugal, Spain and Greece, while countries like Ireland, Denmark, Belgium and Austria exhibit the lowest growth components.

According to the Fields [2004] index all European countries are long term income equalizing, because their indices are positive. There is, however some variation in the equalization across countries. At the lower end of the scale one finds Luxembourg, Portugal, France, Ireland, Belgium and Denmark, while on the upper end are Germany, the Netherlands and Italy. Of these countries, it seems rather surprising that Italy is the most equalizing country among the EU-13.

Table 3: Fields and Ok [1999] Mobility Index: Change over Periods

| Country            | 1995-1998 |        |          | 1998-2001 |        |          | 1995-2001 |        |          |
|--------------------|-----------|--------|----------|-----------|--------|----------|-----------|--------|----------|
|                    | Total     | Growth | Transfer | Total     | Growth | Transfer | Total     | Growth | Transfer |
| Luxembourg (PSELL) | 0.1988    | 0.0997 | 0.0991   | 0.2097    | 0.1258 | 0.0839   | 0.3058    | 0.2255 | 0.0803   |
| Portugal           | 0.3613    | 0.1865 | 0.1748   | 0.2407    | 0.1338 | 0.1069   | 0.5062    | 0.4036 | 0.1026   |
| Ireland            | 0.2595    | 0.0903 | 0.1693   | 0.3395    | 0.2171 | 0.1225   | 0.3697    | 0.2755 | 0.0942   |
| Spain              | 0.3168    | 0.0913 | 0.2255   | 0.2377    | 0.1452 | 0.0924   | 0.3439    | 0.2058 | 0.1381   |
| Greece             | 0.4026    | 0.1604 | 0.2422   | 0.2697    | 0.1670 | 0.1027   | 0.3862    | 0.2209 | 0.1653   |
| France             | 0.2667    | 0.1417 | 0.1250   | 0.2407    | 0.0841 | 0.1566   | 0.3339    | 0.2145 | 0.1194   |
| UK (BHPS)          | 0.3490    | 0.1811 | 0.1679   | 0.2227    | 0.0781 | 0.1446   | 0.4806    | 0.3023 | 0.1783   |
| Denmark            | 0.2588    | 0.1449 | 0.1140   | 0.2956    | 0.1306 | 0.1650   | 0.4426    | 0.3158 | 0.1268   |
| Belgium            | 0.2780    | 0.1217 | 0.1563   | 0.2364    | 0.0697 | 0.1667   | 0.4653    | 0.3237 | 0.1416   |
| Austria            | 0.2743    | 0.0504 | 0.2240   | 0.3222    | 0.1426 | 0.1796   | 0.3767    | 0.2173 | 0.1593   |
| Netherlands        | 0.2964    | 0.2058 | 0.0907   | 0.2864    | 0.0929 | 0.1935   | 0.3689    | 0.2691 | 0.0997   |
| Germany (SOEP)     | 0.2647    | 0.1239 | 0.1408   | 0.3502    | 0.1419 | 0.2083   | 0.3863    | 0.2839 | 0.1025   |
| Italy              | 0.3618    | 0.1704 | 0.1915   | 0.3520    | 0.2245 | 0.1274   | 0.4343    | 0.2633 | 0.1710   |

As expected and already stated by Shorrocks [1978*a*] the equalization of long term incomes gets stronger when the accounting period is extended. Very strong effects of the extension compared to the average of the subperiod indices could be found in Ireland and Spain with over 70% increase whereas in Belgium, Luxembourg and Denmark this effect was rather small with only 16 – 26% increase.

Table 4: Fields [2004] mobility measure: Comparison over Periods

| Country            | 1995-1998 | 1998-2001 | 1995-2001 |
|--------------------|-----------|-----------|-----------|
| Luxembourg (PSELL) | 0.0650    | 0.0402    | 0.0813    |
| Portugal           | 0.0683    | 0.0554    | 0.1061    |
| Ireland            | 0.0696    | 0.0689    | 0.1090    |
| Spain              | 0.0711    | 0.0692    | 0.1159    |
| Greece             | 0.0818    | 0.0693    | 0.1190    |
| France             | 0.0833    | 0.0734    | 0.1207    |
| UK (BHPS)          | 0.0918    | 0.0756    | 0.1278    |
| Denmark            | 0.0956    | 0.0759    | 0.1345    |
| Belgium            | 0.0999    | 0.0855    | 0.1375    |
| Austria            | 0.1096    | 0.0914    | 0.1477    |
| Netherlands        | 0.1141    | 0.0957    | 0.1549    |
| Germany (SOEP)     | 0.1187    | 0.1015    | 0.1627    |
| Italy              | 0.1247    | 0.1095    | 0.1716    |

A more striking result I obtained when looking jointly at the relative mobility measure by Fields and Ok [1999] and the Fields [2004] measure over the period 1995-2001. Figure 4.2 shows that the evidence that relative mobility and the ability to equalize long-run incomes goes hand in hand is rather weak. Excluding Luxembourg the correlation between those indices becomes even negative. This result certainly challenges the intuition given by Shorrocks [1978*a*], who claimed positive correlation.

In figure 4.2 the growth component is plotted vs the ability of long-run equalization.

Figure 1: Total Relative Mobility vs. Long Term Income Equalization

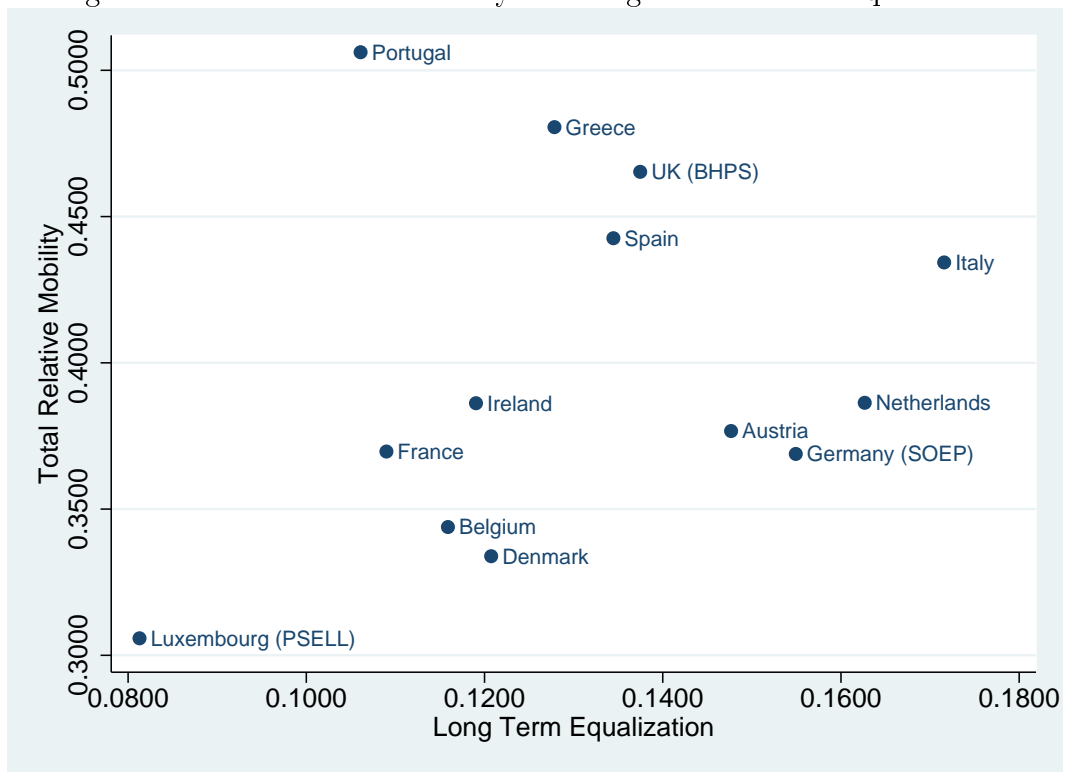


Figure 2: Growth vs Equalization of Incomes

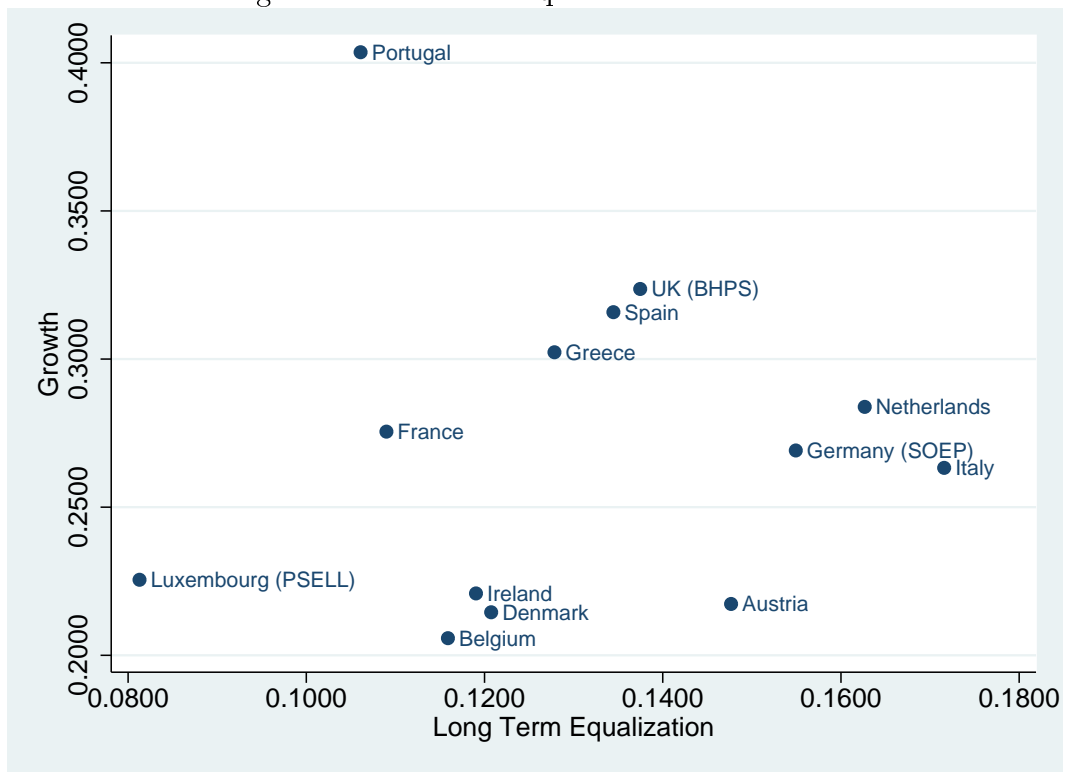
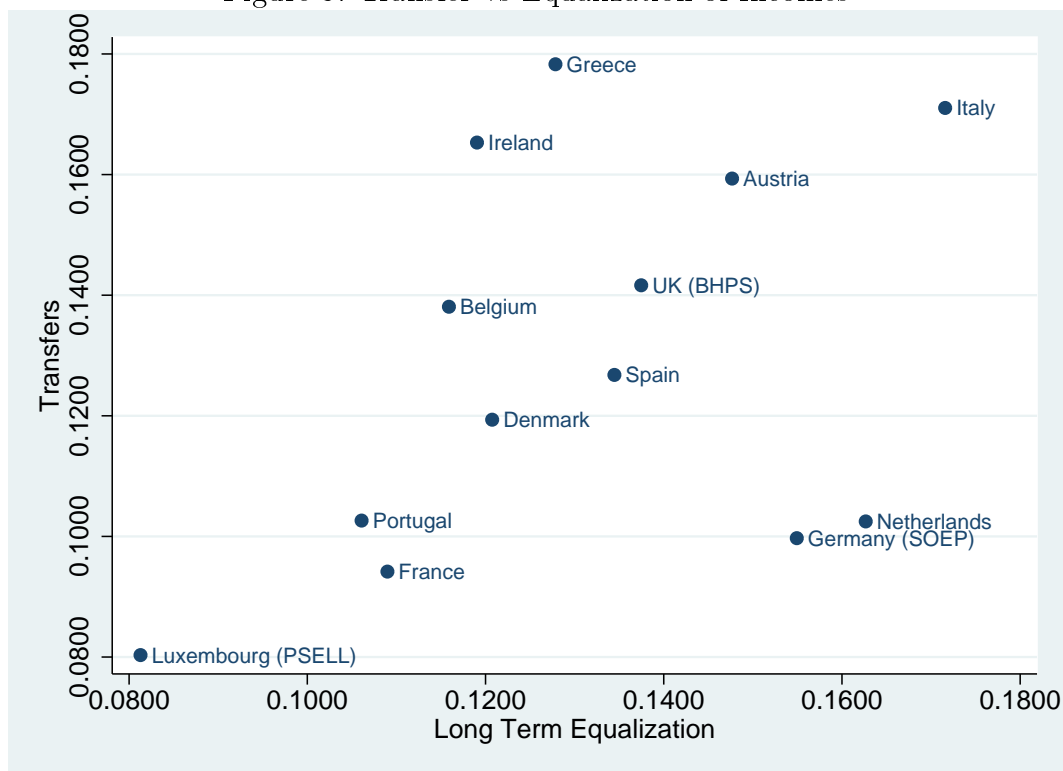


Figure 3: Transfer vs Equalization of Incomes



If we see a combination of a high growth component<sup>4</sup> and a high Fields index<sup>5</sup> as "good" mobility then we could figure out countries that are unambiguously better than others. However this interpretation can not be given, because countries with low ability of equalization like Luxembourg, Belgium, Denmark, Ireland, France and Portugal have a very wide variation in the growth component, while countries with higher relative mobility tend to fluctuate around a growth component of 0.27. An interesting case is Portugal, that experienced a high proportion of income mobility due to growth but was not able to equalize incomes over the observation period, a result that suggests that mainly upper income classes could benefit from extraordinary growth.

The relationship of the transfer component and the Fields index can be observed in figure 4.2. The correlation between those two indices across countries is 0.4048 which indicates a clear positive relationship between those variables and it still remains positive at 0.2, when Luxembourg is excluded from the sample. This suggests, that transfer as defined by that index is redistribution from richer households to poorer,

<sup>4</sup>this could be argued through the welfareist interpretation of the growth component

<sup>5</sup>As argued by Jarvis and Jenkins [1998] that mobility is good when it equalizes opportunities



where a higher level of transfer meant also a higher equalization of incomes in the EU-13.

## 5 Conclusion

In this article I looked at two different measures of mobility to compare 13 different European countries. The measures were total relative mobility, divided into a growth and transfer component, and the equalization of long-term incomes. What I found was a negative relationship between these two indices, when excluding Luxembourg from the sample, which is contrary to the intuition given by Shorrocks [1978*a*]. There is no clear relationship between the growth component and the equalization process, while transfer and equalization are strongly correlated.

Further research has to be done in looking for determinants of wage mobility. Theoretical underpinnings can mostly be found in the search literature (see Jovanovic [1979] or Burdett [1978]) and the newer literature on job information networks [see Ioannides and Loury, 2004].

## Appendix

### 5.1 Variables used from ECHP

| Variable | Description                                |
|----------|--|
| HD001    | Household Size                             |
| HD004    | Equivalised Size, OECD Scale               |
| HI100    | Total Household net income                 |
| HI100X   | Total Household Net Imputation Index (0-1) |

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